### Appendix B

New Mexico Office of the State Engineer Plugging Plans of Operation and Plugging Records (on CD included with this document)



#### STATE OF NEW MEXICO

#### OFFICE OF THE STATE ENGINEER DISTRICT VI - SANTA FE

Tom Blaine , P.E. State Engineer

CONCHA ORTIZ Y PINO BLDG. POST OFFICE BOX 25102 130 SOUTH CAPITOL SANTA FE, NEW MEXICO 87504-5102 (505) 827-6091 FAX: (505) 827-3806

July 1, 2015

U.S Department of Energy/ Los Alamos National Laboratory C/O Mark Everett P.O Box 1663 Los Alamos, NM 87545

Re: Plugging Plan of Operation, LANL Wells

Greetings:

After a review of the Well Plugging Plan of Operations submitted on May 20, 2015, The Office of the Engineer is returning a favorable approval with specific Plugging Conditions and has accepted the Plugging Plans listed below that were submitted for filing:

**RG 95370 POTM3** 

RG95371 POTM2

RG95372 POTM1

**RG95374 MCWBB-6 2A** 

**RG 95376 MCWB-5** 

RG 95377 BH 16P12A

RG 95378 BH16PO

**RG 95379 BCM1** 

Please review the conditions and follow in plugging and return a completed Well Plugging Report that itemizes the actual abandonment process and materials used within 20 days after completion of well plugging. In addition, please include a copy of the approved Plugging Conditions enclosed.

Please address any questions via- telephone to Ramona Martinez at 505.827.6120 or via e-mail at Ramona.Martinez2@state.nm.us.

Sincerely,

Office of State Engineer

Water Resources Allocation Program

Statewide Group

**Enclosure** cc: file



#### DISTRICT 6

### Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. RG 95371

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
POTM-2	2.0	54.0	35°49'44.8"	106°15'16.9"

# Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 1/4" x 7 1/2" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ½" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ½" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

½" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

<u>Well Name</u>	<u>Inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)		Volume (Gallons)
POTM-2	2	34	0.74	5.55
POTM-2 (Overdrill - Auger Boring)	7.5	20	6.14	45.90
Totals:			6.88	51.45

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

Kristie A. Kilgore,

NMOSE Statewide Group
Water Rights Division



Static water level: Dry

#### **WELL PLUGGING** PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL/WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: POTM-2 Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: 505-667-5931 E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): East: 1639021.8 North: 1757064.4 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD 19837). Reason(s) for plugging well: Moisture access hole POTM-2 is old and not used for its intended purpose. The 2) borehole represents a conduit to the subsurface for potential contaminants. 3) Was well used for any type of monitoring program? No \_\_\_\_\_ If yes, please use section VII of this form to detail what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. 4) Does the well tap brackish, saline, or otherwise poor quality water? No \_\_\_\_\_ If yes, provide additional detail, including analytical results and/or laboratory report(s): \_\_\_\_

feet below land surface / feet above land surface (circle one) SANTA FE, NEW MEXICO

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6)	Depth of the well: 54.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Aluminum
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 5 to 9 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? No
	or otherwise sealed? No If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
<u>v. d</u>	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the existing grade.
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.
VI. P	LUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 51.9 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the cite 1 a 114 02 14410102

<b>7</b>			
7)	Grout additives requested, and percent by dry	weight relative to cement: None	
			Age Process of the Communication of the Communicati
8)	Additional notes and calculations: None		
VII.	ADDITIONAL INFORMATION: List addition	nal information below, or on separate si	heet(s):
Moist	ure access hole POTM-2 was drilled in 1991 and 5 to 9 ft bgl. All surface appurtenances will be res	is constructed with 54 ft of 2-in. diame	ter aluminum casing with holes
VIII.	SIGNATURE:		
LY-Sales		, say that I have carefully read	the feenesine Well Diversion
Opera Engin	tions and any attachments, which are a part herece eer pertaining to the plugging of wells and will co ing Plan of Operations and attachments are true to	of; that I am familiar with the rules and omply with them, and that each and all	regulations of the State
	ing 1 tail of operations and adaptiments are true to	but with with	5-19-15
		Signature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:		
This V	Vell Plugging Plan of Operations is:		
	Approved subject to the attached co Not approved for the reasons provid		
	Witness my hand and official seal this	day of	· · · · · · · · · · · · · · · · · · ·
		Scott A. Verhines, State Engine	ser .
		Ву:	

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TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)		The second section with the second section is a second section of the se	Surface
Bottom of proposed interval of grout placement (ft bgl)			54
Theoretical volume of grout required per interval (gallons)			51.9
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 - deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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# DISTRICT 6 Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. RG 95372

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
POTM-1	2.0	47.0	35°49'47.2"	106°15'33.8"

## Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License Issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
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<u>Well Name</u>	<u>Inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
POTM-1	2	27	0.59	4.41
POTM-1 (Overdrill - Auger Boring)	7.5	20	6.14	45.90
Totals:		and the course	6.72	50.31

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

By:

Kristie A. Kilgore.

NMOSE Statewide Group Water Rights Division

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# WELL PLUGGING PLAN OF OPERATIONS



er: U.S. Department of Energy O. Box 1663 5-667-5931 LER INFORMATION:	ber (Well Number) for well to be y/Los Alamos National Laborato  State: New Mexico  E-mail: meveret  ices: Geomechanics Southwest.	Zip code: 87545
he State Engineer POD Number: U.S. Department of Energy. O. Box 1663  5-667-5931  LER INFORMATION: cted to provide plugging service Driller License No.: 1522  RMATION:	y/Los Alamos National Laborato  State: New Mexico  E-mail: meveret	Zip code: 87545  tt@lanl.gov
cr: U.S. Department of Energy  O. Box 1663  5-667-5931  LER INFORMATION:  cted to provide plugging servi  Driller License No.: 1522  RMATION:	y/Los Alamos National Laborato  State: New Mexico  E-mail: meveret	Zip code: 87545  tt@lanl.gov
.O. Box 1663  5-667-5931  LER INFORMATION: cted to provide plugging servi Driller License No.: 1522	State: New Mexico E-mail: meveret	Zip code: 87545 tt@lanl.gov
LER INFORMATION:  cted to provide plugging servi  Driller License No.: 1522	E-mail: meveret	tt@lanl.gov
LER INFORMATION:  cted to provide plugging servi  Driller License No.: 1522	E-mail: meveret	tt@lanl.gov
LER INFORMATION:  cted to provide plugging servi  Driller License No.: 1522  RMATION:	ices: Geomechanics Southwest,	Inc.
cted to provide plugging servi Driller License No.: 1522 RMATION:		
cted to provide plugging servi Driller License No.: 1522 RMATION:		
Driller License No.: 1522  RMATION:		
RMATION:	e well to be plugged should be at	Expiration Date: <u>04/30/2017</u>
Pile Villabert Rein (2000) 1 (1)	e well to be plugged should be at	
Location (BRASS CAP): linates are New Mexico State	East: 1637636.0 North: 1757306.5	
for plugging well: Moisture	access hole POTM-1 is old and a	not used for its intended number. The
used for any type of monitoring	ng program? <u>No</u> If yes, p	please use section VII of this form to deta
ell tap brackish, saline, or oth	nerwise poor quality water? No	If ves. provide additional detail
e c	for plugging well: Moisture a epresents a conduit to the subs- used for any type of monitoria rogeologic parameters were a horization from the New Mexi- well tap brackish, saline, or other	for plugging well: Moisture access hole POTM-1 is old and epresents a conduit to the subsurface for potential contaminant used for any type of monitoring program? No If yes, rogeologic parameters were monitored. If the well was us horization from the New Mexico Environment Department movell tap brackish, saline, or otherwise poor quality water? No analytical results and/or laboratory report(s):

6)	Depth of the well: 47.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Aluminum
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 5 to 9 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted
	or otherwise sealed? Nolf yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
v. D	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the existing grade.
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.
VI. P	LUGGING AND SEALING MATERIALS:
10.1912	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 50.8 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout he: hatch-mixed and delivered 44 55 41 02 1 NU CL02

Additional notes and calculations: None    VII. ADDITIONAL INFORMATION:   List additional information below, or on separate sheet(s):   Moisture access hole POTM-1 was drilled in 1991 and is constructed with 47 ft of 2-in. diameter aluminum easing with hole from 5 to 9 ft bgl. All surface appurtenances will be removed from around the easing before it is abandoned.    VIII. SIGNATURE:		X mixed on site			
Moisture access hole POTM-1 was drilled in 1991 and is constructed with 47 ft of 2-in, diameter aluminum casing with hole from 5 to 9 ft bgl. All surface appurtenances will be removed from around the casing before it is abandoned.  WIII. SIGNATURE:  Mark Everett	7)	Grout additives requested, and percent by dr	y weight relative to ceme	ent: None	
WII. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):  Moisture access hole POTM-1 was drilled in 1991 and is constructed with 47 ft of 2-in, diameter aluminum casing with hole from 5 to 9 ft bgl. All surface appurtenances will be removed from around the casing before it is abandoned.  WIII. SIGNATURE:  ,					ead creations in
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Moisture access hole POTM-1 was drilled in 1991 and is constructed with 47 ft of 2-in, diameter aluminum easing with hole from 5 to 9 ft bel. All surface appurtenances will be removed from around the easing before it is abandoned.  WIII. SIGNATURE:  Mark Everett  Departions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.  Signature of Applicant  Date  X. ACTION OF THE STATE ENGINEER:  This Well Plugging Plan of Operations is:  Approved subject to the attached conditions.  Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of  Scott A. Verhines, State Engineer	8)	Additional notes and calculations: None			
Mark Everett					
Moisture access hole POTM-1 was drilled in 1991 and is constructed with 47 ft of 2-in, diameter aluminum casing with hole from 5 to 9 ft bgl. All surface appurtenances will be removed from around the casing before it is abandoned.  WIII. SIGNATURE:  , Mark Everett  , say that I have carefully read the foregoing Well Plugging Departions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.    Wark   S-20-19		er en			en er en en en en Se a en
WIII. SIGNATURE:  , Mark Everett, say that I have carefully read the foregoing Well Plugging Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.  Signature of Applicant Date  X. ACTION OF THE STATE ENGINEER:  This Well Plugging Plan of Operations is:  Approved subject to the attached conditions Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of Scott A. Verhines, State Engineer	VII.	ADDITIONAL INFORMATION: List additi	onal information below,	or on separate sheet(s):	
WIII. SIGNATURE:    Mark Everett	Moist	ure access hole POTM-1 was drilled in 1991 an	d is constructed with 47 f	ft of 2-in, diameter alum	ninum casing with holes
Mark Everett , say that I have carefully read the foregoing Well Plugging Operations and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.  Signature of Applicant Date  X. ACTION OF THE STATE ENGINEER:  This Well Plugging Plan of Operations is:  Approved subject to the attached conditions Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of ,  Scott A. Verhines, State Engineer	rom .	to 9 ft bgl. All surface appurtenances will be r	emoved from around the	casing before it is aband	doned.
Signature of Applicant  Date  IX. ACTION OF THE STATE ENGINEER:  This Well Plugging Plan of Operations is:  Approved subject to the attached conditions Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of  Scott A. Verhines, State Engineer					
Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.    Signature of Applicant   Date	VIII.	SIGNATURE:			
Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well Plugging Plan of Operations and attachments are true to the best of my knowledge and belief.    Signature of Applicant   Date		Mark Everett	say that I hav	ve carefully read the for	egoing Well Divoging
Signature of Applicant  Date  X. ACTION OF THE STATE ENGINEER:  This Well Plugging Plan of Operations is:  Approved subject to the attached conditions Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of,	<b>Engin</b>	eer pertaining to the plugging of wells and will	cor; that I am tamiliar wit	th the rules and regulation the stantage of th	ons of the State
Signature of Applicant    X. ACTION OF THE STATE ENGINEER:			Unil 6	met	5-20-15
This Well Plugging Plan of Operations is:  Approved subject to the attached conditions Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of,			Signature of Ap	oplicant	
Approved subject to the attached conditions.  Not approved for the reasons provided on the attached letter.  Witness my hand and official seal this day of,	X. A	CTION OF THE STATE ENGINEER:			
Witness my hand and official seal this day of,,	Γhis V	Vell Plugging Plan of Operations is:			
Scott A. Verhines, State Engineer				r.	
By:		Witness my hand and official seal this	day of		
		Witness my hand and official seal this			

TO : 6 HA OS YAM 2105

SAVIA PE, NEW MEXICO

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			47
Theoretical volume of grout required per interval (gallons)			50.8
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

TO :6 MA OS YAM 2105

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

FO : 6 HA OS YAM 2105



# DISTRICT 6 Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. RG 95374

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
MCWB-6-2A	2.0	45.5	35°51'42.6"	106°16'20.9"

## Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 1/4" x 7 1/2" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

1/2" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

<u>Well Name</u>	<u>Inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)		Volume (Gallons)
MCWB-6-2A	2	25.5	0.56	4.16
MCWB-6-2A (Overdrill - Auger Boring)	7.5	20	6.14	45.90
Totals:			6.69	50.06

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the morestringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: http://www.ose.state.nm.us/STST/Forms/WD-11.pdf) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 - 407 Galisteo Street - Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

Kristie A. Kilgore,

NMOSE Statewide Group

Water Rights Division



#### WELL PLUGGING PLAN OF OPERATIONS



NOT	E: A Well Plugging Plan of Operati to plugging.	ons shall be filed with and accepted by	the Office of the State Engineer prior
I. FI	LING FEE: There is no filing fee for	this form.	
II. G	ENERAL/WELLOWNERSHIP:		
Existi	ing Office of the State Engineer POD 1	Number (Well Number) for well to be plu	ugged: MCWB-6,2a
		nergy/Los Alamos National Laboratory	
Maili	ng address: P.O. Box 1663	<b>特别的现在分词,并在第</b> 577年中的第二 <del>次的</del> 6532的	
City:	Los Alamos	State: New Mexico	Zip code: 87545
Phone	e number: <u>505-667-5931</u>	E-mail: meverett@l	anl.gov
	WELL DRILLER INFORMATION		
	\$P\$14.75年16年12月1日 11日 11日 11日 11日 11日 11日 11日 11日 11日	services: Geomechanics Southwest, Inc.	10 March 1980 March 19
New	Mexico Well Driller License No.: 152	2	Expiration Date: <u>04/30/2017</u>
IV. V	VELL INFORMATION:		
Note:	A copy of the existing Well Record f	or the well to be plugged should be attac	hed to this plan.
1)	GPS Well Location (BRASS CAP)	North: 1768968.2	
	Well coordinates are New Mexico (1983]).	State Plane Grid Coordinates, Central Z	one (North American Datum, 1983[NAD
2)	Reason(s) for plugging well: Allu-	vial well MCWB-6.2a is old and not used	for its intended purpose. The borehole
	represents a conduit to the subsurfa		•
3)	what hydrogeologic parameters w	itoring program? No If yes, plea ere monitored. If the well was used t Mexico Environment Department may b	ase use section VII of this form to detail to monitor contaminated or poor quality be required prior to plugging.
4)	Does the well tap brackish, saline,	or otherwise poor quality water? No	If yes, provide additional detail.
		laboratory report(s):	
5)	Static water level: <u>Dry</u> elow land surface / feet above land sur		SOIS WAY SO

	- BONG
6)	Depth of the well: 45.5 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: PVC
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 30.5 to 40.5 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted
	or otherwise sealed? No If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
<u>v. d</u>	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the
	existing grade.
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.
VI. P	LUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 50.1 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout her hotch mixed and delivered to the size

	X mixed on site		
7)	Grout additives requested, and percent by dr	y weight relative to cement: None	
8)	Additional notes and calculations: None		
	The state of the s		
			To STREET NATIONAL CONTROL
<b>УП.</b>	ADDITIONAL INFORMATION: List addition	onal information below, or on separate sheet(s)	
Alluy	ial well MCWB-6.2a was drilled in 1994 and is	constructed with 45.5 ft of 2-in diameter PVC	coging with a some
from .	30.5 to 40.5 ft bgl. All surface appurtenances wi	ll be removed from around the casing before it	is abandoned.
			A 20
	SIGNATURE:	one that I have a S. II	en e
Engin	Mark Everett tions and any attachments, which are a part here eer pertaining to the plugging of wells and will ing Plan of Operations and attachments are true	comply with them, and that each and all of the	tions of the State statements in the Well
	ing 1 im 0. Operations and accomments are true	Which west	C 20.15
		Signature of Applicant	5-20-15 Date
IX. A	CTION OF THE STATE ENGINEER:		
This V	Vell Plugging Plan of Operations is:		
	Approved subject to the attached control Not approved for the reasons provided in the reasons provided		
	Witness my hand and official seal this	day of	<u> </u>
		Scott A. Verhines, State Engineer	
		Por	

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

KT-16 THE STATE OF STREET	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)		77.5 27.40 All 20070 42.5 23.1 No.	Surface
Bottom of proposed interval of grout placement (ft bgl)			45.5
Theoretical volume of grout required per interval (gallons)		7	50.1
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)		Ansatz Control	
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			



#### **DISTRICT 6**

### Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified one alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. RG 95376

Inside diameter (inches)	Total depth (feet) Latitude North				Longitude West
2.0	32	106016'35 24"	35°51'47.7"		
	(inches)	(inches) Total depth (feet)	(inches) Total depth (feet) Latitude North		

## Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
   NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
   Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 1/4" x 7 1/2" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately 0.16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

1/2" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

<u>Well Name</u>	<u>Inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
MCWB-5	2	12	0.26	1.96
MCWB-5 (Overdrill - Auger Boring)	7.5	20	6.14	45.90
Totals:		An arthur contacts	6.40	47.86

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

Kristie A. Kilgore,

NMOSE Statewide Group Water Rights Division

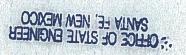


#### WELL PLUGGING PLAN OF OPERATIONS



	to plugging.		y the Office of the State Engineer prior
I. FI	LING FEE: There is no filing fee fe	or this form.	
II. G	ENERAL/WELL OWNERSHIP		
Exist	ing Office of the State Engineer POD	Number (Well Number) for well to be p	lugged: MCWB-5
		Energy/Los Alamos National Laboratory	TO SHOULD SHOULD AND A LIGHT CONTROL OF THE PROPERTY OF THE PR
Maili	ing address: P.O. Box 1663		
City:	Los Alamos	State: New Mexico	Zip code: 87545
		E-mail: meverett@	
	WELL DRILLER INFORMATION		
TANK SE	为40世界上来。\$P\$\$P\$ \$P\$ \$P\$\$P\$ \$P\$ \$P\$ \$P\$ \$P\$ \$P\$ \$	g services: Geomechanics Southwest, Inc	
		122 Maria Ma	
			Expiration Date: 04/30/2017
IY. 1	VELL INFORMATION:		
Note:	A copy of the existing Well Record	for the well to be plugged should be attac	ched to this plan.
1)	GPS Well Location (BRASS CA)	P): East: 1632578.3 North: 1769484.6	
	Well coordinates are New Mexico 1983]).		Zone (North American Datum, 1983[NAD
2)	Reason(s) for plugging well: All	uvial well MCWB-5 is old and not used f	or its intended purpose. The borehole
	represents a conduit to the subsur		
3)	wnat nydrogeologic parameters	nitoring program? No If yes, ple were monitored. If the well was used w Mexico Environment Department may	ase use section VII of this form to detail to monitor contaminated or poor quality be required prior to plugging.
4)	Does the well tap brackish, saline	, or otherwise poor quality water? No	If yes, provide additional detail
		laboratory report(s):	
	CONTROL SERVICE ACCUSE TO A THE SERVICE OF STREET, A SERVICE OF THE SERVICE OF TH		

6)	Depth of the well: 32.0 feet					
7)	Inside diameter of innermost casing: 2.0 inches.					
8)	Casing material: PVC					
9)	The well was constructed with:					
	an open-hole production interval, state the open interval:					
	X a well screen or perforated pipe, state the screened interval(s): 17 to 27 ft bgl					
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None					
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? No If yes, please describe:					
12)	Has all pumping equipment and associated piping been removed from the well? Yes remaining equipment and intentions to remove prior to plugging in Section VII of this form.					
<u>V. D</u>	ESCRIPTION OF PLANNED WELL PLUGGING:					
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.					
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology					
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie					
	pipe. The well will then be overdrilled with 7.5-in, O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will					
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the existing grade.					
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.					
VI. P	LUGGING AND SEALING MATERIALS:					
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant					
1)	For plugging intervals that employ cement grout, complete and attach Table A.					
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.					
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 47.9 gallons					
4)	Type of Cement proposed: Portland Type I/II cement					
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.					
6)	Will the grout be: batch-mixed and delivered to Reset W 07 144 C107					



7				
7)	Grout additives requested, and percent by dry	weight relative	e to cement: None	
8)	Additional notes and calculations: None			
			TO BEAUTY OF THE STATE OF THE S	
VII.	ADDITIONAL INFORMATION: List addition	nal information	on below, or on senarate shee	t(a)·
Alluv	ial well MCWB-5 was drilled in 1994 and is cons	tructed with	32 ft of 2-in diameter PVC o	aging with a comes from 17
to 27	ft bgl. All surface appurtenances will be removed	from around	the casing before it is abande	oned.
	The second secon			PROJECT CONTROL OF THE
	SIGNATURE:			
I,	Mark Everett  tions and any attachments, which are a part hereo	, say	that I have carefully read th	e foregoing Well Plugging
Curin	eer permining to the plugging of wells and will co	omply with th	em, and that each and all of	rulations of the State the statements in the Well
Plugg	ing Plan of Operations and attachments are true to	the best of i	ny knowledge and belief.	
		lisuh	met	5-20-15
		Signa	ture of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:			
This V	Well Plugging Plan of Operations is:			
	Approved subject to the attached co		ched letter.	
	Witness my hand and official seal this	day	of the second	
		Scott	A. Verhines, State Engineer	
		By: _		

2015 MA 02 YAM 3:09

### TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			32
Theoretical volume of grout required per interval (gallons)			47.9
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement		Paragraphic and State of the Control	
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement		NOT THE TOTAL PROPERTY OF THE TOTAL PROPERTY	

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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# DISTRICT 6 Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as 169.6 feet bgs, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

**OSE No.RG 95377** 

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West	
Borehole 16-P-12A	6-P-12A 2	175.4 (video log)	35°50'54.2"	106°19'45.4"	

# Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 1/4" x 7 1/2" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

1/2" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	<u>Volume</u> (Gallons)
Borehole 16-P-12A	2	155.4	3.39	25.00
Borehole 16-P-16A (Overdrill - Auger	(A proximence)	133.7	3.39	25.36
Boring)	7.5	20	6.14	45.90
Totals:	THE PARTY OF THE PARTY.	CONTRACTOR CONTRACTOR	CALL STREET, SALES TO STREET, SALES	Person of the Pe
A STATE OF THE STA			9.53	71.26

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

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Kristie A. Kilgore, NMOSE Statewide Group Water Rights Division



#### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL/WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: Borehole 16-P-12A Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: 505-667-5931 E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): East: 1616925.0 North: 1764092.3 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD 19837). Reason(s) for plugging well: Borehole 16-P-12A is old and not used for its intended purpose. The borehole 2) represents a conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. Does the well tap brackish, saline, or otherwise poor quality water? No \_\_\_\_\_ If yes, provide additional detail. 4) including analytical results and/or laboratory report(s): \_\_\_\_\_

Static water level: 169.6 ft bgl feet below land surface / feet above land surface (circle one)

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6)	Depth of the well: 200 (completion record), 175.4 (recent LANL video log) feet  Inside diameter of innermost casing: 2.0 inches.					
7)						
8)	Casing material: Aluminum					
9)	The well was constructed with:					
	NA an open-hole production interval, state the open interval:					
	NA a well screen or perforated pipe, state the screened interval(s):					
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None					
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted					
	or otherwise sealed? No If yes, please describe:					
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.					
V. D	ESCRIPTION OF PLANNED WELL PLUGGING:					
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.					
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology					
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie					
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will					
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the existing grade.					
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.					
VI. P	LUGGING AND SEALING MATERIALS:					
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant					
1)	For plugging intervals that employ cement grout, complete and attach Table A.					
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.					
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 71.2 gallons					
4)	Type of Cement proposed: Portland Type I/II cement					
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.					
6)	Will the grout be: batch-mixed and delivered to the site 10 :5 LIV A7 IVI CIA7					

	and of the			
7)	Grout additives requested, and percent by dry	y weight n	elative to cement: None	
			·	
8)	Additional notes and calculations: None			
VII.	ADDITIONAL INFORMATION: List addition	onal inform	nation below, or on separate sheet(	в):
Boreh	ole 16-P-12A was drilled in 1987 and is constru	cted with	175 ft of 2-in. diameter aluminum	casing with no screened
interva	il. All surface appurtenances will be removed fr	om around	the casing before it is abandoned.	
VIII.	SIGNATURE:			
,	Mark Everett		, say that I have carefully read the	foregoing Well Plugging
Engine	tions and any attachments, which are a part here eer pertaining to the plugging of wells and will on the plan of Operations and attachments are true	of; that I a	m familiar with the rules and regul	ations of the State
			Unet	5-20-15
			ignature of Applicant	Date
X. A	CTION OF THE STATE ENGINEER:			
This W	ell Plugging Plan of Operations is:			
	Approved subject to the attached co	onditions. ded on the	attached letter.	
	Witness my hand and official seal this		lay of	·,
		S	cott A. Verhines, State Engineer	
		В	y:	

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### TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			175
Theoretical volume of grout required per interval (gallons)			71.2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			Appendix App
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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#### DISTRICT 6

Tom Blaine, P.E.

