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Consulting Geologist

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Education

Ph D Geology Princeton University (1980)
B S Geology Iowa State University (1967)

Experience and Background

Technical

Geology and hydrology of Dockum Group southeastern New Mexico and west Texas
Groundwater availability model of Rustler Formation
Evaluation of evaporite dissolution in Permian Basin evaporites in support of site studies for WCS and GNEP
Halite stability and preservation studies in southeastern New Mexico and west Texas
Evaluation of brine well and injection well locations in west Texas and southeastern New Mexico
Geological environments of cellulose and viable Permian age bacteria preserved in halite
Permian Dewey Lake Formation cements and isolated perched groundwater
Geological studies for realignment of New Mexico Highway 128 (for The Larkin Group)
Geostatistical analyses of pressurized brine reservoirs and hydrogeological controls Waste Isolation Pilot Plant
Review contribute to performance assessment (PA) scenarios and parameters Waste Isolation Pilot Plant
Member of National Academy of Sciences panel reviewing Ward Valley (CA) LLRW disposal project
Evaluate historical compliance issues revise Project Technical Baseline document for Waste Isolation Pilot Plant
Site selection characterization of new landfill site Carlsbad and Eddy County NM
Subsidence studies of potash mines for Waste Isolation Pilot Plant
Chairman external review panel for the Yucca Mountain Project reviewing tectonic and hydrologic concerns
Integrated studies of hydrogeology of the Permian Rustler Formation in southeastern New Mexico
Water table controls on evaporite deposition Permian Salado Formation and Death Valley CA
Shaft mapping (4 shafts) for the Waste Isolation Pilot Plant project east of Carlsbad NM
Geology of Cenozoic volcanic sediments in Argentina for paleoenvironmental reconstruction and stratigraphy
Proprietary studies of frontier sulfur prospects in NM and other areas consulting on evaporite brine sources
Geological investigations of Permian Castile Salado Rustler and Dewey Lake Formations in the Delaware Basin (USA) and region to determine depositional patterns and dissolution history
Geological and geophysical studies of the Waste Isolation Pilot Plant (WIPP) site from 1975 to 1980 as part of site characterization for a repository for radioactive waste
Geological investigations of Mio Pliocene sediments in the rift valley of northwestern Kenya



Experience and Background cont

Management

Start and manage consulting business (since 1988) Clients have included

JOAB Inc SAIC IT Corporation Westinghouse Sandia National Laboratories Mobil Freeport McMoran Gallegos Law Firm The Larkin Group United Salt Corporation Intrepid Potash Company – NM Washington TRU Solutions Washington Safety Management Solutions Gordon Environmental Waste Control Specialists West Texas Water Well Services Cook Joyce Inc Golder and Associates Inc URS Basic Energy Services Intera Key Energy Services CJ Energy/Trinity Environmental

Assistant Professor Department of Geological Science UTEP 1983 1988 contracts research and theses Supervisor Earth Sciences Division Sandia National Laboratories (SNL) 1980 1983 Technical staff of eight with expertise in geology geophysics geochemistry hydrology modeling structural geology petrology Supervised a matrix group from SNL (1980 81) to select areas of crystalline rocks in the Lake Superior region that might be suitable for further characterization for radioactive waste disposal

Represented Sandia geotechnical work on the WIPP to numerous groups such as the Governor's Task Force (NM) Environmental Evaluation Group (NM) Environmental Protection Agency and both the WIPP Panel and the Committee on Radioactive Waste Management of the National Academy of Sciences

Witness/Testimony

Technical expertise deposition for Hartman in *Hartman v Texaco*

Testimony for NM Environment Department hearings on permit for Sand Point landfill Carlsbad NM

Technical expertise rebuttal testimony RCRA Permit Hearings for WIPP (1999) by NM Environment Department Extensive presentations to EPA and Peer Review Panel (for EPA) on geology and hydrology of WIPP and surrounding area (2003 2008)

Written testimony RCRA Permit Hearings for WIPP (2010) by NM Environment Department

Testimony to Blue Ribbon Commission on America's Nuclear Future (January 2011)

Chronology

Consultant (self employed) 1988 to present

Assistant Professor Dept Geological Science University of Texas at El Paso 1983 1988

Supervisor Earth Sciences Division Sandia National Laboratories from 1980 to 1983

