AMIGOS DEL RÍO GUAYNABO, INC.
CIUDADANOS EN DEFENSA DEL AMBIENTE
COMITÉ BASURA CERO ARECIBO
MADRES DE NEGRO DE ARECIBO
SIERRA CLUB DE PUERTO RICO

November 12, 2015

Via Email and Certified Mail
Ms. Lauren McGee Rayburn,
Rural Utilities Service
84 Coxe Ave., Suite 1E
Ashville, North Carolina 28801
Lauren.McGee@wdc.usda.gov

RE: **Comments on "Arecibo Waste-to-Energy and Resource Recovery Project Draft Environmental Impact Statement"**

Dear Ms. Rayburn,

Amigos del Río Guaynabo, Inc., Ciudadanos en Defensa del Ambiente, Comité Basura Cero Arecibo, Madres de Negro de Arecibo, and Sierra Club de Puerto Rico submit these comments on the Draft Environmental Impact Statement prepared by the United States Department of Agriculture ("USDA") Rural Utility Service ("RUS") for RUS's proposal to provide financial support to Energy Answers to construct a municipal waste incinerator in Arecibo, Puerto Rico ("the Incinerator" or "the Project"). *See* Dep't of Agric., Rural Utilities Serv., Arecibo Waste-to-Energy and Resource Recovery Project Draft Environmental Impact Statement (July 2015) ("DEIS").

Despite the availability of more economically beneficial and less environmentally harmful ways to handle waste and despite a current over-capacity of electricity generation in Puerto Rico, RUS is considering whether to financially assist the proposed waste incineration facility—one of the most expensive and polluting ways to address waste and one of the most expensive and polluting ways to produce electricity. This Project, a source of lead emissions, would be sited in one of the country's few lead non-attainment areas and in a territory identified as an "extreme poverty area" with a predominantly minority population. In addition, the Project will serve an area that is decidedly not rural, in contravention of RUS's statutory mandate.

The National Environmental Policy Act, 42 U.S.C. §§ 4321-4375 ("NEPA"), requires that RUS take a "hard look" at the environmental impacts of its planned action. *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 374 (1989). Before committing millions of federal taxpayer dollars to this Project, RUS must "carefully consider[] detailed information concerning significant environmental impacts." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). As explained below, the DEIS does not reflect a hard look or careful consideration of the Project, feasible alternatives, and impacts. Unless RUS addresses the numerous and significant failures outlined in these comments, any decision it makes to financially assist the Project would not be fully informed and in violation of NEPA.

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BACKGROUND

Energy Answers' efforts to construct an incinerator in Arecibo began more than half a decade ago, when it sought to fast-track its proposed project pursuant to Puerto Rico Executive Order 2010-034, which declared an "emergency with respect to the electricity energy generation infrastructure of Puerto Rico." P.R. Exec. Order No. 2010-034 (July 19, 2010). More than five years later, well after that Executive Order expired and was not renewed, Energy Answers' permitting process limps along with no end in sight, plagued by multiple legal challenges and substantial public opposition, including from the very municipalities whose waste is required for the Project's operation.

In 2010, the Puerto Rico Industrial Development Company ("PRIDCO") prepared an EIS (the "2010 PRIDCO EIS") for Energy Answers' proposed project pursuant to Puerto Rico Environmental Public Policy Law, Law No. 416 (Sept. 22, 2004), which was subject to an expedited evaluation process that denied the public an adequate opportunity for review. Public notice of the availability of the 2010 PRIDCO EIS was published on October 26, 2010.[1] The document was more than 300 pages and contained appendices totaling more than 2,000 pages, but the public comment period closed a mere two weeks later on November 9, 2010.[2] On November 26, 2010, one month after the draft EIS was made available to the public, PRIDCO transmitted the final EIS to the Puerto Rico Environmental Quality Board.[3] The 2010 PRIDCO EIS contained 18 appendices, including a Human Health Risk Evaluation (Appendix K) and an Ecological Risk Evaluation (Appendix L), both of which are heavily relied on by RUS's DEIS.[4]

RUS's involvement in the Project as a result of Energy Answers' request for federal financial assistance has only exacerbated the public mistrust stemming from the deeply flawed process that characterized the 2010 PRIDCO EIS. Thus far, RUS has not made "diligent efforts to involve the public." 40 C.F.R. § 1506.6. At both its January 28, 2015 scoping meeting, which was attended by about 150 individuals, and its August 20, 2015 public hearing on the DEIS, which was attended by more than 550 individuals, RUS failed to provide a translator, despite the fact that Spanish is an official language—and the predominant language—in Puerto Rico. As a

[1] Letter from José Ramón Pérez-Riera, Exec. Dir., PRIDCO, to Pedro J. Nieves Miranda, President, Envtl. Quality Board (Nov. 26, 2010), http://www.rd.usda.gov/files/2PRIDCO-EISpt1eng.pdf.

[2] *Id.*

[3] *Id.*

[4] In the Federal Register notice announcing availability of the DEIS, RUS vaguely notes that it "incorporates by reference the environmental impact analyses and associated documentation prepared by . . . [PRIDCO] and the USEPA *where appropriate*." 80 Fed. Reg. 47,452, 47, 452 (Aug. 7, 2015) (emphasis added). But the DEIS itself nowhere indicates which particular parts of the PRIDCO and EPA analyses and supporting documents have been incorporated by reference. To comply with NEPA, the final EIS must identify and describe the incorporated material. 40 C.F.R. § 1502.21.

result, at both public meetings, hundreds of members of the public who had shown up to voice their concerns about the Project could not communicate at all with the RUS staff in attendance.[5]

RUS's failure to engage the affected public also is reflected in the agency's refusal to disclose the nature of Energy Answers' request for assistance. Although RUS prepared the DEIS because Energy Answers "indicated its intent to obtain a loan or a loan guarantee" and RUS "determined that the issuance of a loan or a loan guarantee would constitute a major federal action," DEIS at 1-1, RUS has refused to disclose any information to the public about the scale of the federal taxpayer dollars at stake. The DEIS makes no mention of the amount of the requested assistance, and RUS has insisted that it possesses no documents in response to a Freedom of Information Act ("FOIA") request for all information regarding a possible or actual request for financial assistance from Energy Answers. An appeal of RUS's FOIA determination is pending. *See* Letter from Jonathan Smith et al. to RUS Adm'r (Oct. 13, 2015) (attached as Exhibit 1).

DISCUSSION

I. THE PROJECT DOES NOT SATISFY RUS'S STATED PURPOSE AND NEED.

RUS's description and assessment of the proposed Project and of its purpose and need is incomplete and misleading.[6] The DEIS sets forth two categories of purpose and need for the EA Incinerator, one related to municipal solid waste ("MSW") landfills and the other related to energy generation. DEIS at 1-8 to 1-9. With respect to waste, the DEIS claims the incinerator is needed to address long-term landfill constraints and to extend the lifespan of existing landfills. *Id.* at 1-8. With respect to energy, the DEIS claims the Incinerator would displace existing oil-fired generation on the island, reduce mercury emissions, and reduce methane emissions by diverting waste from landfills. *Id.* at 1-9.