#### **NEW MEXICO STATE ENGINEER**

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as 119.3 feet bgs, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. 95378

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
Borehole 16-P-O	2	119.9 (video log)	35° 50' 49.4"	106° 19' 50.8"

### Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 ¼" x 7 ½" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

½" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	<u>Inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)	Volume (Cubic Feet)	<u>Volume</u> (Gallons)
Borehole 16-P-O	2	99.9	0.40	
Borehole 16-P-O (Overdrill - Auger Boring)		33.3	2.18	16.30
Totals:	7.5	20	6.14	45.90
			8.32	62.20

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

Kristie A. Kilgore,

NMOSE Statewide Group Water Rights Division

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### WELL PLUGGING PLAN OF OPERATIONS



NOT	E: A Well Plugging Plan of Operation to plugging.	ons shall be filed	with and accepted l	by the Office o	f the State Engineer prior
L FI	LING FEE: There is no filing fee for	this form.			
y to the sale	GENERAL / WELL OWNERSHIP: ing Office of the State Engineer POD N	Number (Well Nu	mher) for well to be	nlugged: Roreh	ole 16-P-0
	e of well owner: <u>U.S. Department of E</u>			Contract to the second	
	ing address: P.O. Box 1663				
City:	Los Alamos	State:	New Mexico		Zip code: 87545
	e number: <u>505-667-5931</u>				
	WELL DRILLER INFORMATION:				
	Driller contracted to provide plugging		chanics Southwest, Ir	ıc.	
New	Mexico Well Driller License No.: 152	2		Expira	ntion Date: 04/30/2017
	WELL INFORMATION:				
Note:	A copy of the existing Well Record for	or the well to be p	lugged should be atta	ached to this pl	an.
1)	GPS Well Location (BRASS CAP)		1616480.9 1763605.8		
	Well coordinates are New Mexico S 1983]).			Zone (North A	merican Datum, 1983[NAD
2)	Reason(s) for plugging well: Borel	nole 16-P-0 is old	and not used for its i	ntended purpo	se. The borehole
	represents a conduit to the subsurfa				
3)	Was well used for any type of moni what hydrogeologic parameters we water, authorization from the New 1	ere monitored.	If the well was used	to monitor co	ontaminated or poor quality
4)	Does the well tap brackish, saline, o	or otherwise poor	quality water? No	If yes,	provide additional detail.
	including analytical results and/or l				

5) Static water level: 119.3 ft bgl feet below land surface / feet above land surface (circle one)

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6)	Depth of the well: 135 (completion record), 119.9 (recent LANL video log) feet							
7)	Inside diameter of innermost casing: 2.0 inches.							
8)	Casing material: Aluminum							
9)	The well was constructed with:							
	NA an open-hole production interval, state the open interval:							
	NA a well screen or perforated pipe, state the screened interval(s):							
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None							
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted							
,	or otherwise sealed? No If yes, please describe:							
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.							
<u>V. D</u>	ESCRIPTION OF PLANNED WELL PLUGGING:							
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.							
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology							
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie							
	pipe. The well will then be overdrilled with 7.5-in, O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will							
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the							
	existing grade.							
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.							
VI. P	LUGGING AND SEALING MATERIALS:							
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant							
1)	For plugging intervals that employ cement grout, complete and attach Table A.							
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.							
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 62.2 gallons							
4)	Type of Cement proposed: Portland Type I/II cement							
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.							
6)	Will the grout be: batch-mixed and delivered to the \$6:6 HV OZ AVII SIOZ							

	X mixed on site			
7)	Grout additives requested, and percent by di	ry weight relativ	ve to cement: None	
8)	Additional notes and calculations: None			
VII.	ADDITIONAL INFORMATION: List additi	ional information	on below, or on separate sheet	(s):
Borel	ole 16-P-0 was drilled in 1987 and is construct	ed with 120 ft o	of 2-in. diameter aluminum cas	sing with no screened
Interv	al. All surface appurtenances will be removed f	rom around the	casing before it is abandoned	
				E E N II
VIII.	SIGNATURE:			
-20	Mark Everett	. 591	that I have carefully read the	foregoing Well Plugging
Pl <b>an</b> c Engin	of Operations and any attachments, which are a eer pertaining to the plugging of wells and will ing Plan of Operations and attachments are true	part hereof; tha comply with th	t I am familiar with the rules a sem, and that each and all of the	and regulations of the State
		March	Un off	5-20-15
		Signa	ature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:			
This \	Well Plugging Plan of Operations is:			
	Approved subject to the attached of Not approved for the reasons prov		ached letter.	
	Witness my hand and official seal this	day o	of	_,
		Scott	A. Verhines, State Engineer	
		Bv:		

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SANTA FE, NEW MEXICO

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			120
Theoretical volume of grout required per interval (gallons)			62.2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 - deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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# DISTRICT 6 Tom Blaine, P.E. NEW MEXICO STATE ENGINEER

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ½" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is reported as dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

OSE No. RG 95379

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
BCM-1	2	67.8 (video log)	35° 53'20.93"	106°14'57.38"

## Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
   NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
   Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of the 2" well being plugged to ~20 feet bgs and overdrilled to the determined total depth, the 2" casing shall be terminated at the bottom of the 4 ¼" x 7 ½" auger drill string prior to sealant being placed in the boring.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7

1/2" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	<u>inside</u> <u>Diameter</u> (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
BCM-1	2	47.8	1.04	7.80
BCM-1 (Overdrill - Auger Boring)	7.5	20	6.14	45.90
Totals:			7.18	53.70

- 6. All surface completions (vaults) will be removed, if applicable. The 2" casing will be terminated ~20 feet bgs and the remaining hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill with grout or fully encapsulated in the annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and official seal this 1 day of July, 2015.

Tom Blaine, P. E. State Engineer

Kristie A. Kilgore,

NMOSE Statewide Group

Water Rights Division



### WELL PLUGGING PLAN OF OPERATIONS



	to plugging.		
I. FI	LING FEE: There is no filing fee for	this form.	
II. G	ENERAL/WELLOWNERSHIP:		
Exist	ing Office of the State Engineer POD 1	Number (Well Number) for well to be	plugged: BCM-1
Name	of well owner: <u>U.S. Department of E</u>	nergy/Los Alamos National Laborato	William Charles and the Control of t
Maili	ng address: P.O. Box 1663		
City:	Los Alamos	State: New Mexico	Zip code: 87545
Phone	e number: <u>505-667-5931</u>	E-mail: meverett	@lanl.gov
Ш. Л	WELL DRILLER INFORMATION		Transfer (CA)
Well	Driller contracted to provide plugging	services: Geomechanics Southwest,	Inc.
	Mexico Well Driller License No.: 152		there have come a party than a transfer that the party of the street of the street of the party
[V. )	WELL INFORMATION:		
Note:	A copy of the existing Well Record for	or the well to be plugged should be at	tached to this plan.
1)	GPS Well Location (BRASS CAP)	East: 1640633.6	
		North: 1778915.6	
	weii coordinates are New Mexico ( 1983]).	State Plane Grid Coordinates, Centra	l Zone (North American Datum, 1983[NAD
2)	Reason(s) for plugging well: BCM	I-1 is old and not used for its intended	purpose. The borehole represents a
	conduit to the subsurface for poten	tial contaminants.	Francisco
3)	what hydrogeologic parameters w	itoring program? No If yes, pere monitored. If the well was use Mexico Environment Department ma	please use section VII of this form to detail of to monitor contaminated or poor quality be required prior to plugging.
4)	Does the well tap brackish, saline,	or otherwise poor quality water? No	If yes, provide additional detail,
		aboratory report(s):	
	Salation Committee Committ		

6)	Depth of the well: 50 (completion record), 67.8 (recent LANL video log) feet					
7)	Inside diameter of innermost casing: 2.0 inches.					
8)	Casing material: <u>Galvanized steel</u>					
9)	The well was constructed with:					
	NA an open-hole production interval, state the open interval:					
	NA a well screen or perforated pipe, state the screened interval(s):					
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None					
11)	Was the well built with surface casing? No					
	or otherwise sealed? No If yes, please describe:					
12) V D	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.					
A HERETON	ESCRIPTION OF PLANNED WELL PLUGGING:					
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.					
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology					
.,	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie					
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will					
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the					
	existing grade.					
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.					
VI. F	LUGGING AND SEALING MATERIALS:					
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant					
1)	For plugging intervals that employ cement grout, complete and attach Table A.					
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.					
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 52.1 gallons					
4)	Type of Cement proposed: Portland Type I/II cement					
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.					
6)	Will the grout be: batch-mixed and delivered to the site CO:6 HV AZ IVI CIN7					

	X mixed on site		
7)	Grout additives requested, and percent by dr	y weight relative to cement: None	
B)	Additional notes and calculations: None		SAMPLE SECTION
	Experience of the second secon		Control of the Control of
	1.1. 是一种种的复数 1.1. 1.1. 1.1. 1.1. 1.1. 1.1. 1.1. 1.	And The Control of th	
STARRE	ADDITIONAL INFORMATION: List addition		<b>的现在分词</b> 在一个人的一个人的一个人的一个人的一个人的一个人的一个人的一个人的一个人的一个人的
3CM	-1 was drilled to 94 ft bgl in 1994. The well is coned interval. All surface appurtenances will be re	enstructed with 68 ft of 2-in, diameter galvan	ized steel casing with no
O. C.	New Interval. All surface appurentances will be re	emoved from around the well before it is abar	doned.
VIII.	SIGNATURE:		
	Mark Everett	, say that I have carefully read the	foregoing Well Plugging
Opera Engin	ations and any attachments, which are a part here eer pertaining to the plugging of wells and will	of: that I am familiar with the rules and requi	lations of the State
Plugg	ing Plan of Operations and attachments are true	to the best of my knowledge and belief.	e statements in the Well
		March Maritat	5-20-15
		Signature of Applicant	Date
	CTION OF THE STATE ENGINEER:		
A	COLONIO STATE ENGINEER	and the second s	
This \	Well Plugging Plan of Operations is:		
	Approved subject to the attached c Not approved for the reasons provi	onditions. ded on the attached letter.	
	Witness my hand and official seal this	day of	, <u></u>
		Scott A. Verhines, State Engineer	
		Ву:	

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### TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			67.8
Theoretical volume of grout required per interval (gallons)			52.1
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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SANTA FE, NEW MEXICO

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			



#### STATE OF NEW MEXICO

OFFICE OF THE STATE ENGINEER DISTRICT VI - SANTA FE

Tom Blaine , P.E. State Engineer

BATAAN MEMORIAL BUILDING POST OFFICE BOX 25102 SANTA FE, NEW MEXICO 87504-5102 (505) 827-6120 FAX: (505) 827-6682

July 6, 2015

U.S Department of Energy/ Los Alamos National Laboratory C/O Steve White P.O Box 1663 Los Alamos, NM 87545

Re: Plugging Plan of Operation, LANL Wells

#### Greetings:

After a review of the Well Plugging Plan of Operations submitted on May 20, 2015, The Office of the Engineer is returning a favorable approval with specific Plugging Conditions and has accepted the Plugging Plans submitted for filing:

- RG-95351 TA-52NW-1

- RG-95352 TA-52SE-1

- RG-95353 TA-52 TH-1

- RG-95354 TA-52 NE-1

- RG-95355 TA-52 NE-2

- RG-95359 TSWB-6

- RG-95360 BCO-1

- RG-95362 POTO-4

- RG-95363 POTO-5

- RG-95364 R-4

- RG-95365-MCOI-1

Please return a completed Well Plugging Report that itemizes the actual abandonment process and materials used within 20 days after completion of well plugging. In addition, please include a copy of the approved Plugging Conditions enclosed.

Please address any questions via-telephone to Ramona Martinez at 505.827.6120 or via e-mail at ramona.martinez2@state.nm.us.

Sincerely,

Office of State Engineer

Water Rights Division District 6

Enclosure cc: file



## STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

## Well Plugging Plan of Operations Conditions of Approval for RG-95351

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested test well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the surface casing and casing strings are cemented in from ground surface to 87-feet. Therefore, TA-52 Test Hole NW-1 will not be overdrilled. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used a part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95351 Test well NW-1 (two wells)	2	97.0	35°51′35.5″	106°17′16.5″

### Specific Plugging Conditions of Approval for 1 nested test well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Theoretical volume of sealant required for abandonment of each of the 2-inch (inside) diameter wells inside this nested well is approximately .16 gallons per foot. Total theoretical volume of sealant required to fill each well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Totals:			4	32
TA-52(test Hole) NW- 1 (Well 2)	2	97	2	16
TA-52(test Hole) NW- 1 (Well 1)	2	97	2	16

- 3. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 4. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the test well.
- 5. All surface completions (vaults) will be removed, if applicable. Casing will be terminated 1'- 2' bgs and the remaining hole will be backfilled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plans of Operations dated May 20, 2015, are hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSE District 6, Water Rights Division

Date: July 6, 2015

## 0

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015

Time: 11:41:39

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: US DOE Applicant Last Name: LANL

GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude:

35 Degrees 51 Minutes 35.5 Seconds N

Longitude:

106 Degrees 17 Minutes 16.5 Seconds W

#### Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,969,170
 E: 383,714

 NAD 1983(92) (Survey Feet)
 N: 13,022,187
 E: 1,258,903

 NAD 1927 (Meters)
 N: 3,968,973
 E: 383,659

 NAD 1927 (Survey Feet)
 N: 13,021,540
 E: 1,258,722

#### State Plane Coordinate System Zone: New Mexico Central

 NAD 1983(92) (Meters)
 N: 538,965
 E: 496,575

 NAD 1983(92) (Survey Feet)
 N: 1,768,255
 E: 1,629,180

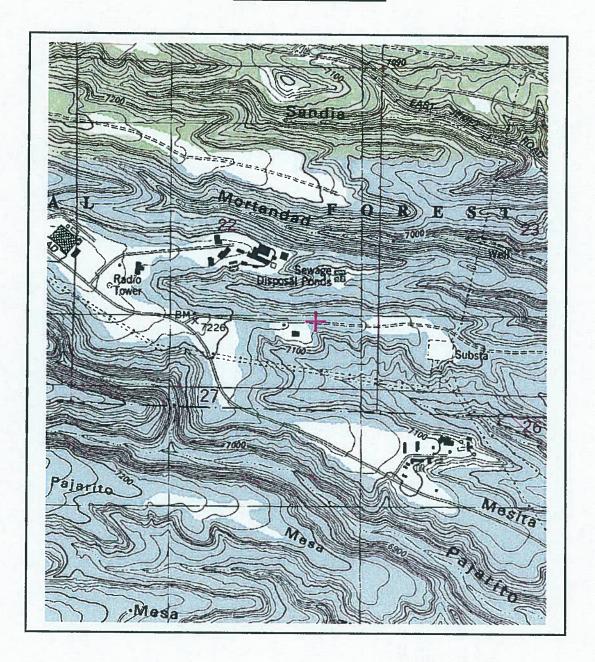
 NAD 1927 (Meters)
 N: 538,951
 E: 148,923

 NAD 1927 (Survey Feet)
 N: 1,768,210
 E: 488,590

Page 1 of 2 Print Date: 05/21/2015

#### **NEW MEXICO OFFICE OF STATE ENGINEER**

#### **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:19,887

Northing/Easting: UTM83(92) (Meter): N: 3,969,170 E: 383,714

Northing/Easting: SPCS83(92) (Feet): N: 1,768,255 E: 1,629,180

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/21/2015



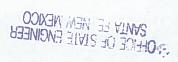
### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL / WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: TA-52 Test Hole NW-1 Name of well owner: <u>U.S. Department of Energy/Los Alamos National Laboratory</u> Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 E-mail: meverett@lanl.gov Phone number: <u>505-667-5931</u> III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): 1629180.3 East: North: 1768254.8 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983/NAD 19837). 2) Reason(s) for plugging well: TA-52 Test Hole NW-1 is old and not used for its intended purpose. The borehole represents a conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. Does the well tap brackish, saline, or otherwise poor quality water? No\_\_\_\_\_ If yes, provide additional detail, 4) including analytical results and/or laboratory report(s):

5) Static water level: <u>Dry</u> feet below land surface / feet above land surface (circle one) 1:8 HT 02 AVH S102

6)	Depth of the well: 97.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Steel/plastic tubing
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 87 to 97 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? Yes If yes, is the annulus surrounding the surface casing grouted
,	or otherwise sealed? Yes
	cemented into the top of tuff.
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DI	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The surface casing and casing strings are cemented in place from ground surface to 87 ft.
	Therefore, TA-52 Test Hole NW-1 will not be overdrilled. The casings will be pressure grouted with neat cement
	from total depth to surface via tremie pipe. A concrete mound will be emplaced above the existing grade.
2)	Will well head be cut-off below land surface after plugging? The surface casing and well head will be cut off before sealing to ground surface.
VI D	LUCCING AND CEALING MATERIAL C
	LUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 31.6 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and <b>fetivened</b> to the site



7)	Grout additives requested, and percent l	by dry weight relative to cement: None	
8)	Additional notes and calculations: Non	ne	
TA-52	test hole NW-1 was drilled in 1964 and is	additional information below, or on separate sheek s constructed with two casing strings of plastic to tameter steel casing at surface. All surface appure	ubing to 97 ft bgl with
I, Operate	eer pertaining to the plugging of wells and	, say that I have carefully read the thereof; that I am familiar with the rules and regwill comply with them, and that each and all of true to the best of my knowledge and belief.	te foregoing Well Plugging gulations of the State the statements in the Well
		Signature of Applicant	Date
	Vell Plugging Plan of Operations is:	had anditions	
	Approved subject to the attacl Not approved for the reasons	provided on the attached letter.	
	. Witness my hand and official seal this _	day of SUL BLAINE RE, Scott A. Verhines, State Engineer	7, 2015
	ENGINE SOLVE	By:	
	NEW MET	E4:8 MA OS YAMBIOS	
		SANTA FE, NEW MEXICO	Well Plugging Plan Version: December, 2011 Page 3 of 5

### TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			97
Theoretical volume of grout required per interval (gallons)			31.6
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

2015 HA OS YAH 2105

SANTA FE, NEW MEXICO



## STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

### Well Plugging Plan of Operations Conditions of Approval for RG-95352

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested test well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the surface casing and casing strings are cemented in from ground surface to 87-feet. Therefore, TA-52 Test Hole NW-1 will not be overdrilled. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used a part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95352 Test well SE-1	2	97.0	35°51′35.2″	106°17′16.2″
(two wells)				

### Specific Plugging Conditions of Approval for 1 nested test well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Theoretical volume of sealant required for abandonment of each of the 2-inch (inside) diameter wells inside this nested well is approximately .16 gallons per foot. Total theoretical volume of sealant required to fill each well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
TA-52(test Hole) SE-1 (Well 1)	2	97	2	16
TA-52(test Hole) SE-1 (Well 2)	2	97	2	16
Totals:			4	32

- 3. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 4. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the test well.
- 5. All surface completions (vaults) will be removed, if applicable. Casing will be terminated 1'-2' bgs and the remaining hole will be backfilled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

the Thornburg, NMOS District 6, Water Rights Division

Date: JULY 6 2015

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015 Time: 13:14:00

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude: 35 Degrees 51 Minutes 35.2 Seconds N Longitude: 106 Degrees 17 Minutes 16.2 Seconds W

#### Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) E: 383,723 N: 3,969,161 NAD 1983(92) (Survey Feet) N: 13,022,156 E: 1,258,932 NAD 1927 (Meters) N: 3,968,964 E: 383,668 NAD 1927 (Survey Feet) N: 13,021,510 E: 1,258,750

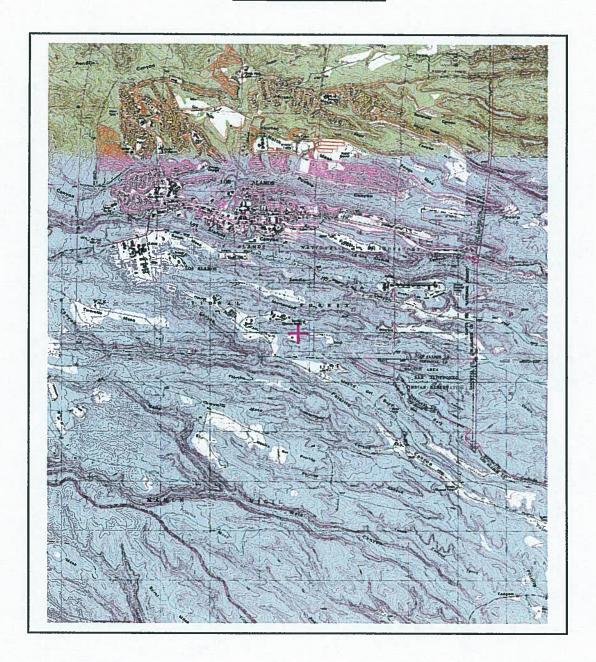
#### State Plane Coordinate System Zone: New Mexico Central

NAD 1983(92) (Meters) N: 538,956 E: 496.584 NAD 1983(92) (Survey Feet) N: 1,768,225 E: 1,629,209 NAD 1927 (Meters) N: 538,942 E: 148,931 NAD 1927 (Survey Feet) N: 1,768,180 E: 488,619

> Page 1 of 2 Print Date: 05/21/2015

#### **NEW MEXICO OFFICE OF STATE ENGINEER**

#### **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:76,536

Northing/Easting: UTM83(92) (Meter): N: 3,969,161 E: 383,723

Northing/Easting: SPCS83(92) (Feet): N: 1,768,225 E: 1,629,209

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/21/2015



## WELL PLUGGING PLAN OF OPERATIONS

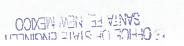


NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL / WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: TA-52 Test Hole SE-1 Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: <u>505-667-5931</u> E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 **IV. WELL INFORMATION:** Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): East: 1629209.4 North: 1768225.1 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD 19837). 2) Reason(s) for plugging well: TA-52 Test Hole SE-1 is old and not used for its intended purpose. The borehole represents a conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. Does the well tap brackish, saline, or otherwise poor quality water? No \_\_\_\_\_\_ If yes, provide additional detail, 4) including analytical results and/or laboratory report(s): 12:8 MA 05 YAH 8105 Static water level: Dry 5)

feet below land surface / feet above land surface (circle one)

6)	Depth of the well: 97.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Steel/plastic tubing
9)	The well was constructed with:
,	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 87 to 97 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? Yes
	or otherwise sealed? Yes If yes, please describe: The borehole has a 6-in. diameter surface casing
	cemented into the top of tuff.
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DI	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The surface casing and casing strings are cemented in place from ground surface to 87 ft.
	Therefore, TA-52 Test Hole SE-1 will not be overdrilled. The casings will be pressure grouted with neat cement
	from total depth to surface via tremie pipe. A concrete mound will be emplaced above the existing grade.
2)	Will well head be cut-off below land surface after plugging? The surface casing and well head will be cut off before sealing to ground surface.
177 B	A MOCKING AND CEANING MATERIAL C.
	LUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 31.6 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the site mixed on site

12:8 HA OS YAM 2105



7)	Grout additives requested, and percent by dry weight relative to cement: None			
8)	Additional notes and calculations: None	e		
TA-52 perfora	test hole SE-1 was drilled in 1964 and is o	dditional information below, or on separate sheen constructed with two casing strings of plastic tulus ameter steel casing at surface. All surface appur	bing to 97 ft bgl with	
I, Operat Engine	ions and any attachments, which are a part er pertaining to the plugging of wells and	, say that I have carefully read the thereof; that I am familiar with the rules and regwill comply with them, and that each and all of	gulations of the State	
Piuggii	ng Plan of Operations and attachments are	true to the best of my knowledge and belief.  Wash limits	5-20-15	
		Signature of Applicant	Date	
	CTION OF THE STATE ENGINEER: Vell Plugging Plan of Operations is:			
	Approved subject to the attacl	hed conditions. provided on the attached letter.		
	Witness my hand and official seal this _	day of JOH BLA INFO PENGINEE	_,2015 /	
	STATE OF STA	Ву:	/	
	OF NEW WILL	12 8 MA OS YAM 8105		

SANTA PEL NEW MEXICO

Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			97
Theoretical volume of grout required per interval (gallons)			31.6 ok CI
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

12 8 HA OS YAH 2105

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

12:8 MA OS YAHBIOS



## STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

## Well Plugging Plan of Operations Conditions of Approval for RG-95353

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested test well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the 6-inch surface casing and 2-inch casing strings are cemented in from ground surface to 87-feet. Therefore, TA-52 Test Hole I will not be overdrilled. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used a part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95353 Test Hole I (two wells)	2	97.0	35°51′35.4″	106°17′16.3″

### Specific Plugging Conditions of Approval for 1 nested test well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Theoretical volume of sealant required for abandonment of each of the 2-inch (inside) diameter wells inside this nested well is approximately .16 gallons per foot. Total theoretical volume of sealant required to fill each well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
TA-52(Test Hole) I				
(Well 1)	2	97	2	16
TA-52(Test Hole) I				
(Well 2)	2	97	2	16
Totals:			4	32

- 3. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 4. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the test well.
- 5. All surface completions (vaults) will be removed, if applicable. Casing will be terminated 1'- 2' bgs and the remaining hole will be backfilled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Thornourg, NMOSE District 6, Water Rights Division

Date: July 6, 2015

2

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015

Time: 13:23:32

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

GW Basin: RIO GRANDE

County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude: 35 Degrees 51 Minutes 35.4 Seconds N Longitude: 106 Degrees 17 Minutes 16.3 Seconds W

#### Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,969,166
 E: 383,720

 NAD 1983(92) (Survey Feet)
 N: 13,022,173
 E: 1,258,921

 NAD 1927 (Meters)
 N: 3,968,969
 E: 383,665

 NAD 1927 (Survey Feet)
 N: 13,021,526
 E: 1,258,739

#### State Plane Coordinate System Zone: New Mexico Central

 NAD 1983(92) (Meters)
 N: 538,961
 E: 496,581

 NAD 1983(92) (Survey Feet)
 N: 1,768,241
 E: 1,629,198

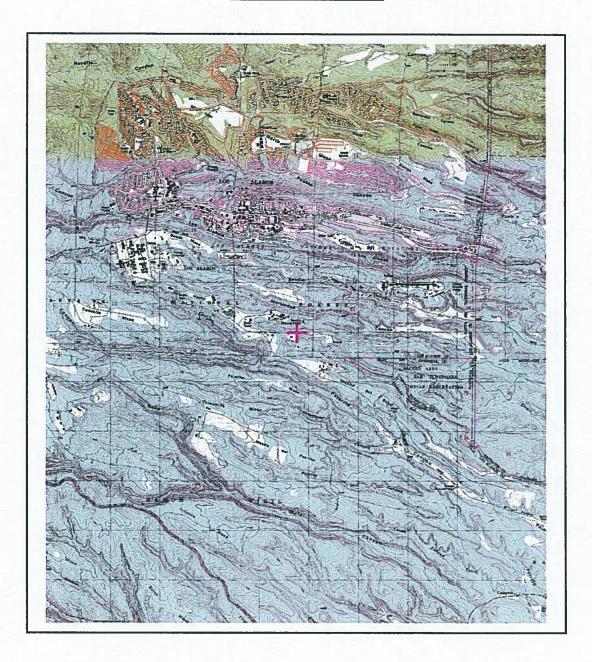
 NAD 1927 (Meters)
 N: 538,947
 E: 148,928

 NAD 1927 (Survey Feet)
 N: 1,768,196
 E: 488,608

Page 1 of 2 Print Date: 05/21/2015

## **NEW MEXICO OFFICE OF STATE ENGINEER**

## **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:76,536

Northing/Easting: UTM83(92) (Meter): N: 3,969,166 E: 383,720

Northing/Easting: SPCS83(92) (Feet): N: 1,768,241 E: 1,629,198

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/21/2015



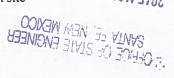
## WELL PLUGGING PLAN OF OPERATIONS



NOT	E: A Well Plugging Plan of Opera to plugging.	tions shall be filed with and accepted by	the Office of the State Engineer prior			
<u>l. FI</u>	LING FEE: There is no filing fee for	or this form.				
II. G	ENERAL / WELL OWNERSHIP:					
Existi	ing Office of the State Engineer POD	Number (Well Number) for well to be plu	ugged: TA-52 Test Hole I			
Name	e of well owner: <u>U.S. Department of</u>	Energy/Los Alamos National Laboratory				
Maili	ng address: P.O. Box 1663					
City:	Los Alamos	State: New Mexico	Zip code: <u>87545</u>			
Phone	e number: <u>505-667-5931</u>	E-mail: meverett@	lanl.gov			
		522				
	WELL DRILLER INFORMATION  Driller contracted to provide pluggin	N: g services: Geomechanics Southwest, Inc				
IV. 1	WELL INFORMATION:					
Note:	A copy of the existing Well Record	for the well to be plugged should be attac	hed to this plan.			
1)	GPS Well Location (BRASS CA	P): East: 1629198.4 North: 1768240.8				
	Well coordinates are New Mexico 1983]).	o State Plane Grid Coordinates, Central Z	one (North American Datum, 1983[NAD			
2)	Reason(s) for plugging well: TA	-52 Test Hole I is old and not used for its	intended purpose. The borehole			
		face for potential contaminants.				
3)	what hydrogeologic parameters	onitoring program? No If yes, please were monitored. If the well was used to Mexico Environment Department may be	to monitor contaminated or poor quality			
4)	Does the well tap brackish, saline	, or otherwise poor quality water? No	If yes, provide additional detail,			
	including analytical results and/o	including analytical results and/or laboratory report(s):				

feet below land surface / feet above land surface (circle one)

6)	Depth of the well: 97.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Steel/plastic tubing
9)	The well was constructed with:  an open-hole production interval, state the open interval:  (x) = 27.5 (7.0 h.d.)
	X a well screen or perforated pipe, state the screened interval(s): 87 to 97 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? Yes If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? Yes If yes, please describe: The borehole has a 6-in. diameter surface casing cemented into the top of tuff.
12)	Has all pumping equipment and associated piping been removed from the well? Yes remaining equipment and intentions to remove prior to plugging in Section VII of this form.
Note:	ESCRIPTION OF PLANNED WELL PLUGGING:  If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional
	ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The surface casing and casing strings are cemented in place from ground surface to 87 ft.
	Therefore, TA-52 Test Hole I will not be overdrilled. The casings will be pressure grouted with neat cement from
	total depth to surface via tremie pipe. A concrete mound will be emplaced above the existing grade.
2)	Will well head be cut-off below land surface after plugging? The surface casing and well head will be cut off before sealing to ground surface.
377 F	N VICCING AND COALING MATERIALS.
	PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 31.6 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix:6 _gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the site  X mixed on site



7)	Grout additives requested, and percent	by dry weig	ht relative to cement: None	
8)	Additional notes and calculations: Non	ie .		
VII.	ADDITIONAL INFORMATION: List a	addition <b>a</b> l in	formation below, or on separate sheet(	s):
holes	2 test hole I was drilled in 1964 and is cons from 87 to 97 ft bgl and 2-in. diameter stee sing before it is abandoned 4-yw			
I, Opera Engin	Mark Everett  tions and any attachments, which are a pareer pertaining to the plugging of wells and ing Plan of Operations and attachments are	t hereof; that will comply	at I am familiar with the rules and regue with them, and that each and all of the	lations of the State
IX. A	CTION OF THE STATE ENGINEER:		Signature of Applicant	Date
This V	Vell Plugging Plan of Operations is:			
	Approved subject to the attac Not approved for the reasons			
	Witness my hand and official seal this _	6TH	day of SUL PE Scott A. Verbines, State Engineer	, 2015
	ENGINATION STATE		By:	
	NEW WENT		SOIS MA OS YAM 8: 52	

SANTA EE, NEW MEXICO

Well Plugging Plan Version: December, 2011 Page 3 of 5

## TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			97
Theoretical volume of grout required per interval (gallons)			31.6 OK CT
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

SE :8 MA OS YAM 210S

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

SOIPHAY 20 AM 8: 52



# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95354

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested test well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the 6-inch surface casing and 2-inch casing strings are cemented in from ground surface to 150-feet. Therefore, TA-52 Test Hole NE-1 will not be overdrilled. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95354 Test Hole NE-1 (two wells)	2	170 & 291	35°51′35.5″	106°17′16.2″

## Specific Plugging Conditions of Approval for 1 nested test well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Theoretical volume of sealant required for abandonment of each of the 2-inch (inside) diameter wells inside this nested well is approximately .16 gallons per foot. Total theoretical volume of sealant required to fill each well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
TA-52(Test Hole) NE-1				
(Well 1)	2	170	4	28
TA-52(Test Hole) NE-1				
(Well 2)	2	291	6	47
Totals:			10	75

- 3. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 4. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the test well.
- 5. All surface completions (vaults) will be removed, if applicable. Casing will be terminated 1'- 2' bgs and the remaining hole will be backfilled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

prisopher M. Thomburg, NMOSE District 6, Water Rights Division

Date: 10(1/6, 2015

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015

Time: 13:41:57

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude:

35 Degrees 51 Minutes 35.5 Seconds N

Longitude:

106 Degrees 17 Minutes 16.2 Seconds W

#### Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) N: 3,969,172 E: 383,723 NAD 1983(92) (Survey Feet) N: 13,022,190 E: 1,258.932 NAD 1927 (Meters) N: 3,968,975 E: 383.668 NAD 1927 (Survey Feet) N: 13,021,544 E: 1,258,751

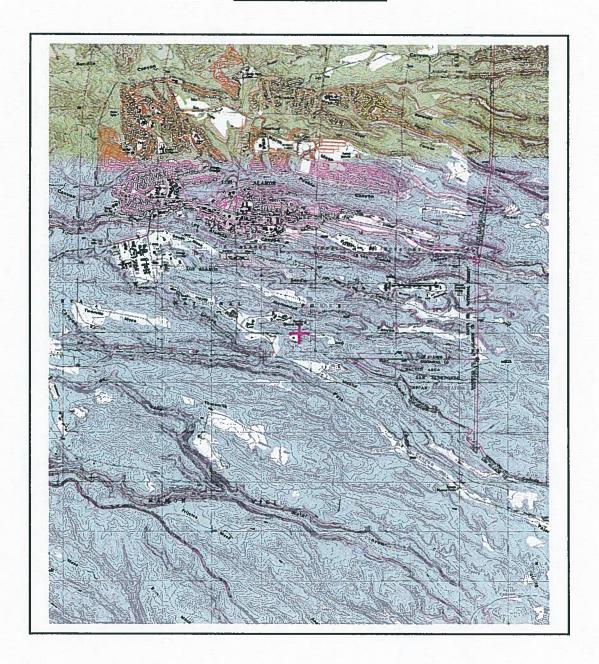
#### State Plane Coordinate System Zone: New Mexico Central

NAD 1983(92) (Meters) N: 538,966 E: 496,584 NAD 1983(92) (Survey Feet) N: 1,768,259 E: 1,629,209 NAD 1927 (Meters) N: 538,953 E: 148,931 NAD 1927 (Survey Feet) N: 1,768,214 E: 488,619

> Page 1 of 2 Print Date: 05/21/2015

### **NEW MEXICO OFFICE OF STATE ENGINEER**

## **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:76,536

Northing/Easting: UTM83(92) (Meter): N: 3,969,172 E: 383,723

Northing/Easting: SPCS83(92) (Feet): N: 1,768,259 E: 1,629,209

GW Basin: Rio Grande

Page 2 of 2 Print Date: 05/21/2015



Static water level: Dry

feet below land surface / feet above land surface (circle one)

## WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL/WELLOWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: TA-52 Test Hole NE-1 Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: 505-667-5931 E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 IV. WELL INFORMATION: Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): East: 1629208.7 North: 1768259.4 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD 1983]). Reason(s) for plugging well: TA-52 Test Hole NE-1 is old and not used for its intended purpose. The borehole 2) represents a conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No \_\_\_\_\_ If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. Does the well tap brackish, saline, or otherwise poor quality water? No \_\_\_\_\_\_ If yes, provide additional detail, 4) including analytical results and/or laboratory report(s):

2015 MA OS YAM 8: 59

6)	Depth of the well: <u>170.0 and 291.0</u> feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Steel/plastic tubing
9)	The well was constructed with:
,,	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 160 to 170 ft bgl, and 272 to 291 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? Yes
	or otherwise sealed? Yes If yes, please describe: The borehole has a 6-in. diameter surface casing
	cemented into the top of tuff.
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
v. Di	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The surface casing and casing strings are cemented in place from ground surface to 150 ft.
	Therefore, TA-52 Test Hole NE-1 will not be overdrilled. The casings will be pressure grouted with neat cement
	from total depth to surface via tremie pipe. A concrete mound will be emplaced above the existing grade.
2)	Will well head be cut-off below land surface after plugging? The surface casing and well head will be cut off before sealing to ground surface.
	A MOCKING AND SEAT YNG MAMERIAA G
	LUGGING AND SEALING MATERIALS:  The physical of a well that tang many quality yester many require the way of a greeighty compart or anguirely content.
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 27.7 and 47.4 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the site



7)	Grout additives requested, and percent by dry weight relative t	Grout additives requested, and percent by dry weight relative to cement: None					
8)	Additional notes and calculations: None						
VII. 1	II. ADDITIONAL INFORMATION: List additional information by	pelow, or on separate sheet(s	):				
with n	A-52 test hole NE-1 was drilled in 1964 and is constructed with two crith perforated holes from 160 to 170 ft bgl and 272 to 291 ft bgl, respectively.	ectively and in diameter s					
surfac	arface appurtenances will be removed from around the casing before it	is abandoned. IN	steer easing at surface. An				
VIII.	III. SIGNATURE:						
Opera Engine	Mark Everett , say the perations and any attachments, which are a part hereof; that I am famingineer pertaining to the plugging of wells and will comply with them lugging Plan of Operations and attachments are true to the best of my	liar with the rules and regula , and that each and all of the knowledge and belief.	ations of the State e statements in the Well				
	- Warl G	e of Applicant	5-20-15 Date				
IV A	X. ACTION OF THE STATE ENGINEER:	o or rappinount	Suite				
	his Well Plugging Plan of Operations is:						
	Approved subject to the attached conditions.  Not approved for the reasons provided on the attached	ed letter.					
	Witness my hand and official seal this day of to	JULY Verhilles, State Engineer	,2015				
	By:	JEST J					
	8: 23 W 8: 23	A OS YAM 210S					
	MEXICO ENCINEER	WEN 'EF ATMAS	Well Plugging Plan Version: December, 2011				

Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			170 and 291
Theoretical volume of grout required per interval (gallons)			27.7 and 47.4
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

2015 HA 05 YAH 2105



## STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95355

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested test well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the 6-inch surface casing and 2-inch casing strings are cemented in from ground surface to 87-feet. Therefore, TA-52 Test Hole NE-2 will not be overdrilled. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used a part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95355 Test Hole NE-2 (two wells)	2	97.0	35°51′35.5″	106°17′16.0″

## Specific Plugging Conditions of Approval for 1 nested test well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Theoretical volume of sealant required for abandonment of each of the 2-inch (inside) diameter wells inside this nested well is approximately .16 gallons per foot. Total theoretical volume of sealant required to fill each well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
TA-52(Test Hole) NE-2				Constitution Village
(Well 1)	2	97	2	16
TA-52(Test Hole) NE-2			Ular IIII John Mari	
(Well 2)	2	97	2	16
Totals:		FM III LEG	4	32

- 3. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 4. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the test well.
- 5. All surface completions (vaults) will be removed, if applicable. Casing will be terminated 1'- 2' bgs and the remaining hole will be backfilled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSE District 6, Water Rights Division

Date

100 (E)

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015 Time: 13:53:37

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude:

35 Degrees 51 Minutes 35.5 Seconds N

Longitude:

106 Degrees 17 Minutes 16.0 Seconds W

#### Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) N: 3,969,170 E: 383,727 NAD 1983(92) (Survey Feet) N: 13,022,186 E: 1,258,943 NAD 1927 (Meters) N: 3,968,973 E: 383,671 NAD 1927 (Survey Feet) N: 13,021,540 E: 1,258,762

#### State Plane Coordinate System Zone: New Mexico Central

NAD 1983(92) (Meters) N: 538,965 E: 496,587 NAD 1983(92) (Survey Feet) N: 1,768,255 E: 1,629,220 N: 538,951 E: 148,935 NAD 1927 (Meters) N: 1,768,210 E: 488,630 NAD 1927 (Survey Feet)

Page 1 of 2

Print Date: 05/21/2015

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

TE :8 MA OS YAMBIOS



feet below land surface / feet above land surface (circle one)

## WELL PLUGGING PLAN OF OPERATIONS



NOT	E: A Well Plugging Plan of Operati to plugging.	ions shall be filed with and accepted by t	he Office of the State Engineer prior
I. FII	LING FEE: There is no filing fee for	this form.	
II. G	ENERAL / WELL OWNERSHIP:		
Existi	ng Office of the State Engineer POD	Number (Well Number) for well to be plug	gged: TA-52 Test Hole NE-2
Name	of well owner: U.S. Department of E	Energy/Los Alamos National Laboratory	
Maili	ng address: P.O. Box 1663		
City:	Los Alamos	State: New Mexico	Zip code: <u>87545</u>
Phone	e number: 505-667-5931	E-mail: meverett@la	nl.gov
	Driller contracted to provide plugging Mexico Well Driller License No.: 152	services: <u>Geomechanics Southwest, Inc.</u> 22	
	WELL DRILLER INFORMATION		
New	Mexico Well Driller License No.: 152	22	Expiration Date: 04/30/2017
IV. V	WELL INFORMATION:		
Note:	A copy of the existing Well Record	for the well to be plugged should be attach	ed to this plan.
1)	GPS Well Location (BRASS CAP	North: 1768254.8	
	Well coordinates are New Mexico 1983]).	State Plane Grid Coordinates, Central Zo	ne (North American Datum, 1983[NAD
2)	Reason(s) for plugging well: TA-	52 Test Hole NE-2 is old and not used for	its intended purpose. The borehole
	represents a conduit to the subsurf	ace for potential contaminants.	
3)	what hydrogeologic parameters v	nitoring program? No If yes, pleas were monitored. If the well was used to Mexico Environment Department may be	monitor contaminated or poor quality
4)	Does the well tap brackish, saline,	, or otherwise poor quality water? No	If yes, provide additional detail,
	including analytical results and/or	laboratory report(s):	
		20.6 1111	
5)	Static water level: <u>Dry</u>	SO : E HA OS YAH 210	5

6)	Depth of the well: 97.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: Steel/plastic tubing
9)	The well was constructed with: an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 87 to 97 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? Yes If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? Yes If yes, please describe: The borehole has a 6-in. diameter surface casing cemented into the top of tuff.
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
<b>V. D</b> !	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The surface casing and casing strings are cemented in place from ground surface to 87 ft.
	Therefore, TA-52 Test Hole NE-2 will not be overdrilled. The casings will be pressure grouted with neat cement
	from total depth to surface via tremie pipe. A concrete mound will be emplaced above the existing grade.
2)	Will well head be cut-off below land surface after plugging? The surface casing and well head will be cut off before sealing to ground surface.
3./Y E	N LICCUMO AND CE ALING MATERIAL C.
	PLUGGING AND SEALING MATERIALS:  The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 31.6 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the site OZ AVH SIOZ mixed on site

OFFICE OF STATE ENGINEER

7)	Grout additives requested, and percent by dry weight relative to cement: None
8)	Additional notes and calculations: None
TA-52	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):  test hole NE-2 was drilled in 1964 and is constructed with two casing strings of plastic tubing to 97 ft bgl with
perfor	ated holes from 87 to 97 ft bgl and 2-in. diameter steel casing at surface. All surface appurtenances will be removed around the casing before it is abandoned.
I, Opera Engin	Mark Everett , say that I have carefully read the foregoing Well Plugging tions and any attachments, which are a part hereof; that I am familiar with the rules and regulations of the State ere pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Well ng Plan of Operations and attachments are true to the best of my knowledge and belief.
	Signature of Applicant Date
IX. A	CTION OF THE STATE ENGINEER:
This V	Vell Plugging Plan of Operations is:
	Approved subject to the attached conditions.  Not approved for the reasons provided on the attached letter.
	Witness my hand and official seal this day of, 2015
	By:
	SO : 9 MA OS YAM 310S
	OOKEM MEN ET ATUAS  Well blugging bla  Version: December, 201

Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			97
Theoretical volume of grout required per interval (gallons)			31.6 OK CI
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			
		70 ·C 119 07 191	

2015 MA OS YAM 3: 02

SOFFICE OF STATE ENGINEER SANTA FE, NEW MEXICO

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

SO : 6 MA OS YAM 210S

#### **Locator Tool Report**

#### General Information:

Application ID: Move-From

Date: 07-06-2015

Time: 09:47:17

WR File Number: LRG-01939-POD1

Purpose: POINT OF DIVERSION

Applicant First Name: KENNETH Applicant Last Name: NEEDHAM

GW Basin: LOWER RIO GRANDE

County: DONA ANA

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - LRG Special Condition Area Name(s): NONE

Land Grant Name: MESILLA CIVIL COLONY

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### Geographic Coordinates:

Latitude: 32 Degrees 17 Minutes 48.8 Seconds N Longitude: 106 Degrees 50 Minutes 13.9 Seconds W

#### **Universal Transverse Mercator Zone: 13N**

NAD 1983(92) (Meters) N: 3,574,828 E: 327,015 NAD 1983(92) (Survey Feet) N: 11,728,414 E: 1,072,882 NAD 1927 (Meters) N: 3,574,650 E: 326,959 NAD 1927 (Survey Feet) N: 11,727,830 E: 1,072,697

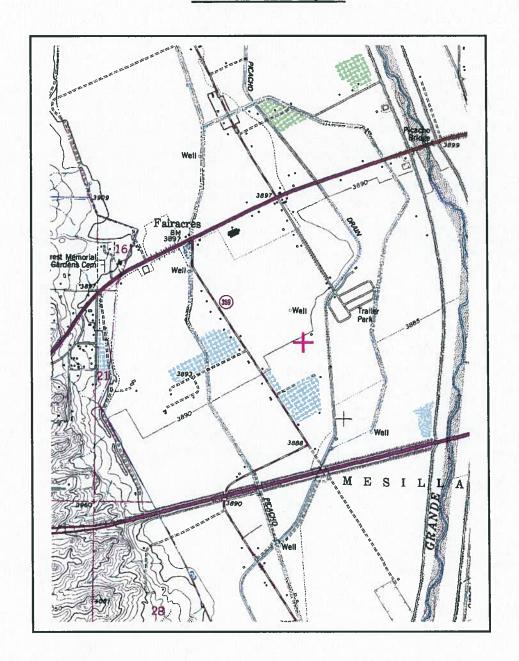
#### State Plane Coordinate System Zone: New Mexico Central

N: 143,938 E: 444,698 NAD 1983(92) (Meters) NAD 1983(92) (Survey Feet) N: 472,237 E: 1,458,980 NAD 1927 (Meters) N: 143.943 E: 97.044 NAD 1927 (Survey Feet) N: 472,255 E: 318,386

> Print Date: 07/06/2015 Page 1 of 2

### **NEW MEXICO OFFICE OF STATE ENGINEER**

## **Locator Tool Report**





WR File Number: LRG-01939-POD\$cale: 1:28,743

Northing/Easting: UTM83(92) (Meter): N: 3,574,828 E: 327,015

Northing/Easting: SPCS83(92) (Feet): N: 472,237 E: 1,458,980

GW Basin: Lower Rio Grande

Page 2 of 2 Print Date: 07/06/2015



# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95359

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 alluvial well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the casing will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95359 Alluvial Well	2	40.0	35°51′37.8″	106°16′25.5″

## Specific Plugging Conditions of Approval for 1 alluvial well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4 NMAC, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE). Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of plugging of the lower portion of the 2" well to the approximate 20 foot bgs depth of actual overdrilling, the top of the 2" casing shall be severed within the bottom of the 4 1/4" X 7 1/2" auger flights prior to sealant being placed within the ID of the augers.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.