Member of Technical Staff Sandia National Laboratories 1975 1980

Affiliations

Geological Society of America (Fellow)

New Mexico Geological Society

International Association of Sedimentologists (IAS)

SEPM (Society for Sedimentary Geology)

Licensing/Registration

Licensed Professional Geologist (Illinois) License No 196 001032 inactive 3/31/13

Professional Geoscientist (Geology) (Texas) License No 167 expires 4/30/16

Other Professional Activities

Corresponding Editor *Journal of Sedimentary Research* (formerly *Journal of Sedimentary Petrology*) (1995 96)

Adjunct Professor *Department of Geology and Geological Engineering* University of Mississippi University MS

Member *National Academy of Sciences Panel on Ward Valley* (1994 1995)

PARTIAL LIST OF PUBLICATIONS

Journal Articles and Reviewed Publications/Documents

- Ewing J E Kelley V A Jones T L Yan T Singh A Powers D W Holt R M and Sharp J M 2012 Final Groundwater Availability Model Report for the Rustler Aquifer report for Texas Water Development Board http://www.twdb.texas.gov/groundwater/models/gam/rslr/RSLR_GAM_Report.pdf
- Holt R M and Powers D W 2011 Synsedimentary dissolution pipes and the isolation of ancient bacteria and cellulose Geological Society of America Bulletin v 123 p 1513 1523 DOI 10.1130/B30197.1
- Holt R M and Powers D W 2010 Evaluation of halite dissolution at a radioactive waste disposal site Andrews County TX Geological Society of America Bulletin v 122 p 1989 2004 DOI 10.1130/B30052.1
- Griffith J D Willcox S Powers D W Nelson R and Baxter B K 2008 Discovery of abundant cellulose microfibers encased in 250 Ma Permian halite a macromolecular target in the search for life on other planets Astrobiology v 8 p 215-228
- Kay R F Fleagle J G Mitchell T Colbert M Bown T and Powers D W 2008 The anatomy of *Dolichocebus gaimanensis* a primitive platyrrhine monkey from Argentina Journal of Human Evolution v 54 p 323 382
- Powers D W and Holt R M 2008 Lessons from early site investigations at the Waste Isolation Pilot Plant in Rempe N T ed *Deep Geologic Repositories* Geological Society of America Reviews in Engineering Geology v XIX p 83 97 doi 10.1130/2008.4019(09) March
- Hovorka S D Holt R M and Powers D W 2007 Depth indicators in Permian Basin evaporites in Schreiber B C Lugli S and Babel M eds *Evaporites Through Space and Time* Geological Society of London Special Publications 285 p 301 330
- Beauheim R L McKenna S A Powers D W and Holt R M 2007 Geoscientific data collection and integration for the Waste Isolation Pilot Plant *Linkage of Geoscientific Arguments and Evidence in Supporting the Safety Case Second AMIGO Workshop Proceedings* Toronto Canada 20 22 September 2005 OECD NEA p 125 132 (ISBN 978 92 64 01966 9)
- Powers D W Holt R M Beauheim R L and Richardson R G 2006 Advances in depositional models of the Permian Rustler Formation southeastern New Mexico in *Caves & Karst of Southeastern New Mexico* L Land and others eds NM Geological Society Fifty seventh Annual Field Conference Guidebook p 267 276
- Powers D W Beauheim R L Holt R M and Hughes D L 2006 Evaporite karst features and processes at Nash Draw Eddy County New Mexico in *Caves & Karst of Southeastern New Mexico* L Land and others eds NM Geological Society Fifty seventh Annual Field Conference Guidebook p 253 266
- Holt R M Powers D W and Lowenstein T K 2006 Halite depositional cycles in the Upper Permian Salado Formation in *Caves & Karst of Southeastern New Mexico* L Land and others eds NM Geological Society Fifty seventh Annual Field Conference Guidebook p 78 80
- Lowenstein T K Satterfield C L Vreeland R H Rosenzweig W D and Powers D W 2005 New evidence for 250 Ma age of halotolerant bacterium from a Permian salt crystal Reply Geology Online Forum DOI 10.1130/0091.7613(2005)31 (<http://www.gsaajournals.org/i0091.7613.31.6.e93.pdf>)
- Holt R M Beauheim R L and Powers D W 2005 Predicting fractured zones in the Culebra Dolomite in Faybishenko B Witherspoon P A and Gale J eds *Dynamics of Fluids and Transport in Fractured Rock* AGU Geophysical Monograph Series v 162 p 103 116
- Satterfield C L Lowenstein T K Vreeland R H Rosenzweig W D and Powers D W 2005 New evidence for 250 Ma age of halotolerant bacterium from a Permian salt crystal Geology v 33 p 265 268
- Beauheim R L and Powers D W 2004 Integration of geologic information in the WIPP safety case in *Geological Disposal building Confidence Using Multiple Lines of Evidence Proceedings First AMIGO Workshop Yverdon les Bains Switzerland 3 5 June 2003* OECD Nuclear Energy Agency Issy les Moulineaux France (ISBN 9264015922) p 145 149
- Powers D W Holt R M Beauheim R L and McKenna S A 2003 Geological factors related to the transmissivity of the Culebra Dolomite Member Permian Rustler Formation Delaware Basin Southeastern New Mexico in Johnson K S and Neal J T eds *Evaporite karst and engineering/environmental problems in the United States* Oklahoma Geological Survey Circular 109 p 211 218
- Powers D W and Owsley D 2003 A field survey of evaporite karst along NM 128 realignment routes in Johnson K S and Neal J T eds *Evaporite karst and engineering/environmental problems in the United States* Oklahoma Geological Survey Circular 109 p 233 240
- Powers D W 2003 Jal Sinkhole in Southeastern New Mexico Evaporite dissolution drillholes and the potential for sinkhole development in Johnson K S and Neal J T eds *Evaporite karst and engineering/environmental problems in the United States* Oklahoma Geological Survey Circular 109 p 219 226
- Powers D W Vreeland R H Rosenzweig W D 2001 How old are bacteria from the Permian age?—Reply *Nature* v 411 p 155 156
- Vreeland R H Rosenzweig W D and Powers D W 2000 Isolation of a 250 million year old halotolerant bacterium from a primary salt crystal *Nature* v 407 p 897 900