Although the DEIS notes that RUS agency actions include "[e]valuat[ing] the financial ability of the borrower to repay its potential financial obligations to RUS" and "[e]nsur[ing]

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[5] Executive Order 12,898 and USDA's own policies require more. *See* Exec. Order No. 12,898, 59 Fed. Reg. 7,629 § 5-5(b) (Feb. 11, 1994) ("Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are . . . understandable, and readily accessible to the public."); Council on Envtl. Quality, Environmental Justice: Guidance Under the National Environmental Policy Act 13 (1997), http://www3.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf ("Participation of low-income populations [and] minority populations . . . may require adaptive or innovative approaches to overcome linguistic . . . barriers to effective participation in the decision-making processes of Federal agencies under customary NEPA procedures."); USDA Departmental Regulation 5600-002, Environmental Justice 35 (Dec. 15, 1997), http://www.ocio.usda.gov/sites/default/files/docs/2012/DR5600-002%5B1%5D.pdf ("Documents [and] meetings . . . should be translated to facilitate participation by persons who do not speak or understand English.").

[6] The DEIS contains numerous internal inconsistencies that do not provide the public with a concrete description of the Project and its scope. For example, the DEIS alternately refers to the Project burning 2,100 tons of waste per day and 2,300 tons per day, *compare* DEIS at 2-11 *with id.* at 1-2; provides unclear projections of the Project's electricity generation that range from 67 MW to 80 MW, *id.* at 1-1, 2-27, 3-46; and alternates between a Project lifetime of 30 years and 50 years, *id.* at 2-36, 3-9. For purposes of these Comments, we refer to a 2,100 ton capacity, 67 MW of electricity generation, and a 30-year lifespan.

adequate fuel supply and waste streams are available to meet the Project needs," DEIS at 1-10, there is no indication in the DEIS that RUS actually has done so. In describing the Project and reaching a determination that there is a "demonstrated need" for the Project, *id.* at 3-29, RUS misleadingly omits key information, presented below, that is critical to an informed decision.

A. The Electricity Generated by the Project is Not Needed.

First, the DEIS makes no mention of the fact that Puerto Rico currently possesses 50 percent more electricity-generating capacity than the island currently needs.[7] The DEIS's description of energy needs on the island begins misleadingly instead with reference to an energy "emergency." DEIS at 1-9. The Puerto Rico Electric Power Authority ("PREPA"), the sole utility delivering all of the island's electricity, recently released a draft Integrated Resource Plan ("IRP") covering the fiscal years 2016 to 2035. In this plan, which "comprehensively evaluates all existing and future generation resources to identify the most efficient plan to meet its electric power requirements," PREPA tellingly makes no mention of the Incinerator.[8] To overcome an arbitrary and capricious standard of review, RUS must incorporate consideration of the actual energy need and generation capacity in Puerto Rico in reaching its determination of whether the Project is, in fact, needed.

B. The Project Likely Will Not Receive the Solid Waste it Needs to Operate at Capacity.

Even if the Project's 67 MW of energy were needed on the island, there is no evidence to show that there will be enough waste for the Incinerator to operate at capacity. First, the municipalities that are expected to provide the stream of MSW as fuel for the Incinerator have indicated their refusal to do so. Moreover, even if the municipalities could be lawfully compelled to send their waste to the Incinerator, the likelihood is quite high that Puerto Rico will not generate enough MSW to sustain the Incinerator over a 30-year lifespan.

The Mayors Association of Puerto Rico, representing 47 of the 78 municipalities in Puerto Rico, has voted unanimously to pursue legal action against Puerto Rico's Solid Waste Management Authority ("SWMA") challenging the contract between SWMA and Energy

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[7] *Power Problems: Puerto Rico's Electric Utility Faces Crippling Debt*, NPR (May 7, 2015, 3:49 AM), http://www.npr.org/2015/05/07/403291009/power-problems-puerto-ricos-electric-utility-faces-crippling-debt (last visited Nov. 11, 2015) (quoting Puerto Rico's top energy official). *See also* Nat'l Renewable Energy Lab., Energy Transition Initiative 2 (2015), http://www.nrel.gov/docs/fy15osti/62708.pdf (last visited Nov. 11, 2015) (showing that Puerto Rico's generation capacity is 5,839 MW, and its peak demand is 3,685 MW).

[8] *See* PREPA, Integrated Resource Plan Volume I: Supply Portfolios and Futures Analysis, Draft for the Review of the Puerto Rico Energy Commission (July 7, 2015) ("PREPA IRP Vol. I"), http://www.aeepr.com/Docs/Ley57/PREPA%20IRP%20Volume%20I%20%E2%80%93%20Draft%20for%20PREC%20review%20-%20July%207-2015.PDF.

Answers that places obligations on Puerto Rico's municipalities to send waste to the Incinerator without their consent.[9] In an August 2015 letter to RUS, the Mayors Association noted that:

> Financial assistance to Energy Answers should be denied by RUS in absence of sound and credible information to draw conclusions on the economic feasibility of the project, particularly when the municipalities of Puerto Rico, with their respective wastes and tipping fees, are not willing partners in this project and will not support with their municipal funds Energy Answers' loan payment capacity.[10]

Likewise, the Federation of Mayors of Puerto Rico, representing the other 31 municipalities in the Commonwealth, also has advised RUS that the economic feasibility of the Project is "based on the erroneous assumption that the affected Municipalities will passively sit idle while their operational budgets and MSW resources get virtually obliterated. USDA/RUS . . . can be certain that this shall not be so."[11] Members of the United States Congress, too, have called into question RUS's ability "to recoup any funds invested in the project," given the widespread municipal opposition.[12]

Beyond such strong municipal opposition to sending waste to the Incinerator, there also remains the very real question whether Puerto Rico will generate enough waste to make the Incinerator viable. The DEIS relies on stale data to conclude that enough waste will be generated to supply the Incinerator's needs—an error that casts serious doubt on the feasibility of the Incinerator, which requires 2,100 tons per day of processed refuse fuel to operate at its generation capacity.

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[9] Jenifer Wiscovitch Padilla, *Alcades Rojos Irán a Tribunal para Evitar Quemar Basura en Incineradora* [Red Mayors Will go to Court to Avoid Burning Trash in Incinerator], Visión (Sept. 30, 2015), http://periodicovision.com/?p=8273 (last visited Nov. 11, 2015).

[10] Letter from Rolando Ortiz Velázquez, President, Puerto Rico's Mayors Ass'n to USDA/RUS 2 (Aug. 20, 2015), https://drive.google.com/file/d/0ByisPzvuK1UBaHpWeldjVXlUdjg/view.

[11] Letter from Reinaldo Paniagua Latimer, Executive Dir., Federación de Alcaldes de Puerto Rico, Inc. to USDA, RUS (Aug. 19, 2015), http://www.corrienteverde.com/incineradora%20RUS%20presentation%20Federacion%20Alcaldes%2020%20agosto.pdf.