5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7 ½" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
TSWB-6 Alluvial Well	2	20	0	3
TSWB-6 Alluvial Well (Auger Boring)	7.5	20	6	46
Totals:			7	49

- 6. All surface completions (vaults) will be removed, if applicable. The top of the 2" casing will be severed within the bottom of the 4 1/4" x 7 1/2" augers and the overdrilled hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a>) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSE District 6, Water Rights Division

Date: July 6, 2015

#### **Locator Tool Report**

#### General Information:

Application ID: 29

Date: 05-21-2015 Time: 14:11:07

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### Geographic Coordinates:

Latitude: Longitude: 35 Degrees 51 Minutes 37.8 Seconds N

106 Degrees 16 Minutes 25.5 Seconds W

Universal Transverse Mercator Zone: 13N

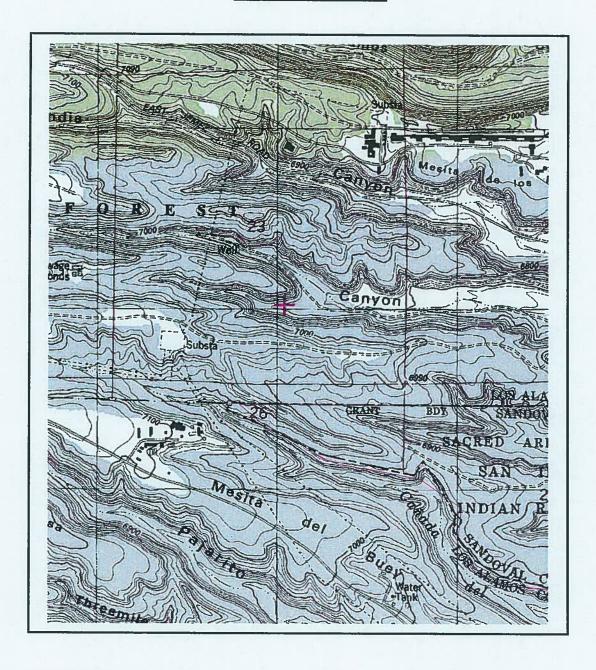
NAD 1983(92) (Meters) E: 384,996 N: 3,969,226 NAD 1983(92) (Survey Feet) N: 13,022,369 E: 1,263,108 NAD 1927 (Meters) N: 3,969,029 E: 384,941 NAD 1927 (Survey Feet) N: 13,021,723 E: 1,262,927

#### State Plane Coordinate System Zone: New Mexico Central

NAD 1983(92) (Meters) N: 539,037 E: 497,856 NAD 1983(92) (Survey Feet) N: 1,768,491 E: 1,633,383 NAD 1927 (Meters) N: 539,023 E: 150,204 NAD 1927 (Survey Feet) N: 1,768,446 E: 492,794

## **NEW MEXICO OFFICE OF STATE ENGINEER**

### **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:21,093

Northing/Easting: UTM83(92) (Meter): N: 3,969,226 E: 384,996

Northing/Easting: SPCS83(92) (Feet): N: 1,768,491 E: 1,633,383

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/21/2015

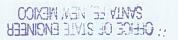


## WELL PLUGGING PLAN OF OPERATIONS



NOTE	E: A Well Plugging Plan of Operations to plugging.	s shall be filed with and accepted by	the Office of the State Engineer prior
<u>I. FIL</u>	LING FEE: There is no filing fee for thi	s form.	
II. GI	ENERAL / WELL OWNERSHIP:		
Existin	ng Office of the State Engineer POD Nur	nber (Well Number) for well to be plu	gged: TSWB-6
Name	of well owner: U.S. Department of Ener	gy/Los Alamos National Laboratory	
Mailin	ng address: P.O. Box 1663		
City: ]	Los Alamos	State: New Mexico	Zip code: <u>87545</u>
Phone	number: 505-667-5931	E-mail: meverett@la	anl.gov
	VELL DRILLER INFORMATION:  Oriller contracted to provide plugging ser	vices: Geomechanics Southwest, Inc.	
New M	Mexico Well Driller License No.: 1522		Expiration Date: 04/30/2017
	VELL INFORMATION:  A copy of the existing Well Record for to GPS Well Location (BRASS CAP):  Well coordinates are New Mexico State 1983]).	East: 1633383.1 North: 1768490.8	ned to this plan.  one (North American Datum, 1983[NAD
2)	Reason(s) for plugging well: Alluvial	well TSWB-6 is old and not used for	its intended purpose. The borehole
	represents a conduit to the subsurface	for potential contaminants.	
3)		monitored. If the well was used to	se use section VII of this form to detail o monitor contaminated or poor quality e required prior to plugging.
4)	Does the well tap brackish, saline, or o	otherwise poor quality water? No	If yes, provide additional detail,
	including analytical results and/or laborate	oratory report(s):	
5) feet be	Static water level: <u>Dry</u> Flow land surface / feet above land surface	e (circle offe) =8 MA OS YAM SI	OZ

6)	Depth of the well: 40.0 feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: PVC
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 25 to 35 ft bgl
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted
11)	or otherwise sealed? No If yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. DE	SCRIPTION OF PLANNED WELL PLUGGING:
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional al information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the
	existing grade.
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.
VI. PI	UGGING AND SEALING MATERIALS:
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 49.2 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the area 02 AVW \$102



	mixed on site				
7)	Grout additives requested, and percent by dry weight relative to cement: None				
8)					
	Additional notes and calculations: None				
VII.	ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s)				
Alluv to 35	ial well TSWB-6 was drilled in 1994 and is constructed with 40 ft of 2-in. diameter PVC casing ft bgl. All surface appurtenances will be removed from around the casing before it is abandone	g with a screen from 25			
	re og 1. 7 m startage apparentances will be removed from around the easing before it is abandone				
VIII.	SIGNATURE:				
I,	Mark Everett , say that I have carefully read the fo	regoing Well Plugging			
Engin	tions and any attachments, which are a part hereof; that I am familiar with the rules and regular eer pertaining to the plugging of wells and will comply with them, and that each and all of the	ions of the State			
Plugg	ing Plan of Operations and attachments are true to the best of my knowledge and belief.				
	_ Work Unet	5-20-15			
	Signature of Applicant	Date			
IX. A	ACTION OF THE STATE ENGINEER:				
This V	Well Plugging Plan of Operations is:				
	Approved subject to the attached conditions.  Not approved for the reasons provided on the attached letter.				
	Witness my hand and official seal this day of John	2015			
	Ton Bure R. E. Seett A. Vorhines, State Engineer	1			
	ENG/NOTE				
	STATE OF THE STATE				
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SANTA EE, NEW MEXICO

\*\*\* OFFICE OF STATE ENGINEER

Well Plugging Plan Version: December, 2011 Page 3 of 5

## TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			40
Theoretical volume of grout required per interval (gallons)			49.2
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95360

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the well will be pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The well will then be overdrilled with 7.5-inch (outside diameter) 4 ¼" (inside diameter) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This test well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95360	2	69.7	35°53′20.9″	106°14′57.2″

# Specific Plugging Conditions of Approval for 1 well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Upon completion of plugging of the lower portion of the 2" well to the approximate 20 foot bgs depth of actual overdrilling, the top of the 2" casing shall be severed within the bottom of the 4 ¼" X 7 ½" augers prior to sealant being placed within the ID of the augers.
- 4. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 7 ½" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ½" x 7 ½" augers may not be pulled out of the hole prior to the sealant being placed.

5. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 7 1/2" (outside) diameter auger boring is 2.3 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
BCO-1	2	49.7	1	8
BCO-1 (Auger Boring)	7.5	20	6	46
Totals:			7	54

- 6. All surface completions (vaults) will be removed, if applicable. The top of the 2" casing will be severed within the bottom of the 4 4" x 7 1/2" augers and the overdrilled hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 7. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the morestringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 8. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 9. A Well Plugging Record (available at: http://www.ose.state.nm.us/STST/Forms/WD-11.pdf) itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 - 407 Galisteo Street - Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 10. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. The rict 6, Water Rights Division Date: July 6, Zors-

### **Locator Tool Report**

#### **General Information:**

Application ID: 29

Date: 05-21-2015

Time: 15:32:38

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

### **Coordinate System Details:**

### **Geographic Coordinates:**

Latitude: Longitude:

35 Degrees 53 Minutes 20.9 Seconds N

106 Degrees 14 Minutes 57.2 Seconds W

#### Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) NAD 1983(92) (Survey Feet) NAD 1927 (Meters) NAD 1927 (Survey Feet)

N: 3,972,374 E: 387,251 N: 13,032,698 E: 1,270,506 N: 3,972,178 E: 387,196

N: 13,032,053 E: 1,270,325

### State Plane Coordinate System Zone: New Mexico Central

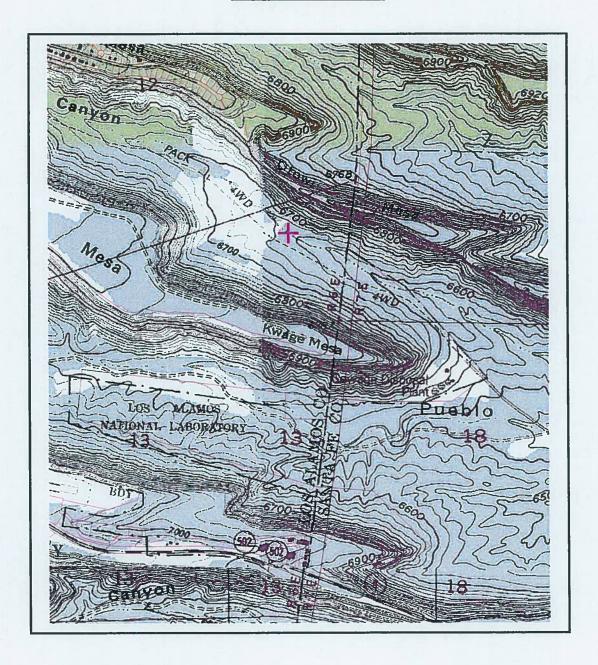
NAD 1983(92) (Meters) NAD 1983(92) (Survey Feet) NAD 1927 (Meters) NAD 1927 (Survey Feet)

N: 542,214 E: 500.071 N: 1,778,915 E: 1,640,649 N: 542,201 E: 152,419 N: 1,778,871 E: 500,060

Print Date: 05/21/2015 Page 1 of 2

# **NEW MEXICO OFFICE OF STATE ENGINEER**

# **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:17,850

Northing/Easting: UTM83(92) (Meter): N: 3,972,374 E: 387,251

Northing/Easting: SPCS83(92) (Feet): N: 1,778,915 E: 1,640,649

GW Basin: Rio Grande

Page 2 of 2 Print Date: 05/21/2015



Static water level: Dry

feet below land surface / feet above land surface (circle one)

# WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL / WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: BCO-1 Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: <u>505-667-5931</u> E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 **IV. WELL INFORMATION:** Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1) GPS Well Location (BRASS CAP): East: 1640648.7 North: 1778914.7 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD 1983]). 2) Reason(s) for plugging well: BCO-1 is old and not used for its intended purpose. The borehole represents a conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. 4) Does the well tap brackish, saline, or otherwise poor quality water? No \_\_\_\_\_\_ If yes, provide additional detail, including analytical results and/or laboratory report(s):

SANTA EE, NEW MEXICO

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6)	Depth of the well: 68 (completion record), 69.7 (recent LANL video log) feet				
7)	Inside diameter of innermost casing: 2.0 inches.				
8)	Casing material: PVC				
9)	The well was constructed with:				
	an open-hole production interval, state the open interval:				
	X a well screen or perforated pipe, state the screened interval(s): 57-67 ft bgl				
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None				
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted				
/	or otherwise sealed? No If yes, please describe:				
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.				
<u>V.</u> D	ESCRIPTION OF PLANNED WELL PLUGGING:				
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.				
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology				
	proposed for the well: The casing will be pressure grouted with neat cement from total depth to 20 ft bgl via tremie				
	pipe. The well will then be overdrilled with 7.5-in. O.D. augers to a minimum of 20 ft bgl. Neat cement slurry will				
	be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with concrete and mounded above the				
	existing grade.				
2)	Will well head be cut-off below land surface after plugging? Well head will be cut off and drilled out before sealing to ground surface.				
VI. P	LUGGING AND SEALING MATERIALS:				
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant				
1)	For plugging intervals that employ cement grout, complete and attach Table A.				
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.				
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 54.0 gallons				
4)	Type of Cement proposed: Portland Type I/II cement				
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.				
6)	Will the grout be: batch-mixed and delivered to the See HV 02 AVH SIOZ				

	X mixed on sit	re				
7)	Grout additives requested, and percent by	Grout additives requested, and percent by dry weight relative to cement: None				
8)	Additional notes and calculations: None	5				
			-			
VII.	ADDITIONAL INFORMATION: List ad	Iditional information below, or on separate sheet	a(s):			
		is constructed with 70 ft of 2-in. diameter PVC of				
interv	al from 57 to 67 ft bgl. All surface appurtens	ances will be removed from around the well before	ore it is abandoned.			
VIII.	SIGNATURE:					
	Mile Will Company and a second	, say that I have carefully read the	e foregoing Well Plugging			
Opera	tions and any attachments, which are a part	hereof; that I am familiar with the rules and regular will comply with them, and that each and all of the	ulations of the State			
		true to the best of my knowledge and belief.	ne statements in the well			
		Mout andt	5-20-15			
		Signature of Applicant	Date			
IV A	CTION OF THE STATE ENGINEER:					
IA. A	CTION OF THE STATE ENGINEER:					
This V	Well Plugging Plan of Operations is:					
	Approved subject to the attache.  Not approved for the reasons p	ed conditions. provided on the attached letter.				
	Witness my hand and official seal this	6 day of July	2015			
	withoss my hand and official scal diffs	Scott A Vertines, State Engineer	7			
	ENGINA!	Ву:	1/			
	THE STATE OF					
		TZ:8 HA OS YAH ZIOS				

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Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			69.7
Theoretical volume of grout required per interval (gallons)			54.0
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95362

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested piezometer well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that each leg of the piezometer cluster will be individually pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-inch (outside diameter) 4 ¼" (inside diameter) (HD) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This piezometer well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95362 Nested Piezometer Well (3 Legs)	2	(A) 174 (B) >89 (C) >38	35°49′43.7″	106°15′15.9″

# Specific Plugging Conditions of Approval for 1 Nested Piezometer Well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the piezometer well.

- 4. Upon completion of the plugging of the lower portion of the deeper 2" wells to approximately 20 foot bgs depth of actual overdrilling, the top of the 2" casing shall be severed within the bottom of the 4 1/4" x 8 1/4" HD augers prior to sealant being placed within the ID of the augers.
- 5. Sealant shall be kept up inside the augers during placement. The 4 1/4" x 8 1/4" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 1/4" x 8 1/4" augers may not be pulled out of the hole prior to the sealant being placed.
- 6. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 8 ¼" (outside) diameter auger boring is ~2.8 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
POTO-4 (A)	2	154	3	25
POTO-4 (B)	2	69	2	11
POTO-4 (C*)	2	18	0	3
POTO-4 (Auger Boring)	8.25	20	7	56
otals:			3 13	95

- 7. All surface completions (vaults) will be removed, if applicable. The top of the 2" casings will be severed within the bottom of the 4 1/4" x 8 1/4" HD augers and the overdrilled hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 8. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 9. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 10. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a> itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 11. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Date: July 6, 2015

Christopher M. Thornburg MOSE District 6, Water Rights Division

ENGINE STATE OF STATE

### **Locator Tool Report**

#### **General Information:**

Application ID: 29

Date: 05-28-2015

Time: 10:49:05

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG Special Condition Area Name(s): NONE

Land Grant Name: RAMON VIGIL

#### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

### **Coordinate System Details:**

### **Geographic Coordinates:**

35 Degrees 49 Minutes 43.7 Seconds N Latitude: 106 Degrees 15 Minutes 15.9 Seconds W Longitude:

Universal Transverse Mercator Zone: 13N

N: 3,965,688 E: 386,695 NAD 1983(92) (Meters) N: 13,010,760 E: 1,268,680 NAD 1983(92) (Survey Feet) N: 3,965,491 E: 386,639 NAD 1927 (Meters) N: 13,010,113 E: 1,268,499 NAD 1927 (Survey Feet)

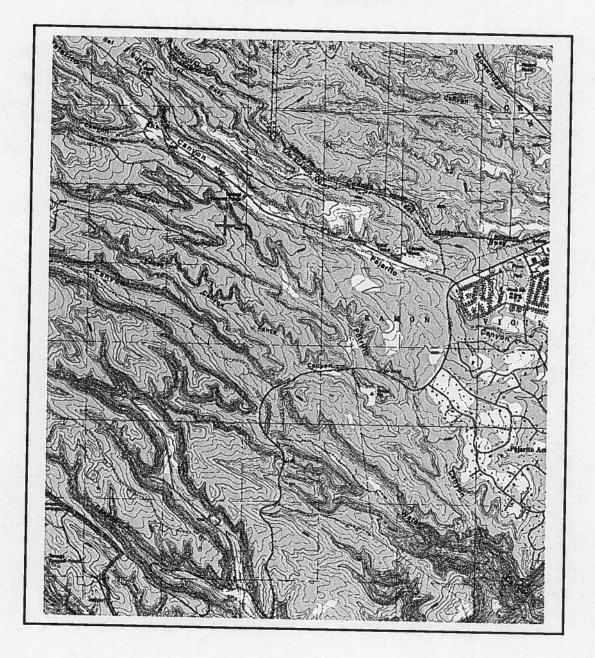
State Plane Coordinate System Zone: New Mexico Central

N: 535,520 E: 499,600 NAD 1983(92) (Meters) N: 1,756,952 E: 1,639,104 NAD 1983(92) (Survey Feet) E: 151,948 N: 535,506 NAD 1927 (Meters) NAD 1927 (Survey Feet) N: 1,756,907 E: 498,515

> Print Date: 05/28/2015 Page 1 of 2

# NEW MEXICO OFFICE OF STATE ENGINEER

# **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:48,211

Northing/Easting: UTM83(92) (Meter): N: 3,965,688 E: 386,695

Northing/Easting: SPCS83(92) (Feet): N: 1,756,952 E: 1,639,104

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/28/2015

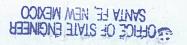


# TRO # 569741 WELL PLUGGING PLAN OF OPERATIONS



	LING FEE: There is no filing fee for the	nis form.	
II. G	SENERAL / WELL OWNERSHIP:		
Exist	ing Office of the State Engineer POD Nu	umber (Well Number) for well to be plug	gged: POTO-4A, B, C
Name	e of well owner: <u>U.S. Department of End</u>	ergy/Los Alamos National Laboratory	
Maili	ing address: P.O. Box 1663		The Table 1
City:	Los Alamos	State: New Mexico	Zip code: <u>87545</u>
Phon	e number: 505-667-5931	E-mail: meverett@la	nl.gov
	WELL INFORMATION:		
Note:	GPS Well Location (BRASS CAP):	East: 1639103.8	ed to this plan.
	GPS Well Location (BRASS CAP):		
1)	GPS Well Location (BRASS CAP):  Well coordinates are New Mexico St. 1983]).	East: 1639103.8 North: 1756952.4	ne (North American Datum, 1983[NAD
1)	GPS Well Location (BRASS CAP):  Well coordinates are New Mexico St. 1983]).  Reason(s) for plugging well: The PC	East: 1639103.8 North: 1756952.4 ate Plane Grid Coordinates, Central Zon	ne (North American Datum, 1983[NAD and not used for its intended purpose.
1)	GPS Well Location (BRASS CAP):  Well coordinates are New Mexico St. 1983]).  Reason(s) for plugging well: The PC The borehole represents a conduit to  Was well used for any type of monito what hydrogeologic parameters were	East: 1639103.8 North: 1756952.4 ate Plane Grid Coordinates, Central Zoo DTO-4A, B, C piezometer cluster is old a	ne (North American Datum, 1983[NAD and not used for its intended purpose.  ts.  e use section VII of this form to detai monitor contaminated or poor quality
	GPS Well Location (BRASS CAP):  Well coordinates are New Mexico St. 1983]).  Reason(s) for plugging well: The PC The borehole represents a conduit to  Was well used for any type of monitor what hydrogeologic parameters were water, authorization from the New Mexico St. 1983].	East: 1639103.8 North: 1756952.4 ate Plane Grid Coordinates, Central Zoo DTO-4A, B, C piezometer cluster is old a the subsurface for potential contaminant oring program? No If yes, pleas re monitored. If the well was used to	ne (North American Datum, 1983[NAD and not used for its intended purpose.  ts.  e use section VII of this form to detai monitor contaminated or poor quality required prior to plugging.

5) Static water level: <u>Dry</u> feet below land surface / feet above land surface (circle one) \*6 HY 02 AVH \$102



6)	Depth of the well: 174 (A), >89 (B), >38 (C) feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: PVC
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 154-164 ft bgl (A), 79-89 ft bgl (B), 28-38
	ft bgl (C)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted
	or otherwise sealed? NoIf yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
V. D	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
-)	proposed for the well: The piezometers will be individually pressure grouted with neat cement from total depth to
	20 ft bgl via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-in. O.D. augers to a minimum of
	20 ft bgl. Neat cement slurry will be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with
	concrete and mounded above the existing grade.
2)	Will well head be cut-off below land surface after plugging? Well heads will be cut off and drilled out before sealing to ground surface.
VI. P	PLUGGING AND SEALING MATERIALS:
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 94.8 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.

6)	Will the grout be: batch-mixed and de X mixed on site	livered to the site		
7)	Grout additives requested, and percent by dry w	eight relative to cement: No	one	
				7:
8)	Additional notes and calculations: None		6	
			-7	
	ADDITIONAL INFORMATION: List additional			
	ole POTO-4 was drilled to 180 ft bgl in 1991. Thre exometer is constructed with 174 ft of 2-in. diamete			
POTO	-4B piezometer is constructed with 2-in. diameter	PVC casing below 89 ft bgl	with a screened inter	rval from 79 to 89 ft
	OTO-4C piezometer is constructed with 2-in. diamogl. All surface appurtenances will be removed from			
38 11 0	gi. An surface appurenances will be removed from	i around the plezometers be	rote they are abando	ncu.
VIII.	SIGNATURE:			
		, say that I have care	fully read the forego	ing Well Plugging
Operat	tions and any attachments, which are a part hereof;	that I am familiar with the r	rules and regulations	of the State
	eer pertaining to the plugging of wells and will coming Plan of Operations and attachments are true to t			ments in the Well
1 10001		A /		
	$\underline{\mathcal{W}}$	wh Unit	Miles Park	5-20-13
		Signature of Applican	t	Date
IX. A	CTION OF THE STATE ENGINEER:			
This W	Vell Plugging Plan of Operations is:			
	Approved subject to the attached cond Not approved for the reasons provided	litions. I on the attached letter.		
	Witness my hand and official seal this	day of Tuly	,2	015
	TO M C I M C I	JOM Bans P. Scott A. Verhines, Sta	E.	
	STATE			
		By:	949	
	AL OLIVER	00 :6 HA 05 YAM 6	102	
	SIAI	an : P MA OS YAM ?	100	
	107 3HO-1012	CONTRACT STATES		
	WEW WELL	FICE OF STATE ENGINEER	10%	Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)		7 🐧	Surface
Bottom of proposed interval of grout placement (ft bgl)			174 (A), 89 (B), 38 (C)
Theoretical volume of grout required per interval (gallons)			94.8 ak (T)
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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# TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 - most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95363

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested piezometer well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that each leg of the piezometer cluster will be individually pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-inch (outside diameter) 4 ¼" (inside diameter) (HD) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This piezometer well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95363 Nested Piezometer Well (2 Legs)	2	(A) 77.5 (B) >17	35°49′43.1″	106°15′15.0″

### Specific Plugging Conditions of Approval for 1 Nested Piezometer Well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Each individual well inside the nested cluster shall be abandoned separately (The 17' leg of the cluster will be completely excavated and removed by the overdrill operation). The volumes for each

- individual well inside the nested cluster shall be reported separately on the well plugging record for the piezometer well.
- 4. Upon completion of plugging of the lower portion of the deeper 2" piezometer well to approximately 20 foot bgs of actual overdrilling, the top of the 2-inch casing shall be severed within the bottom of the 4 ½" x 8 ½" HD augers prior to sealant being placed within the ID of the augers.
- 5. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 8 ¼" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 8 ¼" augers may not be pulled out of the hole prior to the sealant being placed.
- 6. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 8 ¼" (outside) diameter auger boring is ~2.8 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
POTO-5 (A)	2	57.5	1	9
POTO-5 (Auger Boring)	8.25	20	7	56
Totals:			9	65

- 7. All surface completions (vaults) will be removed, if applicable. The top of the 2" casing shall be severed within the bottom of the 4 ¼" x 8 ¼" HD augers and the overdrilled hole will be backfilled with sealant to 2 foot bgs. The remaining 2 foot will be filled with concrete to surface.
- 8. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 9. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a> itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 11. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesald conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSE District 6, Water Rights Division



### **Locator Tool Report**

### **General Information:**

Application ID: 29

Date: 05-21-2015

Time: 13:36:29

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: RAMON VIGIL

### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude: Longitude:

35 Degrees 49 Minutes 43.1 Seconds N 106 Degrees 15 Minutes 15.0 Seconds W

#### Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) N: 3,965,669 E: 386,718 NAD 1983(92) (Survey Feet) N: 13,010,698 E: 1,268,759 NAD 1927 (Meters) N: 3,965,472 E: 386,663 NAD 1927 (Survey Feet) N: 13,010,052 E: 1,268,578

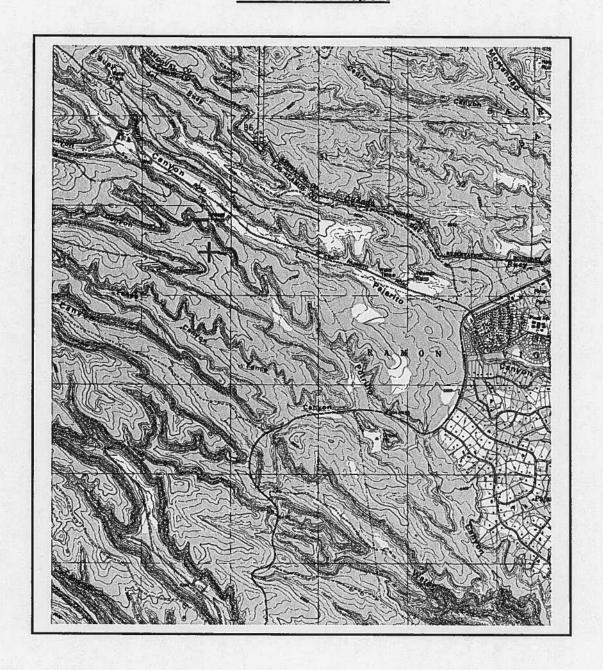
### State Plane Coordinate System Zone: New Mexico Central

E: 499,624 NAD 1983(92) (Meters) N: 535,502 NAD 1983(92) (Survey Feet) N: 1,756,892 E: 1,639,183 NAD 1927 (Meters) N: 535,488 E: 151,972 NAD 1927 (Survey Feet) N: 1,756,847 E: 498,594

> Page 1 of 2 Print Date: 05/21/2015

# **NEW MEXICO OFFICE OF STATE ENGINEER**

# **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:42,386

Northing/Easting: UTM83(92) (Meter): N: 3,965,669 E: 386,718

Northing/Easting: SPCS83(92) (Feet): N: 1,756,892 E: 1,639,183

GW Basin: Rio Grande

Page 2 of 2

Print Date: 05/21/2015



# WELL PLUGGING PLAN OF OPERATIONS



	to plugging.		ed by the Office of the State Engineer prior
I. FI	LING FEE: There is no filing fee	RG-95363	
II. G	ENERAL / WELL OWNERSHIP		
Exist	ing Office of the State Engineer PO	D Number (Well Number) for well to	be plugged: POTO-5A, B
Name	e of well owner: <u>U.S. Department o</u>	f Energy/Los Alamos National Labora	atory
Maili	ng address: P.O. Box 1663		
City:	Los Alamos	State: New Mexico	Zip code: <u>87545</u>
Phone	e number: 505-667-5931	E-mail: mever	ett@lanl.gov
6	WELL DRILLER INFORMATIO	the second secon	
Well	Driller contracted to provide pluggi	ng services: Geomechanics Southwest	t, Inc.
New	Mexico Well Driller License No.: 1	1522	Expiration Date: <u>04/30/2017</u>
1)	GPS Well Location (BRASS CA Well coordinates are New Mexic 1983]).	North: 1756891.8	tral Zone (North American Datum, 1983[NAD
		POTO SA P	
2)	Reason(s) for plugging well: <u>Th</u>	he POTO-3A, B piezometer cluster is c	old and not used for its intended purpose. The
2)		the subsurface for potential contamina	
2)	borehole represents a conduit to  Was well used for any type of m what hydrogeologic parameters	the subsurface for potential contamination on itoring program? No If yes,	, please use section VII of this form to detail
	Was well used for any type of m what hydrogeologic parameters water, authorization from the Ne	nonitoring program? No If yes, were monitored. If the well was usew Mexico Environment Department in	, please use section VII of this form to detail
3)	Was well used for any type of m what hydrogeologic parameters water, authorization from the Ne	nonitoring program? No If yes, were monitored. If the well was usew Mexico Environment Department in	nnts.  , please use section VII of this form to detail used to monitor contaminated or poor quality may be required prior to plugging.   If yes, provide additional detail,
3)	Was well used for any type of m what hydrogeologic parameters water, authorization from the Ne	nonitoring program? No If yes, is were monitored. If the well was usew Mexico Environment Department in the, or otherwise poor quality water? No	n, please use section VII of this form to detain used to monitor contaminated or poor quality may be required prior to plugging.  If yes, provide additional detail,

feet below land surface / feet above land surface (circle one)

