

Geosciences Research Foundation Metrics

Branding for the Geosciences Review

Amy Halloran and Joel Sikora



*Exceptional
service
in the
national
interest*



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Center 6900 Special Recognition (2010-2013)

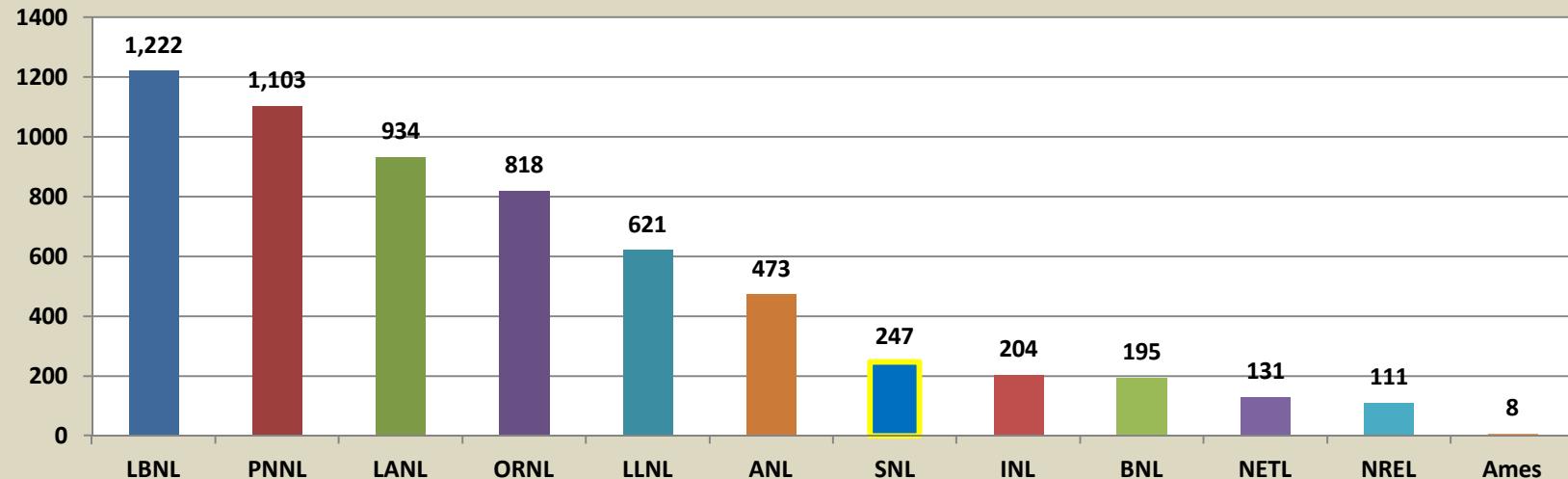
- **48 Advisory Board, Editors and Associate Editors**
- **59 Invited Talks**
 - 51 National
 - 8 International
- **26 Professional Leadership positions (2009-2013)**
- **11 Awards**
- **4 Journal/Book Covers**
- **1 Fellow**
 - *Patrick Cygan, Pennsylvania State University, Centennial Fellow, College of Earth and Mineral Science*



Peer Reviewed Papers and Citations

Sandia isn't as prolific in geoscience related papers as many DOE Labs

DOE Laboratory Geoscience Related Peer Reviewed Papers*
(2007-2011)



