

STANDING DECLARATIONS

Declaration of Danny Berry

My name is Danny Berry. I live at 89 Berry Ranch Ln., Eunice, New Mexico 88231. My home and ranch lie less than 10 miles from the site where Holtec International proposes to construct a storage facility for spent nuclear fuel and high level radioactive waste.

I am a member of Sierra Club and wish to be represented by the organization in the intervention for the license application for Holtec's proposed nuclear waste storage facility.

Holtec plans to ship the deadly reactor waste mainly by rail, in a process that would take over 20 years. The license would allow high-level radioactive waste to be stored just below the ground in dry casks for 40 years, and extensions for storage of over 100 years have been discussed. Cracks or leaks could occur if dry casks are allowed to sit in the ground where corrosive groundwater could cause leaks in the casks. Furthermore, oil and gas companies have been drilling in the area of the Holtec site using hydraulic fracturing (fracking). This has caused the creation of geologic faults that induce earthquakes. Those earthquakes could cause the casks in the Holtec facility to crack and leak radioactive material.

I could be impacted if there is a leak or accident at the site. Winds could carry contamination towards my home and ranch. My health and the health of my livestock could be impacted by exposure to radioactive materials.

There are also risks from potential terrorist actions, which could be severe if such huge volumes of nuclear reactor waste from reactors around the country are stored at the Holtec site. Large volumes of waste with high curie counts could be involved.

Emergency responders in our community may not be adequately trained and equipped to deal with a situation involving a radioactive release.

I am also concerned that if a permanent repository for nuclear waste is not developed, the Holtec site will become a de facto repository without the protections of a permanent repository. A permanent repository requires deep burial in impermeable rock. The Holtec site is just the opposite.

For my own health and safety, for the well-being of my ranching operation, and for the sake of the health and safety of other people in the Hobbs, Carlsbad and Eunice area, I oppose the Holtec proposal and seek to be represented by Sierra Club.

I state under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge and belief.

Dated this 13 day of September, 2018.

Danny Berry
Danny Berry

Declaration of Danielle Marie Dyer

My name is Danielle Marie Dyer. I live at 1300 N. Dal Paso St., Hobbs, New Mexico 88240. My home and business lie about 34 miles east of the site where Holtec International proposes to construct a storage facility for spent nuclear fuel and high level radioactive waste. My home and business also lie about 24 miles north from the Waste Control Specialists, LLC storage facility in Texas site that J.F. Lehman & Company recently purchased and propose to now use for spent nuclear fuel and high level radioactive waste. Both the value of my home and the value of my business will be adversely affected by addition of either of these nearby high level radioactive waste sites because neither my house nor business will be worth anything if they are poisonously or radioactively contaminated. The current conservative value of my home is \$300,000. The current conservative value of my business is \$350,000. My house and business insurances are through Farmers Insurance Company and contain a Nuclear Energy Liability Exclusion clause and thus I have no insurance recourse if my home or business become contaminated by radioactive material.

I am a member of Sierra Club and wish to be represented by the organization in the intervention for the license application for both Holtec's proposed nuclear waste storage facility site and for J.F. Lehman & Company proposed nuclear waste storage facility site. I never consented to risk my life and business by having a highly radioactive material dump minutes from where I reside. The city of Jal, NM, eleven miles from the proposed Holtec site still opposes its opening. I learned of this proposed highly radioactive dump site only a few months ago and spoke out against it at a Nuclear Regulatory Commission hearing. All prior hearings regarding this issue were held with a minimum of publicity, at times when the working public could not attend, and with deceptive descriptions such as "Energyplex" to convince the local population that its purpose was to recycle nuclear material for reuse in energy-generation to help the rest of the nation. Unlike the mayor of Hobbs who tries to convince the electorate that they are "nuclear sophisticates", and who coincidentally is part-owner of the land that would be sold to Holtec for the proposed highly radioactive dump site, I believe that the people of Hobbs, many of whom proudly display "Oil field Trash" bumper stickers, absolutely do not appreciate the danger to themselves and their families from this highly radioactive material dump minutes from where they live.

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radioactive materials into the Ogallala drinking water aquifer that extends from southeastern New Mexico up to most of Nebraska.

I could be impacted if there is a leak or accident at the site. The estimated kill zone from the leak of a single radioactive canister is 60 miles. In addition, we have many migratory birds that traverse our area because we are one of the few spots for water on their path to and from Central America. These animals include: the turkey vulture; the borrowing owl; and orioles, all protected by the Migratory Bird Treaty Act. Their health would be impacted by exposure to radioactive materials as well. However, not only could winds carry contamination towards my home in Hobbs, but the radiation given off by each train passing through Hobbs carrying these highly radioactive materials to either of these two sites is the equivalent of one heavy X-ray dose. Thus, my health could be impacted both by exposure to radioactive materials as well as by the cumulative harmful effect from multiple radiation exposures from these passing trains.

In addition to the risk of exposure from fire-caused release of radioactive and highly poisonous materials, inherent due to the nuclear-interaction high heat generated by accumulating so much highly radioactive material in one location, There are also risks from potential terrorist actions, which could be severe if such huge volumes of nuclear reactor waste from reactors around the country are stored at the either of these two sites. Large volumes of waste with high curie counts could be involved.

Emergency responders in our community may not be adequately trained and equipped to deal with a situation involving a radioactive release. Further, though very isolated from a Texas population point of view, the J.F. Lehman & Company facility site is actually closer to Hobbs than to any Texas population center. New Mexico emergency responders, such as our firefighting departments, are under **no** obligation to respond to problems occurring at this radioactive site, unless the President of the United States declares the problem to be a national emergency, because this site is not within the state of New Mexico. Therefore, even if eventually compelled by the President to respond, this inherent response delay will inevitably lead to even greater potential radioactive material damage to Hobbs and the critical Ogallala water supply because the J.F. Lehman & Company facility site is actually closer to Hobbs than Holtec's New Mexico site.

I am also concerned that if a permanent repository for nuclear waste is not developed, the Holtec or J.F. Lehman & Company facility sites will become de facto repositories without the protections of a permanent repository. A permanent repository requires deep burial in impermeable rock. The proposed Holtec and J.F. Lehman & Company facility sites are just the opposite.

For my own health and safety, and for the sake of the health and safety of other people in the Hobbs and Carlsbad area, I oppose the Holtec and J.F. Lehman & Company proposals and seek to be represented by Sierra Club.

I state under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge and belief.

Dated this 13 day of September, 2018.

Daniel Ryan

Declaration of Deanna Maria Dyer

My name is Deanna Maria Dyer. I live at 1300 N. Dal Paso St., Hobbs, New Mexico 88240. My home and business lie about 34 miles east of the site where Holtec International proposes to construct a storage facility for spent nuclear fuel and high level radioactive waste. My home and business also lie about 24 miles north from the Waste Control Specialists, LLC storage facility in Texas site that J.F. Lehman & Company recently purchased and propose to now use for spent nuclear fuel and high level radioactive waste. Both the value of my home and the value of my business will be adversely affected by addition of either of these nearby high level radioactive waste sites because neither my house nor business will be worth anything if they are poisonously or radioactively contaminated. The current conservative value of my home is \$300,000. The current conservative value of my business is \$350,000. My house and business insurances are through Farmers Insurance Company and contain a Nuclear Energy Liability Exclusion clause and thus I have no insurance recourse if my home or business become contaminated by radioactive material.

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radioactive materials into the Ogallala drinking water aquifer that extends from southeastern New Mexico up to most of Nebraska.

I could be impacted if there is a leak or accident at the site. The estimated kill zone from the leak of a single radioactive canister is 60 miles. In addition, we have many migratory birds that traverse our area because we are one of the few spots for water on their path to and from Central America. These animals include: the turkey vulture; the borrowing owl; and orioles, all protected by the Migratory Bird Treaty Act. Their health would be impacted by exposure to radioactive materials as well. However, not only could winds carry contamination towards my home in Hobbs, but the radiation given off by each train passing through Hobbs carrying these highly radioactive materials to either of these two sites is the equivalent of one heavy X-ray dose. Thus, my health could be impacted both by exposure to radioactive materials as well as by the cumulative harmful effect from multiple radiation exposures from these passing trains.