- Powers D W and Holt R M 2000 The salt that wasn't there mudflat facies equivalents to halite of the Permian Rustler Formation southeastern New Mexico *Journal of Sedimentary Research* v 70 no 1 p 29 36
- Powers D W and Holt R M 1999 The Los Medanos Member of the Permian Rustler Formation *New Mexico Geology* v 21 no 4 p 97 103
- Weart W D Rempe N T and Powers D W 1998 The Waste Isolation Pilot Plant *Geotimes* v 43 no 10 p 14 19
- Vreeland R H and Powers D W 1998 Considerations for microbiological sampling of crystals from ancient salt formations in Aharon Oren ed *Microbiology and Biogeochemistry of Hypersaline Environments* CRC Press Boca Raton FL p 53 73
- Boak D M Dotson L Aguilar R Powers D W and Newman G 1997 Wellbore enlargement investigation potential analogs to the Waste Isolation Pilot Plant during inadvertent intrusion of the repository SAND96 2629 Sandia National Laboratories Albuquerque NM
- Leslie A B Kendall A C Harwood G M and Powers D W 1996 Conflicting indicators of palaeodepth during deposition of the Upper Permian Castile Formation Texas and New Mexico in Kemp A E S ed *Palaeoclimatology and Palaeoceanography from Laminated Sediments* Geological Society London Special Publication 116 p 79 92
- Powers D W 1996 Tracing early breccia pipe studies Waste Isolation Pilot Plant southeastern New Mexico A study of the documentation available and decision making during the early years of WIPP SAND94 0991 Sandia National Laboratories Albuquerque NM
- NAS/NRC 1995 Ward Valley an examination of seven issues in earth sciences and ecology National Academy Press Washington DC 252 p
- Deal D E Abitz R J Belski D S Case J B Crawley M E Givens C A James Lipponer P P Milligan D J Myers J Powers D W Valdivia M A 1995 Brine sampling and evaluation program 1992 1993 report and summary of BSEP data since 1982 DOE WIPP 94 011 U S Department of Energy Carlsbad NM
- Powers D W and Magee M 1993 Site selection and characterization of the Sand Point landfill site Eddy County New Mexico in D W Love and others eds *Carlsbad Region New Mexico and West Texas 44th NMGS Fall Field Conference Guidebook* New Mexico Geological Society Socorro NM p 353 357
- Powers D W and Holt R M 1993 The upper Cenozoic Gatuna Formation of southeastern New Mexico in D W Love and others eds *Carlsbad Region New Mexico and West Texas 44th NMGS Fall Field Conference Guidebook* New Mexico Geological Society Socorro NM p 271 282
- Holt R M and Powers D W 1993 Summary of Delaware Basin end stage deposits in D W Love and others eds *Carlsbad Region New Mexico and West Texas 44th NMGS Fall Field Conference Guidebook* New Mexico Geological Society Socorro NM p 90 92
- Powers D W and Martin M L 1993 A select bibliography with abstracts of reports related to Waste Isolation Pilot Plant (WIPP) geotechnical studies (1972 1990) SAND92 7277 Sandia National Laboratories Albuquerque NM 501 p
- Powers D W 1993 Geotechnical aspects of site selection and characterization Waste Isolation Pilot Plant southeastern New Mexico USA in D Alexandre and others ed *Proc 1993 Int Conf on Nuclear Waste Management and Environmental Remediation* Prague Czech Republic ASME NY NY v 1 p 689 693
- Holt R M and Powers D W 1990 Geotechnical activities in the air intake shaft (AIS) DOE/WIPP 90 051 U S Department of Energy Carlsbad NM <http://www.ntis.gov/search/product.aspx?ABBR=DE91017780>
- Powers D W and Martin M L 1990 Road log in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 7 20
- Powers D W 1990 A brief survey of geological investigations of the Waste Isolation Pilot Plant in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 21 25
- Powers D W and LeMone D V 1990 A summary of Ochoan stratigraphy of the western and northern Delaware Basin in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 27 32
- Powers D W 1990 Recent research advances in the geology of the Permian Castile Formation of southeastern New Mexico in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 33 44
- Holt R M and Powers D W 1990 Halite sequences within the Late Permian Salado Formation in the vicinity of the Waste Isolation Pilot Plant in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 45 78
- Powers D W and Holt R M 1990 Sedimentology of the Rustler Formation near the Waste Isolation Pilot Plant (WIPP) site in Powers D W Holt R M Beauheim R L and Rempe N eds 1990 *Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14* Geological Society of America (Dallas Geological Society) p 79 106