SAVTA PE, NEW MEXICO

6)	Depth of the well: $\underline{77.5 \text{ (A)}}$ , $\geq 17 \text{ (B)}$ feet
7)	Inside diameter of innermost casing: 2.0 inches.
8)	Casing material: PVC
9)	The well was constructed with:
	an open-hole production interval, state the open interval:
	X a well screen or perforated pipe, state the screened interval(s): 57.5-67.5 ft bgl (A), 7-17 ft bgl (B)
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None
11)	
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted
	or otherwise sealed? NoIf yes, please describe:
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.
<u>V. D</u>	ESCRIPTION OF PLANNED WELL PLUGGING:
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology
	proposed for the well: The piezometers will be individually pressure grouted with neat cement from total depth to
	20 ft bgl via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-in. O.D. augers to a minimum of
	20 ft bgl. Neat cement slurry will be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with
	concrete and mounded above the existing grade.
2)	Will well head be cut-off below land surface after plugging? Well heads will be cut off and drilled out before sealing to ground surface.
VI. P	PLUGGING AND SEALING MATERIALS:
	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant
1)	For plugging intervals that employ cement grout, complete and attach Table A.
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 64.9 gallons
4)	Type of Cement proposed: Portland Type I/II cement
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.
6)	Will the grout be: batch-mixed and delivered to the Site. He OZ AVH SINZ

	X mixed on site		
7)	Grout additives requested, and percent by d	ry weight relative to cement: None	
8)	Additional notes and calculations: None		
VII. A	ADDITIONAL INFORMATION: List addi	tional information below, or on separate sheet(s	):
Test ho	ole POTO-5 was drilled to 80 ft had in 1991. T	wo piezometers (A and B) were installed in the	test hale POTO-SA
piezom	eter is constructed with 77.5 ft of 2-in. diame	ter PVC casing with a screened interval from 5	7.5 to 67.5 ft bgl. POTO-
	zometer is constructed with 2-in. diameter PV appurtenances will be removed from around	C casing below 17 ft bgl with a screened interv	al from 7 to 17 ft bgl. All
001100			
VIII.	SIGNATURE:		
I,		, say that I have carefully read the f	
		reof; that I am familiar with the rules and regula I comply with them, and that each and all of the	
	ng Plan of Operations and attachments are tru		statements in the wen
		March Un off	5-20-15
		Signature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:		
This W	ell Plugging Plan of Operations is:		
	Approved subject to the attached	conditions	
	Not approved for the reasons pro		
	W	TH TOW	2015
	Witness my hand and official seal this	day of Bank PE	7
	ENG/NET	Scott A Vachines, State Enginee	
	2 5 6 1 C 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	By:	<u>//</u>
	THE REPORT OF THE PARTY OF THE		
	11 M M N 10 2	2015 MAY 20 PM 3: 33	
	William In		

OSIZEM MEN 'E- VLNVS Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			77.5 (A), 17 (B)
Theoretical volume of grout required per interval (gallons)			64.9 OV
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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SAVTA FE, NEW MEXICO

TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

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SENTE DE STATE ENGINEER
SANTA FE, NEW MEXICO



# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95364

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 nested piezometer well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that each leg of the piezometer cluster will be individually pressure grouted with neat cement from total depth to 20 feet below ground surface (bgs) via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-inch (outside diameter) 4 ¼" (inside diameter) (HD) augers to a minimum of 20 feet bgs. Neat cement will be used to fill the boring from 20 feet up to 2 feet bgs. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This piezometer well was not used as part of a monitoring program. Existing active wells that are in close proximity to the well(s) that are to be abandoned could possibly have communication during cementing operations. To reduce the likelihood of this scenario, the water to cement ratio can be reduced to 5.2 gallons of water per 94 pound sack of Portland cement.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95364 Nested Piezometer Well (2 Legs)	2	(East) 231, (West) 125	35°52′57.2″	106°15′13.6″

# <u>Specific Plugging Conditions of Approval for 1 Nested Piezometer Well for the U.S.</u> <u>Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico</u>

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column.
- 3. Each individual well inside the nested cluster shall be abandoned separately. The volumes for each individual well inside the nested cluster shall be reported separately on the well plugging record for the piezometer well.

- 4. Upon completion of the plugging of the lower portion of the 2" piezometer well to approximately 20 foot bgs of actual overdrilling, the top of the 2 inch casing shall be severed within the bottom of the 4 1/4" x 8 1/4" HD augers prior to sealant being placed within the ID of the augers.
- 5. Sealant shall be kept up inside the augers during placement. The 4 ¼" x 8 ¼" augers shall be pulled out of the hole in such a manner that allows the sealant to remain inside the auger at all times, thus providing displacement to prevent borehole collapse. The 4 ¼" x 8 ½" augers may not be pulled out of the hole prior to the sealant being placed.
- 6. Theoretical volume of sealant required for abandonment of the 2-inch (inside) diameter well is approximately .16 gallons per foot. Theoretical volume of sealant required for abandonment of the 8 1/4" (outside) diameter auger boring is ~2.8 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
R-4 (East)	2	211	5	34
R-4 (West)	2	105	2	17
R-4 (Auger Boring)	8.25	20	7	56
Гotals:			14	107

- 7. All surface completions (vaults) will be removed, if applicable. The top of the 2" casing will be severed within the bottom of the 4 1/2" x 8 1/2" HD augers and the overdrilled hole will be backfilled with sealant to 2 feet bgs. The remaining 2' will be filled with concrete to surface.
- 8. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 9. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 10. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a> itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.
- 11. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSE District 6, Water Rights Division

Date: July 6, 2015



### **Locator Tool Report**

### **General Information:**

Application ID: 29

Date: 05-21-2015 Time: 15:52:59

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

> GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### Geographic Coordinates:

Latitude: Longitude:

35 Degrees 52 Minutes 57.2 Seconds N 106 Degrees 15 Minutes 13.6 Seconds W

Universal Transverse Mercator Zone: 13N

NAD 1983(92) (Meters) NAD 1983(92) (Survey Feet)

N: 3,971,649 N: 13,030,318 E: 1,269,125

E: 386,830

NAD 1927 (Meters)

N: 3,971,452

E: 386,775

NAD 1927 (Survey Feet)

N: 13,029,671 E: 1,268,944

State Plane Coordinate System Zone: New Mexico Central

NAD 1983(92) (Meters)

N: 541,483 N: 1,776,517 E: 499,659

NAD 1983(92) (Survey Feet) NAD 1927 (Meters)

N: 541,470

E: 1,639,298 E: 152,007

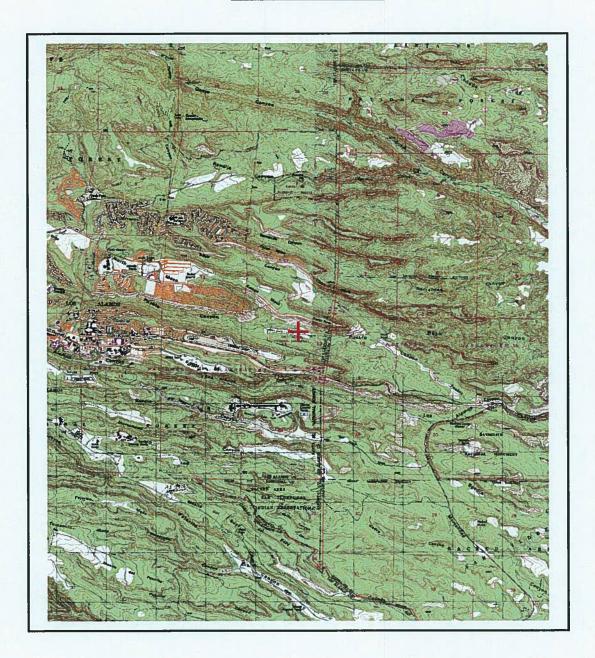
NAD 1927 (Survey Feet)

N: 1,776,471

E: 498,709

# **NEW MEXICO OFFICE OF STATE ENGINEER**

# **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:76,536

Northing/Easting: UTM83(92) (Meter): N: 3,971,649 E: 386,830

Northing/Easting: SPCS83(92) (Feet): N: 1,776,517 E: 1,639,298

GW Basin: Rio Grande

Page 2 of 2

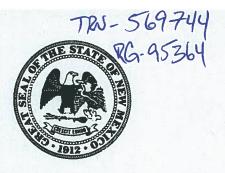
Print Date: 05/21/2015



Static water level: Dry

feet below land surface / feet above land surface (circle one)

# WELL PLUGGING PLAN OF OPERATIONS



I. FIL	ING FEE: There is no filing fee for	this form.	
II. GI	ENERAL / WELL OWNERSHIP:		
Existir	ng Office of the State Engineer POD 1	Number (Well Number) for well to be plug	gged: R-4 Piezometers (East and West)
Name	of well owner: <u>U.S. Department of E</u>	nergy/Los Alamos National Laboratory	
Mailin	g address: P.O. Box 1663		
City:	Los Alamos	State: New Mexico	Zip code: <u>87545</u>
Phone	number: <u>505-667-5931</u>	E-mail: meverett@la	nl.gov
III. W	ELL DRILLER INFORMATION		
Well I	Driller contracted to provide plugging	services: <u>Geomechanics Southwest, Inc.</u>	
New N	Mexico Well Driller License No.: 152	2	Expiration Date: <u>04/30/2017</u>
IV. W	ELL INFORMATION:		
Note:	A C.1 1.41 TW 11 D 1.6		
	A copy of the existing Well Record i	or the well to be plugged should be attach	ed to this plan.
			ed to this plan.
1)	GPS Well Location (BRASS CAP)	: East: 1639297.6	ed to this plan.
	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico		
	GPS Well Location (BRASS CAP)	East: 1639297.6 North: 1776516.9	
	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico 1983]).	East: 1639297.6 North: 1776516.9	ne (North American Datum, 1983[NAD
1)	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico 1983]).	e: East: 1639297.6 North: 1776516.9 State Plane Grid Coordinates, Central Zo	ne (North American Datum, 1983[NAD
1)	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico (1983]).  Reason(s) for plugging well: The larger represents a conduit to the subsurface.	East: 1639297.6 North: 1776516.9 State Plane Grid Coordinates, Central Zo R-4 piezometer cluster is old and not used ace for potential contaminants.	ne (North American Datum, 1983[NAD for its intended purpose. The borehole
1)	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico 1983]).  Reason(s) for plugging well: The larger sents a conduit to the subsurface.  Was well used for any type of monwhat hydrogeologic parameters were sent to the subsurface.	e: East: 1639297.6 North: 1776516.9 State Plane Grid Coordinates, Central Zo	ne (North American Datum, 1983[NAD for its intended purpose. The borehole e use section VII of this form to detail monitor contaminated or poor quality
1)	GPS Well Location (BRASS CAP)  Well coordinates are New Mexico (1983]).  Reason(s) for plugging well: The I represents a conduit to the subsurfative was well used for any type of mon what hydrogeologic parameters water, authorization from the New	East: 1639297.6 North: 1776516.9 State Plane Grid Coordinates, Central Zo R-4 piezometer cluster is old and not used ace for potential contaminants.  itoring program? No If yes, pleasere monitored. If the well was used to	ne (North American Datum, 1983[NAD for its intended purpose. The borehole e use section VII of this form to detail monitor contaminated or poor quality required prior to plugging.

2015 MA 3: 31

6)	Depth of the well: 231 (East), 125 (West) feet				
7)	Inside diameter of innermost casing: 2.0 inches.				
8)	Casing material: PVC				
9)	The well was constructed with:  an open-hole production interval, state the open interval:  X a well screen or perforated pipe, state the screened interval(s): 221-231 ft bgl (East), 115-125 ft bgl (West)				
	a wen selection perforated pipe, state the selection mervan(s). 221 251 to be (2200), 115 125 to be (300)				
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None				
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? No If yes, please describe:				
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.				
V. DI	ESCRIPTION OF PLANNED WELL PLUGGING:				
pipe, a	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional cal information, such as geophysical logs, that are necessary to adequately describe the proposal.  Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology				
	proposed for the well: The piezometers will be individually pressure grouted with neat cement from total depth to				
	20 ft bgl via tremie pipe. The piezometer cluster will then be overdrilled with 8.25-in. O.D. augers to a minimum of				
	20 ft bgl. Neat cement slurry will be used to fill the boring from 20 to 2 ft bgl. The top 2 ft will be filled with				
	concrete and mounded above the existing grade.				
2)	Will well head be cut-off below land surface after plugging? Well heads will be cut off and drilled out before sealing to ground surface.				
VI. P	LUGGING AND SEALING MATERIALS:				
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant				
1)	For plugging intervals that employ cement grout, complete and attach Table A.				
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.				
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 107 gallons				
4)	Type of Cement proposed: Portland Type I/II cement				
5)	Proposed cement grout mix: 6 gallons of water per 94 pound sack of Portland cement.				
6)	Will the grout be: batch-mixed and delivered to the Egited 02 AVH \$107				

	A_ IIIAG OII .	Site .	
7)	Grout additives requested, and percent	by dry weight relative to cement: None	
8)	Additional notes and calculations: No	ne	
VII	ADDITIONAL INFORMATION: List	additional information below, or on separate sheet(s	0.
. Oh			
		Two piezometers (East and West) were installed in a ameter PVC casing with a screened interval from 22	
		-in. diameter PVC casing with a screened interval fr	om 115 to 125 ft bgl. All
surtac	e appurtenances will be removed from arc	ound the piezometers before they are abandoned.	
VIII.	SIGNATURE:		
		, say that I have carefully read the f	oregoing Well Plugging
Opera	tions and any attachments, which are a pa	rt hereof; that I am familiar with the rules and regula	ations of the State
Engin	eer pertaining to the plugging of wells and	d will comply with them, and that each and all of the	statements in the Well
Plugg	ng Plan of Operations and attachments ar	te true to the best of my knowledge and belief.	
		Work Unit	5-20-15
		Signature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER		
This V	Vell Plugging Plan of Operations is:		
	Approved subject to the attac	ched conditions. s provided on the attached letter.	
	Not approved for the reasons		
	Witness my hand and official seal this	6 day of Toly	,2015
	Widioss my hand and official soul and	TOM BLAINE P.E.	,
	mining.	Scott A. Verhinge, State Engineer	7
	ENGINE	Ву:	
	56 6 6		
	TI S S I I I I I I I I I I I I I I I I I		
	100	SOLS MY SO PM 3: 31	
	30.912.0		
	MEM !!	SANTA FE, NEW MEXICO	Wall Diversing Plan

SANTA FE, NEW MEXICO

Well Plugging Plan Version: December, 2011 Page 3 of 5

TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			231 (East) and 125 (West)
Theoretical volume of grout required per interval (gallons)			107
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

16:5 M9 05 YAH 3105

SANTA FE, NEW MEXICO



# STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Tom Blaine, P.E. District 6 Office, Santa Fe, NM

# Well Plugging Plan of Operations Conditions of Approval for RG-95365

The U.S. Department of Energy / Los Alamos National Laboratory has identified 1 well as tabulated below. On the Well Plugging Plan of Operations received May 20, 2015, the applicant stated that the well is old and not used for its intended purpose and that the borehole represents a conduit to the subsurface for potential contaminants. The applicant states that the well will be pressure grouted with neat cement from total depth to 2 feet below ground surface (bgs) via tremie pipe. The top 2 feet will be filled with concrete and mounded above the existing grade. Static water level is dry, according to the applicant. There is no OSE File No. or historical record available for this test well. This well was not used as part of a monitoring program. Given the small diameter of the casing in this well, a reduction in water below 6 gallons per 94 pound sack of Portland Cement is not advised.

Location: Los Alamos, New Mexico.

Approximate well coordinates: See tabulated data.

Well Name	Inside diameter (inches)	Total depth (feet)	Latitude North	Longitude West
RG-95365	1.1	825.6	35°51′52.3″	106°17′30.3″

## Specific Plugging Conditions of Approval for 1 Well for the U.S. Department of Energy / Los Alamos National Laboratory, Los Alamos County, New Mexico

- Water well drilling and well drilling activities, including well plugging, are regulated under 19.27.4
  NMAC, which requires any person engaged in the business of well drilling within New Mexico to
  obtain a Well Driller License issued by the New Mexico Office of the State Engineer (NMOSE).
  Therefore, the firm of a New Mexico licensed Well Driller shall perform the well plugging.
- 2. Placement of the sealant within the well shall be by pumping through a tremie pipe extended to near well bottom (based on sounding depth), and kept below top of the slurry column as the well is plugged from bottom-upwards in a manner that displaces the standing water column. An explanation of how this process was successfully achieved shall be required on the Well Plugging Record, upon completion of the well plugging.
- 3. All cement mixture will contain no more than 6 gallons of water per 94 pound sack of cement. Total minimum amount of required sealant will be based on the sounding depth inside casing.
- 4. Theoretical volume of sealant required for abandonment of the 1.1-inch (inside) diameter well is approximately .05 gallons per foot. Total theoretical volume of sealant required to fill the well is tabulated below.

Well Name	Inside Diameter (Inches)	Total Depth (feet)	Volume (Cubic Feet)	Volume (Gallons)
MCOI-1	1.1	825.6	5	41
Totals:			5	41

- 5. All surface completions (vaults) will be removed, if applicable. The 1.1" casing will be terminated ~2 feet bgs and filled with concrete to surface.
- 6. Should the NMED, or another regulatory agency sharing jurisdiction of the project authorize, or by regulation require a more stringent well plugging procedure than herein acknowledged, the more-stringent procedure should be followed. This, in part, includes provisions regarding pre-authorization to proceed, contaminant remediation, inspection, pulling/perforating of casing, or prohibition of free discharge of any fluid from the borehole during or related to the plugging process.
- 7. NMOSE witnessing of the plugging will not be required, but shall be facilitated if a NMOSE observer is onsite. NMOSE witnessing may be requested during normal work hours by calling the District 6 NMOSE Office at 505-827-6120, at least 48-hours in advance. NMOSE inspection will occur dependant on personnel availability.
- 8. A Well Plugging Record (available at: <a href="http://www.ose.state.nm.us/STST/Forms/WD-11.pdf">http://www.ose.state.nm.us/STST/Forms/WD-11.pdf</a> itemizing actual abandonment process and materials used shall be filed with the State Engineer (NMOSE, P.O. Box 25102 407 Galisteo Street Room 102, Santa Fe, NM 87504-5102), <a href="https://www.ose.state.nm.us/STST/Forms/WD-11.pdf">within 20 days after completion of well plugging. Please attach a copy of these plugging conditions.</a>
- 9. Although the applicant responses to plugging plan Section IV indicate that there may be a concern for contaminant travel through the old well(s) being plugged, applicant has not indicated that the well casing will be either pulled during tremie backfill or fully encapsulated in annular grout seal. The OSE does not have documentation that surface or subsurface contamination exists in the area, and takes at face value that the applicant's plugging intentions address known or surmised concerns regarding potential contaminant pathways. The plugging method proposed addresses the OSE's concern that overt comingling of aquifers or draining of surface water to aquifers is prevented by plugging the well casings.

The NMOSE Well Plugging Plan of Operations dated May 20, 2015, with annotation, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Christopher M. Thornburg, NMOSP District 6, Water Rights Division

Date: July 6, 2015

### **Locator Tool Report**

#### **General Information:**

Application ID: 29

Date: 05-21-2015

Time: 14:07:36

WR File Number: RG-00000

Purpose: OTHER

Applicant First Name: USDOE Applicant Last Name: LANL

GW Basin: RIO GRANDE County: LOS ALAMOS

Critical Management Area Name(s): WATERS USE ONLY: SUBBASIN - NRG

Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

### PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

#### **Coordinate System Details:**

#### **Geographic Coordinates:**

Latitude: 35 Degrees 51 Minutes 52.3 Seconds N Longitude: 106 Degrees 17 Minutes 30.3 Seconds W

#### Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,969,694
 E: 383,375

 NAD 1983(92) (Survey Feet)
 N: 13,023,904
 E: 1,257,789

 NAD 1927 (Meters)
 N: 3,969,491
 E: 383,425

 NAD 1927 (Survey Feet)
 N: 13,023,237
 E: 1,257,953

#### State Plane Coordinate System Zone: New Mexico Central

 NAD 1983(92) (Meters)
 N: 539,484
 E: 496,229

 NAD 1983(92) (Survey Feet)
 N: 1,769,958
 E: 1,628,044

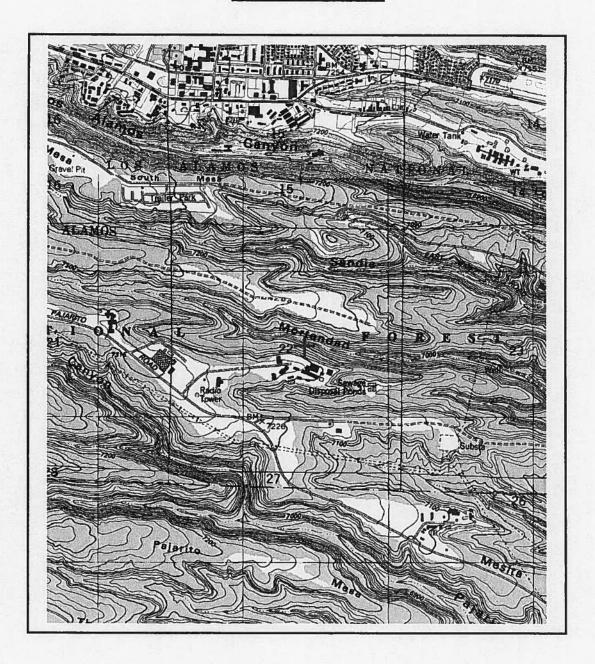
 NAD 1927 (Meters)
 N: 539,466
 E: 148,682

 NAD 1927 (Survey Feet)
 N: 1,769,896
 E: 487,800

Page 1 of 2 Print Date: 05/21/2015

### **NEW MEXICO OFFICE OF STATE ENGINEER**

### **Locator Tool Report**





WR File Number: RG-00000 Scale: 1:26,115

Northing/Easting: UTM83(92) (Meter): N: 3,969,694 E: 383,375

Northing/Easting: SPCS83(92) (Feet): N: 1,769,958 E: 1,628,044

GW Basin: Rio Grande

Page 2 of 2 Print Date: 05/21/2015



Static water level: Dry

feet below land surface / feet above land surface (circle one) = 8 WV 02 AVW SIOZ

### WELL PLUGGING PLAN OF OPERATIONS



NOTE: A Well Plugging Plan of Operations shall be filed with and accepted by the Office of the State Engineer prior to plugging. I. FILING FEE: There is no filing fee for this form. II. GENERAL/WELL OWNERSHIP: Existing Office of the State Engineer POD Number (Well Number) for well to be plugged: MCOI-1 Name of well owner: U.S. Department of Energy/Los Alamos National Laboratory Mailing address: P.O. Box 1663 City: Los Alamos State: New Mexico Zip code: 87545 Phone number: 505-667-5931 E-mail: meverett@lanl.gov III. WELL DRILLER INFORMATION: Well Driller contracted to provide plugging services: Geomechanics Southwest, Inc. New Mexico Well Driller License No.: 1522 Expiration Date: 04/30/2017 **IV. WELL INFORMATION:** Note: A copy of the existing Well Record for the well to be plugged should be attached to this plan. 1628044.5 GPS Well Location (BRASS CAP): East: 1) North: 1769957.4 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983[NAD Reason(s) for plugging well: MCOI-1 is old and not used for its intended purpose. The borehole represents a 2) conduit to the subsurface for potential contaminants. Was well used for any type of monitoring program? No \_\_\_\_\_ If yes, please use section VII of this form to detail 3) what hydrogeologic parameters were monitored. If the well was used to monitor contaminated or poor quality water, authorization from the New Mexico Environment Department may be required prior to plugging. 4) including analytical results and/or laboratory report(s):

6)	Depth of the well: 825.6 feet							
7)	Inside diameter of innermost casing: 1.1 inches.							
8)	Casing material: Stainless steel							
9)	The well was constructed with:							
	an open-hole production interval, state the open interval:							
	X a well screen or perforated pipe, state the screened interval(s): 815-825.5 ft bgl							
10)	What annular interval surrounding the artesian casing of this well is cement-grouted? None							
1								
11)	Was the well built with surface casing? No If yes, is the annulus surrounding the surface casing grouted or otherwise sealed? No If yes, please describe:							
12)	Has all pumping equipment and associated piping been removed from the well? Yes If not, describe remaining equipment and intentions to remove prior to plugging in Section VII of this form.							
V D	ESCRIPTION OF PLANNED WELL PLUGGING:							
pipe,	If this plan proposes to plug an artesian well in a way other than with cement grout, placed bottom to top with a tremie a detailed diagram of the well showing proposed final plugged configuration shall be attached, as well as any additional ical information, such as geophysical logs, that are necessary to adequately describe the proposal.							
1)	Describe the method by which cement grout shall be placed in the well, or describe requested plugging methodology							
	proposed for the well: The piezometer is cemented in place from surface to 77 ft bgl. Therefore, the							
	piezometer will not be overdrilled. The piezometer will be pressure grouted with neat cement from total depth to 2							
	ft bgl via tremie pipe. The casing will be cut near ground surface and the top 2 ft will be filled with concrete and							
	mounded above the existing grade.							
2)	Will well head be cut-off below land surface after plugging? Well head will be cut near ground surface.							
VI. F	PLUGGING AND SEALING MATERIALS:							
Note:	The plugging of a well that taps poor quality water may require the use of a specialty cement or specialty sealant							
1)	For plugging intervals that employ cement grout, complete and attach Table A.							
2)	For plugging intervals that will employ approved non-cement based sealant(s), complete and attach Table B.							
3)	Theoretical volume of grout required to plug the well to land surface: Approximately 39.3 gallons							
4)	Type of Cement proposed: Portland Type I/II cement							
5)	Proposed cement grout mix:6 gallons of water per 94 pound sack of Portland cement.							
6)	Will the grout be: batch-mixed and delivered to the site  X mixed on site CZ AVW SIOZ							

SANTA FE, NEW MEXICO

7)	Grout additives requested, and percent by	dry weight relative to cement: None	
8)	Additional notes and calculations: None		
			parameters of the second
VII. A	ADDITIONAL INFORMATION: List add	ditional information below, or on separate sheet(s	):
Coreho	ole MCOI-1 was drilled to 843.2 ft bgl in 20	005. MCOI-1 piezometer was installed in the core	hole and is constructed
	25.6 ft of 1-in. diameter stainless steel casin enances will be removed from around the pi	g with a screened interval from 815 to 825.5 ft bg	l. All surface
appuru	enances will be removed from around the pr	rezonneter before it is abandoned.	
VIII.	SIGNATURE:		
		, say that I have carefully read the f	
Operat	ions and any attachments, which are a part l	hereof; that I am familiar with the rules and regula	ations of the State
	er pertaining to the plugging of wells and wing Plan of Operations and attachments are to	vill comply with them, and that each and all of the rue to the best of my knowledge and belief.	statements in the well
00		114 / 14 04	- 32
		wan unit	5-20-15
		Signature of Applicant	Date
IX. A	CTION OF THE STATE ENGINEER:		
This U	Vell Plugging Plan of Operations is:		
I IIIS W			
	Approved subject to the attache Not approved for the reasons pr	ed conditions.	
	Not approved for the reasons p		
	Witness my hand and official seal this	674 day of July	2015
		Scott A. Verhines State Engineer	
	ENGINER	Scott A. J.	
	THE STATE OF	Ву:	<del>/</del>
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	100 K 1912 OF THE		
	NEW WELL	40.0 IN 07 INIO	
	"Milling	2015 MAY 20 AM 8:54	

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SANTA FE, NEW MEXICO

Well Plugging Plan Version: December, 2011 Page 3 of 5

## TABLE A - For plugging intervals that employ cement grout. Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of grout placement (ft bgl)			Surface
Bottom of proposed interval of grout placement (ft bgl)			825.6
Theoretical volume of grout required per interval (gallons)			39.3 40.8 ok @
Proposed cement grout mix gallons of water per 94-lb. sack of Portland cement			6
Mixed on-site or batch- mixed and delivered?			On-site
Grout additive 1 requested			
Additive 1 percent by dry weight relative to cement			
Grout additive 2 requested			
Additive 2 percent by dry weight relative to cement			

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TABLE B - For plugging intervals that will employ approved non-cement based sealant(s). Start with deepest interval.