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Declaration of Gordon Wayne Dyer

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I state under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge and belief.

Dated this 13th day of September, 2018.

Gordon Wayne Dyer

Declaration of Martha A. Singleterry

My name is Martha A. Singleterry. I live at 1506 W. Ural Dr., Carlsbad, New Mexico 88220. My home lies about 34 miles west of the site where Holtec International proposes to construct a storage facility for spent nuclear fuel and high level radioactive waste.

I am a member of Sierra Club and wish to be represented by the organization in the intervention for the license application for Holtec's proposed nuclear waste storage facility.

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burial in impermeable rock. The Holtec site is just the opposite.

For my own health and safety, and for the sake of the health and safety of other people in the Hobbs and Carlsbad area, I oppose the Holtec proposal and seek to be represented by Sierra Club.

I state under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge and belief.

Dated this 10th day of September, 2018.


Martha A. Singletary

Declaration of Ed and Patty Hughs

Our names are Ed and Patty Hughs. We live at 5530 Remington Rd., Las Cruces, New Mexico 88011. We own approximately 4,200 acres that is an operating cattle ranch in Quay County, New Mexico, just west of Nara Visa, New Mexico. Our family has ranched here since 1909. The product of the ranch is live beef that we sell to feeders/feedlots in the form of steer and Heifer calves that weigh approximately 650 pounds each at the time we sell them.

We are members of Sierra Club and wish to be represented by the organization in the intervention for the license application for Holtec's proposed nuclear waste storage facility.

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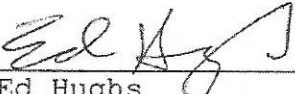
Our above-described cattle ranch is bordered on its southern border by the Union Pacific Railroad, which is a major rail line in New Mexico. The length of the immediate border with the rail line is approximately 2.5 miles with another approximately 0.75 miles within a short distance. Proposed rail shipping routes have not been established for Holtec and probably will not be in the near future. However, Union Pacific, being a major rail carrier, is a very likely prospect for hauling the canisters of radioactive waste. If there is an accident and radiation is released, anywhere near our property, we could no longer market our beef and indeed, would cease operation as a cattle ranch. The land, the grass, the water and cattle would all be irreparably contaminated.

We know that there have been train derailments recently in New Mexico, and if radioactive waste were on those trains, the results would be catastrophic. We are also aware that the rails and railbeds in New Mexico are also not sufficient to carry the heavy loads of the spent nuclear fuel containers. This is an unacceptable risk that the Nuclear Regulatory Commission must address and deny a permit for the Holtec project.

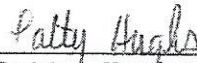
In order to protect our financial interests as herein described, we oppose the Holtec proposal and seek to be represented by Sierra Club.

We state under penalty of perjury that the foregoing statements are true and correct to the best of our knowledge and belief.

Dated this 28 day of August, 2018.



Ed Hughs



Patty Hughs

Declaration of Jimi Gadzia

My name is Jimi Gadzia. I live at 1604 E. Berrendo Rd., Roswell, New Mexico 88201. I have a financial interest in oil and gas rights in areas adjacent to or within 10 miles of the site of Holtec's proposed nuclear waste storage facility. I also live within a half mile of the rail line in Roswell, separated only by agricultural fields. This is a rail line that will surely be transporting highly radioactive waste if the Holtec site is licensed.

I am a member of Sierra Club and wish to be represented by the organization in the intervention for the license application for Holtec's proposed nuclear waste storage facility.

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The oil and gas in the area of the Holtec site is obtained by hydraulic fracturing (fracking). This creates changes in the underground geology in which a radioactive leak from the Holtec site would seriously impair the oil and gas operations in the area. That would adversely impact my financial interests.

There are also risks from potential terrorist actions, which could be severe if such huge volumes of nuclear reactor waste from reactors around the country are stored at the Holtec site. Large volumes of waste with high curie counts could be involved. That would cause a severe disruption in the oil and gas industry in the area, and thus adversely impact my financial interests.

In the event of a radioactive release from the Holtec facility, either en route on the railroad or at the facility site, the oil and gas extraction activities in the area would be shut down and adversely impact my financial interests. In addition, the added truck and rail activity from Holtec's activities are a risk to existing businesses. The roads are in poor shape and the level of traffic in the oil field is already very heavy and dangerous.

I have also heard from railroad representatives that this section, Clovis to Carlsbad, is at capacity and is in worse shape than any rail line in the state and beyond. Thus, I believe that Holtec's activities could significantly hinder access to critical transportation needs of the oil and gas industry.

Because of the proximity of my residence to the rail line in Roswell, I am seriously concerned about an accident en route, knowing that Roswell and Chaves County are ill prepared.

Emergency responders in our community may not be adequately trained and equipped to deal with a situation involving a radioactive release.

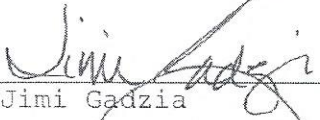
I am also concerned that if a permanent repository for nuclear waste is not developed, the Holtec site will become a de facto repository

without the protections of a permanent repository. A permanent repository requires deep burial in impermeable rock. The Holtec site is just the opposite.

For my own health and safety, and to protect my financial interests as herein described, I oppose the Holtec proposal and seek to be represented by Sierra Club.

I state under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge and belief.

Dated this 28th day of AUGUST, 2018.



Jimi Gadzia

EXPERT DECLARATIONS

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF)
) Docket No. 72-1050
HOLTEC INTERNATIONAL)
) DECLARATION OF GEORGE RICE
(Consolidated Interim Storage)
Facility Project))

I, George Rice, declare as follows:

1. I have reviewed various documents related to the proposal by Holtec International to develop a nuclear waste storage facility in Lea County, New Mexico. The focus of my review was the adequacy and accuracy of the Holtec documents with respect to the hydrology and hydrogeology of the site proposed for the nuclear waste facility.

2. Based on my review of the Holtec documents I prepared a report, which is attached to this declaration. That report is true and correct to the best of my knowledge and belief.

3. My curriculum Vitae is attached.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated __September 10, 2018.



GEORGE RICE

George Rice
Groundwater Hydrologist

414 East French Place
San Antonio, TX 78212
(210) 251-5524
jorje44@yahoo.com

General

More than 20 years experience in groundwater contamination investigations.

Education

M.S. Hydrology, University of Arizona, 1991
B.S. Hydrology, University of Arizona, 1979

Employment History

1993: Consultant
1988 - 1993: The MITRE Corporation, Brooks Air Force Base, Texas
1983 - 1988: SHB Geotechnical Engineers, Inc., Albuquerque, New Mexico
1980 - 1983: University of Arizona, Tucson, Arizona
1979 - 1980: U.S. Forest Service, Gifford Pinchot National Forest, Vancouver,
Washington

Experience

- Design and install monitor well networks.
- Design, perform, and analyze aquifer tests.
- Design and install vadose zone monitor networks.
- Design and conduct groundwater sampling programs.
- Apply groundwater flow and contaminant transport models to predict the fate of groundwater contaminants.
- Participate in multidisciplinary teams to select and design hazardous waste disposal sites.
- Conduct third party reviews of environmental documents and field programs.
- Expert Witness.

Representative Projects

UMTRA Project, Arizona, Colorado, New Mexico, Utah, Wyoming. Groundwater contamination caused by uranium mill tailings. Typical contaminants: metals (arsenic, uranium). Worked for SHB Geotechnical Engineers, Inc. Determined extent and character of contamination, developed plans to cleanup tailings and groundwater.

Yucca Mountain Nuclear Waste Repository, Yucca Mountain, Nevada. Worked for Southwest Research Institute and HOME (Healing Ourselves and Mother Earth). Evaluated the potential for groundwater to contact waste canisters, and established background concentrations for radionuclides in aquifer down gradient of the proposed waste repository.