[12] Letter from Nydia M. Velázquez and José E. Serrano to USDA Secretary Tom Vilsack (emphasis added) (Sep. 30, 2015), http://puertoricotequiero.com/wp-content/uploads/2015/09/Misiva-Nydia-Vel%C3%A1zque-y-Jos%C3%A9-Serrano.pdf. This would not be the first time strong public opposition has effectively killed an incinerator proposed by Energy Answers. *See*, *e.g.*, Timothy Wheeler, Trash-Burning Power Project Hits New Snag, The Baltimore Sun (February 22, 2015), http://www.baltimoresun.com/features/green/blog/bs-md-incinerator-20150216-story.html (last visited Nov. 11, 2015); *see also* Letter from Leah Kelly, Attorney, Envtl. Integrity Project, et al. to Benjamin Grumbles, Sec'y of the Env't, Maryland Dep't of the Env't (Aug. 12, 2015) (explaining that Energy Answers Baltimore, LLC allowed its air permit to expire by failing to construct within 18 months), http://environmentalintegrity.org/wp-content/uploads/2015.08.12_FINAL_Letter_to_MDE.pdf (letter), http://environmentalintegrity.org/wp-content/uploads/2015.08.12_FINAL_Attachments_to_MDE_Letter.pdf (attachments).

The DEIS relies on 2006 projections that show an increase in Puerto Rico's population between 2012 and 2025, and on 2008 data that project an increase in the amount of waste generated in Puerto Rico over the same time period. *See* DEIS at 2-12, Table 2-1 (using an increasing population over the next decade with a static daily waste-generation rate of about 5.6 lbs/day per person to calculate the available waste in the service area). But these projections are no longer valid. As the DEIS itself later recognizes in a separate section, more recent data show that the population of Puerto Rico declined from 2000 to 2013 and is "projected to continue to decline through 2030." *Id.* at 3-121. Specifically, the island's population is declining at about 0.6% per year, with some years showing a 1% decline.[13]

At the same time, Puerto Rico's per capita waste production is also declining and would be expected to continue to decline with implementation of recycling policies. *See* DEIS at 1-5 (noting that Puerto Rico's current 14% recycling rate falls far short of the mandated 35% target rate). The DEIS relies on SWMA's 2008 Dynamic Itinerary for Infrastructure Projects ("Dynamic Itinerary") for a per capita waste production estimate of 5.56 lbs/day, based on 2003 waste production estimates that SWMA expected to remain constant.[14] *Id.* at 2-12, Table 2-1.[15] In 2015, SWMA revised this per-person estimate to 5.0 lbs/day in 2014. *Id.* at 1-5. For reference, the current U.S. average per capita waste generation is 4.4 lbs/day. *Id.*

RUS uses the following formula to determine how much waste will be available for incineration each year:

{[Population x (MSW (in lbs)/person/day)] / 2000 lbs/ton} x
(1 - recycling rate) = Total MSW per day to incinerator (in tons)[16]

The DEIS makes clear that "2,100 tons per day of processed refuse fuel . . . is needed for the proposed Project to operate at its generation capacity." *Id.* at 2-11. But applying the Puerto Rico Solid Waste Reduction and Recycling Act (Act 70) goal recycling rate of 35% to a smaller population that has a per capita solid waste production of 5.0 lbs/day or less shows that the applicable waste stream will fail to meet the Incinerator's capacity as early as 2028.

Using 2010 census data,[17] the Puerto Rico Planning Board's population decline estimates,[18] and the Central Intelligence Agency's population growth rate for Puerto Rico (-

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[13] The World Factbook, Central America and Caribbean: Puerto Rico, Cent. Intelligence Agency ("CIA World Factbook"), https://www.cia.gov/library/publications/the-world-factbook/geos/rq.html (last visited Nov. 11, 2015); Lizette Alvarez, *Economy and Crime Spur New Puerto Rican Exodus*, N.Y. Times, Feb. 8, 2014, at A1.

[14] Autoridad de Desperdicios Sólidos [Solid Waste Management Authority], *Itinerario Dinámico para Proyectos de Infraestructura* [Dynamic Itinerary for Infrastructure Projects] at 3-1 to 3-2 (May 2008) ("Dynamic Itinerary"), https://noticiasmicrojuris.files.wordpress.com/2014/12/dynamic_itinerary.pdf (last visited Nov. 11, 2015).

[15] This table derives total available waste by assuming approximately 5.56 lbs/day per person of waste production.

[16] This equation is derived from the values in Table 2-1 in the DEIS, which provides RUS's estimates for available daily waste for 2012, 2020, and 2025. DEIS at 2-12, Table 2-1.

[17] To retrieve the 2010 census data for each municipality in the service area, go to http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

0.6%),[19] the service area will have a population of around 1,472,231 in 2028. Assuming that the 0.05 lbs/day decrease in per capita waste production between 2003 (5.56 lbs/day) and 2014 (5.0 lbs/day) remains constant, Puerto Ricans will only produce 4.36 lbs/day per person in 2028. Accepting the DEIS's assumption that Puerto Rico will achieve the goal 35% by 2020,[20] DEIS at 2-12, Table 2-1, then the available waste for incineration will only be 2,086 tons/day in 2028. Thus, the service area will be unable to supply the Project with enough fuel—2,100 tons/day—to reach its generation capacity within a decade or so of operation. And if the Incinerator, in fact needs to collect 2,300 tons/day of MSW in order to have 2,100 tons/day of burnable refuse, as some sections of the DEIS seem to suggest, *Id.* at 1-2, 3-76, the service area will fail to hit that 2,300 tons/day target as early as 2022.[21]

These conclusions are reflected in the following chart, which shows how many tons per day of waste will be available to the Incinerator during its lifespan. The decrease in waste production over time is a function of decreasing population, decreasing waste production per capita, and increases in recycling rate. This analysis assumes that once Puerto Rico attains a 35% recycling rate in 2020, that recycling rate will remain constant, even if higher recycling rates are certainly possible.[22]

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[18] Junta de Planficiación de Puerto Rico [Puerto Rico Planning Board], Proyección Poblacional 2015-2016, Puerto Rico [Population Projections 2015-2025, Puerto Rico], http://www.jp.gobierno.pr/Portal_JP/Default.aspx?tabid=120 (last updated May 13, 2015).