- Holt R M and Powers D W 1990 The Late Permian Dewey Lake Formation at the Waste Isolation Pilot Plant *in* Powers D W Holt R M Beauheim R L and Rempe N eds 1990 Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP) Guidebook 14 Geological Society of America (Dallas Geological Society) p 107 129
- Holt R M and Powers D W 1988 Facies variability and post depositional alteration within the Rustler Formation in the vicinity of the Waste Isolation Pilot Plant southeastern New Mexico WIPP DOE 88 004 Department of Energy Carlsbad NM 88221
- Powers D W and Holt R M 1987 Rustler Formation in the waste handling and exhaust shafts Waste Isolation Pilot Plant (WIPP) site southeastern New Mexico *in* Chaturvedi L ed The Rustler Formation at the WIPP site EEG 34 Environmental Evaluation Group Santa Fe NM p 26 35
- Fleagle J G Powers D W Conroy G C and Waters J P 1987 New fossil platyrrhines from Santa Cruz Province Argentina *Folia Primatol* v 48 p 65 77
- Powers D W and LeMone D V 1987 A summary of Ochoan stratigraphy western Delaware Basin Guidebook 18 El Paso Geological Society p 63 68
- Robinson J Q and Powers D W 1987 A clastic deposit within the lower Castile Formation western Delaware Basin Guidebook 18 El Paso Geological Society p 69 79
- Holt R M and Powers D W 1987 The Permian Rustler Formation at the WIPP site southeastern New Mexico Guidebook 18 El Paso Geological Society p 140 148
- Powers D W Holt R M and Hoffer J M 1987 Preliminary studies of near surface sediments Salt Flat graben west Texas Guidebook 18 El Paso Geological Society p 184 194
- Powers D W 1986 A simple rack for slabbing small diameter rock core with a rock saw *J Sed Pet* v 56 p 553 554
- Holt R M and Powers D W 1986 Geotechnical activities in the exhaust shaft Waste Isolation Pilot Plant DOE WIPP 86 008 Department of Energy Carlsbad NM 88221
- Powers D W and Hassinger B W 1985 Synsedimentary dissolution pits in halite of the Permian Salado Formation southeastern New Mexico *J Sed Pet* v 55 p 769 773
- Holt R M and Powers D W 1984 Geotechnical activities in the waste handling shaft Waste Isolation Pilot Plant (WIPP) project southeastern New Mexico WTSD TME 038 Department of Energy Carlsbad NM 88221
- Borns D J Barrows L J and Powers D W 1983 Deformation of evaporites near the Waste Isolation Pilot Plant site SAND82 1069 Sandia National Laboratories Albuquerque NM 87185
- Jarolimек L Timmer M J and Powers D W 1983 Correlation of drill and shaft logs Waste Isolation Pilot Plant (WIPP) project southeastern New Mexico TME 3179 Department of Energy Albuquerque NM
- Keller G R Veldhuis M J and Powers D W 1983 An analysis of gravity and magnetic anomalies in the Diablo Plateau area *in* Geology of the Sierra Diablo and Southern Hueco Mountains West Texas Permian Basin Sec SEPM Pub 83 22 p 152 165
- Powers D W and Easterling R G 1982 Improved methodology for using embedded Markov chains to describe cyclical sediments *J Sed Pet* v 52 p 913 923
- Powers D W 1981 Geologic investigation of the WIPP site overview and issues *in* Environmental Geology and Hydrology in New Mexico New Mex Geol Soc Spec Publ 10 p 119 122
- Maglio V J and Powers D W 1981 Exploration for Miocene faunas of East Africa *Nat Geog Soc Res Reports* v 13 p 405 418
- Reilinger R Brown L and Powers D W 1980 New evidence for tectonic uplift in the Diablo Plateau region west Texas *Geophysical Research Letters* v 7 p 181 184
- Anderson R Y and Powers D W 1978 Salt anticlines in Castile Salado evaporite sequence northern Delaware Basin *in* Austin G S ed Geology and mineral deposits of Ochoan rocks in Delaware Basin and adjacent areas New Mex Bur Mines and Min Res Circ 159 p 79 84
- Hern J L Powers D W and Barrows L J 1978 Seismic reflection data report Waste Isolation Pilot Plant (WIPP) site southeast New Mexico SAND79 0264 V I & II Sandia National Laboratories Albuquerque NM 87185
- Powers D W Lambert S J Shaffer S E Hill L R and Weart W D eds 1978 Geological characterization report Waste Isolation Pilot Plant (WIPP) site southeastern New Mexico SAND78 1596 v I & II about 1500 p Sandia National Laboratories Albuquerque NM 87185
- Cerling T E and Powers D W 1977 Paleorifting between the Gregory and Ethiopian Rifts *Geology* v 5 p 441 445
- O'Brien P D and Powers D W 1976 The southeastern New Mexico radioactive waste disposal pilot plant Proc 23rd Ann Mtg Southwestern Petroleum Short Course p 335 344