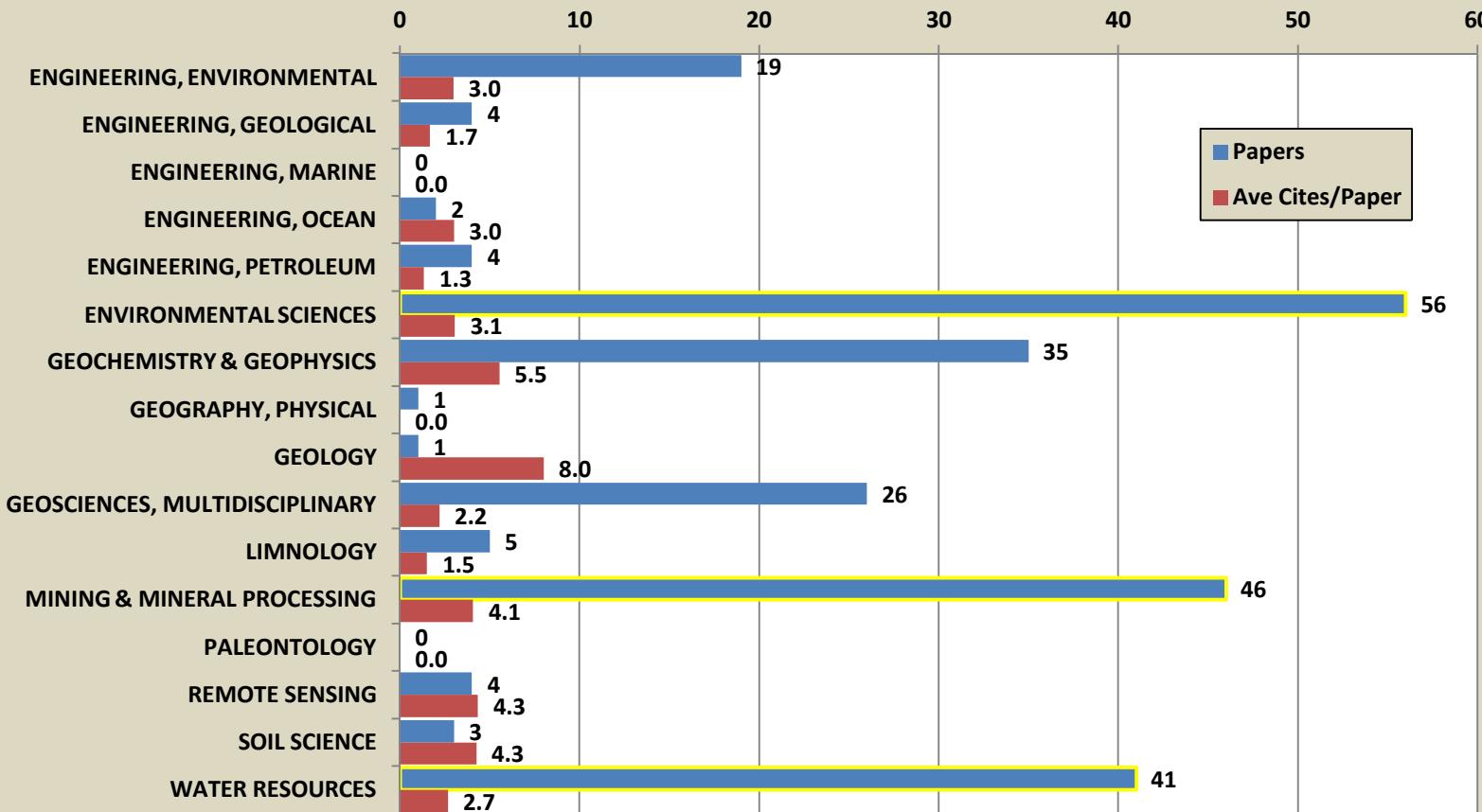
Web of Science Geoscience Subject Areas

- ENGINEERING, ENVIRONMENTAL
- ENGINEERING, GEOLOGICAL
- ENGINEERING, OCEAN
- ENGINEERING, PETROLEUM
- ENVIRONMENTAL SCIENCES
- GEOCHEMISTRY & GEOPHYSICS
- GEOGRAPHY, PHYSICAL
- GEOLOGY
- GEOSCIENCES, MULTIDISCIPLINARY
- LIMNOLOGY
- MINING & MINERAL PROCESSING
- PALEONTOLOGY
- REMOTE SENSING
- SOIL SCIENCE
- WATER RESOURCES

Peer Reviewed Papers and Citations

Sandia is most prolific in the areas of Environmental Sciences, Mining & Mineral Processing, and Water Resources