	Interval 1 – deepest	Interval 2	Interval 3 – most shallow
			Note: if the well is non-artesian and breaches only one aquifer, use only this column.
Top of proposed interval of sealant placement (ft bgl)			
Bottom of proposed sealant of grout placement (ft bgl)			
Theoretical volume of sealant required per interval (gallons)			
Proposed abandonment sealant (manufacturer and trade name)			

2015 MAY 20 AM 8: 54





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GEI	NERAL / WELL OWNERSHIP:				
State E	ngineer Well Number: RG95351 TA-52 Hole	NW-1			
Well o	wner: U.S. Department of Energy/Los Alamo	s Nationa	l Laboratory Phone No.:	505-667-3005	_
Mailing	g address: P.O. Box 1663				
City:	Los Alamos	State:	New Mexico	Zip code:	87545
II. WI	ELL PLUGGING INFORMATION:				
1)	Name of well drilling company that plugged	well:	Geomechanics Southwest, In	ic. (GSI)	
2)	New Mexico Well Driller License No.:	1522	Expiration	n Date: <u>4/30/17</u>	
3)	Well plugging activities were supervised by	the follo	wing well driller(s)/rig superv	isor(s): GSI	
4)	Date well plugging began: 7/21/15		Date well plugging conclu	ided:7/21/15	5
5)	GPS Well Location: East: <u>1629046</u> North: 1768198		-		
	Well coordinates are New Mexico State Pla [NAD 1983]).		_ Coordinates, Central Zone (N	North American Datum	ı, 1983
6)	Depth of well confirmed at initiation of plug by the following manner: <u>Manual tag line n</u>			elow ground level (bgl),	,
7)	Static water level measured at initiation of p	lugging:	<u>dry</u> ft bgl		
8)	Date well plugging plan of operations was a	pproved	by the State Engineer: 7/6/20	15	
9)	Were all plugging activities consistent with between the approved plugging plan and the				differences
Well T	A-52 Test Hole NW-1 was constructed with 2	-in ID pl	astic tubing and 0.75-in ID tul	ping to 97 ft bgl. Howe	ver, when
depths	were measured inside the tubes, the 2-in ID tu	be was to	otal depth was 77.2 ft bgl and t	he 0.75-in ID tube was	blocked
at 3.5 f	t bgl. Also, due to construction details, this we	ll abando	onment was not supposed to in	clude over-drilling. Ho	owever,
the surf	face casing extended only to ~2 ft bgl and was	easily re	moved. The 2-in tube was cer	mented with 1-in poly t	ubing
from 77	7.2 to 2 ft bgl with Portland Type I/II neat cem	ent. The	plastic tubes were drilled out	from surface to 20 ft b	gl with a
6.25-in	ID/10-in OD hollow stem auger, terminating	the tubin	g at 20 ft bgl, with neat cemen	t emplaced from 20 ft b	ogl to
ground	level.				

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	13.4 gallons	9.6 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
· _					nom surface to 20 it bgi
10 -					
-					
: <del></del>					
-					
_	Portland Type I/II Cement	2.8 gallons	1.7 gallons	Tremie	Cement in 2-in. plastic tubing from 2 to 77.3 ft bgl.
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57 <b>–</b>					
" –					
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]					

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7,4805	=	gallons
cubic yards	х	201.97	=	gallons

III. SIGNATURE:

I, Brank L. Sadis	, say	that I	am	familiar	with	the	rules	of the	Office	of the	Stat
Engineer pertaining to the plugging of wells and that e	each a	nd all o	of the	e stateme	nts in	this	Plugg	ing Re	ecord an	d attach	ıment
are true to the best of my knowledge and belief.	A	5	- 1								

Signature of Well Driller

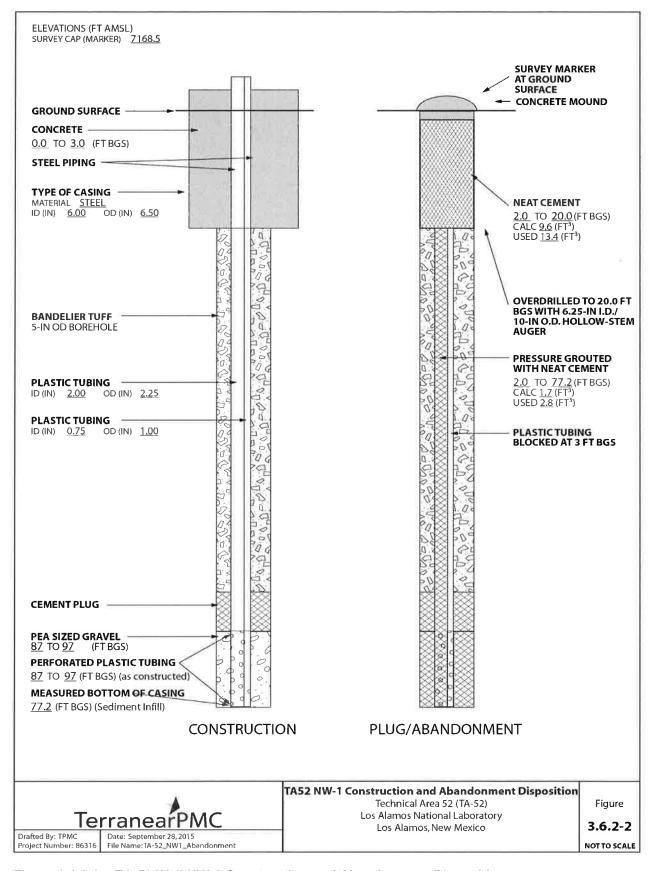


Figure 3.6.2-2 TA-52 Well NW-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GE	NEKAL/ WELLOWNERSHIF.
State E	Engineer Well Number: RG95352 TA-52 Hole SE-1
Well o	wner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailin	g address: P.O. Box 1663
City: _	Los Alamos State: New Mexico Zip code: 87545
II. WI	ELL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
	·
4)	Date well plugging began: 7/22/15 Date well plugging concluded: 7/22/15
5)	GPS Well Location: East: <u>1629041.992</u> North: <u>1768200.691</u>
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: <u>well 1, 77.8, well 2, 4.5</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7)	Static water level measured at initiation of plugging: dry ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer: 7/6/2015
9)	Were all plugging activities consistent with an approved plugging plan? No. If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well 7	TA-52 Test Hole SE-1 was constructed with 2-in ID plastic tubing and 0.75-in ID tubing to 97 ft bgl. However, when
depths	were measured inside the tubes, the 2-in ID tube was total depth was 77.8 ft bgl and the 0.75-in ID tube was blocked
at 4.5 f	t bgl. Also, due to construction details, this well abandonment was not to include over-drilling. However, the surface
casing	extended only to ~2 ft bgl and was easily removed. The 2-in tube was cemented with 1-in poly tubing from 77.8 to 2
ft bgl v	with Portland Type I/II neat cement. The plastic tubes were drilled out from surface to 20 ft bgl with a 6.25-in ID/10-
in OD	hollow stem auger, terminating the tubing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.

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### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
10 -	Portland Type I/II Cement	16 gallons	9.6 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
57	Portland Type I/II Cement	2.8 gallons	1.7 gallons	Tremie	Cement in 2-in. plastic tubing from 2 to 77.3 ft bgl.
		f		,	

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

m. signature.									
1. Brack L. Santons	, say	that I	am	familiar	with the	e rules o	f the Offi	ce of the	State
Engineer pertaining to the plugging of wells and that	each a	nd all o	of the	e stateme	nts in th	is Pluggin	g Record a	and attach	ments
are true to the best of my knowledge and belief.		_	л	0					
N	21	7	Ρ	λ_	$\triangle$			•	

Signature of Well Driller

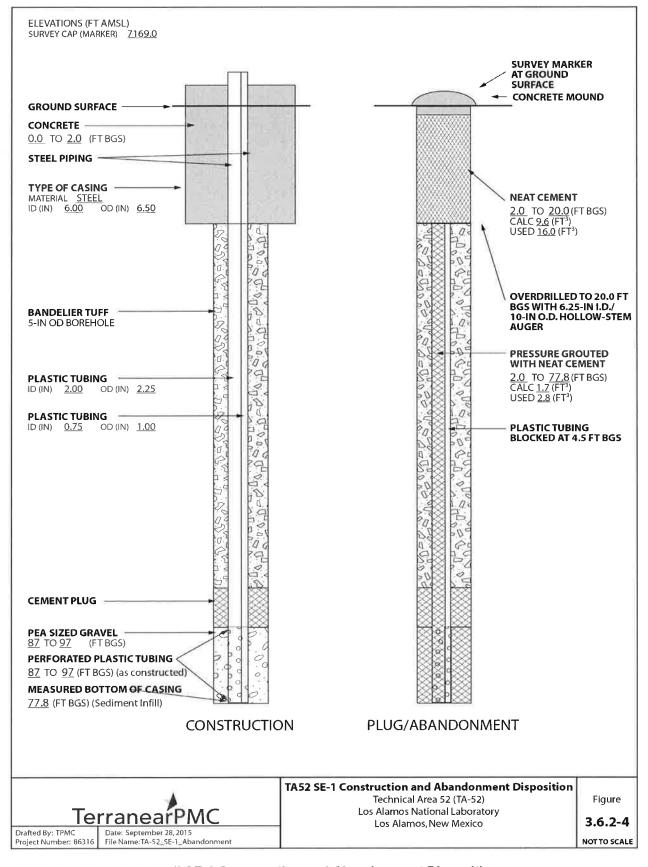


Figure 3.6.2-4 TA-52 Well SE-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GEN	VERAL / WELL OWNERSHIP:
State Er	ngineer Well Number: RG95353 TA-52 Hole I
Well ov	wner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing	address: P.O. Box 1663
City: _	Los Alamos State: New Mexico Zip code: 87545
II. WE	LL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	Date well plugging began: 7/22/15 Date well plugging concluded: 7/22/15
5)	GPS Well Location: East: <u>1629060.618</u> North: 1768242.618
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: <u>well 1, 76.2, well 2, 5.5</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7)	Static water level measured at initiation of plugging: <u>dry</u> ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer: 7/6/2015
9)	Were all plugging activities consistent with an approved plugging plan? No . If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well T	A-52 Test Hole I was constructed with 2-in ID plastic tubing and 0.75-in ID tubing to 97 ft bgl. However, when
depths v	were measured inside the tubes, the 2-in ID tube was total depth was 76.2 ft bgl and the 0.75-in ID tube was blocked
at 5.5 ft	bgl. Also, due to construction details, this well abandonment was not to include over-drilling. However, the surface
casing e	extended only to ~2 ft bgl and was easily removed. The 2-in tube was cemented with 1-in poly tubing from 76.2 to 2
ft bgl w	ith Portland Type I/II neat cement. The plastic tubes were over-drilled from surface to 20 ft bgl with a 6.25-in ID/10-
in OD h	allow stam auger terminating the tubing at 20 ft has, with next coment emplaced from 20 ft hal to ground level

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	16 gallons	9.6 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
20					nom surisos to 20 h ogi
_					
=					
1-					
78	Portland Type I/II Cement	2.8 gallons	1.7 gallons	Tremie	Cement in 2-in. plastic tubing from 2 to 77.3 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805		gallons
cubic yards	х	201.97	=	gailons

III. SIGNATURE:						
I, Brada L. Sales	, say that I an	n familiar	with the	rules of the	e Office	of the State
Engineer pertaining to the plugging of wells and that	each and all of t	he stateme	nts in this	Plugging Re	ecord and	attachments
are true to the best of my knowledge and belief.	001					
1 \	$X \perp X$	0	-		4.	-

Signature of Well Driller

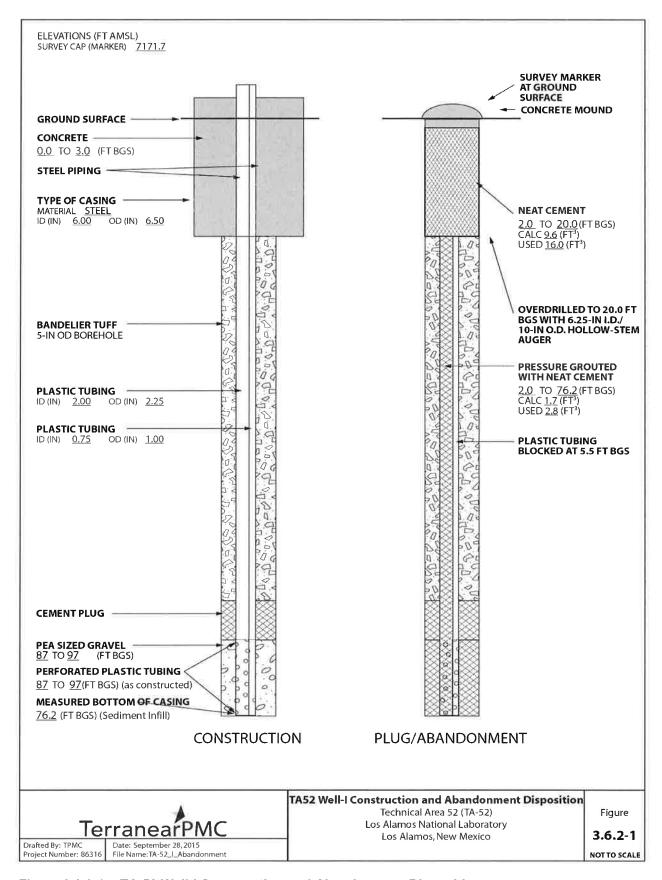


Figure 3.6.2-1 TA-52 Well-I Construction and Abandonment Disposition



emplaced from 20 ft bgl to ground level.

### PLUGGING RECORD



NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GEN	NERAL / WELL OWNERSHIP:
State Er	ngineer Well Number: RG95354 TA-52 NE-1
Well ov	wner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005
Mailing	g address: P.O. Box 1663
City: _	Los Alamos State: New Mexico Zip code: 87545
II. WE	LL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	Date well plugging began: 7/22/15 Date well plugging concluded: 7/22/15
5)	GPS Well Location: East: <u>1629056.249</u> North: 1768205.599
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: <u>well 1, 284.2, wells 2 and 3, 4</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7)	Static water level measured at initiation of plugging: dry ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer: 7/6/2015
9)	Were all plugging activities consistent with an approved plugging plan? No . If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well T	A-52 Test Hole NE-1 was constructed with 1 string of 1.5-in ID plastic tubing to 291 ft bgl and 2 strings of 0.75-in ID
tubing t	o 170 ft bgl. However, when depths were measured inside the tubes, the 1.5-in ID tube total depth was 284.2 ft bgl
and the	2 0.75-in ID tubes were blocked at 4 ft bgl. Also, due to construction details, this well abandonment was not to
include	over-drilling. However, the surface casing extended only to ~2 ft bgl and was easily removed. The 1.5-in tube was
cemente	ed with 1-in poly tubing from 284.2 to 2 ft bgl with Portland Type I/II neat cement. The plastic tubes were drilled out
from su	rface to 20 ft bgl with a 3.25-in ID/7-in OD hollow stem auger, terminating the tubing at 20 ft bgl, with neat cement

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	10.7 gallons	4.2 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
: <u> </u>					nom surface to 20 it ogi
10					
10					
_					
:=					
S <del>-</del>					
g <del></del>	Portland Type I/II Cement	4 gallons	3.5 gallons	Tremie	Cement in 2-in. plastic tubing from 2 to 77.3 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

**III. SIGNATURE:** 

I, Branden L. Sades	_, say that	I am familiar	with the	rules of tl	he Office	of the State
Engineer pertaining to the plugging of wells and that	t each and all	of the stateme	ents in this	Plugging F	Record and	attachments
are true to the best of my knowledge and belief.		-0				

Signature of Well Driller

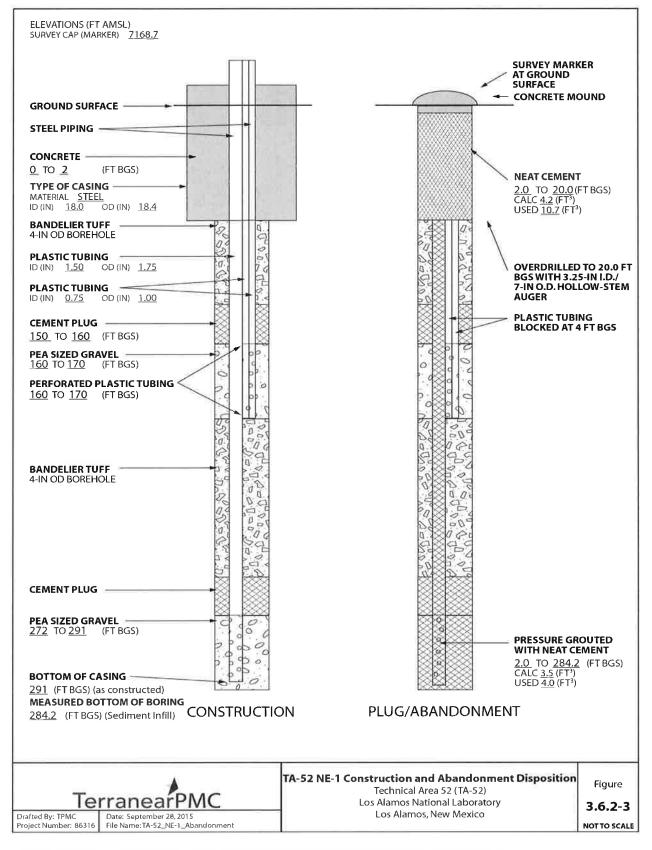


Figure 3.6.2-3 TA-52 Well NE-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:
State Engineer Well Number: RG95355 TA-52 Hole NE-2
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
II. WELL PLUGGING INFORMATION:
1) Name of well drilling company that plugged well: <u>Geomechanics Southwest, Inc.</u> (GSI)
2) New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4) Date well plugging began:7/22/15 Date well plugging concluded:7/22/15
5) GPS Well Location: East: <u>1629054.546</u>
North: <u>1768180.955</u> Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
Depth of well confirmed at initiation of plugging as: <u>well 1, 77.3, well 2, 4.5</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7) Static water level measured at initiation of plugging: <u>dry</u> ft bgl
8) Date well plugging plan of operations was approved by the State Engineer: 7/6/2015
9) Were all plugging activities consistent with an approved plugging plan? No. If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well TA-52 Test Hole NE-2 was constructed with 2-in ID plastic tubing and 0.75-in ID tubing to 97 ft bgl. However, when
depths were measured inside the tubes, the 2-in ID tube was total depth was 77.3 ft bgl and the 0.75-in ID tube was blocked
at 4.5 ft bgl. Also, due to construction details, this well abandonment was to not include over-drilling. However, the surface
casing extended only to $\sim$ 2 ft bgl and was easily removed. The 2-in tube was cemented with 1-in poly tubing from 77.3 to 2
ft bgl with Portland Type I/II neat cement. The plastic tubes were drilled out from surface to 20 ft bgl with a 6.25-in ID/10-
in OD hollow stem auger, terminating the tubing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement <u>Method</u> (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	16 gallons	9.6 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
					nom surface to 20 it ogi
10					
10					
_					
i <del></del>					
1-	Portland Type I/II Cement	2.8 gallons	1.7 gallons	Tremie	Cement in 2-in. plastic tubing from 2 to 77.3 ft bgl.
-				7	nom 2 to 77.5 it ogi.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:		1920					
I, Boul L. Soles	, say that I an	n familiar	with the	rules of th	ne Office	of the	State
Engineer pertaining to the plugging of wells and that of	each and all of the	he/stateme	nts in this	Plugging F	Record and	l attachr	ments
are true to the best of my knowledge and belief.	- 1	()					
$\Lambda$	0 1	X	$\rightarrow$				_

Signature of Well Driller

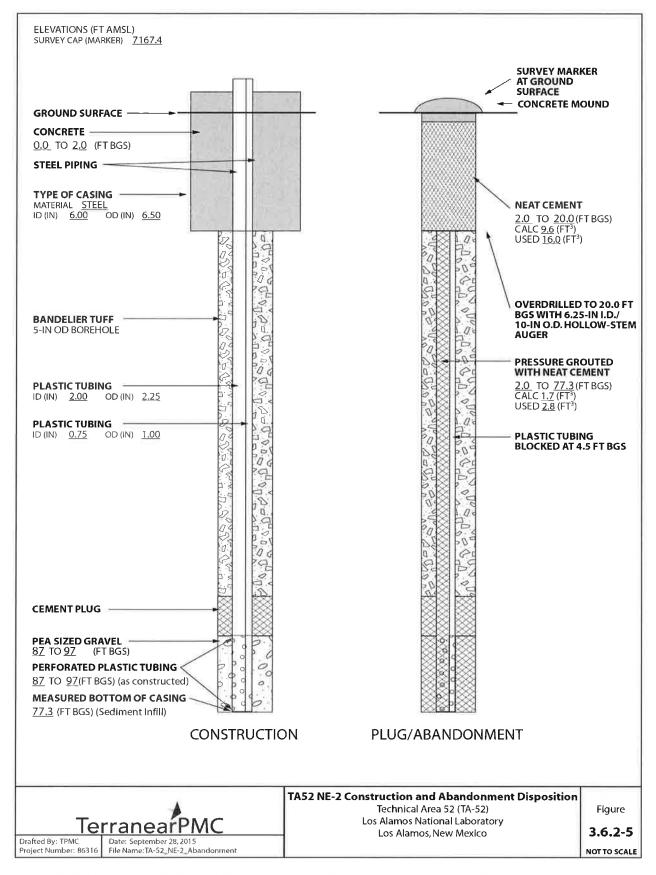


Figure 3.6.2-5 TA-52 Well NE-2 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

	ERAL / WELL OWNERSHIP:		
`	gineer Well Number: RG95359 TSWB-6		-
	ner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:	505-667-3005	-
_	address: P.O. Box 1663		
City:	Los Alamos State: New Mexico	Zip code:	87545
II. WEI	LL PLUGGING INFORMATION:		
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc.	(GSI)	
2)	New Mexico Well Driller License No.: Expiration Date	: <u>4/30/17</u>	
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s)	: GSI	
4)	Date well plugging began:7/21/15 Date well plugging concluded: _	7/21/15	;
5)	GPS Well Location: East: 1633382.200 North: 1768489.709		
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North A [NAD 1983]).	American Datum	, 1983
,	Depth of well confirmed at initiation of plugging as: <u>38.8</u> ft below ground level (by the following manner: <u>Manual tag line measurement</u>	ogl),	,
7)	Static water level measured at initiation of plugging: <u>Dry</u> ft bgl		
8)	Date well plugging plan of operations was approved by the State Engineer:7/6/2015	5	
	Were all plugging activities consistent with an approved plugging plan? <u>no</u> If not, between the approved plugging plan and the well as it was plugged (attach additional pag		differences
The PVC	casing supposed to be 2-in ID, however, the well was built with 3-in ID schedule 80 PV	C. The well was	silted in
from 40	to 38.8 ft bgl. The PVC casing was cemented with 1-in poly tubing from 38.8 to 2 ft bgl	with Portland Ty	pe I/II
neat cem	ent. The well casing was slated to be over-drilled with 4.25-in ID/7.5-in OD hollow-stem	auger from surfa	ace to 20
ft bgl. H	owever, the well was over-drilled with a 6.25-in ID/10-in OD hollow stem auger, termina	ating the casing a	t 20 ft bgl,
with neat	cement emplaced from 20 ft bgl to ground level.		