Other Reviewed and Unreviewed Reports or Papers

- Powers D W 2014 Basic data report for drillhole NP 1 (CP 1163) section 1 T19S R32E Lea County NM report to Sandia National Laboratories December 1 2014 128 p ERMS# 563150 Carlsbad NM Sandia National Laboratories WIPP Records Center

Holt R M Kuszmaul J S Powers D W and Hughes E E 2011 Subsurface discontinuity mapping for the Federal Waste Disposal Facility and Compact Waste Disposal Facility landfills report to Waste Control Specialists September 2011

Yuhr L and Powers D W Geophysical logging of new upper Dockum wells at Waste Control Specialists LLC location December 2010 report to Waste Control Specialists March 2011

Kuszmaul J S R M Holt E Hughes and D W Powers 2010 Discontinuity mapping in the byproduct material landfill excavation at the WCS site attachment to letter from William P Dornsife WCS to Susan Jablonski Texas Commission on Environmental Quality November 10 2010

Holt R M Gnsak G E Pckens J F Powers D W Kuszmaul J Hughes E E Griffith C and Cook S L 2010 Conceptual model report report to Waste Control Specialists June 2010

Powers D W 2010 Report of activities to plug and abandon Scratch Royalty #1A (Central Well) at the Waste Control Specialists Site report to Waste Control Specialists LLC (March 31)

Powers D W 2010 Basic data report for drillhole SNL 18 (C 3233) (Waste Isolation Pilot Plant) DOE/WIPP 07 3366 US Department of Energy Carlsbad NM