Kelly Air Force Base, San Antonio, Texas. Groundwater contamination caused by discharge of contaminated water, leakage from tanks and lines, and disposal of wastes. Typical contaminants: solvents (TCE, PCE), fuel components (benzene), metals (chromium, thallium). Member of Kelly Air Force Base RAB. Commented on Air Force's plans to cleanup contaminated soils and groundwater.

Pantex Plant, Amarillo, Texas. Groundwater contamination caused by discharge of manufacturing process water and disposal of wastes. Typical contaminants: (TCE, PCE), explosives (RDX), metals (chromium), radionuclides (tritium). Worked for STAND (Serious Texans Against Nuclear Dumping). Evaluated DOE's plans to delineate, cleanup, and monitor contaminated groundwater.

Los Alamos National Laboratory, Los Alamos, New Mexico. Groundwater contamination caused by discharges and disposal of industrial wastes. Typical contaminants: explosives (RDX, perchlorate), metals (chromium), radionuclides (plutonium, tritium). Worked for CCNS (Concerned Citizens for Nuclear Safety) and Los Alamos National Laboratory. Evaluated the potential for laboratory contaminants to reach the Rio Grande, and evaluated disposal options for radioactive wastes.

Kingsville Dome Mine, Kleberg County, Texas. Groundwater contamination caused by in-situ uranium mining. Typical contaminants: metals (molybdenum, uranium). Worked for the Kleberg County URI Citizen Review Board. Evaluated URI's progress in cleaning up contaminated groundwater, and plans for post-cleanup monitoring.

Flint Hills Refinery, Corpus Christi, Texas. Groundwater contamination caused by leakage from refinery. Typical contaminants: fuel components (benzene). Worked with concerned citizens to evaluate the Texas Commission on Environmental Quality's plans to determine the extent of contamination.

Longhorn Army Ammunition Plant, Karnack, Texas. Groundwater contamination caused by discharge of contaminated water, leakage from tanks, and disposal of wastes. Typical contaminants: solvents (TCE, DCE), explosives (RDX, perchlorate), metals (antimony, thallium). Worked for Caddo Lake Institute. Evaluated Army's plans to clean-up contaminated groundwater.

Bibliography

Rice, G., 1987. *Design of Low Level Radioactive Waste Repositories to Minimize Groundwater Contamination*. Presented to Rocky Mountain Association of Environmental Professionals, Albuquerque, New Mexico.

Rice, G., Brinkman, J., and Muller, D., 1988. *Reliability of Chemical Analyses of Water Samples -- The Experience of the UMTRA Project*. Ground Water Monitoring Review, Vol. VIII, No. 3, pp. 71-75.

Casagrande, D., Price, F., Rice, G., Vogel, G., 1989. *Geochemistry Manual*, MITRE Working Paper WP-89W00180. The MITRE Corporation, Civil Systems Division, 7525 Colshire Drive, McLean, Virginia.

Rice, G., Green, R., Pohle, J., 1993, *Reduction in Uncertainty in the Geologic Setting Performance Measure, 10 CFR 60.113(a)(2): Computer Code Selections, Conceptual Models, and Databases*, Prepared for Nuclear Regulatory Commission Contract NRC-02-88-005, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas.

Rice, G. 1994, *AGUA Report, Contamination of the Edwards Aquifer in Bexar County*.

Green, R., Meyer, K., Rice, G., 1994, *Hydraulic Characterization of Hydrothermally-Altered Nopal Tuff*, Prepared for Nuclear Regulatory Commission Contract NRC-02-93-005, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas.

Green, R.T., Dodge, F.T., Svedeman, S.J., Manteufel, R.D., Rice, G., Meyer, K.A., Baca, R.G., 1995, *Thermally Driven Moisture Redistribution in Partially Saturated Porous Media*, Prepared for Nuclear Regulatory Commission Contract NRC-02-93-005, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas.

Rice, G., 1996, *The BFI Tessman Road Landfill: Hydrologic Issues*, Prepared for Larry R. Daves and Associates, San Antonio, Texas.

Rice, G., 1997, *Groundwater and Groundwater Contamination in the Vicinity of Mr. Quintanilla's House, 710 Price Avenue, San Antonio, Texas*, Prepared for Tinsman & Houser, San Antonio, Texas.

Rice, G., 2001, *Evaluation of Groundwater Characterization and Modeling at the Pantex Plant*, June 2001. Prepared for Serious Texans Against Nuclear Dumping (STAND).

Rice, G., 2001, *Evaluation of HDR/SAWS Modeling of the Carrizo-Wilcox Aquifer in Lee, Bastrop, and Milam Counties, Texas*.

Rice, G., 2002, *Groundwater Modeling at Pantex, and Recommendations of the Technical Advisory Group*, Prepared for Serious Texans Against Nuclear Dumping (STAND), September 2002.

Rice, G., 2003, *Background Concentrations of Contaminants in the Ogallala Aquifer at Pantex, an Evaluation*, Prepared for Serious Texans Against Nuclear Dumping (STAND), May 2003.

Rice, G., and P. Allison, 2004, *Contaminants in The Ogallala Aquifer at the Pantex Plant*, STAND Technical Report 2004-1, May 2004.

Rice, G., 2004, *The Potential for Groundwater Contaminants from Los Alamos National Laboratory to Reach the Rio Grande*, July 2004.

Rice, G., 2006, *Effects of URI's Kingsville Dome Mine on Groundwater Quality*, Prepared for the Kleberg County URI Citizen Review Board, July 2007.

Rice, G., 2012, *Occurrence of Groundwater at the Compact Waste Facility, Waste Control Specialists Facility, Andrews County, Texas*, May 3, 2012.

Rice, G., 2014, *Excursions of Mining Solution at the Kingsville Dome In-situ Leach Uranium Mine*, Volume 9—Austin Geological Society Bulletin—2012-2013.

Comments on Proposed Holtec Facility

George Rice
September 6, 2018

Introduction

Holtec International (Holtec, applicant) is proposing to store spent nuclear fuel (SNF) at a site in Lea County, New Mexico.¹ Holtec plans to store the SNF for up to 120 years, or until a permanent repository is available.²

The site is underlain by 25 to 40 feet of caliche³ and alluvium (unconsolidated clays, silts, sands, and gravels)⁴. The Triassic-age Dockum Group, consisting of shales, siltstones, and sandstones, underlies the alluvium.⁵ At the site, the Dockum is at least 400 feet thick and it consists of two members: the Chinle Formation and the Santa Rosa Formation.⁶ The Santa Rosa Formation, is an important aquifer in Lea County.⁷

The wastes would be contained in canisters⁸, and the canisters would be buried to a depth of about 22.5 feet beneath the site.⁹

Comments

Comment 1: Failure to determine whether shallow groundwater exists at the site

If contaminants leak from the facility, they could be transported by shallow groundwater underlying the site. Shallow groundwater is groundwater that may exist in the alluvium, at its interface with the underlying Dockum (figure 1).

The applicant claims there is probably no shallow groundwater at the site.¹⁰ However, the applicant has not done the field investigations necessary to determine whether shallow groundwater exists.

¹ Holtec, 2017, page 13 of 543.

² Holtec, 2017, page 19 of 543.

³ The caliche is near the surface and is about ten feet thick (Holtec, 2017, page 63 of 543).

⁴ ELEA, 2007, page 2.4-4.

⁵ Holtec, 2017, page 63 of 543; and GEI, 2017, pages 17 and 18 of 520.

⁶ GEI, 2017, pages 17 and 18 of 520; GEI, 2017, page 34 of 520 (figure 4).

⁷ GEI, 2017, page 19 of 520.

⁸ Holtec, 2017, page 13 of 543.

⁹ Holtec, 2017, page 34 of 543.

¹⁰ Holtec, 2017, page 91 of 543.

