

Fact Sheet Concerning Sources of Groundwater Contamination at the Technical Area Five (TA-V), the Tijeras Arroyo Groundwater (TAG) and the Burn Site Areas of Concern at Sandia National Laboratories

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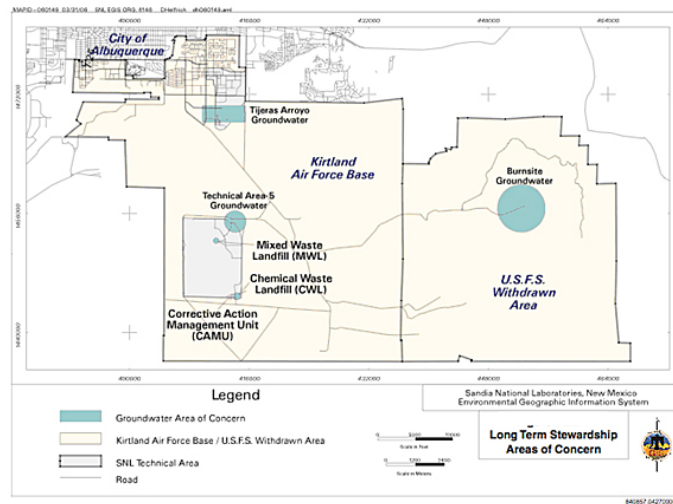
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This Fact Sheet summarizes a report on the potential sources of groundwater contamination at three sites at Sandia National Laboratories (“SNL”) in New Mexico south of the City of Albuquerque in Bernalillo County: Technical Area Five (“TA-V”), The Tijeras Arroyo Groundwater (“TAG”) site and the Burn Site Groundwater Areas of Concern.



Long-Term Stewardship Areas of Concern at Sandia National Laboratories showing Location of Tijeras Arroyo Groundwater (TAG) and Technical Area 5 (TA-V) Groundwater Remediation Sites

Overview

Sandia National Laboratories is located with the boundaries of Kirtland Air Force Base (“KAFB”). SNL and KAFB are located in a portion of Bernalillo County that has not been incorporated into the city limits of the City of Albuquerque. The City of Albuquerque borders SNL and KAFB on the north and west.

Water supply wells for the City and surrounding County are operated by the Albuquerque Bernalillo County Water Utility Authority (“ABCWUA”) are found within a quarter mile of the northern boundary of SNL. These water supply wells, and water supply wells used by SNL and KAFB, draw water from the regional aquifer beneath the Middle Rio Grande Valley where the City of Albuquerque, SNL and KAFB are located.

The TA-V and TAG site are located in the watershed of Tijeras Arroyo and overlie the Middle Rio Grande Regional Aquifer. Tijeras Arroyo slopes east-to-west as it crosses SNL and KAFB between the

Sandia Mountains to the east and the South Valley and Rio Grande to the west. Between the TA-V and TAG sites, Tijeras Arroyo is joined by its largest tributary, Arroyo del Coyote just west of the golf course on Kirtland Base, Tijeras Arroyo Golf Course. The Burn Site is located down gradient of springs at the headwaters of the Arroyo del Coyote watershed.

The water table in the Rio Grande regional aquifer located beneath the TA-V and TAG sites has been affected by withdrawals from the aquifer for drinking water uses in the City of Albuquerque and on KAFB. The regional aquifer water table had dropped by 80 – 100 feet during the 1960 – 2002 period. The continuing withdrawals of groundwater for drinking water use continue to influence the regional and perched aquifer water tables at TA-V and TAG.

Information in on the sites in this Fact Sheet is compiled from SNL Annual Groundwater Monitoring Reports 2009 – present, and other sources listed. The SNL Annual Groundwater Monitoring Reports from 2006 to the present are available at http://www.sandia.gov/news/publications/environmental_reports/.