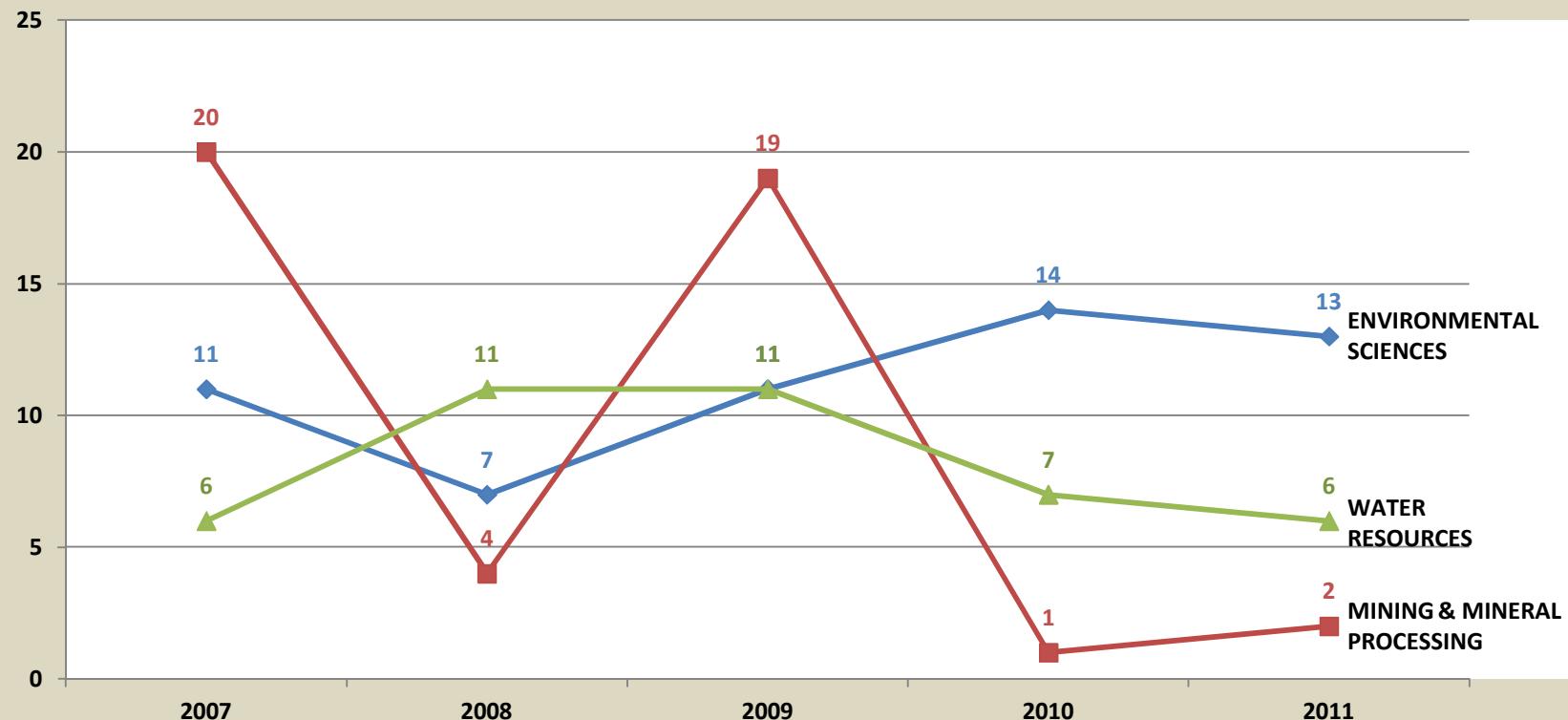
**Sandia Geoscience Papers by Subject Area
(2007-2011)**



Peer Reviewed Papers and Citations

Sandia is most prolific in the areas of Environmental Sciences, Mining & Mineral Processing, and Water Resources

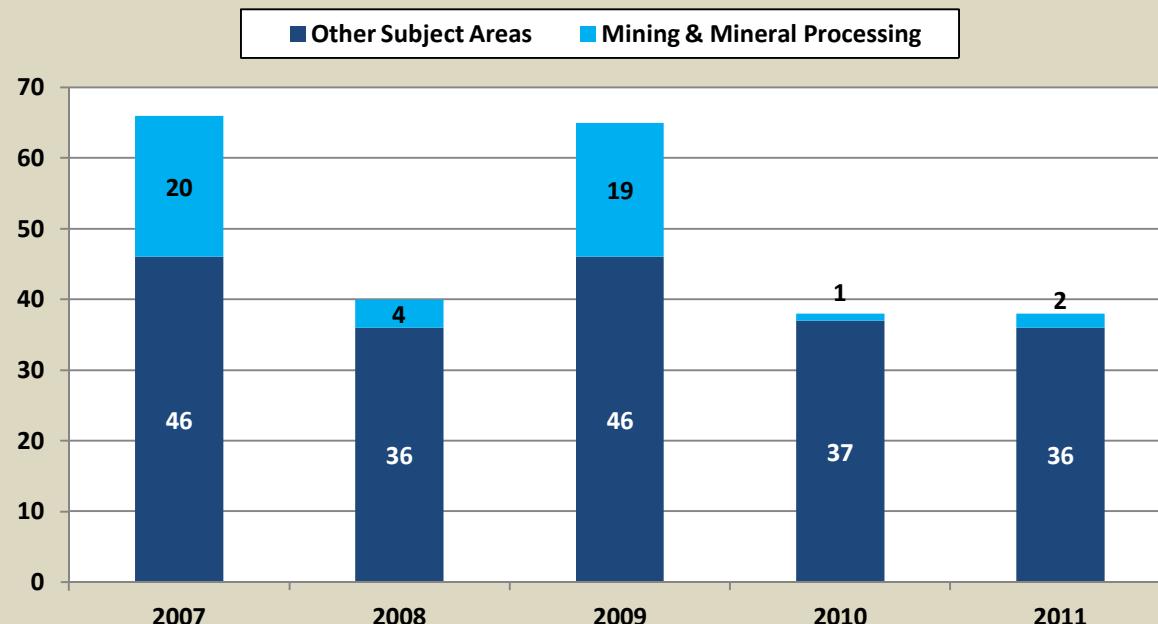
Sandia Geoscience Papers – Top Three Subject Areas for Sandia (2007-2011)