The applicant's claim is based on information obtained from onsite drilling. Specifically:

- 1) No water was found in the well that was completed (screened) at the interface of the alluvium and the Dockum¹¹.
- 2) During drilling, saturated conditions were not encountered in the alluvium.¹²

Each of these points is addressed below.

First point – no water found in well

Only one well has been completed at the interface of the alluvium and the Dockum. This well, ELEA-1, is in the west-central portion of the site and was installed in 2007¹³. No groundwater was found in the well.¹⁴ Available documents do not contain any data to indicate that the well has been checked for the presence of water since 2007.¹⁵ However, the absence of groundwater at one time does not mean that groundwater is absent at all times. Shallow aquifers may be intermittently saturated.

Intermittent saturation occurs in the shallow aquifer at the Waste Control Specialist (WCS) site. The WCS site is approximately 40 miles east of the Holtec site.¹⁶ The shallow materials underlying the WCS site are similar to those at the Holtec site. There are approximately 50 feet of caliche and unconsolidated or semi-consolidated sands and gravels overlying the Dockum Group.¹⁷ Figure 2 shows intermittent saturation at WCS well TP-87.¹⁸ Given the similarity of the sites, it is reasonable to assume that intermittent saturation could also occur at the Holtec site.

Even if ELEA-1 has been regularly found to be dry since 2007, it represents only one point in the 1040 acre site.¹⁹ The applicant does not know whether shallow groundwater exists in other portions of the site.

¹¹ Holtec, 2017, page 91 of 543.

¹² ELEA, 2007, pages 2.4-4 and 2-11-15.

¹³ Holtec, 2017, page 95 of 543; ELEA, 2007, page 2.4-3.

¹⁴ Although some water was found in the well after it was installed, it is believed to be water that was introduced to hydrate the bentonite seal (Holtec, 2017, page 91 of 543).

¹⁵ GEI, 2017, pages 18, 19, and 28 (table 5) of 520.

¹⁶ Holtec, 2017, pages 159 and 233 (figure 5.1.1) of 543.

¹⁷ WCS, 2007, appendix 2.6:1, Geology Report, pages 5-13 and 5-14, and figure 5-4.

¹⁸ Well TP-87 is completed across the alluvium/Dockum interface. The figure shows saturated thicknesses above the alluvium/Dockum interface. Data are from the Monthly OAG Water Level Reports for June 2011 through March 2012. See, for example, WCS, 2012, pages 7 and 8, and table 1. It should be noted that water level data were available for only a limited period – June 2012 – March 2012. During this period, about a foot of water was present above the interface at well PZ-46. However, in a water table map for March, 2016, PZ-46 is shown as being dry (WCS 2017?, page 3-96 (figure 3.4-2)).

¹⁹ Holtec, 2017, page 13 of 543.

Four other wells have been installed on the site: ELEA-2, B101 MW, B106 MW, and B107 MW²⁰. Well ELEA-2 was installed in 2007²¹, and wells B101 MW, B106 MW, and B107 MW, were installed in 2017²². All four wells are completed entirely in the Dockum.²³ Thus, they cannot be used to determine whether groundwater exists at the alluvium/Dockum interface.

Second point - saturated conditions not encountered during drilling

There are at least two reasons that materials appear to be unsaturated during drilling, even though the in-situ materials are saturated. First, drilling with air will often dry the cuttings as they are brought to the surface.²⁴ Second, water may drain from the cuttings as they are brought to the surface.

It is not uncommon to find water in wells, even though the materials retrieved during drilling appeared to be unsaturated. This can be seen in another example from the WCS site. Figure 3 shows water levels in WCS well TP-43.²⁵ The boring log for this well states that all the materials encountered during drilling were dry.²⁶ Yet, the well contains more than two feet of water above the alluvium/Dockum interface. Clearly, the fact that saturated materials are not identified during drilling does not mean that groundwater is not present.

It should also be noted that the caliche and alluvium at the Holtec site are not dry. Water contents were measured in samples that came from ten²⁷ to 30 feet below land surface. The water contents ranged from five to 16 percent by weight.²⁸ This indicates that precipitation is infiltrating from land surface and moving toward the alluvium/Dockum interface.

²⁰ ELEA, 2007, page 2.4-3; and GEI, 2017, pages 18 and 28 (table 5) of 520.

²¹ ELEA, 2007, page 2.4-3.

²² GEI, 2017, page 9 of 520.

²³ ELEA, 2007, page 2.4-4; and GEI, 2017, pages 34 and 35 of 520 (figures 4 and 5).

²⁴ Air was used to advance borings at the Holtec site: ELEA, 2007, page 2.4-3; GEI, 2017, page 18 of 520.

²⁵ Data are from the Monthly OAG Water Level Reports for June 2011 through March 2012. See, for example, WCS, 2012, table 1.

²⁶ The well was drilled with air. WCS, 2011, attachment D, boring logs.

²⁷ The depth for the shallowest sample (B102 G1) is given as 0.0 to 10.0 feet. This sample contained the least amount of water measured at the site (5 %). GEI, 2017, page 26 of 520 (table 3).

²⁸ Water content was measured on 15 samples. The average water content was 11.7 percent by weight (GEI, 2017, page 26 of 520 (table 3)). The highest water content (16%) was in a sandy gravel, ten to 11 feet below ground surface (GEI, page 101 of 520 (log for boring B105)).

Recommendation:

The applicant should be required to perform the work necessary to determine:

- whether shallow groundwater exists at the site, and if it exists,
- the direction groundwater flow,
- the rate of groundwater flow,
- the rate at which contaminants could be transported by the groundwater, and
- the likely fate of the contaminants.

The question of whether shallow groundwater exists could be answered by installing a network of monitor wells at the site. These wells should be completed at the alluvium/Dockum interface.

If shallow groundwater exists, the direction and rate of flow could be determined by measuring water levels and hydraulic testing, respectively.

The transport and fate of contaminants could be addressed with contaminant transport modeling.