Summary of Groundwater Contamination at TAG and TA-V Environmental Restoration Sites

Characteristic	Tijeras Arroyo Groundwater (TAG) Site	Technical Area V (TA-V) Site
Nitrate groundwater contamination (EPA MCL = 10 mg/L)	Up to 30 ppm	Up to 25 ppm
TCE groundwater contamination (EPA MCL=5 µg/L=5 ppb)	Up to 10 ppb	Up to 25 ppb
PCE groundwater contamination (EPA MCL=5 µg/L=5 ppb)	None detected	Up to 8 ppb
Other groundwater contaminants	Chlorinated volatile organic compounds (less than 5 ppb)	cis-1,2-DCE 4.5 µg/L; well below EPA MCL of 70 µg/L
Probable source of contamination	Solid-waste management units	Liquid-waste disposal system
Depth to groundwater (ft. below ground surface)	450-475 (regional aquifer) 250-375 (perched aquifer)	+/- 500

At TA-V, Trichloroethene (TCE), Tetrachloroethene (PCE) and Nitrate exceeding allowable maximum contaminant levels (MCLs) have been identified in monitoring wells sampling groundwater beneath the site since 1993 in the deep alluvial aquifer that supplies drinking water to the Albuquerque area. Sources of the TA-V contamination identified by SNL include liquid waste disposal systems that discharged at least 50 million gallons of wastewater between the early 1960s and 1992.

At TAG, TCE contamination in the regional aquifer was first identified by SNL in 1994. TCE exceeding the applicable Maximum Contaminant Level (“MCL”) has been detected in two wells sampling a perched ground water system connected to the regional aquifer; including exceedences of the applicable MCLs for TCE in all samples from one of the wells. Nitrate exceeding the applicable MCL has been detected in four of the TAG monitoring wells, reaching 3 times the MCL in August 2009 samples.

**Summary of Health Effects and their Maximum Contaminant Levels (MCL) in Drinking Water
Established by the US Environmental Protection Agency for SNL Contaminants**

Contaminant	Maximum Contaminant Level Goal (MCLG) ¹ - mg/l (parts per million)	Maximum Contaminant Level (MCL)¹ - mg/l (parts per million)	Health Effects from Long-term Exposure to Contaminants above MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Trichloroethylene (TCE)	zero	0.005	Liver problems; increased risk of cancer	Discharges from metal degreasing site and other factories
Tetrachloroethylene (PCE)	zero	0.005	Liver problems; increased risk of cancer	Discharges from factories and dry cleaners
Nitrate	10	10	Infants below age of six months who drink water containing nitrate in excess of MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-bay syndrome.	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural features

What are the Potential Sources of Contamination at TA-V?

Three waste disposal sites previously operated by SNL have been identified by as potential sources of contamination detected at TA-V.

Wastewater Disposal History at Potential Sources of Contaminants at TA-V

Disposal Site	Period of Operation	Estimated Volume of Release - gallons	SWMU Number
TA-V Seepage Pits	1960s - 1992	30 - 50 million	275
Liquid Waste Disposal System (LWDS) Drain Field	1962 - 1967	6.5 million	5
Liquid Waste Disposal System Surface Impoundments	1967 - 1972	12 million	4

What are the Potential Sources of Contamination at TAG?

Three waste disposal sites previously operated by SNL have been identified as “high Concern” potential sources of contamination detected at TAG.

Wastewater Disposal History at SNL Locations of “High Concern” as Potential Sources of Release at TAG

Source: SNL AGMR 2010 and SNL, “Tijeras Arroyo Groundwater Investigation Report”, 2005 available at <https://hwbdocuments.env.nm.gov/Sandia%20National%20Labs/2005-11-11%20Tijeras%20Arroyo%20GW%20IR.pdf>

INVESTIGATION REPORT

Source	Contaminant of Concern	Period of Operation	Estimated Volume of Release in gallons	SWMU Number
TA-I Old Acid Waste Line Outfall	TCE, Nitrate	1948-1974	1.3 billion	46 (connected to SWMU 226)
TA-II Bldg. 901 Septic System	TCE, Nitrate	1948 – 1992	No estimate identified	165
TA-I Sanitary Sewer System	Nitrate	1948 – Present (as of 2005)	No estimate identified	187

Ten KAFB waste disposal sites have been identified as potential sources of the contamination detected at TAG.