Powers D W 2010 Basic data report for drillhole SNL 6 & 6A (C 3151) (Waste Isolation Pilot Plant) DOE/WIPP 07 3323 US Department of Energy Carlsbad NM

Powers D W 2009 Basic data report for drillhole SNL 17 & 17A (C 3222) (Waste Isolation Pilot Plant) DOE/WIPP 07 3365 US Department of Energy Carlsbad NM

Powers D W 2009 Basic data report for drillhole SNL 19 (C-3234) (Waste Isolation Pilot Plant) DOE/WIPP 07 3367 US Department of Energy Carlsbad NM

Powers D W 2009 Petrographic Examination of selected samples from CP 975 report to Waste Control Specialists LLC

Powers D W 2009 Disruptions in near surface deposits in the excavation for by product disposal at WCS report to Waste Control Specialists LLC

Powers D W 2009 Condition 51 K for License No R04100 Verification and evaluation of the location of faulting nearest to the land disposal facility report to Waste Control Specialists LLC January

Powers D W 2009 Basic data report for drillhole SNL 16 (C-3220) (Waste Isolation Pilot Plant) DOE/WIPP 07 3364 US Department of Energy Carlsbad NM

Powers D W 2009 Basic data report for drillhole SNL 10 (C-3221) (Waste Isolation Pilot Plant) DOE/WIPP 07 3363 US Department of Energy Carlsbad NM

Powers D W 2009 Basic data report for drillhole SNL 8 (C 3150) (Waste Isolation Pilot Plant) DOE/WIPP 05 3324 US Department of Energy Carlsbad NM

Powers D W and Richardson R G 2008 Basic data report for drillhole SNL 15 (C 3152) (Waste Isolation Pilot Plant) DOE/WIPP 05 3325 US Department of Energy Carlsbad NM

Powers D W and Richardson R G 2008 Basic data report for drillhole SNL 13 (C 3139) (Waste Isolation Pilot Plant) DOE/WIPP 05 3319 US Department of Energy Carlsbad NM

Powers D W and Richardson R G 2008 Basic data report for drillhole SNL 14 (C 3140) (Waste Isolation Pilot Plant) DOE/WIPP 05-3320 US Department of Energy Carlsbad NM

Powers D W 2008 Basic geology of exploratory drillhole CP 975 Section 33 T21S R38E Lea County NM report for Waste Control Specialists LLC Andrews TX (July)

Holt R M and Powers D W 2007c Report on mapping of a trench through pedogenic calcrete (caliche) across a drainage and possible lineament Waste Control Specialists disposal site Andrews County TX report to WCS LLC in support of RCRA Permit Application for the Federal Facility Waste Disposal Facility V 10 Attachment V I Attachment 4 4

Powers D W 2007c Analysis Report for Task 1A of AP 114 Refinement of Rustler halite margins within the Culebra modeling domain report to Sandia National Laboratories October 5 2007

Powers D W 2007b Report on evaporite stability in the vicinity of the proposed GNEP site Lea County NM April 2007 report to Gordon Environmental Incorporated Albuquerque NM

Powers D W 2007a Surficial geology of section 2 T21S R29E Eddy County New Mexico January 2007 report to Intrepid Potash – New Mexico LLC

Holt R M and Powers D W 2007b Evaluation of halite dissolution in the vicinity of Waste Control Specialists disposal site Andrews County TX March 2007 report to WCS LLC in support of application to Texas Commission on Environmental Quality (<http://64.224.191.188/wcs/> Vol 12 Appendix 2 6 1 Geology Report Attachment 4 2

Holt R M and Powers D W 2007a Evaluation of halite dissolution in the vicinity of Waste Control Specialists disposal site Andrews County TX January 2007 report to WCS LLC in support of application to Texas Department of State Health Services for permit to dispose of byproduct waste

Powers D W 2006 Basic data report for relief wells #1 and 2 Intrepid West October 2006 report to Intrepid Potash – New Mexico LLC

Powers D W 2006 Analysis Report Task 1D of AP 114 Collect current and historic information on water levels and specific gravity in potash tailings ponds within the Culebra modeling domain report to Sandia National Laboratories March 31 2006 (ERMS #543124)

Powers D W 2006 Analysis Report Task 1B of AP 114 Identify possible area of recharge to the Culebra west and south of WIPP report to Sandia National Laboratories April 1 2006 (ERMS # 543094)