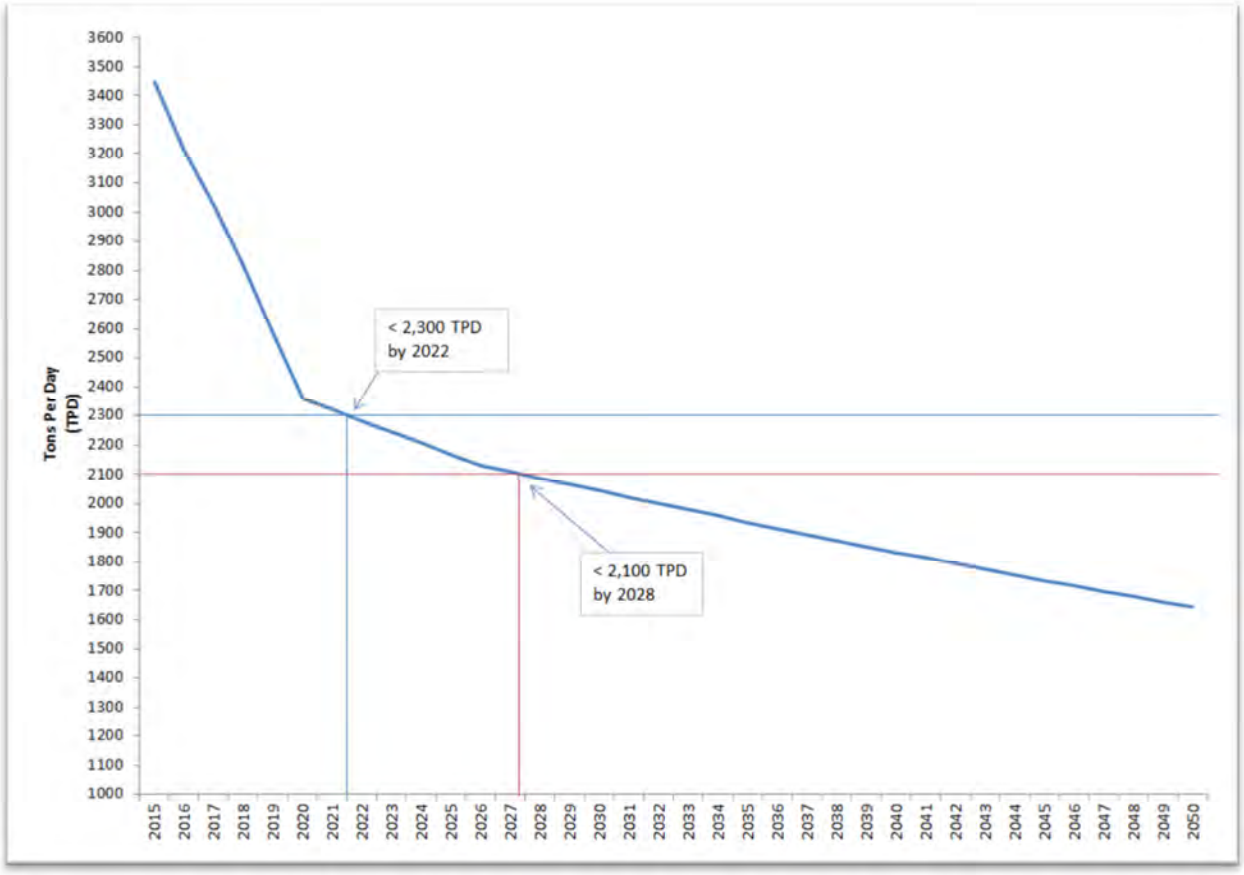
[19] CIA World Factbook; *see also* PREPA, Integrated Resource Plan Volume III Demand and Fuel Forecasts and Demand Side Management 1-6 to1-7 (Aug. 17, 2015) ("PREPA IRP Vol III"), http://www.aeepr.com/Docs/Ley57/PREPA%20IRP%20Volume%20III%20DRAFT%20for%20PREC%20Review%20-%20Demand%20Forecast%20August_17_2015.pdf (last visited Nov. 11, 2015) (Puerto Rico's population projected to decline from 3,598,357 in 2015 to 3,329,725 in 2035, about a 0.6% decline each year).

[20] The Puerto Rico legislature had originally hoped to attain this 35% recycling rate by 1992, but that deadline has since been pushed back. *See* 1992 P.R. Laws 70.

[21] The comments on the DEIS submitted by the group CAMBIO, incorporated by reference here, contain a similar waste stream analysis that finds the service area will provide only 1,498 tons/day of MSW in 2025, under the assumption that some of the municipalities in the service area will not send their MSW to the Arecibo Incinerator and will instead send it to a second proposed incinerator in Barceloneta or to the municipality's own landfill, where applicable. Ingrid M. Vila-Biaggi & Luis E. Rodríguez-Rivera, Comments Concerning the Draft RUS EIS Related to Energy Answers Arecibo Incineration Project 6-9 (Nov. 11, 2015); *see also id.* Attach. 5, at 11 (economic waste-stream analysis prepared for the CAMBIO Comments by Advantage Business Consulting).

[22] Massachusetts, for example, has a recycling rate at 47%. Mass. Dep't of Envtl. Prot., Overview: Solid Waste Management in Massachusetts 1, http://www.mass.gov/eea/docs/dep/recycle/solid/swminma.pdf (last visited Oct. 26, 2015). In Figure 1, the assumption that the recycling rate will no longer increase after 2020 explains why the decrease in overall waste production begins to slow down this year.

Figure 1: Waste Available for Incineration through 2050



C. Without a Water Supply, the Project Will Not be Feasible.

Energy Answers cannot operate the Incinerator without an adequate and economical source of process and cooling water, and to date, Energy Answers has failed to secure such a water supply. Energy Answers proposes to withdraw two million gallons a day from Caño Tiburones Natural Reserve, the biologically rich estuarine wetlands to the east of the Project site managed by the Department of Natural and Environmental Resources ("DNER"). The DEIS references an agreement between Energy Answers and DNER "confirming the validity of the proposal to use the brackish water" from Caño Tiburones, DEIS at 2-26, but it fails to mention the critical fact that DNER has denied Energy Answers' application for the relevant water franchise[23] and thereafter rescinded this very agreement.[24] In its December 20, 2013 denial of Energy Answers' request, DNER officials explained that continuous daily water extraction from

[23] DNER, Denial of Request for Water Franchise (Dec. 20, 2013) ("DNER Denial") (copy of original document in Spanish, along with unofficial translation in English attached as Exhibit 2). Energy Answers appealed that decision, and the matter is currently pending before the Environmental Quality Board.

[24] Letter from Irma Pagan Villegas, DNER, to Mark Green, Energy Answers Arecibo, LLC (Jan. 27, 2014) (copy of original document in Spanish, along with unofficial translation in English attached as Exhibit 3).

the wetlands would lead to "the degradation of the natural reserve's ecosystem."[25] Notably, water supplied from the Caño Tiburones is the only alternative considered by RUS. *Id.* at 2-7 to 2-8. Without this source of water, the Incinerator is likely not feasible.[26]

D. Significant Legal Obstacles Raise Serious Questions about the Legal Status of the Project.

The project is currently facing multiple legal challenges from community groups and local government. Citizen groups have brought suit in the District Court for the District of Puerto Rico challenging the Army Corps of Engineers' issuance of a Clean Water Act section 404 permit for the Project's filling of wetlands. *Citizens of the Karst v. U.S. Army Corp. of Engineers*, No. 14-1592 (D. P.R. filed Mar. 20, 2015). Various citizen groups also have challenged Puerto Rico Planning Board's siting consultation and approval process for the Project in the Court of Appeals of Puerto Rico. *Nezario v. Junta de Planificacion*, No. KLRA-2015-01001 (P.R. Cir. Sep. 15, 2015). Some of the undersigned groups also are intervenors in an administrative appeals process before the Puerto Rico Environmental Quality Board, following DNER's denial of Energy Answers' request to access water in the Caño Tiburones Natural Reserve. And some of these same groups have filed a separate administrative appeal of the construction permit issued to Energy Answers by the Environmental Quality Board, challenging both the substance and procedure of the Board's decision. *In re: Energy Answers Arecibo, LLC*, P.R. Envtl. Quality Bd. No. R-15-14-1 (filed Oct. 2, 2015). Moreover, as noted above, an association of mayors representing over half of Puerto Rico's municipalities has voted unanimously to pursue legal action against SWMA to challenge that agency's waste disposal contract with Energy Answers that places obligations on Puerto Rico's municipalities without their consent.