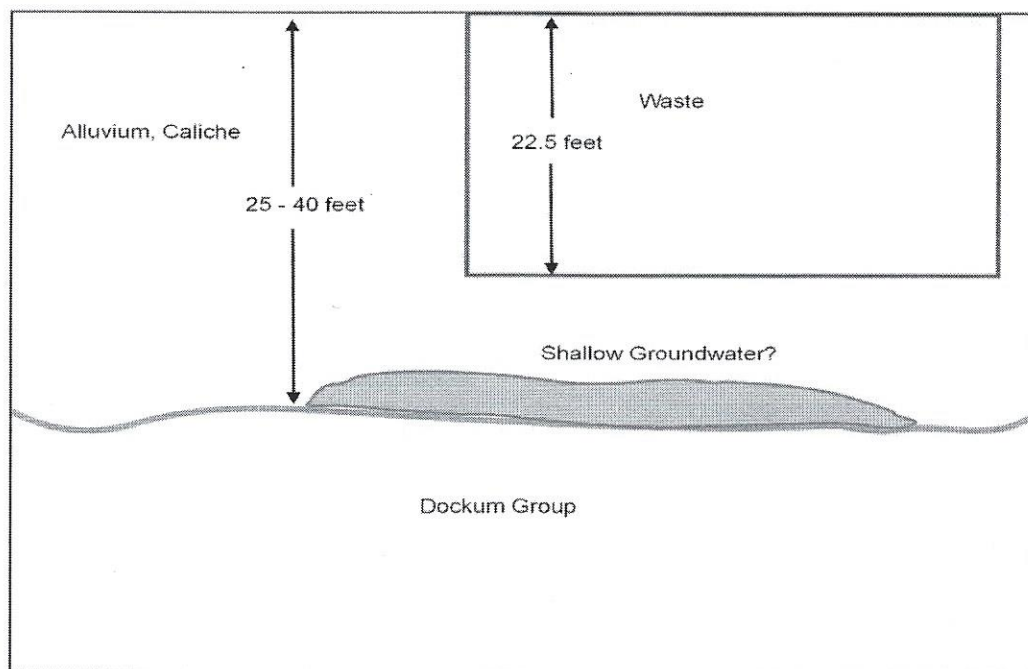


Figure 1
Schematic Cross-section of Holtec Site

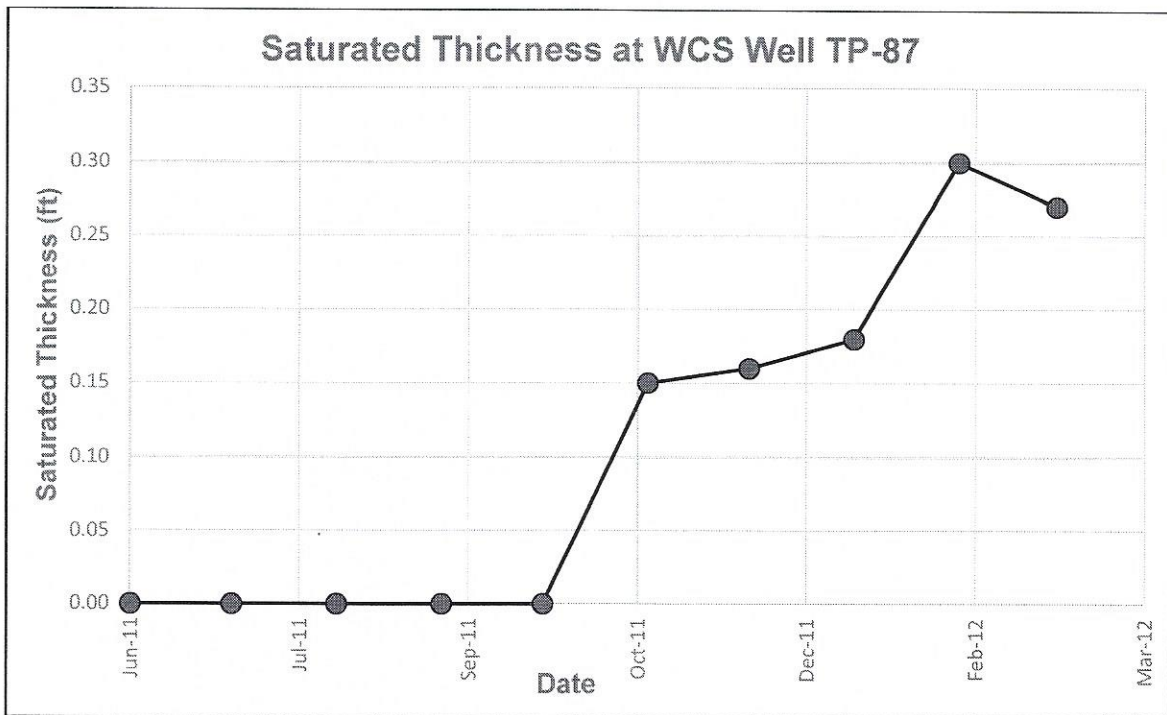


Figure 2

Saturated Thickness above the Alluvium/Dockum Interface at WCS Well TP-87

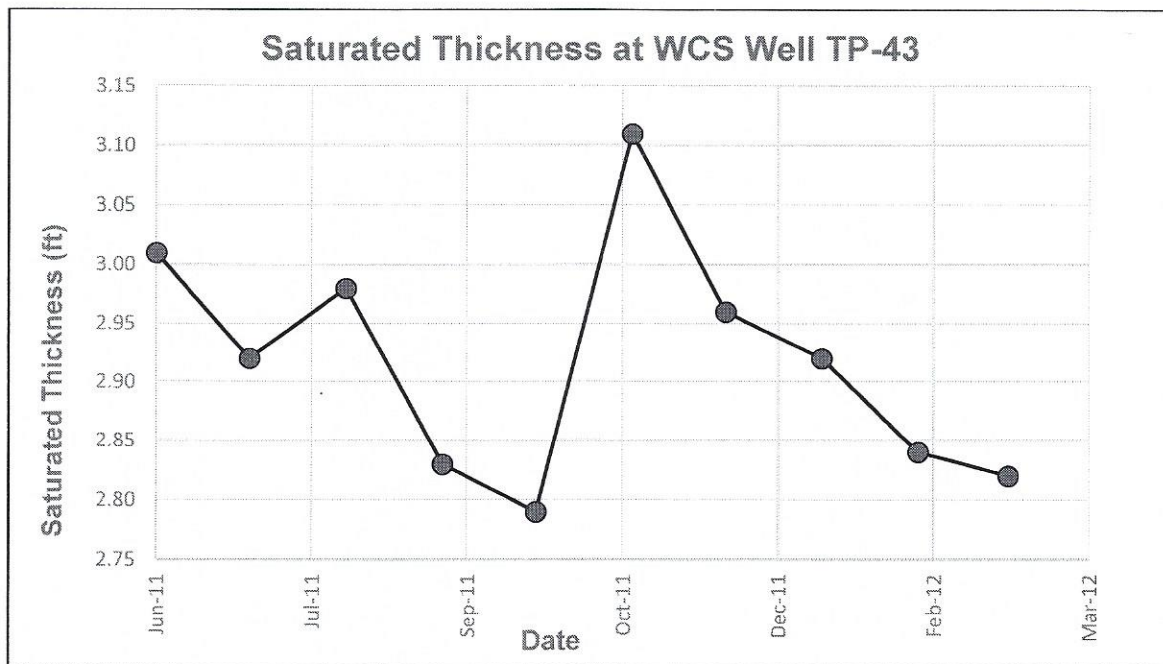


Figure 3

Saturated Thickness above the Alluvium/Dockum Interface at WCS Well TP-43

Comment 2: Failure to determine whether brine continues to flow in the subsurface

Two brine disposal facilities once operated in the northeast portion of the site.²⁹ In 2007, several springs or seeps were flowing from the flank of a drainage immediately south of the disposal facilities.³⁰ A water sample was collected from one of the springs.³¹ The water was brine.³²

The applicant has not addressed basic questions regarding the subsurface movement of brine. Do the springs/seeps that were flowing in 2007 continue to flow? Is brine moving along perched zones in the alluvial materials, or along the alluvium/Dockum interface? Could the brine come into contact with the canisters?

Recommendation:

The applicant should answer the questions raised above.

Whether the springs and seeps continue to flow could be determined by examining the areas where they flowed in the past.

The monitor wells recommended in comment 1 could be used to determine whether brine is moving in the subsurface. Surface geophysics (e.g., resistivity survey)³³ could also be used to detect brine, including any perched brine.

Measurements of brine levels in wells, and hydraulic testing of the wells would provide the information needed to determine whether the brine could reach the canisters.

Comment 3: Fractures

Fractures are common at the site. They are reported in the logs of monitor wells completed in the Dockum³⁴, and they occur in both the Chinle and the Santa Rosa formations.³⁵ Some portions of both formations are described as *highly fractured*.³⁶

Fractures could rapidly convey contaminants to underlying groundwater. However, the applicant does not appear to have investigated the potential effects of fractures at the site.

²⁹ ELEA, 2007, page 2.11-5 (figure 2.11.3-2).

³⁰ ELEA, 2007, pages 2.11-4 and 2.11-5 (figures 2.11.3-1 and 2.11.3-2).

³¹ ELEA, 2007, page 2.11-6.

³² Brine is defined as water with a total dissolved solids (TDS) content greater than 100,000 mg/L (Davis and DeWiest, 1966, page 118 (table 4.4)). The TDS of the sample was 120,000 mg/L (ELEA, 2007, page 2.11-14 (table 2.11.4-2)).

³³ Jansen, 2011.

³⁴ See logs for B101, B106, and B107 (GEI, 2017, pages 71 through 130 of 520 (appendix C, boring logs)). Note, the log for well ELEA-2 is illegible (ELEA, 2007, page 2.3-7).

³⁵ GEI, 2017, pages 71 through 130 of 520 (appendix C, boring logs).

³⁶ See, for example, GEI, 2017, pages 79 and 81 (log for boring B101).

Recommendation:

The applicant should determine whether fractures are a potential pathway for contaminants to migrate to underlying groundwater, particularly to the Santa Rosa Formation.