- Powers D W and Richardson R G 2004d Basic data report for drillhole SNL 5 (C 3002) (Waste Isolation Pilot Plant) DOE/WIPP 04 3305 US Department of Energy Carlsbad NM
- Powers D W and Richardson R G 2004c Basic data report for drillhole SNL 1 (C 2953) (Waste Isolation Pilot Plant) DOE/WIPP 04 3301 US Department of Energy Carlsbad NM
- Powers D W and Richardson R G 2004b Basic data report for drillhole SNL 3 (C 2949) (Waste Isolation Pilot Plant) DOE/WIPP 03 3294 US Department of Energy Carlsbad NM
- Powers D W and Richardson R G 2004a Basic data report for drillhole SNL 12 (C 2954) (Waste Isolation Pilot Plant) DOE/WIPP 03 3295 US Department of Energy Carlsbad NM
http://www.wipp.energy.gov/library/cra/2009_cra/references/Others%5CPowers_Richardson_2004_Basic_Data_Report_for_Drillhole_SNL12_C2954_03_3295.PDF
- Powers D W Powers J L Chace D A and Roberts R M 2004 Otero Mesa roadlog *in* Clark K F and Goodell P C eds Cerro de Cristo Rey Otero Mesa New Mexico and Texas and Copper Canyon Mexico Guidebook for the 2004 Field Conferences El Paso Geological Society p 23 33
- Powers D W 2004e Analysis Report Task 1B of AP 110 Identify plugged and abandoned oil or gas wells not sealed through the Culebra with cement and units to which the Culebra might be connected report to Sandia National Laboratories December 2004 (ERMS#538279)
- Powers D W 2004d Analysis Report Task 1A of AP 110 Identify potash holes not sealed through the Culebra with cement and units to which the Culebra might be connected report to Sandia National Laboratories May 2004 (ERMS#535377)
- Powers D W 2004c An introduction to the geology of the Otero Mesa Dell City Texas area *in* Clark K F and Goodell P C eds Cerro de Cristo Rey Otero Mesa New Mexico and Texas and Copper Canyon Mexico Guidebook for the 2004 Field Conferences El Paso Geological Society p 35 45
- Powers D W 2004b An introductory field trip to the history geology and hydrology of the southern Otero Mesa and Dell City Texas area *in* Clark K F and Goodell P C eds Cerro de Cristo Rey Otero Mesa New Mexico and Texas and Copper Canyon Mexico Guidebook for the 2004 Field Conferences El Paso Geological Society p 21 22
- Powers D W 2004a Laguna Grande brine sources letter report to United Salt Corporation Carlsbad NM (proprietary)
- Powers D W and Richardson R G 2003b Basic data report for drillhole SNL 9 (C-2950) (Waste Isolation Pilot Plant) DOE/WIPP 03 3291 US Department of Energy Carlsbad NM
- Powers D W and Richardson R G 2003a Basic data report for drillhole SNL 2 (C 2948) (Waste Isolation Pilot Plant) DOE/WIPP 03 3290 US Department of Energy Carlsbad NM
- Powers D W and Stensrud W A 2003 Basic data report for drillhole C 2811 (Waste Isolation Pilot Plant – WIPP) DOE/WIPP 02 3223 US Department of Energy Carlsbad NM
- Powers D W 2003b TEST PLAN TP 02 05 Geohydrological Conceptual Model for the Dewey Lake Formation in the Vicinity of the Waste Isolation Pilot Plant (WIPP) Sandia National Laboratories
- Powers D W 2003a Addendum 2 to Analysis report Task 1 of AP 088 Construction of geologic contour maps report to Sandia National Laboratories January 13 2003 (ERMS # 522085)
- Powers D W 2002c Addendum to Analysis report Task 1 of AP 088 Construction of geologic contour maps report to Sandia National Laboratories July 23 2002
- Powers D W 2002b Analysis report Task 1 of AP 088 Construction of geologic contour maps report to Sandia National Laboratories April 17 2002 (ERMS # 522085)
- Powers D W 2002a Basic data report for drillhole C 2737 (Waste Isolation Pilot Plant – WIPP) DOE/WIPP 01 3210 US Department of Energy Carlsbad NM
- Powers D W 2001 Macroscopic strain features in selected cores from the disturbed rock zone report to Sandia National Laboratories 12 p + appendix May 2001 (Task 6)
- Powers D W 2001 Geology of cores from Q Room Alcove for the DRZ test program report to Sandia National Laboratories 11 p + appendix January 2001 (Task 5)
- Powers D W 2000 Task 2 Contract 5987 (WIPP underground test site selection and description) memo to Sandia National Laboratories 10 p + figures + Appendix March 31 2000
- Powers D W 2000 Core descriptions from location 1 S90 drift for DRZ test program report to Sandia National Laboratories 9 p + appendix April 2000 (Task 5)
- Powers D W 2000 Moisture on surfaces in newer excavations at the Waste Isolation Pilot Plant report to Sandia National Laboratories 11 p (Task 4)
- Powers D W 2000 Evaporites casing requirements water floods and out of formation waters potential for sinkhole developments Meeting paper for Solution Mining Research Institute Special Symposium on Sinkholes and Unusual Subsidence Over Solution mined Caverns and Salt and Potash Mines San Antonio TX 10/15/00
- Powers D W 1999 A field survey of evaporite karst along NM 128 realignment routes in parts of sections 3-6 and 10 T22S R30E Appendix B *in* Phase B Location Study Report New Mexico 128 TPM 0128(7)) CN 3279 The Larkin Group Albuquerque NM 14 p
- Powers D W 1999 Letter report Potential source of coarse fill NM 128 realignment Appendix B *in* Phase B Location Study Report New Mexico 128 TPM 0128(7)) CN 3279 The Larkin Group Albuquerque NM 17 p
- Powers D W 1999 Overview of project geology realignment of NM 128 Appendix C *in* Phase A Initial Corridor Analysis Report, New Mexico 128 TPM 0128(7)) CN 3279 The Larkin Group Albuquerque NM 12 p