Finally, the undersigned parties are challenging Energy Answers' Clean Air Act Prevention of Significant Deterioration ("PSD") permit. *Sierra Club De Puerto Rico v. U.S. Envtl. Prot. Agency*, No. 14-1138 (D.C. Cir. filed July 17, 2014). The case is currently pending before the Circuit Court of Appeals for the District of Columbia. In requesting an extension of its Prevention of Significant Deterioration Air Permit, which was valid for 18 months, Energy Answers cites this pending litigation as the reason "it is not feasible or practicable to finance and/or commence an intensive construction program."[27]

Although the United States Environmental Protection Agency ("EPA") granted this request and extended Energy Answers' PSD permit until April 10, 2017, EPA cited its internal guidance in pointing out that "in the event that Energy Answers does not commence construction

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[25] Ex. 2.

[26] Even if Energy Answers were to secure this water supply, the DEIS fails to take into account the severe drought Puerto Rico is experiencing and may experience in the future, *see* Section III.D.1, *infra.*

[27] *See* Letter from Mark Green, Vice President, Energy Answers Arecibo, LLC, to Steven Riva, Chief, U.S. Envtl. Prot. Agency ("EPA") Region 2 Permitting Section, Air Programs Branch (July 26, 2015) (attached as Exhibit 4).

by April 10, 2017, Region 2 is not inclined to grant another extension."[28] In light of the multiple pending challenges to the Project, some of which surely will be appealed, the likelihood that Energy Answers will commence construction in a mere 18 months seems extremely low. Energy Answers' PSD permit therefore likely will expire, or at least require "a substantive re-analysis."[29]

E. RUS Has Failed to Explain How Funding the Project is Within its Authority.

RUS is authorized to provide loans or loan guarantees to rural electricity projects under the Rural Electrification Act of 1936, as amended, 7 U.S.C. §§ 901 *et seq*. "The very purpose of the [Rural Electrification Act] and its amendments is to provide modern conveniences, such as electricity, . . . to *rural* communities that might not otherwise be offered such amenities." *Iowa Cable & Telecommunications Ass'n v. U.S. Dep't of Agric*., 469 F. Supp. 2d 711, 720-21 (S.D. Iowa 2006) (emphasis added). The Act does this by authorizing and empowering RUS "to make loans for rural electrification . . . for the purpose of financing the construction and operation of generating plants, electric transmission and distribution lines or systems for the furnishing and improving of *electric service to persons in rural areas* . . ." 7 U.S.C. § 904(a) (emphasis added). Under the Act, a "rural area" is "any area other than a city, town, or unincorporated area that has a population of greater than 20,000 inhabitants." 7 U.S.C. §§ 913(3); 1991(a)(13)(C); *see also* 7 C.F.R. § 1710.2.

As the Rural Electrification Act and its implementing regulations make clear, RUS may only provide funding to electricity projects whose service area is rural. 7 U.S.C. § 904(a); 7 C.F.R. § 1710.151(a) (requiring, prior to loan issuance, a finding that "[a]dequate electric service will be made available to the widest practical number of rural users in the borrower's service area during the life of the loan."). RUS may only provide funds to projects serving non-rural beneficiaries if "(1) The primary purpose of the loan is to furnish or improve service for [rural] beneficiaries; and (2) The use of loan funds to serve [non-rural] beneficiaries is necessary and incidental to the primary purpose of the loan." 7 C.F.R. § 1710.104(b).

The DEIS explains that energy produced by the Project would be transmitted to the Cambalache Transmission Center, where it will enter Puerto Rico's electrical grid. DEIS at 1-2, 2-27, 2-28. The service area of the project, then, will be the main island of Puerto Rico. But, according to the 2010 United States Census, 93.8% of Puerto Rico's population lives in urban areas, defined as areas with a population density of at least 1,000 people per square mile.[30] Puerto Rico, in fact, has a higher population density than any U.S. state or territory except the

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[28] Letter from John Filippelli, Director, EPA Region 2 Clean Air and Sustainability Division, to Patrick Mahoney, President, Energy Answers, LLC (Oct. 1, 2015) (attached as Exhibit 5).

[29] EPA, Guidance on Extension of Prevention of Significant Deterioration (PSD) Permits under 40 CFR 52.21(r)(2) (Jan. 31, 2014), http://www2.epa.gov/sites/production/files/2015-07/documents/extend14.pdf.

[30] Oficina del Censo, Junta de Planificación de Puerto Rico [Census Office, Puerto Rico Planning Board], Geografía Censal de Puerto Rico [Census Geography of Puerto Rico] 21-22 (Mar. 28, 2012), http://www.jp.gobierno.pr/Portal_JP/Portals/0/Censo/Geografia%20Censal%202010%20UPR.pdf.

District of Columbia and New Jersey.[31] Indeed, only fifteen of Puerto Rico's 78 municipalities have a population of less than 20,000, thereby qualifying as "rural" under the Rural Electrification Act.[32] The DEIS completely fails to explain how the service area of the Project could be classified as "rural" under the Act or, absent such a classification, how the Project is otherwise "necessary" for the primary purpose of providing electric service in rural areas.[33]

RUS's shift away from its statutory mandate to provide services to rural areas only is a longstanding issue. A 2005 audit of RUS's broadband grant and loan programs by the USDA Office of Inspector General, for example, found that RUS's "focus has shifted away from those rural communities that would not, without Government assistance, have access to broadband technologies."[34] The audit concluded that this shift occurred because "RUS has not satisfactorily implemented statutory requirements for serving rural instead of suburban areas . . . [and] RUS' inconsistent administration of the programs has resulted in irregularities in approving and servicing grants and loans."[35]

The 2005 audit found that RUS's simplistic 20,000-inhabitant threshold to classify an area as rural was broad enough to include suburban communities near large cities, so "the agency has issued over $103.4 million in loans to 64 communities near large cities, including $45.6 million in loans to 19 planned subdivisions near Houston, Texas."[36] The 2005 audit led to a follow-up audit in 2009 that found that these loans were also provided to suburban communities near Chicago and Las Vegas.[37] The appropriate management of RUS's broadband program became the subject of a hearing before the United State Congress[38] and scrutiny in federal court. *See, e.g.*, *Iowa Cable & Telecommunications Ass'n*, 469 F. Supp. 2d at 714-716 (discussing 2005

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[31] U.S. Dep't of Commerce, United States Census, American FactFinder, Population, Housing Units, Area, and Density: 2010 – United States; and Puerto Rico, 2010 Census Summary File 1, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_GCTPH1.US01PR&prodType=table.

[32] These municipalities are Adjuntas, Arroyo, Ceiba, Ciales, Culebra, Florida, Guanica, Hormigueros, Jayuya, Las Marias, Maricao, Maunabo, Patillas, Rincon, and Vieques. *See* U.S. Dep't of Commerce, United States Census, American FactFinder, Puerto Rico – 2010 Census – Compare Counties for Population, Housing, Area, and Density, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

[33] Similarly, though RUS is authorized to provide electric infrastructure loans to corporations, the Rural Electrification Act makes clear a strong preference for this financial assistance to government entities and "cooperative, nonprofit, or limited-dividend associations," instead of corporations like Energy Answers. 7 U.S.C. § 904(a); *see also* 7 C.F.R. § 1710.101(b).