KAFB Sites of Potential Sources of TCE and Nitrate at TAG

Potential Source	Contaminant of Concern and Level of Concern (L=Low; M=Medium; H=High)	Dates of Operations	Estimate Volume of release (gallons), acreage and/or volume of debris
KAFB Landfill LF-02	TCE (L), Nitrate (M)	1945 - 1967	Storm water (no estimate available); 50 acres of unlined landfill; estimated 1,000,000 cubic yards of waste
KAFB Landfill LF-08	TCE (L), Nitrate (M)	1960 -1989	Storm water (no estimate provided); 30 acres of unlined landfill; estimated 600,000 cubic yards of waste
KAFB Landfill LF-44	(TCE (None); Nitrate (M)	1979 - 1988	Storm water (no estimate provided); 2 acres of unlined landfill; no debris volume estimate
KAFB Landfill LF-268	TCE (None); Nitrate (M)	1989 – Present (as of 2005)	Storm water (no estimated provided); 45 acres of landfill; no liner identified; no debris volume estimate
KAFB Sewage Lagoons	TCE (H); Nitrate (H)	1966 - 1987	Most of 7.3 billion gallons discharged at lagoons; unidentified volume of wastewater piped to golf course pond
KAFB Golf Course Main Pond	TCE (H); Nitrate (H)	1966 - 1987	Unknown volume of wastewater piped from KAFB sewage lagoons; After 1988, pond used to store well water
KAFB Sanitary Sewer Lines	TCE (L); Nitrate (M)	1940s – Present (as of 2005)	No estimate of volume released
KAFB Septic Tank Systems	TCE (L); Nitrate (M)	1940s – Present (as	Estimated 30 systems across KAFB; No estimate of volume released

		of 2005)	
KAFB Manzano Base Blasting	TCE (None); Nitrate (Medium)	1940s - Present (as of 2005)	Dynamite blasting of bunkers may have left explosive material that degrades to nitrate

Five City of Albuquerque waste disposal sites have been identified as potential sources of contamination at TAG.

City of Albuquerque (COA) Sites of Potential Sources of TCE and Nitrate at TAG

Potential Source	Contaminant of Concern and Level of Concern (L=Low; M=Medium; H=High)	Period of Operations	Estimate Volume of release (gallons), acreage and/or volume of debris
COA Eubank Landfill - Northeast Area	TCE (H); Nitrate (H)	1974(?) - 1989	27 acres of landfill area; No liner identified; estimated 1,000,000 cubic yards of municipal and industrial debris dumped; sewer lines associated with residential waste lagoons and septic tanks cross site.
COA Eubank Landfill - Southwest Area	TCE (H); Nitrate (M)	Early 1960s - 1973(?)	60 acres of landfill area; no liner identified; no estimate of volume of municipal and industrial debris dumped
COA Sanitary-Sewer Rupture/Temporary Sewage Pond	TCE (L); Nitrate (H)	1994	100 million gallons spilled; unknown volume of septic water recovered from temporary pond on floodplain
COA Sanitary Sewer Lines	TCE (L); Nitrate (H)	1940s - Present (as of 2005)	Leaking sewer lines may be ongoing problem on KAFB
COA Montessa Park/Tree Farm	TCE (None); Nitrate (H)	1950s - Present (as of 2005)	No volume estimate provided; Sewage lagoon use at Montessa Park Correctional Facility; Irrigation ponds and fertilizer used at US Forest Service Tree Farm

What are the Potential Sources of Contaminants at the Burn Site Ground Groundwater Area of Concern?

“Maximum and most recent concentrations of nitrate in groundwater from Burn Site wells. – 2008 – SNL AGMR 2009

Contaminant	Historical Maximum Concentration	Recent Maximum Concentration	Regulatory Limit (MCL)
Nitrate ^a	32.6 mg/L ^b	29.3 mg/L ^c	10 mg/L ^d
mg/L = milligrams per liter a. Nitrate or nitrate plus nitrite (NPN) both expressed as nitrogen. b. Detected in a sample from well CYN-MW6 collected in June 2006. Duplicate result was 29.5 mg/L. c. Detected in a sample from well CYN-MW6 collected in December 2007. Duplicate result was 27.7 mg/L. d. 40 CFR 141.62, “Maximum Contaminant Levels for Inorganic Contaminants (2003).”			

“Nitrate in groundwater near the Burn Site is attributed to non-point sources derived either from nitrate disseminated from open detonation of HE [High Explosives] from 1967 until the early 1980s at sites within Solid Waste Management Unit (SWMU) 65 or from concentration of nitrate present in rainwater via evaporation or transpiration of water from alluvial deposits in Lurance Canyon.

“Evaluation of nitrate in sediments from nearby pristine alluvial deposits and springs that discharge from fractured metamorphic rocks will be useful in determining the source of nitrate in groundwater at the Burn Site and evaluating whether that source has been depleted. The trends of nitrate concentrations over time indicate that a pulse of nitrate has moved downgradient across the Burn Site since 1995.” SNL AGMR 2009.