Peer Reviewed Papers and Citations

Sandia has the strongest Impact (average citations per paper) compared to the other DOE labs in Mining and Mineral Processing

**Sandia Geoscience Related Peer Reviewed Papers
(2007-2011)**



**Mining & Mineral Processing Papers
(2007-2011)**

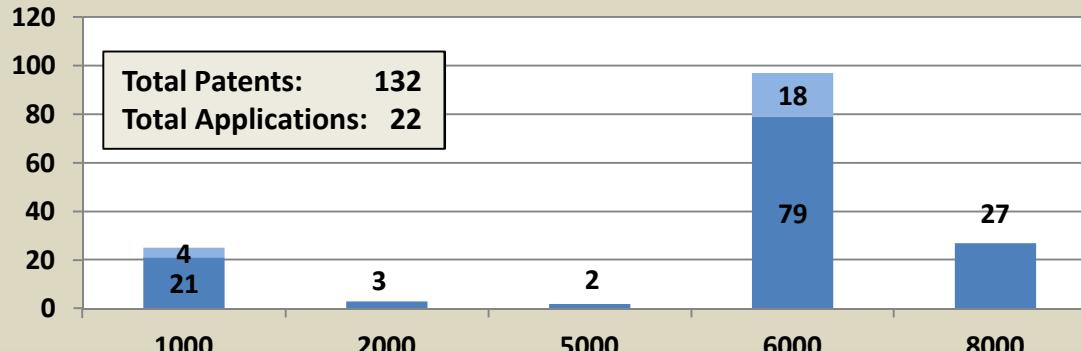
Laboratory	Impact*
LBNL	4.7
SNL	4.1
INL	3.9
ORNL	3.8
LLNL	3.5
PNNL	3.4
LANL	3.3
Ames	3.2
ANL	2.8
NETL	1.8
BNL	1.0
NREL	1.0

* Impact is defined by
Average Citations per Paper

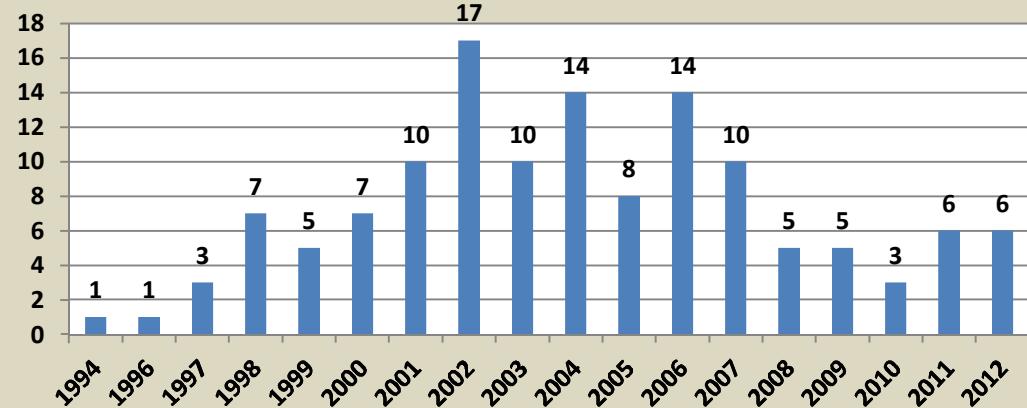
Patents and Patent Applications

Geoscience Related Patents and Applications By Division (1994-2012)

■ Patents □ Applications



Geoscience Related Patents by Year (1994-2012)



Licensing Royalties

Royalty Bearing Patent Licenses in the Geosciences (as of 8/28/2012)