Dating of groundwater in the Dockum could indicate whether substantial fracture flow is occurring at the site. Groundwater that is relatively young³⁷, or a mixture of young and old, would indicate that water is moving from ground surface to the Dockum along relatively fast pathways. The most likely fast pathways would be fractures.³⁸

The potential for fractures to act as pathways could also be investigated with computerized models. Fracture-flow modeling has been performed at the WCS site.³⁹

Comment 4: Santa Rosa Formation

The Santa Rosa Formation is a member of the Dockum Group, and is an important aquifer in Lea County.⁴⁰ It is used for domestic supply, stock watering, and irrigation.⁴¹ At the site, the top of the Santa Rosa is approximately 215 feet below land surface⁴². Monitor well B101 is completed in the Santa Rosa, and the depth to water in the well is about 250 feet.⁴³ The quality of this water has not been determined.

Because significant questions regarding groundwater at the site have not been addressed,⁴⁴ the possibility that waste-contaminated groundwater could reach the Santa Rosa Formation cannot be dismissed.

Recommendation:

The applicant should investigate the possibility that waste-contaminated groundwater could reach the Santa Rosa Aquifer.

³⁷ Young water is water that fell as rain after the atmospheric testing of nuclear weapons began (1950s). This water may contain elevated concentrations of tritium.

³⁸ It is also possible that water is migrating through old wells with deteriorated casing. If so, the wells would be acting, in effect, as large, highly permeable fractures.

³⁹ WCS, 2007, page 6-42.

⁴⁰ GEI, 2017, page 19 of 520.

⁴¹ INTERA, 2014, page 21.

⁴² GEI, 2017, page 80 of 520 (log for boring B101).

⁴³ GEI, 2017, page 36 of 520 (figure 6).

⁴⁴ See comments 1, 2, and 3, above.

Comment 5: Packer tests in Santa Rosa Formation

The applicant performed two sets of packer tests in the Santa Rosa; one in the unsaturated zone, and one in the saturated zone. The purpose of these tests was to estimate the hydraulic conductivity (permeability) of the formation.⁴⁵ The measured hydraulic conductivities were low, ranging from 1.8×10^{-7} cm/s to 1.8×10^{-6} cm/s.⁴⁶

The applicant calculated the hydraulic conductivities using the methods given in the U.S. Bureau of Reclamation's Field Manual⁴⁷. However, the applicant does not appear to have followed several of the recommendations in the manual.⁴⁸

- The applicant does not appear to have cleaned the hole before conducting the packer tests.⁴⁹ The manual states: *Although cleaning the hole is frequently omitted, failing to clean the hole may result in a permeable rock appearing to be impermeable because the hole wall is sealed by cuttings or drilling fluid.*⁵⁰
- There is no description of the water used in the tests. The manual states: *The quality of water used in permeability tests is important. The presence of only a few parts per million of turbidity or air dissolved in water can plug soil and rock voids and cause serious errors in test results. Water should be clear and silt free. To avoid plugging the soil pores with air bubbles, use water that is a few degrees warmer than the temperature of the test section.*⁵¹
- The test duration appears to be too short. The manual states: *Tests should be run until three or more readings of water take and pressure taken at 5-minute intervals are essentially equal.*⁵² However, the duration of most tests was only five minutes.⁵³

It should be noted that even when the tests are done properly, the values obtained are only semi-quantitative – within an order of magnitude of the actual value.⁵⁴

⁴⁵ GEI, 2017, page 12 of 520.

⁴⁶ GEI, 2017, page 25 of 520 (table 2); and GEI, 2017, pages 244 through 258 of 520 (attachment G).

⁴⁷ USBR, 2001. See, for example, GEI, 2017, page 244 (attachment G).

⁴⁸ A more complete description of the packer tests may be contained in field notes taken during the tests. However, the field notes were not provided (GEI, 2017).

⁴⁹ GEI, 2017, page 12 of 520.

⁵⁰ USBR, 2001, pages 119 and 120. Recommended cleaning methods include surging with clear water and bailing, and jetting with water. Note: the manual uses the terms *permeability* and *hydraulic conductivity* interchangeably (USBR, 2001, page 107).

⁵¹ USBR, 2001, page 116.

⁵² USBR, 2001, page 127.

⁵³ GEI, 2017, pages 244 through 258 of 520 (attachment G). Although most tests were only five minutes long, some were run for 20 minutes.

⁵⁴ USBR, 2001, pages 113, 116, and 117.

Recommendation:

The applicant should provide documentation (field notes) showing that the recommendations in the manual were followed. Or, the applicant should give valid reasons for not following the recommendations. Otherwise, the values of hydraulic conductivity calculated from the packer tests should be considered unreliable.

References

Davis and DeWiest, 1966, *Hydrogeology*, John Wiley & Sons, Inc.

ELEA (Eddy Lea Energy Alliance, LLC), 2007, *Final Detailed Siting Report and Final Communications Report*, April 2007.

GEI (GEI Consultants), 2017, *HI-STORE CISF Phase 1 Site Characterization*, Lea County, New Mexico, December 2017.

Holtec (Holtec International), 2017, *Environmental Report on the HI-STORE CIS Facility*, December 2017.

INTERA, 2014, *Water Resources Monitoring Plan, Ochoa Mine Project, Lea County, New Mexico*, January 31, 2014.

Jansen, John R., 2011, *Geophysical Methods to Map Brackish and Saline Water in Aquifers*, proceedings of the 2011 Georgia Water Resources Conference, held April 11-13, 2011, at the University of Georgia.

USBR (U.S. Bureau of Reclamation), 2001, *Engineering Geology Field Manual*, Second Edition, Volume 2, Chapter 17.

WCS (Waste Control Specialist), 2007, *Application for License to Authorize Near Surface Land Disposal of Low Level Radioactive Waste*, March 16, 2007, appendix 2.6.1, Geology Report.

WCS, 2011, Letter from J. Scott Kirk to Susan Jablonski of TCEQ, *Low Level Radioactive Waste Disposal Facility Monitor Well Alterations*, November 30, 2011.

WCS, 2012, Letter from J. Scott Kirk to Lorrie Council of TCEQ, *Monthly OAG Water Level Report Submitted in Support of LC 44 in RML No. ROS807 and LC 70 in RML No. R04100*, Waste Control Specialists LLC, Andrews County, Texas, April 10, 2012. Saturated thicknesses taken from the Monthly OAG Water Level Reports for June 2011 through March 2012.

WCS, 2017?, *WCS Consolidated Interim Spent Fuel Storage Facility Environmental Report*, Docket Number 72-1050, Revision 0.

BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF)
) Docket No. 72-1050
HOLTEC INTERNATIONAL)
) DECLARATION OF MARVIN
(Consolidated Interim Storage) RESNIKOFF
Facility Project))

I, Marvin Resnikoff, declare as follows:


1. I have been involved in evaluating the impacts of nuclear waste transport and storage for many years, beginning with work for New York Attorney General Lefkowitz in 1975. I have written technical papers and four books on the subject, and I have prepared declarations and given testimony in Nuclear Regulatory Commission proceedings regarding nuclear waste. For further information on my qualifications to express opinions in this proceeding, my curriculum vitae is attached.

2. On behalf of the Sierra Club I have reviewed, analyzed and evaluated the documents submitted by Holtec International related to Holtec's application for a license to operate a CIS facility in Lea County, New Mexico. I have also consulted literature in the field of nuclear waste transportation and storage, and I have performed calculations and analysis sufficient to reach opinions and conclusions regarding safety issues inherent in Holtec's proposal.

3. I have reviewed Sierra Club Contentions 4, 14, 20, 21, 22, 23, and 24. All of those contentions are based on opinions that I provided to Sierra Club based on my research and analysis and on my training and experience, and I support all of those contentions. I am prepared and willing to testify as needed in support of those contentions and my opinions.

I certify under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated September 13, 2018.