Powers D W 1999 Second inspection of air intake shaft for evidence of brine inflow consultant report prepared for Westinghouse Electric Corporation 15 p

Powers D W 1997 Geology of piezometer holes to investigate shallow water sources under the Waste Isolation Pilot Plant in Duke Engineering and Services 1997 Exhaust Shaft Phase 2 Hydraulic Assessment Data Report involving Drilling Installation Water quality Sampling and Testing of Piezometers 1 12 DOE/WIPP 97 2278 US Department of Energy Carlsbad NM

Powers D W 1997 Preliminary report on geology of drillholes C2505 C2506 and C2507 Appendix D in Intera 1997 Exhaust Shaft Hydraulic Assessment Data Report DOE/WIPP 97 2219 (January) US Department of Energy Carlsbad NM

Powers D W Martin M L and Terrill L J 1997 Geology across Nash Draw as exposed in the El Paso Energy pipeline trench consultant report prepared for Westinghouse Electric Corporation 27 p

Holt R M and Powers D W 1997 Geologic controls on hydraulic properties in the Rustler Formation southeastern New Mexico IT Corporation report prepared for Westinghouse Electric Corporation 135 p

Martin M L Terrill L J and Powers D W 1996 Geological data collected from the northern experimental area of WIPP preliminary report to Westinghouse Electric Corporation 15 p + appendix material

Powers D W Sigda J M and Holt R M 1996 Probability of intercepting a pressurized brine reservoir under the WIPP report and data package [ERMS 523414] for Sandia National Laboratories in support of WIPP performance assessment

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+ numerous abstracts and formal presentations at professional meetings public hearings

+ proprietary reports to sulfur companies on frontier prospect areas

+ proprietary reports to service companies in the oil and gas industry

+ contributed to and edited 23 additional reviewed drillhole basic data reports (BDR) from Sandia National Laboratories limited listing of individual authors

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| BDR ERDA 6 | SAND79 0267 | BDR WIPP 21 | SAND79-0277 |
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| BDR AEC 8 | SAND79-0269 | BDR WIPP 25 | SAND79-0279 |
| BDR ERDA 9 | SAND79 0270 | BDR WIPP 26 | SAND79-0280 |
| BDR ERDA 10 | SAND79 0271 | BDR WIPP 27 | SAND79-0281 |
| BDR WIPP 11 | SAND79 0272 | BDR WIPP 28 | SAND79-0282 |
| BDR WIPP 13 | SAND79 0273 | BDR WIPP 29 | SAND79-0283 |
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| BDR WIPP 14 | SAND82 1783 | BDR WIPP 32 | SAND80-1102 |
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