COMPANY	License #	Duration	IP licensed	Royalty revenues
UOP Honeywell (CSTs for radwaste cleanup)	C00041	1994 - 2017	2 patents for CSTs; Exclusive for radwaste cleanup	\$300K 1999 – 2008; \$800K in 2012 (fully paid)
US Grout (ultrafine grout for wells)	C00632	1998 - 2015	2 patents non-exclusively 5266.1, 5266.2	\$275K up to 2012; ~ 25K/yr avg.
Baker Hughes (drilling telemetry systems)	C00534	1998-2019	3 patents; 3 copyrights; some exclusive rights	\$400K up to 2012; ~ \$20K/yr avg.
XAcT Drilling Telemetry	C01028	2001 – 2019	3 patents; 3 copyrights non-exclusive rights	\$80K up to 2012; ~ \$4K/ yr now
Verrillon, Inc. (optical fiber)	C02330	2009 – 2022	1 patent; currently negotiating for exclusive rights	\$46K to date; growing sales now

Center 6900 Patent and Software License Royalty Income (2007-Current)



Patent #	Title	Issue/ Filing Date	Owning Center
US6482380B1	Silicotitanate molecular sieve and condensed phases	11/19/2002	1100
N/A (application)	One-Step Capture and Storage of Volatile Fission Gases	10/23/2012	1100
N/A (application)	Pelletized Molecular Sieves and Method of Making Molecular Sieves	11/12/2012	1100
N/A (application)	Mixed-Layered Bismuth-Oxygen-Iodine Materials For Capture And Waste Disposal Of Radioactive Iodine	1/29/2013	1100
US6021094A	Method of migrating seismic records	2/1/2000	1400
US6618712B1	Particle analysis using laser ablation mass spectroscopy	9/9/2003	1400
US5703836A	Acoustic transducer	12/30/1997	1500
US6182755B1	Bellow seal and anchor	2/6/2001	1500
US5571944A	Acoustic wave (AW) based moisture sensor for use with corrosive gases	11/5/1996	1700
US5661233A	Acoustic-wave sensor apparatus for analyzing a petroleum-based composition and sensing solidification of constituents therein	8/26/1997	1700
US5763283A	Method and apparatus for phase and amplitude detection	6/9/1998	1700
US5827952A	Method of and apparatus for determining deposition-point temperature	10/27/1998	1700
US6358748B1	Microbend fiber-optic chemical sensor	3/19/2002	1700
US6581445B1	Distributed fiber optic moisture intrusion sensing system	6/24/2003	1700
US6902701B1	Apparatus for sensing volatile organic chemicals in fluids	6/7/2005	1700
US5770275A	Molecular sieving silica membrane fabrication process	6/23/1998	1800
US5935646A	Molecular sieving silica membrane fabrication process	8/10/1999	1800
US5950906A	Reversible brazing process	9/14/1999	1800
US6048546A	Immobilized lipid-bilayer materials	4/11/2000	1800
US6271335B1	Method of making thermally removable polymeric encapsulants	8/7/2001	1800
US6337384B1	Method of making thermally removable epoxies	1/8/2002	1800
US6403753B1	Method of making thermally removable polyurethanes	6/11/2002	1800
US6494326B1	Composite zeolite membranes	12/17/2002	1800
US6561275B2	Apparatus for controlling fluid flow in a conduit wall	5/13/2003	1800
N/A (application)	Sulfonium-based antimicrobial and antibacterial coatings	9/20/2012	1800
N/A (application)	Coatings for the Prevention of Biofouling in Marine Environments	1/14/2013	1800
US5337917A	Crash resistant container	8/16/1994	2100
US5722488A	Apparatus for downhole drilling communications and method for making and using the same	3/3/1998	2600
US6617591B1	Method for remote detection of trace contaminants	9/9/2003	2600
US6455825B1	Use of miniature magnetic sensors for real-time control of the induction heating process	9/24/2002	5300
US6566636B1	Closed loop control of the induction heating process using miniature magnetic sensors	5/20/2003	5300
US5774419A	High speed point derivative microseismic detector	6/30/1998	6100
US5776244A	Ultrafine cementitious grout	7/7/1998	6100
US5934373A	Apparatus and method for monitoring underground fracturing	8/10/1999	6100