[34] USDA, Office of Inspector General, Southwest Region, Audit Report 09601-4-Te, Rural Utilities Service Broadband Grant and Loan Programs, at i (Sept. 2005), http://www.usda.gov/oig/webdocs/09601-04-TE.pdf.

[35] *Id.*

[36] *Id.* at ii, 7–8.

[37] USDA, Office of Inspector General, Southwest Region, Audit Report, Rural Utilities Service Broadband Loan and Loan Guarantee Program 5 (Mar. 2009), http://www.usda.gov/oig/webdocs/09601-8-TE.pdf.

[38] *See generally* USDA, Office of Inspector General, Statement of the Honorable Phyllis K. Fong, Inspector General (Feb. 10, 2011), http://www.usda.gov/oig/webdocs/IGtestimony110223.pdf.

audit and noting Plaintiffs' "concern that the RUS Program was straying from its statutory purpose."). Notably, the 2005 audit concluded that "[p]opulation totals alone are not a viable way of determining if an area is urban or rural," and instead recommended determining whether an area is rural based on population density.[39] As noted above, Puerto Rico is overwhelmingly urban based on population density, so the Project would fail to be under RUS's jurisdiction under this revised metric as well.[40]

RUS's adherence to its statutory mandate to fund projects that serve rural areas has come under scrutiny from within USDA, the United States Congress, and federal courts. RUS should avoid continued judicial and political scrutiny by declining to fund this urban Project and, at the very least, taking a hard look at whether the Project will indeed serve a rural area.[41]

II. THE DEIS FAILS TO CONSIDER REASONABLE ALTERNATIVES.

The DEIS's analysis of alternatives is woefully inadequate. This alternatives analysis "is the heart of the environmental impact statement" and "should present environmental impacts of the proposal in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and public." 40 C.F.R. § 1502.14. Agencies are required to "devote substantial" treatment to each alternative; include "reasonable alternatives not within the jurisdiction of the lead agency;" and include the "alternative of no action." 40 C.F.R. § 1502.14(b-d). The EIS must "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. 40 C.F.R. § 1502.14(a).

RUS must consider all reasonable alternatives that fulfill the purpose and need of the project. The scope of reasonable alternatives considered depends on "what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative."[42] Further, an agency may not "define the project so narrowly that it forecloses a reasonable consideration of alternatives." *Utah Envtl. Cong. v. Bosworth*, 439 F.3d 1184, 1195 (10th Cir. 2006). "The existence of a viable but unexamined alternative renders an alternatives analysis inadequate." *Dubois v. U.S. Dep't of Agric.*, 102 F.3d 1273, 1287 (1st Cir. 1996) (internal quotations omitted).

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[39] *Id.* at 10–11 (Feb. 10, 2011).

[40] Nor is there much precedent for RUS to provide funding for the construction of waste incinerators. No waste-to-energy facility operators are included as a "Power Supply" borrower in RUS's list of borrowers under its Electric Infrastructure Loan & Loan Guarantee Program, current as of December 31, 2014. RUS. Borrowers Directory (Dec. 31, 2014), http://www.rd.usda.gov/programs-services/electric-infrastructure-loan-loan-guarantee-program.

[41] The Rural Electrification Act also prevents a loan to be issued until RUS "finds and certifies that in his judgment the security therefor is reasonably adequate and such loan will be repaid within the time agreed." 7 U.S.C. § 904(d). As explained *infra*, the Project rests on shaky financial assumptions that are likely to prove untrue, and RUS must fully consider the complete financial situation of the Project prior to authorizing any loan.

[42] Council on Envtl. Quality, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026, 18,027 (Mar. 23, 1981) (as amended).

Here, the Project's identified purpose and need are to (1) address Puerto Rico's solid waste management limitations related to long-term landfill constraints; and (2) reduce Puerto Rico's dependence on fossil fuels by expanding sustainable renewable energy sources and using "to the maximum extent possible the island's energy resources, such as the sun and wind, conservation efforts, and efficiency improvements." DEIS at 1-9. But RUS improperly limits the choice of reasonable alternatives to waste-to-energy (*i.e.*, waste incineration) technologies only. This approach is overly narrow, and a number of reliable, productive, cost-efficient, economically preferable, and environmentally superior alternatives better serve the Project's purpose and need and embody Puerto Rico's policy goals. Indeed, the 2008 Dynamic Itinerary references various scenarios and strategies for diverting waste from Puerto Rico's landfills, none of which are analyzed in the DEIS.[43] Among the scenarios considered is a "Backup Case" in which no MSW incinerators are built.[44]

A. RUS Failed to Consider Reasonable Alternatives to Divert Waste from Puerto Rico's Landfills and Extend the Life of Existing Landfills.

The proposed Incinerator will drastically affect the future of Puerto Rico's solid waste management. The Incinerator will disrupt Puerto Rico's efforts to promote recycling and reuse by committing a certain tonnage of the island's waste to incineration for 30 years or more. Recycling and reuse projects create more jobs, produce far less environmental harm than incineration, and serve the same purpose and need of diverting solid waste from landfills. RUS failed to consider these reasonable alternatives to the proposed Incinerator that would also divert MSW from Puerto Rico's landfills and extend the life of its existing landfills. The Waste Reduction and Recycling Act of Puerto Rico prioritizes source reduction, reuse, recycling, and composting over facilities that burn waste to generate energy. DEIS at 1-2. The Puerto Rico Legislature's sound determination to prioritize nearly every type of waste management method above incineration is supported by science and practice, as detailed below:

1. Source reduction

There are a number of source reduction policies that could effectively divert waste from landfills and extend the life of existing landfills. For example, thousands of U.S. communities have instituted Pay As You Throw ("PAYT") or Save Money and Reduce Trash ("SMART") programs that create a financial incentive for residential and commercial waste generators to reduce waste and instead recycle, reduce, reuse, and compost.[45] When consumers are required to pay for every bag of trash they generate, they are motivated to recycle more and find creative solutions to reduce the amount of waste they generate in the first place.[46] These programs are proven to be highly effective. According to EPA, communities with PAYT/SMART programs

[43] Dynamic Itinerary § 5.

[44] *Id*. at 4-5 to 4-8.

[45] N.Y. State Dep't of Envtl. Conservation, Beyond Waste: A Sustainable Materials Management Strategy for New York State 117 (Dec. 27, 2010).

[46] EPA, Pay as You Throw: A Cooling Effect on Climate Change (March 2003), http://www3.epa.gov/epawaste/nonhaz/municipal/pubs/ghg/climpayt.pdf.

reduce the amount of waste destined for landfills by 12-27% on average and increase recycling rates by 32-59%.[47]

Enacting source reduction focused regulations, such as mandatory recycling and composting laws, can also be incredibly effective. In 2009, as part of San Francisco's highly successful initiative to produce zero waste by 2020, the city adopted a law requiring all property owners to separate refuse into recyclables, compostables, and trash and to subscribe to an adequate collection service.[48] Since enacting this law, San Francisco has exceeded its waste diversion rate goal, achieving a 77% diversion rate in 2010.[49] This law has also been the impetus to the creation of over 100 new jobs in San Francisco's recycling and composting industry.[50]

2. Reuse

Reuse is the recovery of materials for the same use or repurposing materials for a new use. Reuse allows products to be used to their maximum extent and, like recycling, reduces the amount of waste that would otherwise be sent to landfills. Reuse involves collecting and reusing materials such as household and office furniture, building materials, books, sporting equipment, electronics, and appliances. From an environmental perspective, reusing materials reduces raw material processing, which lowers overall energy use, prevents pollution, and decreases greenhouse gas ("GHG") emissions.[51] Reusing, remanufacturing, and refurbishing also have economic value. For example, recycling 10,000 tons of paper, glass, and plastics for reuse creates 137 jobs as compared to only one job to landfill it.[52]

3. Recycling

Recognizing the importance of the island's landfill capacity issue, the Puerto Rico Legislature has emphasized recycling as a priority. But the island has yet to reach the Solid Waste Reduction and Recycling Act's 35% recycling goal. This proposed incineration project will divert tax-payer dollars away from potential recycling programs that would otherwise contribute to meeting Puerto Rico's recycling rate goal.