MARVIN RESNIKOFF



RADIOACTIVE WASTE
MANAGEMENT ASSOCIATES

Marvin Resnikoff, Ph.D.
Resume

EDUCATION:

Ph.D., Physics
M.S., Physics
B.A., Physics/Math

1965, University of Michigan
1962, University of Michigan
1959, University of Michigan

SUMMARY OF PROFESSIONAL EXPERIENCE:

Marvin Resnikoff is Senior Associate at Radioactive Waste Management Associates and is an international consultant on radioactive waste management issues. He is Principal Manager at Associates for dose reconstruction and risk assessment studies of radioactive waste facilities and transportation of radioactive materials. A nuclear physicist and a graduate of the University of Michigan, Dr. Resnikoff has worked on radioactive issues since his first project at West Valley, New York in 1974. Throughout his career, he has assisted public interest groups and state and local governments across the US, Canada, Germany and England on radioactive waste storage and transportation issues. He has authored or co-authored four books on radioactive waste issues including *Living Without Landfills*, regarding low-level waste landfills, and *The Next Nuclear Gamble*, regarding transportation of radioactive waste. .

Radiological Implications of Fracking. Dr. Resnikoff examined the radiological implications of fracking in papers on indoor radon concentrations and drill rock disposal in landfills from the Marcellus shale formation. For Delaware Riverkeepers (PA), FreshWater Accountability Project (OH) and Residents for the Protection of Lowman and Chemung (NY) he wrote reports that examined the implication of disposal of drill cuttings and drill fluids on landfills and the environment. He examined several fracking sites in Pennsylvania. In October 2011, he was an invited panelist at the annual conference of the Water Environment Federation on the subject of radioactivity in Marcellus shale wastes.

Dose Reconstruction. He has conducted dose reconstruction studies of oil pipe cleaners in Mississippi and Louisiana, residents of Canon City, Colorado near a former uranium mill, residents of West Chicago, Illinois near a former thorium processing plant, and residents and former workers at a thorium processing facility in Maywood, New Jersey. He has also served as an expert witness for plaintiffs in Karnes County, Texas, Milan, New Mexico and Uravan, Colorado, who were exposed to radioactivity from uranium mining and milling activities. He has worked on personal injury cases involving former workers and residents at the ITCO and other oil pipe cleaning yards involving NORM in Louisiana and Texas. He also evaluated radiation exposures and risks in worker compensation cases involving former workers at Maywood Chemical Works thorium

processing plant. He also served as an expert witness in a case involving the Port St. Lucie reactors and brain cancer developed by two children and in a case involving clean-up of an abandoned radioactive materials processing facility in Webster, Texas. He investigated phosphogypsum plants in Florida, Texas and Alberta, Canada and served as an expert witness in a personal injury case involving a Texas phosphogypsum worker. He served as an expert witness in a case involving plutonium workers at INEEL, and federal border guards in Brownsville, TX. He is also a member of the Health Physics Society.

Decommissioning. In February 1976, assisted by four engineering students at State University of New York at Buffalo, Dr. Resnikoff authored a paper that, according to *Science*, changed the direction of power reactor decommissioning in the United States. His paper showed that power reactors could not be entombed for long enough periods to allow the radioactivity to decay to safe enough levels for unrestricted release. The presence of long-lived radionuclides meant that large volumes of decommissioning waste would still have to go to low-level or high-level waste disposal facilities. He assisted public interest groups and served as an expert witness before the NRC on decommissioning the Yankee-Rowe, Diablo Canyon, Big Rock Point and CT Yankee reactors.

He conducted studies on the remediation and closure of the leaking Maxey Flats, Kentucky radioactive landfill for Maxey Flats Concerned Citizens, Inc. and of the leaking uranium basin on the NMI/Starmet site in Concord, Massachusetts under grants from the Environmental Protection Agency. He co-authored a study on the cost of remediating the former West Valley, New York reprocessing plant site. He also conducted studies of the Wayne and Maywood, New Jersey thorium Superfund sites and proposed low-level radioactive waste facilities at Martinsville (Illinois), Boyd County (Nebraska), Wake County (North Carolina), Ward Valley (California) and Hudspeth County (Texas). He also served as an expert witness for CRPE, a public interest groups, regarding the proposed expansion of the Buttonwillow, California NORM landfill and for Earthjustice re. the licensing of an irradiation facility near the Honolulu airport in Hawaii. In August 2010, he was an invited panelist at President Obama's Blue Ribbon Commission on Nuclear Safety.

Transportation of Irradiated Nuclear Fuel. In addition to dose reconstruction and decommissioning cases, Dr. Resnikoff also works on the risk of transporting radioactive material. Under a contract with the State of Utah, Dr. Resnikoff was a technical consultant to DEQ on the proposed dry cask storage facility for high-level waste at Skull Valley, Utah. He assisted the State on licensing proceedings before the Nuclear Regulatory Commission. He has also prepared studies on transportation risks and consequences for the State of Nevada and the Nevada counties: Clark, White Pine, Lander and Churchill. In addition, he worked for the Southwest Research and Information Center and New Mexico Attorney General on shipments of plutonium-contaminated waste to the WIPP facility in New Mexico. In June 2000, he was appointed to a Blue Ribbon Panel on Alternatives to Incineration by DOE Secretary Bill Richardson. He served as a consultant to the New York Attorney General on air shipments of plutonium through New York's Kennedy Airport, and transport of irradiated fuel through New York City. On hearings before state commissions and in federal court, he investigated proposed dry storage facilities at the Point Beach (WI), Prairie Island (MN), Palisades (MI), Maine Yankee, Connecticut Yankee and Vermont Yankee reactors. He is presently working for the State of Nevada on Yucca Mountain repository

issues before the Nuclear Regulatory Commission (NRC). He also served as an expert witness for Earthjustice on a proposed NRC license for a food irradiator at the Honolulu, Hawaii airport. In 2013, he was an invited panelist before the Nuclear Waste Technical Review Board, Implication of High Burnup nuclear Fuel on decommissioning and transportation.

Dr. Resnikoff is an international expert in nuclear waste management, and has testified often before State Legislatures and the U.S. Congress. In Canada, he conducted studies on behalf of the Coalition of Environmental Groups and Northwatch for hearings before the Ontario Environmental Assessment Board on issues involving radioactive waste in the nuclear fuel cycle and Elliot Lake tailings and the Interchurch Uranium Coalition in Environmental Impact Statement hearings before a Federal panel regarding the environmental impact of uranium mining in Northern Saskatchewan. He also worked on behalf of the Morningside Heights Consortium regarding radium-contaminated soil in Malvern and on behalf of Northwatch regarding decommissioning the Elliot Lake tailings area before a FEARO panel. He conducted a study for Concerned Citizens of Manitoba regarding transportation of irradiated fuel to a Canadian high-level waste repository. He authored a report for Greenpeace on the environmental assessment of a proposed intermediate level waste repository under Lake Huron, and for the Provincial Womens Council of Ontario on radioactive waste management costs in a proceeding before the Ontario Energy Board. As part of an international team of experts for the State of Lower Saxony, the Gorleben International Review, he reviewed the plans of the nuclear industry to locate a reprocessing and waste disposal operation at Gorleben, West Germany. He presented evidence at the Sizewell B Inquiry on behalf of the Town and Country Planning Association (England) on transporting nuclear fuel through London.

He has extensively investigated the safety of the West Valley, New York and Barnwell, South Carolina nuclear fuel reprocessing facilities. His paper on reprocessing economics (Environment, July/August, 1975) was the first to show the marginal economics of recycling plutonium. He completed a more detailed study on the same subject for the Environmental Protection Agency, "Cost/Benefits of U/Pu Recycle," in 1983. His paper on decommissioning nuclear reactors (Environment, December, 1976) was the first to show that reactors would remain radioactive for several hundred thousand years. In March 2004, Dr. Resnikoff was project director and co-author of a study of groundwater contamination at DOE facilities, *Danger Lurks Below*.