Patent #	Title	Issue/ Filing Date	Owning Center
US5968257A	Ultrafine cementitious grout	10/19/1999	6100
US6405608B1	Method and apparatus for optimized sampling of volatilizable target substances	6/18/2002	6100
US6477907B1	Detection of explosives in soils	11/12/2002	6100
US6802227B2	Method and apparatus for optimized sampling of volatilizable target substances	10/12/2004	6100
US7888397B1	Poly(phenylene)-based anion exchange membrane	2/15/2011	6100
US7951747B1	Single-layer transition metal sulfide catalysts	5/31/2011	6100
US6494084B1	Adjustable shear stress erosion and transport flume	12/17/2002	6200
US6592294B1	Situ formation of apatite for sequestering radionuclides and heavy metals	7/15/2003	6200
US6679105B1	Oscillatory erosion and transport flume with superimposed unidirectional flow	1/20/2004	6200
US6687640B1	Airborne agent concentration analysis	2/3/2004	6200
US7028481B1	High efficiency Brayton cycles using LNG	4/18/2006	6200
US7790134B1	Method of purifying isosaccharinate	9/7/2010	6200
N/A (application)	Support System, Excavation Arrangement, and Process for Supporting an Object	9/27/2012	6200
US6230503B1	Method and apparatus for extracting water from air	5/15/2001	6500
US6360549B1	Method and apparatus for extracting water from air	3/26/2002	6500
US6453684B1	Method and apparatus for extracting water from air	9/24/2002	6500
US6511525B2	Method and apparatus for extracting water from air using a desiccant	1/28/2003	6500
US4474622A	Composition and process for recovering and upgrading petroleum products	10/2/1984	6600
US6234025B1	Ultrasonic inspection apparatus and method using a focused wave device	5/22/2001	6600
US6357968B1	Method and apparatus for constructing an underground barrier wall structure	3/19/2002	6600
US6566574B1	Formulations for neutralization of chemical and biological toxants	5/20/2003	6600
US6596254B1	Niobate-based octahedral molecular sieves	7/22/2003	6600
US6693285B1	Fluorescent fluid interface position sensor	2/17/2004	6600
US6723890B2	Concentrated formulations and methods for neutralizing chemical and biological toxants	4/20/2004	6600
US6821434B1	System for removal of arsenic from water	11/23/2004	6600
US6824690B1	Zirconium-modified materials for selective adsorption and removal of aqueous arsenic	11/30/2004	6600
US6834720B1	Method and apparatus for injecting particulate media into the ground	12/28/2004	6600
US6853798B1	Downhole geothermal well sensors comprising a hydrogen-resistant optical fiber	2/8/2005	6600
US6965709B1	Fluorescent optical position sensor	11/15/2005	6600
US7003405B1	Methods for characterizing subsurface volatile contaminants using in-situ sensors	2/21/2006	6600
US7036612B1	Controllable magneto-rheological fluid-based dampers for drilling	5/2/2006	6600
US7049622B1	Optical position sensor for determining the interface between a clear and an opaque fluid	5/23/2006	6600
US7074336B1	Inorganic ion sorbents and methods for using the same	7/11/2006	6600
US7085694B2	Apparatus and method for interaction phenomena with world modules in data-flow-based simulation	8/1/2006	6600
US7119245B1	Synthesis of an un-supported, high-flow ZSM-22 zeolite membrane	10/10/2006	6600

Patent #	Title	Issue/ Filing Date	Owning Center
US7122164B2	Niobate-based octahedral molecular sieves	10/17/2006	6600
US7122502B1	Inorganic ion sorbents	10/17/2006	6600
US7125497B1	Reactive formulations for a neutralization of toxic industrial chemicals	10/24/2006	6600
US7138063B1	Method of removing arsenic and other anionic contaminants from contaminated water using enhanced coagulation	11/21/2006	6600
US7229593B1	Portable vapor diffusion coefficient meter	6/12/2007	6600
US7244359B1	Inorganic ion sorbent method	7/17/2007	6600
US7276468B1	Granulated decontamination formulations	10/2/2007	6600
US7282470B2	Decontamination formulation with sorbent additive	10/16/2007	6600
US7282676B1	Integrating preconcentrator heat controller	10/16/2007	6600
US7299711B1	Analyte separation utilizing temperature programmed desorption of a preconcentrator mesh	11/27/2007	6600
US7329857B1	Side-emitting fiber optic position sensor	2/12/2008	6600
US7390432B2	Enhanced formulations for neutralization of chemical, biological and industrial toxants	6/24/2008	6600
US7514493B1	Strippable containment and decontamination coating composition and method of use	4/7/2009	6600
US7662759B1	Decontamination formulation with additive for enhanced mold remediation	2/16/2010	6600
US7750199B1	Kit systems for granulated decontamination formulations	7/6/2010	6600
US7875101B2	Hybrid membrane—PSA system for separating oxygen from air	1/25/2011	6600
US8012411B1	Enhanced toxic cloud knockdown spray system for decontamination applications	9/6/2011	6600
US8022265B2	Reduced weight decontamination formulation utilizing a solid peracid compound for neutralization of chemical and biological warfare agents	9/20/2011	6600
US8241562B1	Enhanced toxic cloud knockdown spray system for decontamination applications	8/14/2012	6600
US6416252B1	In situ formation of phosphate barriers in soil	7/9/2002	6800
US6527691B1	In situ formation of magnetite reactive barriers in soil for waste stabilization	3/4/2003	6800
US5823261A	Well-pump alignment system	10/20/1998	6900
US6041872A	Disposable telemetry cable deployment system	3/28/2000	6900
US6110378A	Method of using novel silico-titanates	8/29/2000	6900
US6147932A	Acoustic transducer	11/14/2000	6900
US6188647B1	Extension method of drillstring component assembly	2/13/2001	6900
US6221237B1	Electrokinetic removal of charged contaminant species from soil and other media using moderately conductive adsorptive materials	4/24/2001	6900
US6271670B1	Method and apparatus for detecting external cracks from within a metal tube	8/7/2001	6900
US6427791B1	Drill bit assembly for releasably retaining a drill bit cutter	8/6/2002	6900
US6479427B1	Silico-titanates and their methods of making and using	11/12/2002	6900
US6791470B1	Reducing injection loss in drill strings	9/14/2004	6900
US6802980B1	Arsenic removal in conjunction with lime softening	10/12/2004	6900