Investing in public education initiatives that emphasize the many benefits of recycling, reduction, reuse, and composting is an effective way to reduce the amount of waste destined for

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[47] *Id.*

[48] Tellus Institute, More Jobs, Less Pollution: Growing the Recycling Economy in the United States 26 (2011) ("Tellus Institute"), http://www.tellus.org/pub/More%20Jobs,%20Less%20Pollution%20-%20Growing%20the%20Recycling%20Economy%20in%20the%20US.pdf.

[49] *Id.*

[50] *Id.*

[51] EPA, Reducing and Reusing Basics, http://www2.epa.gov/recycle/reducing-and-reusing-basics (last updated Oct. 21, 2015).

[52] Institute for Local Self-Reliance, Recycling Means Business (Feb. 1, 2002), https://ilsr.org/recycling-means-business/.

landfills.[53] Empowering consumers with the knowledge that simple modifications to their purchasing practices, such as giving preference to products that have less packaging and are recyclable or compostable, can be very impactful in terms of source reduction. In 2010, a San Francisco public education initiative to train apartment building residents, businesses, food establishments, and city employees on how to recycle and compost resulted in over half a million dollars in savings and waste management efficiencies.[54]

An emphasis on recycling over traditional landfill disposal and incineration coincides with a number of environmental and economic benefits. Recycling reduces the amount of waste destined for landfills; conserves natural resources such as timber, water, and minerals; decreases energy demand, thereby diminishing GHG emissions; and prevents pollution by reducing the need to collect and process new raw materials.[55] Additionally, recycling is more labor intensive and provides 10 times more jobs per ton of waste than incineration or landfills, which generate the fewest jobs per ton of waste compared to all other waste disposal options.[56]

4. Compost-to-energy/Anaerobic digester facility

Compost-to-energy facilities involve diverting food waste and compostable materials from landfills to a digester facility where waste is used to produce renewable energy and ultimately recycled as organic nutrients for agriculture. In 2012, food waste comprised 14.5% of total materials generated in the U.S. municipal waste stream and yard trimmings comprised 13.5%.[57] Diverting these materials to composting facilities, where they can be used to generate electricity and recycled as valuable organic nutrients that can be used to enhance agricultural productivity, would result in a number of economic and environmental gains. First, eliminating food waste and other compostable materials from the waste stream would reduce the amount of material directed to landfills. Second, composting waste creates more jobs than incineration, which only produces 0.66 jobs per 1000 tons of food waste, less than a sixth of composting's estimated 4.34 jobs per 1000 tons of compostable food scraps and yard trimmings.[58] Third, compostable materials are ultimately recycled as organic nutrients for agriculture, thereby reducing the need for chemical fertilizers that are harmful to human health and the environment.[59] Composting also reduces methane emissions from landfills.[60]

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[53] Tellus Institute at 27.

[54] *Id*.

[55] EPA, Recycling Basics, http://www2.epa.gov/recycle/recycling-basics (last updated Oct. 21, 2015).

[56] Tellus Institute at 26.

[57] EPA, Office of Res. Conservation and Recovery, Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Tables and Figures for 2012, Table 2 (Feb. 2012).

[58] Tellus Institute at 34 (stating, in 2008, composting either 1,000 tons of food waste or yard trimmings would create 1.67 collection jobs and 0.50 processing jobs, a total of 2.17 jobs each).

[59] EPA, Composting at Home, http://www2.epa.gov/recycle/composting-home (last updated Sept. 25, 2015).

[60] *Id.*

B. RUS Failed to Consider Reasonable Alternatives to Reduce Puerto Rico's Dependence on Oil-Fired Electric Generation.

The proposed incinerator is counterproductive to Puerto Rico's energy policy outlined in the Act for the Transformation and Energy Relief of Puerto Rico (Act 57), which calls for using "to the maximum extent possible the island's energy resources, such as the sun and wind, conservation efforts, and efficiency improvements."[61] Act for the Transformation and Energy Relief of Puerto Rico (Act 57); DEIS at 1-9. The DEIS incorrectly attributes several benefits to the Project that supposedly will accrue from "displac[ing]" electricity produced from existing fossil fuel plants. DEIS at 3-51. However, most of Puerto Rico's oil-fired power plants are likely slated for retirement or limited use.[62] If anything is "displaced" by the Incinerator it will likely be wind or solar projects, which compete with the Incinerator to meet Puerto Rico's Renewable Energy Portfolio Standard. *See id.* at 1-7.

RUS fails to consider reasonable alternative to the Incinerator for reducing Puerto Rico's dependence on an aging fleet of oil-fired power plants. These include wind, solar, and energy efficiency, which are preferred alternatives from an environmental and economic perspective. Wind, solar, and energy efficiency measures have no ongoing fuel costs, hedge against future fuel price increases and instability, and save on costs by avoiding the need for some transmission and distribution system upgrades.[63] Investments in energy efficiency, solar, and wind also can keep more money circulating within the local Puerto Rican economy.[64] Moreover, renewable wind and solar resources are consistent with Act 57, which proclaims the island's "need to evolve from our dependence on fossil fuels and use to the maximum extent possible the Island's energy resources, such as the sun and the wind, conservation, and efficiency." Act for the Transformation and Energy Relief of Puerto Rico (Act 57).

Investing in the following proposed alternatives would not only be environmentally and economically preferable, but would also provide a sound foundation for Puerto Rico to meet its statewide renewable energy policy goals. To comply with NEPA, RUS must consider and evaluate these alternative methods to achieve the project's purpose of reducing Puerto Rico's dependence on oil-fired electric generation:

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[61] In considering the proposed action's environmental consequences, RUS must "include discussions of . . . [p]ossible conflicts between the proposed action and the objectives of . . . regional, state, and local . . . land use plans, and controls for the area concerned." 40 C.F.R. § 1502.16(c); *see also id.* § 1506.2(d) ("[EISs] shall discuss any inconsistency of a proposed action with any approved state or local plan and laws . . . . Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law.").

[62] Limited use units "cannot be dispatched with capacity factors greater than 8 percent averaged over two years and are assumed available only to confront Major Events, such as large disruptions to the transmission system produced by hurricanes." PREPA IRP Vol. I, at xvi n.4.

[63] Cathy Kunkel et al., Inst. for Energy Econ. & Fin. Analysis, Opportunity for a New Direction for Puerto Rico's Electric System 10 (Sept. 10, 2015), http://ieefa.org/wp-content/uploads/2015/09/Opportunity-for-A-New-Direction-for-Puerto-Ricos-Electric-System-Sept-10-2015.pdf ("IEEFA Report").