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging <u>Material Used</u> (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	100.2 gallons	71.1 gallons	Tremie/Augers	Surface plug in 10-in, borehole
20					from surface to 20 ft bgl
38,8	Portland Type I/II Cement	24.7 gallons	12 gallons	Tremie	Cement in 2-in. PVC well casing from 2 to 38.8 ft bgl.
38,8					
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:										
I, Branden L. Salu	J	, sav t	hat I am	familiar	with the	rules o	f the	Office	of the	State
Engineer pertaining to the plugging										
are true to the best of my knowledge	and belief.	1	01				_			

Signature of Well Driller

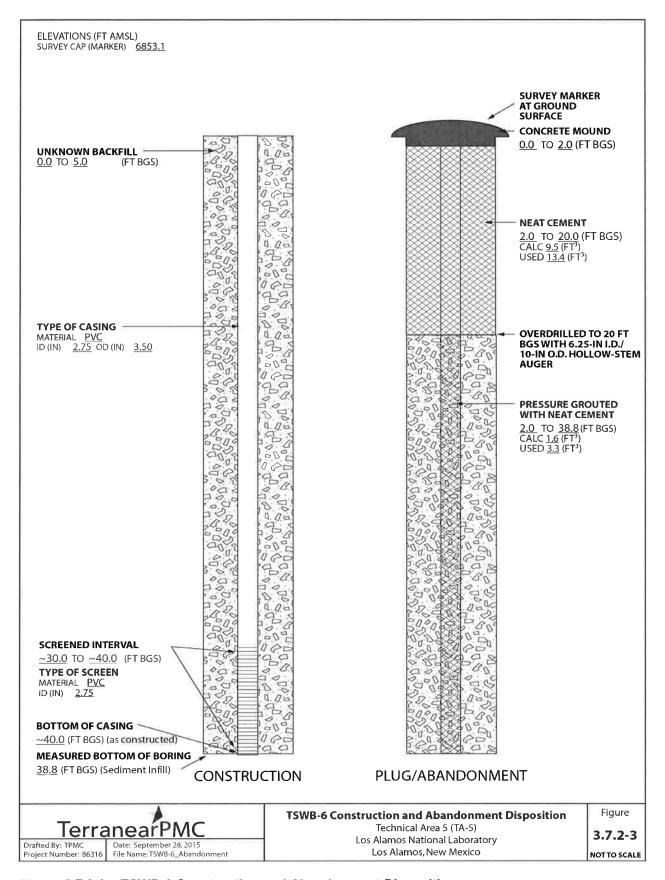


Figure 3.7.2-3 TSWB-6 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GEN	ERAL / WELL OWNERSHIP:
State Er	ngineer Well Number: RG95360 BCO-1
Well ow	ner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing	address: P.O. Box 1663
City: _	Los Alamos State: New Mexico Zip code: 87545
II. WE	LL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	D. 4. 11. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
4)	Date well plugging began:7/28/15 Date well plugging concluded:7/28/15
5)	GPS Well Location: East: <u>1640649.415</u> North: <u>1778915.961</u>
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: 69.7 ft below ground level (bgl), by the following manner: Manual tag line measurement
7)	Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer: 7/6/2015
9)	Were all plugging activities consistent with an approved plugging plan? <u>no</u> If not, please describe difference between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well BO	CO-1 was reported to be constructed with 2-in PVC casing to 70 ft bgl, however, actual well construction was 4-in
PVC cas	sing, with a measured depth of 69.7 ft bgl. The 4-in ID PVC casing was grouted with 1-in poly tubing from total
depth to	2 ft bgl with Portland Type I/II neat cement. The well casing was slated to be over-drilled out with 4.25-in ID/7.5-in
OD holl	ow-stem auger from surface to 20 ft bgl. However, the casing was over-drilled with a 6.25-in ID/10-in OD hollow
stem aug	ger, terminating the casing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging  Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	85.3 gallons	71.8 gallons	Tremie/Augers	Surface plug in 10-in, borehole from surface to 20 ft bgl
10 -					
-					
_	Portland Type I/II Cement	59.8 gallons	47.1 gallons	Tremie	Cement in 4-in. PVC well casing from 2 to 69.7 ft bgl.
-					
_					
57					
-					
-					
		181			

MULTIPLY		BY		AND OBTAIN
cubic feet	х	7,4805	=	gallons
cubic yards	х	201.97	=	gallons

III. SIGNATURE.										
1, Balen L. Sades	, sa	y that l	am	familiar	with th	e rules	of the	Office	of the	State
Engineer pertaining to the plugging of wells and	that each	and all	of the	stateme	nts in th	is Pluggi	ing Red	ord and	attachi	ments
are true to the best of my knowledge and belief.	5.2	1	2	1						
	$\sim$	//	1	V						

Signature of Well Driller

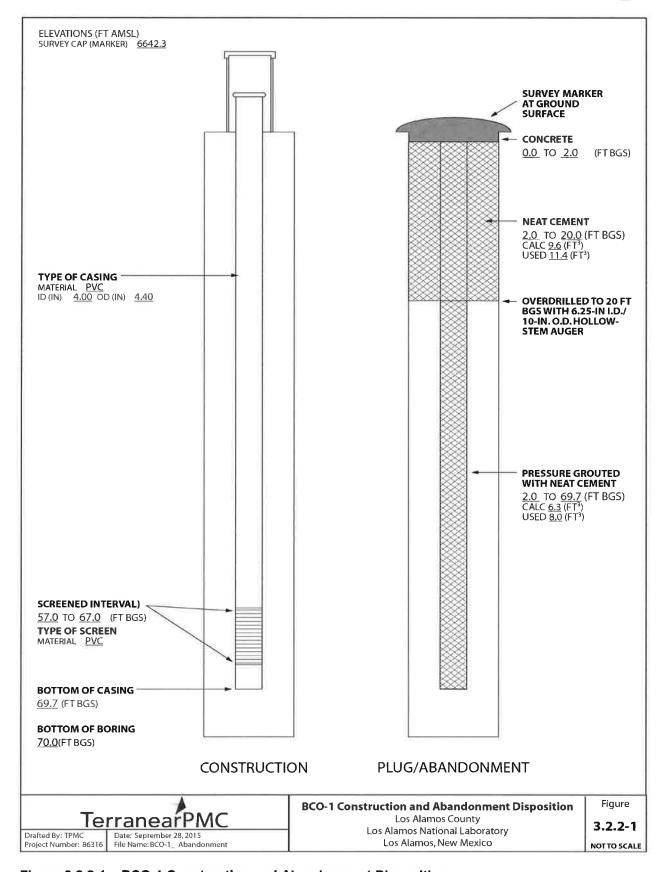


Figure 3.2.2-1 BCO-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GEN	NERAL / WELL OWNERSHIP:					
State E	ngineer Well Number: RG95362 POTO-4A, B, C					
Well ov	wner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005					
Mailing	g address: P.O. Box 1663					
City: _	Los Alamos State: New Mexico Zip code: 87545					
II. WE	ELL PLUGGING INFORMATION:					
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)					
2)	New Mexico Well Driller License No.: Expiration Date: 4/30/17					
2)	Well plugging activities were supervised by the following well driller(s)/rig superviser(s): GSI					
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI					
4)	Date well plugging began:9/04/15 Date well plugging concluded:9/05/15					
5)	GPS Well Location: East: <u>1638939.305</u> North: 1757056.953					
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).					
6)	Depth of well confirmed at initiation of plugging as: A: 47.2, B: 87.7, C: 174.2 ft below ground level (bgl), by the following manner: Manual tag line measurement					
7)	Static water level measured at initiation of plugging: A: dry, B: dry, C: 173.35 ft bgl					
8)	Date well plugging plan of operations was approved by the State Engineer:					
9)	Were all plugging activities consistent with an approved plugging plan? NO If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):					
The ind	lividual 2-in. PVC casings were cemented with 1-in poly tubing from total depth (A: 47.2, B: 87.7, 174.2) to 2 ft bgl					
with Po	ertland Type I/II neat cement. The nested piezometer was slated to be over-drilled from surface to 20 ft bgl with a					
4.25-in	ID/8-in OD hollow-stem auger, though a 6.25-in ID/10-in OD hollow stem auger was used, terminating the casing					
stings a	t 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.					

### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement <u>Method</u> (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	100.2 gallons	82.3 gallons	Tremie/Augers	Surface plug in 10-in. borehole
×-					from surface to 20 ft bgl
20 —					
_					
50	Portland Type I/II Cement	9 gallons	8.2 gallons	Tremie	Cement in 2-in. PVC well casing from 2 to 47.2 ft bgl.
- 1					
]					a di ai mra n
_	Portland Type I/II Cement	17.2 gallons	15 gallons	Tremie	Cement in 2-in. PVC well casing from 2 to 87.7 ft bgl.
100					
-					
ž. <del>-</del>	D. dan J.T. as I/II Comment	22.711	20.211	Tremie	Cement in 2-in. PVC well casing
200	Portland Type I/II Cement	33.7 gallons	29.2 gallons	Tremie	from 2 to 174.2 ft bgl.
200					
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	w				

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNALUKE.	
I, Breach L. S. Jus , say that I am familiar with the	rules of the Office of the State
Engineer pertaining to the plugging of wells and that each and all of the statements in this	Plugging Record and attachments
are true to the best of my knowledge and belief.	
BULLA	
1 2 0 14 9	12-15-15

Signature of Well Driller

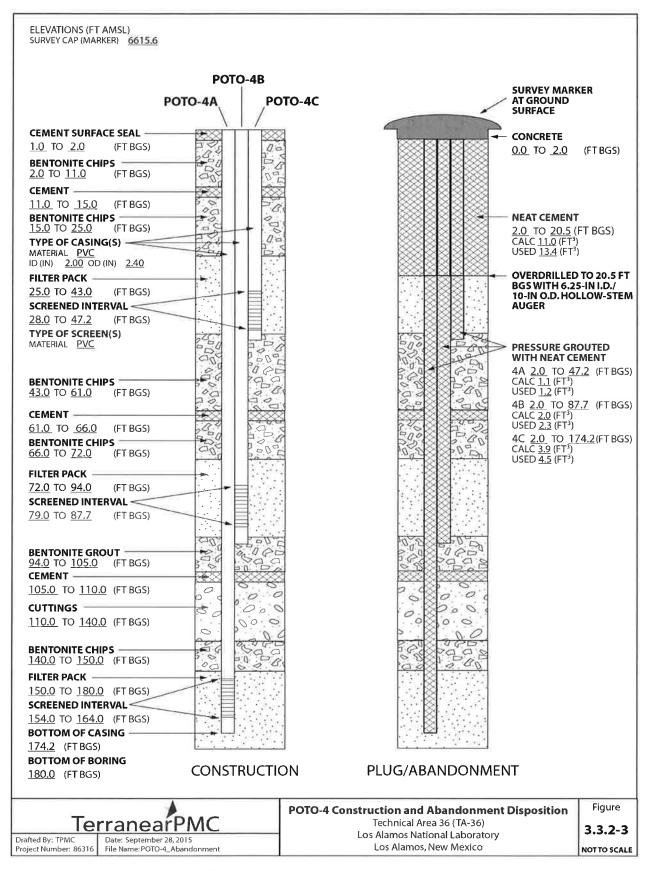


Figure 3.3.2-3 POTO-4A, B, C Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:	
State Engineer Well Number: RG95363 POTO-5A, B	
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005	
Mailing address: P.O. Box 1663	
City: Los Alamos State: New Mexico Zip code: 8754	5
II. WELL PLUGGING INFORMATION:	
Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)	
2) New Mexico Well Driller License No.: Expiration Date: 4/30/17	
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI	
4) Date well plugging began:9/04/15 Date well plugging concluded:9/05/15	
5) GPS Well Location: East: <u>1638945.987</u> North: <u>1757050.902</u>	
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).	
Depth of well confirmed at initiation of plugging as: A: 77.1, B: 27.2 ft below ground level (bgl), by the following manner: Manual tag line measurement	
7) Static water level measured at initiation of plugging: A: 77.05, B: 26.6 ft bgl	
8) Date well plugging plan of operations was approved by the State Engineer:	
9) Were all plugging activities consistent with an approved plugging plan? <u>NO</u> If not, please describe differe between the approved plugging plan and the well as it was plugged (attach additional pages as needed):	nces
The individual 2-in. PVC casings were cemented with 1-in poly tubing from total depth (A: 77.1, B: 27.2) to 2 ft bgl with	1
Portland Type I/II neat cement. The nested piezometer was slated to be over-drilled from surface to 20 ft bgl with a 4.25-	<u>in</u>
ID/8-in OD hollow-stem auger, however, a 6.25-in ID/10-in OD hollow stem auger was used, terminating the casing sting	<u>s at</u>
20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.	

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging <u>Material Used</u> (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	55.4 gallons	53.9 gallons	Tremie/Augers	Surface plug in 8-in. borehole from surface to 20 ft bgl
20 –					Hom surface to 20 ft ogi
50	Portland Type I/II Cement	5.2 gallons	4.5 gallons	Tremie	B: Cement in 2-in. PVC well casing from 2 to 27.2 ft bgl.
100	Portland Type I/II Cement	15 gallons	12.7 gallons	Tremie	A: Cement in 2-in. PVC well casing from 2 to 77.1 ft bgl.
-					
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-					
_					
-					
8—				A.L.	

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNALUKE.								
1, Brula L. Seles	, say tl	nat I am	familiar	with the	rules of	the Office	of the	State
Engineer pertaining to the plugging of wells and that	each and	l all of th	e stateme	nts in this	Plugging	Record an	d attach	ments
are true to the best of my knowledge and belief.	1	20						
·/	V	$\nu$	~					_

Signature of Well Driller

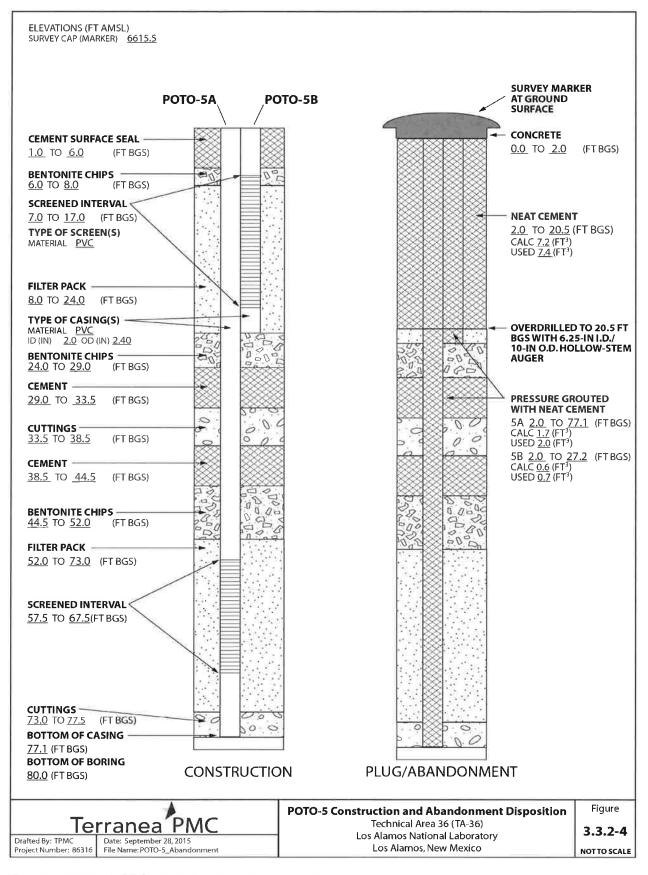


Figure 3.3.2-4 POTO-5A, B Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GE	NERAL / WELL OWNERSHIP:
State E	Engineer Well Number: RG95364 R-4 East, West
Well o	wner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailin	g address: P.O. Box 1663
City:	Los Alamos State: New Mexico Zip code: 87545
<u>II. W</u>	ELL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	Date well plugging began: 9/02/15 Date well plugging concluded: 9/02/15
5)	GPS Well Location: East: <u>1639297.733</u> North: <u>1776517.093</u>
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: <u>East: 230.9, West: 125.0</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7)	Static water level measured at initiation of plugging: East: dry, West: dry ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer:7/6/2015
9)	Were all plugging activities consistent with an approved plugging plan? No If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
The inc	dividual 2-in. PVC casings were cemented with 1-in poly tubing from total depth (East: 230.9, West: 125.0) to 2 ft
bgl wit	th Portland Type I/II neat cement. The nested piezometer was to be over-drilled from surface to 20 ft bgl with a 4.25-
in ID/8	i-in OD hollow-stem auger, however, 6.25-in ID/10-in OD hollow-stem auger was used, terminating the casing strings
at 20 ft	bgl, with neat cement emplaced from 20 ft bgl to ground level.

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#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
20	Portland Type I/II Cement	90 gallons	82.3 gallons	Tremie/Augers	Surface plug in 10-in. borehole from surface to 20 ft bgl
150	Portland Type I/II Cement	24.7 gallons	20.2 gallons	Tremie	West: Cement in 2-in. PVC well casing from 2 to 125.0 ft bgl.
300	Portland Type I/II Cement	44.1 gallons	37.4 gallons	Tremie	East: Cement in 2-in. PVC well casing from 2 to 230.9 ft bgl.
-					
-					

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:								
0 // / 0 //	, say th	nat I am	familiar	with the	rules of t	the Office	of the S	State
Engineer pertaining to the plugging of wells and that e	ach and	l all of the	e stateme	nts in this	Plugging	Record and	d attachm	ents
are true to the best of my knowledge and belief.	0	00	^					

Signature of Well Driller

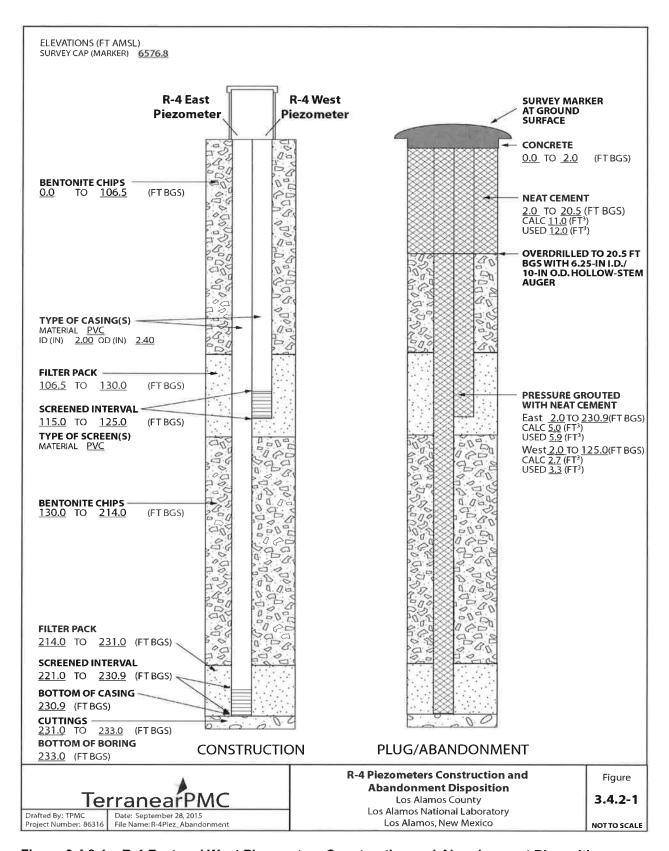


Figure 3.4.2-1 R-4 East and West Piezometers Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENI	ERAL / WELL OWNERSHIP:
State Eng	gineer Well Number: RG95365 MCOI-1
Well own	ner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing	address: P.O. Box 1663
City:	Los Alamos State: New Mexico Zip code: 87545
	LL PLUGGING INFORMATION:  Name of well drilling company that plugged well:   Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	Date well plugging began: 9/3/15 Date well plugging concluded: 9/3/15
,	GPS Well Location: East: <u>1628046.120</u> North: <u>1769956.568</u> Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
	Depth of well confirmed at initiation of plugging as: 825.6 ft below ground level (bgl), by the following manner: Manual tag line measurement
7)	Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer:
	Were all plugging activities consistent with an approved plugging plan? <u>yes</u> If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well MC	COI-1 was grouted with 0.5-in poly tubing from total depth to 2 ft bgl with Portland Type I/II cement. The well
casing w	as over-drilled with 4.25-in ID/7.5-in OD hollow-stem auger from surface to 20 ft bgl, with neat cement emplaced
from 20	ft bgl to ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	55.4 gallons	44.9 gallons	Tremie/Augers	Surface plug in 8-in. borehole from surface to 20 ft bgl
٦					from surface to 20 ft ogr
٦					
10					
- 7					
-					
-	Portland Type I/II Cement	35.2 gallons	33.7 gallons	Tremie	Cement in 1.1-in. steel well casing
=					from 2 to 825.6 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:									
D ( ) C () ed	, say that	I am	familiar	with the	e rules	of the	Office	of the	State
Engineer pertaining to the plugging of wells and that e	each and all	of the	stateme	nts in thi	is Pluggi	ng Rec	ord and	attach	ments
are true to the best of my knowledge and belief.	1 /	1	1						
1//	V	/	1 ~	)			13		

Signature of Well Driller

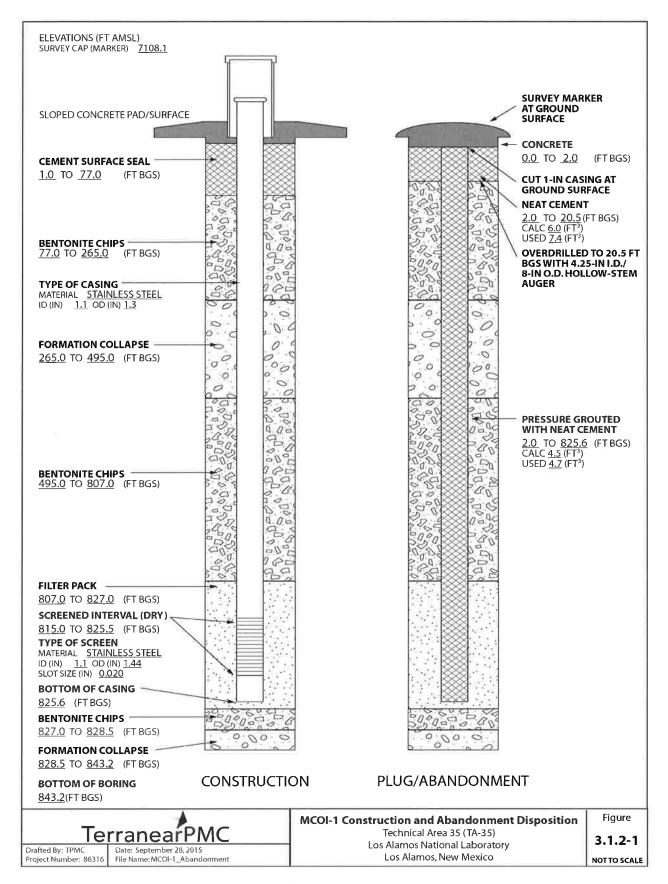


Figure 3.1.2-1 MCOI-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GE	NERAL / WELL OWNERSHIP:
State E	Engineer Well Number: RG95371 POTM-2
Well o	owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailin	g address: P.O. Box 1663
City:	Los Alamos State: New Mexico Zip code: 87545
II. W	ELL PLUGGING INFORMATION:
1)	Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2)	New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3)	Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4)	Date well plugging began: 9/04/15 Date well plugging concluded: 9/05/15
5)	GPS Well Location: East: <u>1638907.630</u> North: 1757119.565
	Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
6)	Depth of well confirmed at initiation of plugging as: _53.1 ft below ground level (bgl), by the following manner: _Manual tag line measurement
7)	Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8)	Date well plugging plan of operations was approved by the State Engineer:7/1/2015
9)	Were all plugging activities consistent with an approved plugging plan? Yes If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
The 2-	in. aluminum casing was silted in from 54 to 53.1 ft bgl. The aluminum casing was cemented with 1-in poly tubing
from 5	3.1 to 2 ft bgl with Portland Type I/II neat cement. The well casing was over-drilled from surface to 20 ft bgl with a
4.25-in	1D/8-in OD hollow stem auger, terminating the casing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to
ground	level.
h-	

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
20 -	Portland Type I/II Cement	55.4 gallons	53.9 gallons	Tremie/Augers	Surface plug in 8-in. borehole from surface to 20 ft bgl
53.1	Portland Type I/II Cement	12 gallons	9 gallons	Tremie	Cement in 2-in. aluminum well casing from 2 to 53.1 ft bgl.

MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	Ξ	gallons

III. SIGNATURE:

III. SIGNATURE:									
I, Brade L. Saules	, say	that I	am	familiar	with the	rules of	the Office	of the	State
Engineer pertaining to the plugging of wells and that	each ar	nd all	of the	stateme	nts in thi	s Pluggin	g Record an	d attach	ment
are true to the best of my knowledge and belief.	,	7		. (					

Signature of Well Driller

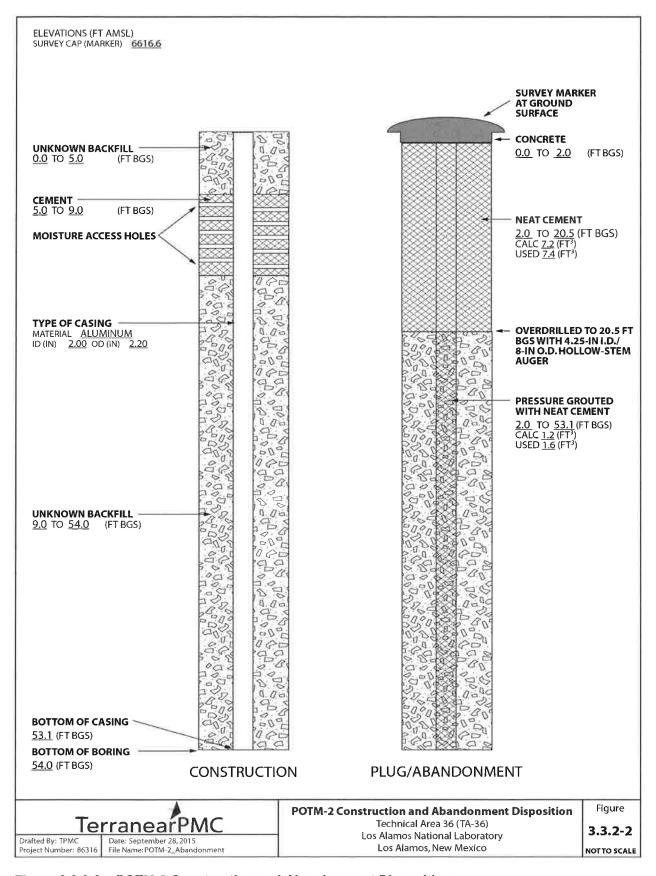


Figure 3.3.2-2 POTM-2 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:
State Engineer Well Number: RG95372 POTM-1
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
II. WELL PLUGGING INFORMATION:
1) Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)
2) New Mexico Well Driller License No.: Expiration Date: 4/30/17
Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4) Date well plugging began:9/04/15 Date well plugging concluded:9/05/15
5) GPS Well Location: East: <u>1637636.415</u> North: 1757302.965
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
Depth of well confirmed at initiation of plugging as: <u>46.5</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
7) Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
Date well plugging plan of operations was approved by the State Engineer:
Were all plugging activities consistent with an approved plugging plan? Yes If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
The 2-in. aluminum casing was silted in from 47 to 46.5 ft bgl. The aluminum casing was cemented with 1-in poly tubing
from 46.5 to 2 ft bgl with Portland Type I/II neat cement. The well casing was over-drilled from surface to 20 ft bgl with a
4.25-in ID/8-in OD hollow stem auger, terminating the casing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to
ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments  ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	70 gallons	54 gallons	Tremie/Augers	Surface plug in 8-in. borehole from surface to 20 ft bgl
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46.5	Portland Type I/II Cement	12.7 gallons	8.2 gallons	Tremie	Cement in 2-in. aluminum casing from 2 to 46.5 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:	
I, Bal L Sales , say that I am familiar with the	rules of the Office of the State
Engineer pertaining to the plugging of wells and that each and all of the statements in this	Plugging Record and attachments
are true to the best of my knowledge and belief.	
are true to the best of my knowledge and benefit	15

Signature of Well Driller

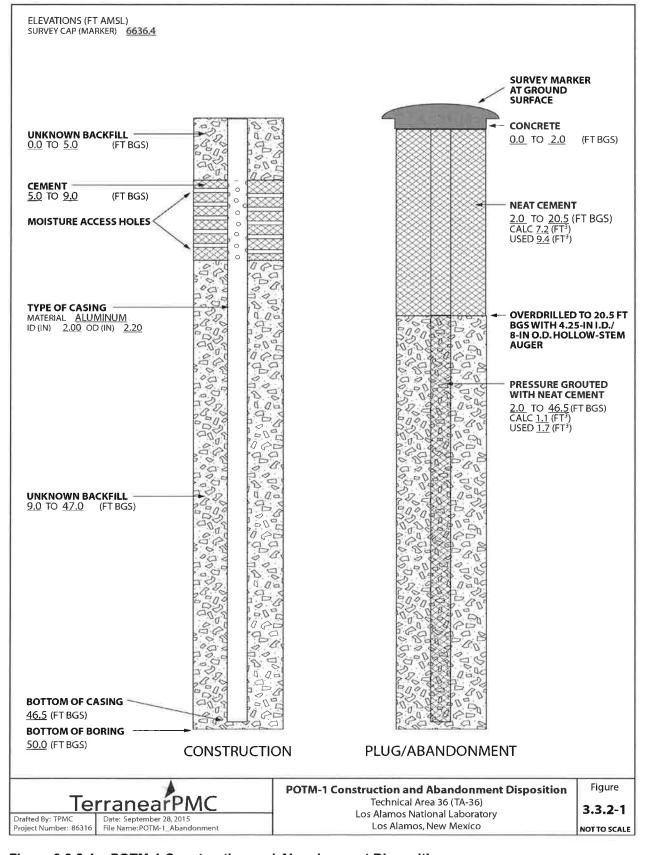


Figure 3.3.2-1 POTM-1 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:
State Engineer Well Number: RG95374 MCWB-6.2A
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
<ul> <li>II. WELL PLUGGING INFORMATION:</li> <li>1) Name of well drilling company that plugged well: Geomechanics Southwest, Inc. (GSI)</li> </ul>
2) New Mexico Well Driller License No.:1522 Expiration Date: 4/30/17
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4) Date well plugging began: 7/20/15 Date well plugging concluded: 7/21/15
5) GPS Well Location: East: <u>1633752.812</u> North: 1768967.860
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
Depth of well confirmed at initiation of plugging as: _45.6 ft below ground level (bgl), by the following manner: _Manual tag line measurement
7) Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8) Date well plugging plan of operations was approved by the State Engineer:
9) Were all plugging activities consistent with an approved plugging plan? No If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
The well was supposed to be 2-in schedule 40 PVC casing, however the well casing turned out to be 3-in schedule 80 PVC.
The PVC casing was cemented with 1-in poly tubing from 45.6 to 2 ft bgl with Portland Type I/II neat cement. The well
casing was over-drilled from surface to 20 ft bgl with a 6.25-in ID/10-in OD hollow stem auger, terminating the casing at 20
ft bgl, with neat cement emplaced from 20 ft bgl to ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging <u>Material Used</u> (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	100 gallons	72 gallons	Tremie/Augers	Surface plug in 10-in. borehole
20 -					from surface to 20 ft bgl
45.6	Portland Type I/II Cement	21.7 gallons	13.5 gallons	Tremie	Cement in 3-in. schedule 80 PVC casing from 2 to 45.6 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	_X_	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:

I, Brank L. Sanlus	, say	that I ar	n familiar	with the	e rules o	of the	Office	of the	State
Engineer pertaining to the plugging of wells and that	each an	nd all of t	he stateme	ents in thi	s Pluggii	ng Re	cord and	l attach	ments
are true to the best of my knowledge and belief.									

Signature of Well Driller

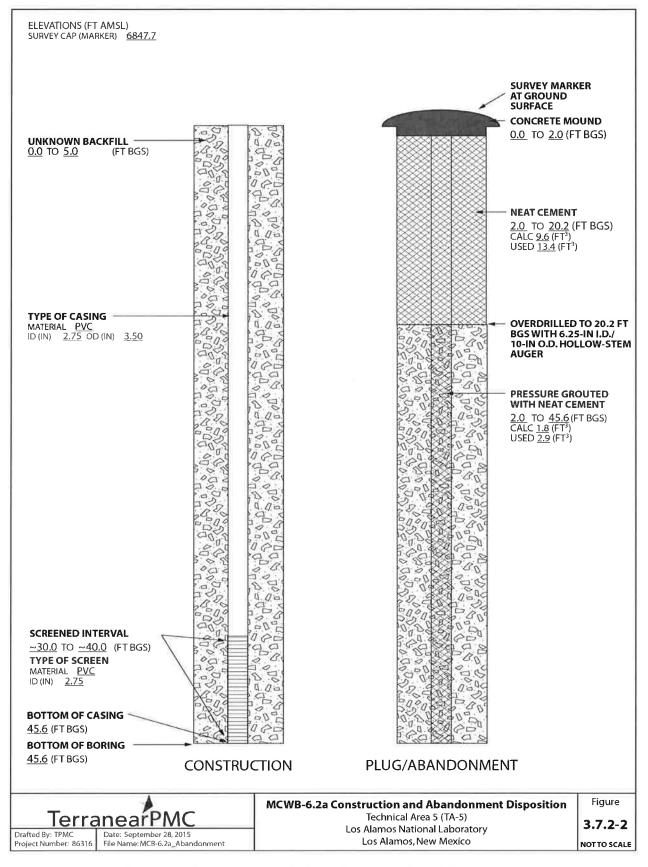


Figure 3.7.2-2 MCWB-6.2a Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:
State Engineer Well Number: RG95376 MCWB-5
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
II. WELL PLUGGING INFORMATION:
1) Name of well drilling company that plugged well: <u>Geomechanics Southwest, Inc.</u> (GSI)
2) New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4) Date well plugging began: 7/20/15 Date well plugging concluded: 7/20/15
5) GPS Well Location: East: <u>1632576.529</u> North: 1769484.011
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
Depth of well confirmed at initiation of plugging as: 27.7 ft below ground level (bgl), by the following manner: Manual tag line measurement
7) Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8) Date well plugging plan of operations was approved by the State Engineer:
Were all plugging activities consistent with an approved plugging plan? <u>no</u> If not, please describe difference between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
The 2-in PVC casing was silted in from 40 to 27.7 ft bgl. The PVC casing was cemented with 1-in poly tubing from 27.2 t
2 ft bgl with Portland Type I/II neat cement. The well casing was slated to be over-drilled with 4.25-in ID/7.5-in OD hollow
stem auger from surface to 20 ft bgl. However, the well was over-drilled with a 3.25-in ID/7-in OD hollow stem auger,
terminating the casing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0 20	Portland Type I/II Cement	50.1 gallons	38.9 gallons	Tremie/Augers	Surface plug in 7-in. borehole from surface to 20 ft bgl
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-	Portland Type I/II Cement	15 gallons	8.2 gallons	Tremie	Cement in 2-in. PVC well casing from 2 to 27.7 ft bgl.
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cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

III. SIGNATURE:		
1, Brank L. Sades	, say that I am familiar with the	rules of the Office of the State
Engineer pertaining to the plugging of wells	and that each and all of the statements in this	Plugging Record and attachments
are true to the best of my knowledge and belie	ef. and	
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Signature of Well Driller

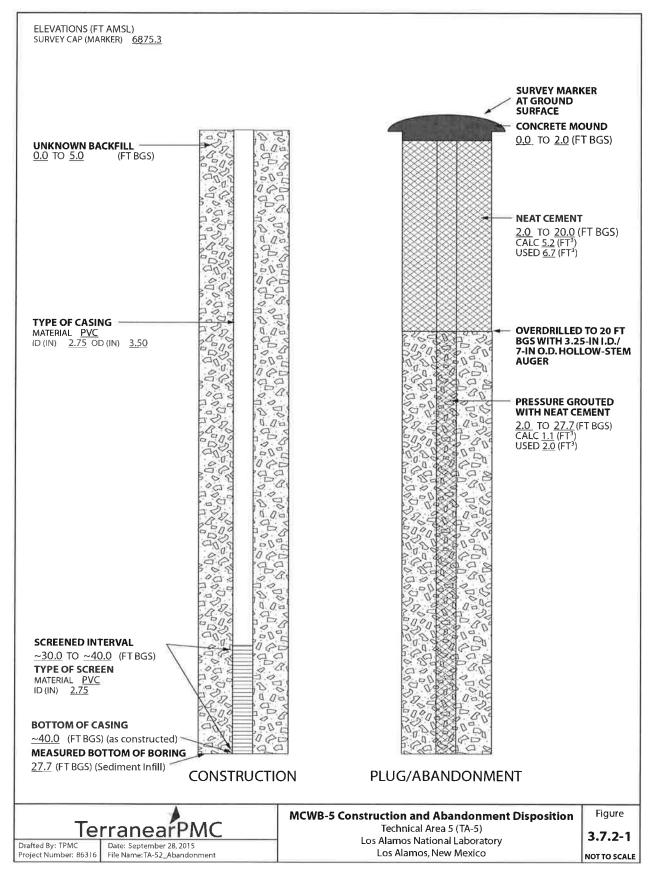


Figure 3.7.2-1 MCWB-5 Well Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

. GENERAL / WELL OWNERSHIP:
state Engineer Well Number: RG95377 16-P-12A
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.: 505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
I. WELL PLUGGING INFORMATION:
Name of well drilling company that plugged well: <u>Geomechanics Southwest, Inc.</u> (GSI)
New Mexico Well Driller License No.: 1522 Expiration Date: 4/30/17
Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
Date well plugging began: 9/4/15 Date well plugging concluded: 9/4/15
OPS Well Location: East: 1616900.389 North: 1764076.658 Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983
[NAD 1983]).
Depth of well confirmed at initiation of plugging as: <u>175.4</u> ft below ground level (bgl), by the following manner: <u>Manual tag line measurement</u>
Static water level measured at initiation of plugging: <u>170.1</u> ft bgl
Date well plugging plan of operations was approved by the State Engineer:
Were all plugging activities consistent with an approved plugging plan? <u>yes</u> If not, please describe differences between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
he 2-in aluminum casing was cemented with 1-in poly tubing from 175.4 to 2 ft bgl with Portland Type I/II neat cement.
he well casing was over-drilled from surface to 20 ft bgl with a 4.25-in ID/8-in OD hollow stem auger, terminating the
asing at 20 ft bgl, with neat cement emplaced from 20 ft bgl to ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0 20	Portland Type I/II Cement	55.4 gallons	44.9 gallons	Tremie/Augers	Surface plug in 8-in. borehole from surface to 20 ft bgl
20 -					Hom surface to 20 ft ogr
200	Portland Type I/II Cement	35.2 gallons	29.2 gallons	Tremie	Cement in 2-in. aluminum well casing from 2 to 175.4 ft bgl.
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cubic feet	Х	7.4805	=	gallons	
cubic yards	Х	201.97	=	gallons	

III. SIGNATURE:

1, But L Sales	, say that	I am	familiar	with t	he rules	of the	Office	of the	State
Engineer pertaining to the plugging of wells and that	each and all	of the	stateme	nts in t	his Plug	ging Re	cord and	l attach:	ments
are true to the best of my knowledge and belief.	>1	1	n			_			

Signature of Well Driller

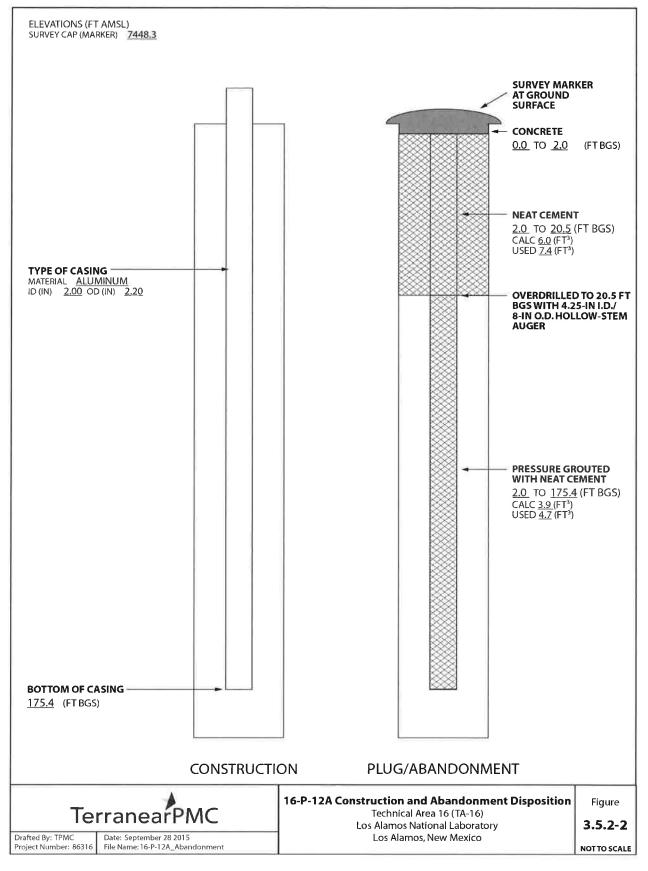


Figure 3.5.2-2 Borehole 16-P-12A Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL/WELL OWNERSHIP:	
State Engineer Well Number: RG95378 16-P-0	
Well owner: <u>U.S. Department of Energy/Los Alamos National Laboratory</u> Phone No.: <u>505-667-300</u>	05
Mailing address: P.O. Box 1663	
City: Los Alamos State: New Mexico Zip code:	87545
II. WELL PLUGGING INFORMATION:	
1) Name of well drilling company that plugged well: <u>Geomechanics Southwest, Inc.</u> (GSI)	
2) New Mexico Well Driller License No.: Expiration Date: 4/30/17	
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI	
4) Date well plugging began:	3/15
5) GPS Well Location: East: <u>1616459.399</u> North: 1763584.287	
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Da [NAD 1983]).	tum, 1983
6) Depth of well confirmed at initiation of plugging as: 119.0 ft below ground level (bgl), by the following manner: Manual tag line measurement	
7) Static water level measured at initiation of plugging: <u>118.6</u> ft bgl	
8) Date well plugging plan of operations was approved by the State Engineer:	
9) Were all plugging activities consistent with an approved plugging plan? no If not, please describetween the approved plugging plan and the well as it was plugged (attach additional pages as needed)	
The 2-in aluminum casing was cemented with 1-in poly tubing from 119.0 to 2 ft bgl with Portland Type I/II r	neat cement.
The well casing was scheduled to be over-drilled from surface to 20 ft bgl with a 4.25-in ID/8-in OD hollow st	tem auger,
however 3.25-in ID/7-in OD augers were used, terminating the casing at 20 ft bgl, with neat cement emplaced ft	rom 20 ft bgl
to ground level.	

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#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open annular space also plugged", etc.)
0	Portland Type I/II Cement	39.6 gallons	35.9 gallons	Tremie/Augers	Surface plug in 7-in. borehole
20					from surface to 20 ft bgl
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	Portland Type I/II Cement	29.9 gallons	20.2 gallons	Tremie	Cement in 2-in. aluminum well casing from 2 to 119.0 ft bgl.
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MULTIPLY		BY		AND OBTAIN
cubic feet	Х	7.4805	=	gallons
cubic yards	Х	201.97	=	gallons

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		pertaining				nd that	each a	nd all	of the	stateme	nts in	this	Plugg	ging Re	ecord and	d attach	ments

are true to the best of my knowledge and belief.

III. SIGNATURE:

Signature of Well Driller

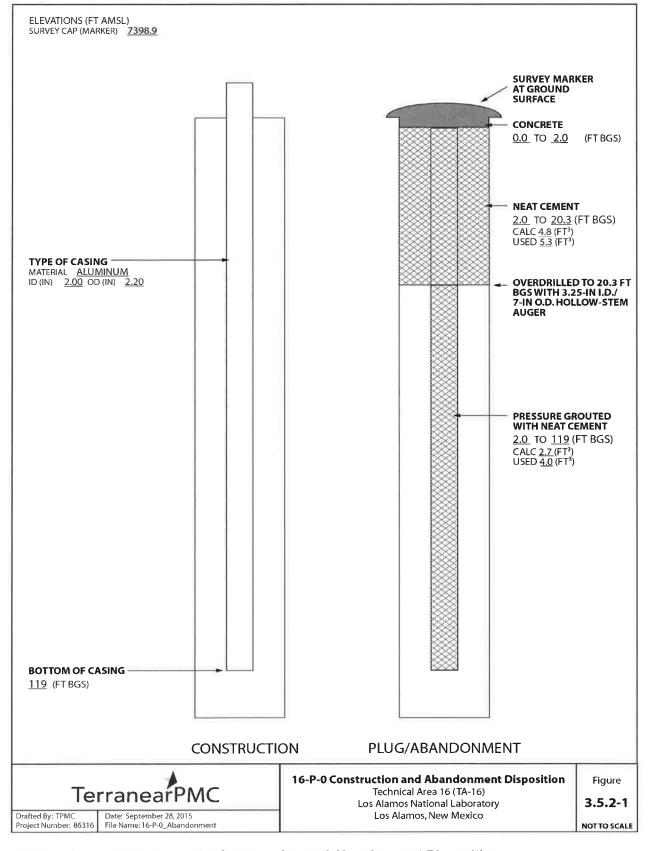


Figure 3.5.2-1 Borehole 16-P-0 Construction and Abandonment Disposition





NOTE: A Well Plugging Plan of Operations shall be approved by the State Engineer prior to plugging - 19.27.4 NMAC

I. GENERAL / WELL OWNERSHIP:
State Engineer Well Number: RG95379 BCM-1
Well owner: U.S. Department of Energy/Los Alamos National Laboratory Phone No.:505-667-3005
Mailing address: P.O. Box 1663
City: Los Alamos State: New Mexico Zip code: 87545
II. WELL PLUGGING INFORMATION:
1) Name of well drilling company that plugged well: <u>Geomechanics Southwest, Inc.</u> (GSI)
2) New Mexico Well Driller License No.:1522 Expiration Date: 4/30/17
3) Well plugging activities were supervised by the following well driller(s)/rig supervisor(s): GSI
4) Date well plugging began: 7/28/15 Date well plugging concluded: 7/28/15
5) GPS Well Location: East: <u>1640658.884</u> North: <u>1778914.149</u>
Well coordinates are New Mexico State Plane Grid Coordinates, Central Zone (North American Datum, 1983 [NAD 1983]).
Depth of well confirmed at initiation of plugging as: 67.8 ft below ground level (bgl), by the following manner: Manual tag line measurement
7) Static water level measured at initiation of plugging: <u>Dry</u> ft bgl
8) Date well plugging plan of operations was approved by the State Engineer:
Were all plugging activities consistent with an approved plugging plan? <u>no</u> If not, please describe difference between the approved plugging plan and the well as it was plugged (attach additional pages as needed):
Well BCM-1 had a reported depth of 47.8 ft bgl, however, the actual well depth was measured at 67.8 ft bgl. The 2-in PVC
casing was grouted with 1-in poly tubing from total depth to 2 ft bgl with Portland Type I/II neat cement. The well casing
was slated to be over-drilled with 4.25-in ID/7.5-in OD hollow-stem auger from surface to 20 ft bgl. However, the well was
over-drilled with a 3.25-in ID/7-in OD hollow stem auger, terminating the casing at 20 ft bgl, with neat cement emplaced
from 20 ft bgl to ground level.

#### For each interval plugged, describe within the following columns:

Depth (ft bgl)	Plugging Material Used (include any additives used)	Volume of Material Placed (gallons)	Theoretical Volume of Borehole/ Casing (gallons)	Placement  Method (tremie pipe, other)	Comments ("casing perforated first", "open			
0	Portland Type I/II Cement	39.6 gallons	30.7 gallons	Tremie/Augers	Surface plug in 7-in. borehole from surface to 20 ft bgl			
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7-	Portland Type I/II Cement	15 gallons	11.2 gallons	Tremie	Cement in 2-in. PVC well casing			
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MULTIPLY AND OBTAIN 7.4805 cubic feet gallons 201.97 cubic yards gallons

III. SIGNATURE:											
II. SIGNATURE: I, Bral L-Sals	say	that l	am	familiar	with	the	rules	of the	Office	of the	State
Engineer pertaining to the plugging of wells and that ea	ich ar	nd all	of the	e stateme	nts in	this	Plugg	ing Re	cord and	d attach	ments

are true to the best of my knowledge and belief.

III. SIGNATURE:

Signature of Well Driller

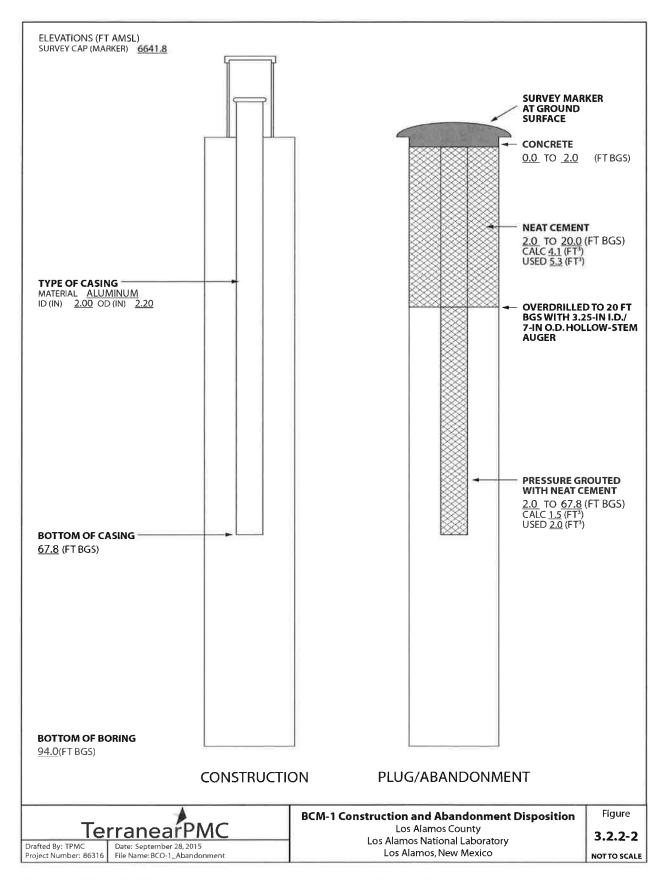


Figure 3.2.2-2 BCM-1 Construction and Abandonment Disposition