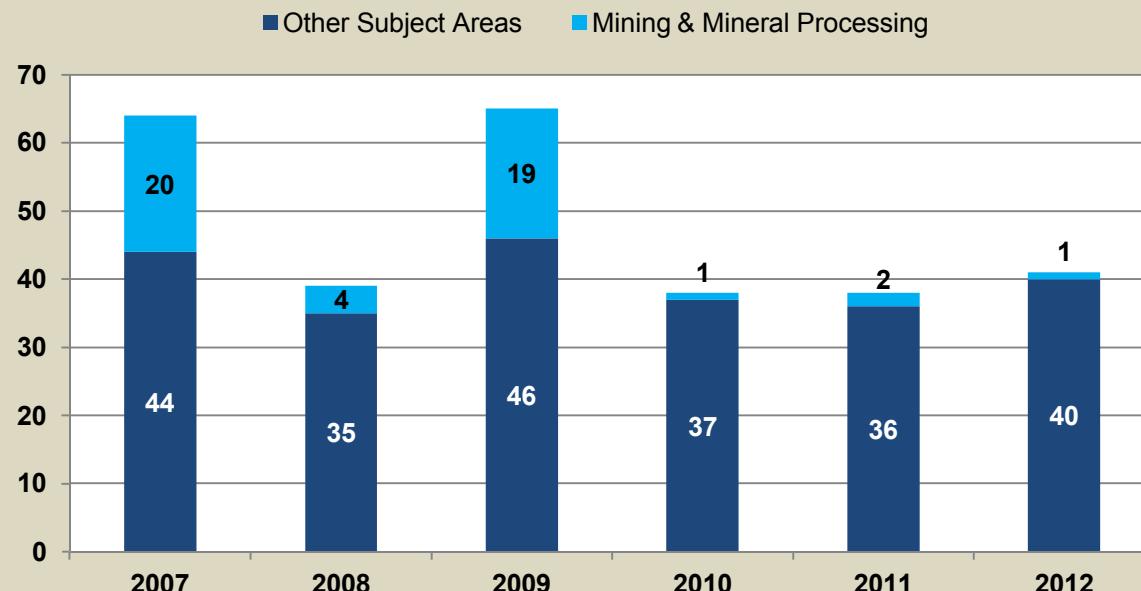
Patent #	Title	Issue/ Filing Date	Owning Center
US6830695B1	In situ remediation process using divalent metal cations	12/14/2004	6900
US7171328B1	Method for measuring thermal properties using a long-wavelength infrared thermal image	1/30/2007	6900
US7247242B1	Arsenic removal from water	7/24/2007	6900
US7362235B1	Impedance-matched drilling telemetry system	4/22/2008	6900
US7494640B1	Hydrogen peroxide modified sodium titanates with improved sorption capabilities	2/24/2009	6900
US7514004B1	In-tank recirculating arsenic treatment system	4/7/2009	6900
N/A (application)	Methods for attaching Polymerizable Ceragenins to Water Treatment Membranes	1/7/2011	6900
N/A (application)	Methods for attaching Polymerizable Ceragenins to Water Treatment Membranes	1/7/2011	6900
N/A (application)	Reduced-impact sliding pressure control valve for pneumatic hammer drill	1/7/2011	6900
N/A (application)	System and method for silica scale control	4/4/2011	6900
N/A (application)	Inherently safe in situ uranium recovery	4/11/2011	6900
N/A (application)	Methods of recovering alkali metals	4/28/2011	6900
N/A (application)	Simulating current flow through a well casing and an induced fracture	8/9/2011	6900
N/A (application)	PH adjustment of power plant cooling water with flue gas/fly ash	8/11/2011	6900
N/A (application)	Injection withdrawal tracer tests to assess proppant placement	8/11/2011	6900
US8006776B1	Sliding pressure control valve for pneumatic hammer drill	8/30/2011	6900
N/A (application)	Waterflooding injectate design systems and methods	9/6/2011	6900
N/A (application)	Delaminated sodium nonatitanate and a method for producing delaminate	12/2/2011	6900
N/A (application)	Functionalized surfaces for destruction of pathogens and organics	12/19/2011	6900
US8119011B1	Optimized alumina coagulants for water treatment	2/21/2012	6900
US8176995B1	Reduced-impact sliding pressure control valve for pneumatic hammer drill	5/15/2012	6900
N/A (application)	Self-consuming materials	7/19/2012	6900
N/A (application)	Method for producing delaminated ganglion dynamics and its implications to geologic carbon dioxide storage	7/25/2012	6900
N/A (application)	Characterization of Stimulated Fractures Using Natural Tracers	8/30/2012	6900
US8262950B1	Low sintering temperature glass waste forms for sequestering radioactive iodine	9/11/2012	6900
N/A (application)	High Temperature Charge Amplifier for Geothermal Applications	9/11/2012	6900
US8292492B2	Airfoil-shaped micro-mixers for reducing fouling on membrane surfaces	10/23/2012	6900
N/A (application)	Waterflooding Injectate Design Systems and Methods	11/26/2012	6900
US5594250A	Method for detecting water equivalent of snow using secondary cosmic gamma radiation	1/14/1997	8100
US6030587A	Method and apparatus for waste destruction using supercritical water oxidation	2/29/2000	8100
US6882786B1	Preform for producing an optical fiber and method therefor	4/19/2005	8100
US6918573B1	Microvalve	7/19/2005	8100
US6966336B1	Fluid injection microvalve	11/22/2005	8100
US7094326B2	Electrodes for microfluidic applications	8/22/2006	8100
US7213473B2	Sample preparation system for microfluidic applications	5/8/2007	8100