Dr. Resnikoff has prepared reports on incineration of radioactive materials, transportation of irradiated fuel and plutonium, reprocessing, and management of low-level radioactive waste. He has served as an expert witness in state and federal court cases and agency proceedings. He has served as a consultant to the State of Kansas on low-level waste management, to the Town of Wayne, New Jersey, in reviewing the cleanup of a local thorium waste dump, to WARD on disposal of radium wastes in Vernon, New Jersey, and to the Illinois Attorney General on the expansion of the spent fuel pools at the Morris Operation and the Zion reactor, to the Idaho Attorney General on the transportation of irradiated submarine fuel to the INEL facility in Idaho and to the Alaska Attorney General on shipments of plutonium through Alaska. He was an invited speaker at the 1976 Canadian meeting of the American Nuclear Society to discuss the risk of transporting plutonium by air. In July and August 1989, he was an invited guest of Japanese public interest groups, Fishermen's Cooperatives and the Japanese Congress Against A- and H- Bombs (Gensuikin).

Dr. Resnikoff was formerly Research Director of the Radioactive Waste Campaign, a public interest organization conducting research and public education on the radioactive waste issue. His duties with the Campaign included directing the research program on low-level commercial and military waste and irradiated nuclear fuel transportation, writing articles, fact sheets and reports, formulating policy and networking with numerous environmental and public interest organizations and the media. He is author of the Campaign's book on "low-level" waste, *Living Without Landfills*, and co-author of the Campaign's book, *Deadly Defense, A Citizen Guide to Military Landfills*.

Between 1981 and 1983, Dr. Resnikoff was a Project Director at the Council on Economic Priorities, a New York-based non-profit research organization, where he authored the 390-page study, *The Next Nuclear Gamble, Transportation and Storage of Nuclear Waste*. The CEP study details the hazard of transporting irradiated nuclear fuel and outlines safer options.

Between 1974 and 1981, he was a lecturer at Rachel Carson College, an undergraduate environmental studies division of the State University of New York at Buffalo, where he taught energy and environmental courses. The years 1975-1977 he also worked for the New York Public Interest Group (NYPIRG).

In 1973, Dr. Resnikoff was a Fulbright lecturer in particle physics at the Universidad de Chile in Santiago, Chile. From 1967 to 1973, he was an Assistant Professor of Physics at the State University of New York at Buffalo. He has written numerous papers in particle physics, under grants from the National Science Foundation. He is a 1965 graduate of the University of Michigan with a Doctor of Philosophy in Theoretical Physics, specializing in group theory and particle physics. Dr. Resnikoff is a member of the American Public Health Association and the Health Physics Society.

PROFESSIONAL EXPERIENCE:

April 1989 - present **Senior Associate**, Radioactive Waste Management Associates, management of consulting firm focused on radioactive waste issues, evaluation of nuclear transportation and military and commercial radioactive waste disposal facilities.

1978 - 1981; 1983 - April 1989 **Research Director**, Radioactive Waste Campaign, directed research program for Campaign, including research for all fact sheets and the two books, *Living Without Landfills*, and *Deadly Defense*. The fact sheets dealt with low-level radioactive waste landfills, incineration of radioactive waste, transportation of high-level waste and decommissioning of nuclear reactors. Responsible for fund-raising, budget preparation and project management.

1981 - 1983 **Project Director**, Council on Economic Priorities, directed project which produced the report *The Next Nuclear Gamble*, on transportation and storage of high-level waste.

1974 - 1981 **Instructor**, Rachel Carson College, State University of New York at Buffalo, taught classes on energy and the environment, and conducted research into the economics of recycling of plutonium from irradiated fuel under a grant from the Environmental Protection Agency.

1975 - 1976 **Project Coordinator**, SUNY at Buffalo, New York Public Interest Research Group, assisted students on research projects, including project on waste from decommissioning nuclear reactor.

1973 **Fulbright Fellowship** at the Universidad de Chile, conducting research in elementary particle physics.

1967 - 1972 **Assistant Professor of Physics**, SUNY at Buffalo, conducted research in elementary particle physics and taught a range of graduate and undergraduate physics courses.

1965 - 1967 **Research Associate**, Department of Physics, University of Maryland, conducted research into elementary particle physics.

PROFESSIONAL ORGANIZATIONS:

Health Physics Society
Water Environment Federation

SPECIAL SPEAKING ENGAGEMENTS:

- 1967 Invited Speaker, w/ O.W. Greenberg, Meeting of the American Physical Society, Washington, D.C., "Symmetric Quark Model of Baryon Resonances," Conf-670414—6.
- 1976 Invited Speaker, Meeting of the American Nuclear Society, Toronto, Canada, "Comparison of risk assessments of Pu released during transport."
- 1976 Statement before the Subcommittee on Energy and the Environment of the Interior Committee, House of Representatives, on recycling of plutonium.
- 1977 Statement before the Subcommittee on Government Operations, House of Representatives, on Nuclear Power Costs
- 1979 Chaired panel w/Dr. Karl Morgan and Dr. Alice Stewart, Gorleben International Review, on the health effects of radiation, Hanover, Germany.
- 2000 Invited day-long seminar presentation to the California Department of Health on the health effects of radiation
- 2002 Testimony before the Committee on Transportation & Infrastructure, United States House of Representatives, on transportation of nuclear materials.
- 2003 Presentation before the National Academy of Sciences Study Committee on Transportation of Radioactive Waste, Las Vegas, NV, "Baltimore Tunnel Fire: Implications for SNF Transportation Safety."
- 2006 Biglin, K. and Resnikoff, M, Emergency Response to a Nuclear Waste Shipment Accident, Inyo County, June 15, 2006, paper presented at ESRI Annual Conference, August 2006.
- 2008 Invited Speaker, Meeting of the American Nuclear Society, Anaheim, CA, "State of Nevada Recommendations for Yucca Mountain Transportation Safety and Security."
- 2008 Presentation at Waste Management 2008, Phoenix, AZ, "Fugitive Dust Emissions from Uranium Haul Roads."
- 2008 Presentation at Waste Management 2008, Phoenix, AZ, "State of Nevada Perspective on the US DOE Yucca Mountain Transportation Program."
- 2011 Invited Panelist, annual conference, Water Environment Federation, Radioactivity in Marcellus shale water.
- 2013 Invited Panelist, Nuclear Waste Technical Review Board, Implication of High Burnup nuclear Fuel on decommissioning and transportation.

Books and Articles

Resnikoff, M, "Expensive Enrichment," *Environment*, July/August 1975, pp. 28–35.

Harwood, S *et al*, "The Cost of Turning It Off," *Environment*, December 1976, pp.17-26.

M. Resnikoff, "Environmental Perspective." Chapter 7 in "The Politics of Nuclear Waste," edited by William Colglazier, Pergamon Press, 1982

M. Resnikoff, *et al*, "The Next Nuclear Gamble, Transportation and Storage of Nuclear Waste," Council on Economic Priorities, 1983.

M. Resnikoff, "Shipping Flasks in Severe Rail Accidents," Chapter 18 in "The Urban Transportation of Irradiated Fuel," edited by John Surrey, Macmillan Press, London, 1984.

M. Resnikoff, "Living Without Landfills," Radioactive Waste Campaign, 1988.

M. Resnikoff, *et al*, "Deadly Defense, A Citizen Guide to Military Landfills," Radioactive Waste Campaign, 1989.

M. Marvin Resnikoff, "The Generation Time Bomb: Radioactive and Chemical Wastes." Chapter in "Hidden Dangers: Environmental Consequences of Preparing for War," edited by Anne Ehrlich and John Birks, Sierra Club Books, San Francisco, 1990.

I. Fairlie and M. Resnikoff, "No Dose Too Low," The Bulletin of Atomic Scientists, Nov/Dec 1997.

M. Resnikoff, "Danger Lurks Below," Alliance for Nuclear Accountability, 2004.

M Resnikoff, "Radon in Natural Gas from Marcellus Shale," Ethics in Biology, Engineering & Medicine, Vol. 2, Issue 4, 2011, pp. 317- 331.