Patent #	Title	Issue/ Filing Date	Owning Center
US7297246B2	Electrokinetic pump	11/20/2007	8100
US7375814B2	Natural gas leak mapper	5/20/2008	8100
US7384526B2	High-pressure microhydraulic actuator	6/10/2008	8100
US7486399B1	Method for mapping a natural gas leak	2/3/2009	8100
US6420696B1	Embedded sensor having an identifiable orientation	7/16/2002	8200
US6770201B2	Cast-to-shape electrokinetic trapping medium	8/3/2004	8200
US6846399B2	Castable three-dimensional stationary phase for electric field-driven applications	1/25/2005	8200
US7625474B1	Method for a microfluidic weaklink device	12/1/2009	8200
US6086243A	Electrokinetic micro-fluid mixer	7/11/2000	8300
US6770183B1	Electrokinetic pump	8/3/2004	8300
US5942093A	Electro-osmotically driven liquid delivery method and apparatus	8/24/1999	8600
US6287440B1	Method for eliminating gas blocking in electrokinetic pumping systems	9/11/2001	8600
US6290909B1	Sample injector for high pressure liquid chromatography	9/18/2001	8600
US6326787B1	NMR of thin layers using a meanderline surface coil	12/4/2001	8600
US6495015B1	Electrokinetically pumped high pressure sprays	12/17/2002	8600
US6770182B1	Method for producing a thin sample band in a microchannel device	8/3/2004	8600
US6843272B2	Conductance valve and pressure-to-conductance transducer method and apparatus	1/18/2005	8600
US7005301B2	Piecewise uniform conduction-like flow channels and method therefor	2/28/2006	8600
US7014747B2	Dielectrophoretic systems without embedded electrodes	3/21/2006	8600
US8162149B1	Particle sorter comprising a fluid displacer in a closed-loop fluid circuit	4/24/2012	8600

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Sandia has the strongest impact in the area of Mining and Mineral Processing

**Sandia Geoscience Related Peer Reviewed Papers*
(2007-2012)**



**Mining & Mineral Processing Papers*
(2007-2011)**

Laboratory	Impact*
LBNL	4.7
SNL	4.1
INL	3.9
ORNL	3.8
LLNL	3.5
PNNL	3.4
LANL	3.3
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ANL	2.8
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NREL	1.0