[64] *Id.*

1. Cleaner renewable energy sources

Studies estimate that wind and solar could supply more than 100% of Puerto Rico's electricity needs.[65] A 2009 study from the University of Puerto Rico concluded that just 10% of Puerto Rico's wind and solar resources could generate 33.3% of the island's 2006 electricity demand (or 39% of 2014 electricity demand).[66] In 2011, only 1% of Puerto Rico's electricity came from renewable energy sources, mainly hydroelectricity.[67] Given the island's abundance of environmentally preferable natural energy resources, such as wind and solar, the RUS should instead apply its financial support to help Puerto Rico take advantage of its untapped potential for the development of true renewable energy sources.

Puerto Rico's Renewable Energy Portfolio Standard requires PREPA to obtain 12% of its electricity from renewable sources beginning in 2015, 15% by 2020, and 20% by 2035.[68] Green energy resources are divided into two categories: "Sustainable Renewable Energy," which includes wind and solar, and "Alternative Renewable Energy," which includes energy derived from incineration.[69] But the classification of waste-to-energy as "renewable" is plainly inaccurate as the waste required to produce energy through incineration is made entirely of finite resources. Thus, Puerto Rico should deemphasize investments in incineration and focus instead on true renewable energy sources, which produce no GHG emissions and do not generate toxic ash that competes for limited landfill capacity.

Puerto Rico is quickly becoming a U.S. leader in distributed solar energy development.[70] The two solar technologies most popular on the island are photovoltaic ("PV") electricity production and hot water heating, and many residents receive funding assistance for these types of projects through government-sponsored weatherization assistance programs.[71] Puerto Rico has the potential to generate at least 1,100 MW of solar energy.[72] As of 2012, more than 400 MW of solar PV are in development in Puerto Rico and PREPA has already signed power purchase agreements with two facilities already in operation: a 24 MW solar PV plant in Guayama and a 26 MW solar PV plant in Loiza. Puerto Rico also has the option of repurposing

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[65] *Id.* at 11.

[66] *See* Augustín A. Irizarry-Rivera et al., Universidad de Puerto Rico, Achievable Renewable Energy Targets for Puerto Rico's Renewable Energy Portfolio Standard 1-6, Table 1-1 (2009).

[67] Puerto Rico Territory Energy Profile, U.S. Energy Info. Admin., http://www.eia.gov/state/print.cfm?sid=RQ (last updated Apr. 16, 2015) ("EIA Puerto Rico").

[68] *Id.*

[69] U.S. Dep't of Energy, Puerto Rico: Renewable Energy Portfolio Standard, http://energy.gov/savings/puerto-rico-renewable-energy-portfolio-standard (last visited Nov. 10, 2015).

[70] *Id.*

[71] *Id.*

[72] USDA, National Renewable Energy Laboratory, Energy Transition Initiative: Islands: Energy Snapshot: Puerto Rico 3 fig. at top of page (Mar. 2015) ("NREL Puerto Rico Snapshot"), http://www.nrel.gov/docs/fy15osti/62708.pdf.

closed landfills as sites for new renewable energy projects. The EPA's RE-Powering America's Land Initiative encourages renewable energy development, such as solar, on current and formerly contaminated landfills.[73] According to EPA, communities that reuse these sites for renewable energy projects have saved millions in energy costs, created new construction jobs, and received new property tax revenue as a result of the land's new use.[74]

Wind energy is a viable option for Puerto Rico and is growing in popularity.[75] Coupled with the Commonwealth's policy to increase the island's renewable portfolio, wind energy is in a prime position to grow. Puerto Rico has the potential to generate at least 840 MW of wind electricity.[76] PREPA has already signed long-term power purchase agreements with several wind energy facilities that generate a total of 118 MW throughout the island and has an additional 250 MW of wind power in development.[77]

2. Energy efficiency

Puerto Rico has been ranked last among all U.S. states and territories in energy efficiency savings[78] and currently has no energy efficiency targets in place,[79] leaving significant room for improvement in this area. Investing in energy efficiency measures is the most affordable way to reduce electricity demand. In the U.S., the cost to a utility to save one kWh of electricity averages just 2.8 cents, which is much less expensive than generating the same unit of power.[80] Accordingly, allocating government funding to robust energy efficiency measures that will reduce demand on the grid is far more worthwhile than investing in electricity generation to meet energy demands.

Effective and affordable ways to reduce electricity demand include offering energy rebates for efficient appliances and systems; investing in efficiency improvements to the electricity grid and infrastructure; applying funding to home energy audits to make sure homes operate efficiently; providing energy efficiency incentives to industrial users; and implementing educational programs to teach the public how to reduce energy use and decrease electric bills.[81] Investing in energy efficiency measures that reduce overall energy demand is a favorable

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[73] EPA, RE-Powering America's Land, http://www2.epa.gov/re-powering/learn-more-about-re-powering#what_is (last updated Oct. 30, 2015).

[74] *Id.*

[75] *See* EIA Puerto Rico.

[76] *See* NREL Puerto Rico Snapshot.

[77] *See* EIA Puerto Rico.

[78] IEEFA Report at 9.

[79] *See* NREL Puerto Rico Snapshot.

[80] IEEFA Report at 9.

[81] *Id.* at 9.

alternative because, contrary to incineration, energy efficiency decreases the island's need for new energy sources does not burden local communities with health risks.

3. Landfill gas energy

The DEIS also should consider retrieving landfill gas for electricity generation as an alternative to incineration. Landfill gas is a natural byproduct of the decomposition of MSW. It contains approximately 50% methane, a potent greenhouse gas, which can be captured and burned to produce energy.[82] Capturing methane from one million tons of MSW in a landfill can produce approximately 0.78 MW of power.[83] MSW landfills are the third-largest human-caused source of methane emissions in the country, so reducing methane emissions from landfills is, according to EPA, "one of the best ways to lessen the human impact on global climate change."[84]

C. RUS's Assessment of Different Site Locations and Alternative Waste Incineration Technologies is Inadequate.

The DEIS's assessment of alternative waste incineration technologies and different site locations is superficial, merely describing the different options without any discussion of their environmental impacts. Further, the DEIS arbitrarily eliminates alternatives and fails to adequately explain its basis for choosing the Incinerator option.

RUS's examination of alternative technologies to incineration is deficient. The DEIS describes alternative incinerator technologies without examining or comparing the environmental impacts of these alternatives, DEIS at 2-2 to 2-5, in clear violation of NEPA, 40 C.F.R. § 1502.14. More significantly, RUS fails to consider any alternatives to waste incineration. The DEIS contemplates a number of waste-to-energy technologies—including gasification, pyrolysis, plasma arc gasification, mass burn, and processed refuse fuel incineration—with no analysis of environmental impacts. And the DEIS compares the selected process refuse fuel technology with only one other technology—mass burn. DEIS at 2-5. Despite these cursory evaluations, the final reason for choosing the Project is based entirely on Energy Answer's previous experience operating a process refuse fuel facility in Massachusetts. *Id.*

RUS's consideration of alternative sites for the Incinerator is also lacking. The DEIS fails to discuss, let alone compare, any environmental impacts of alternative sites, including the final selection. RUS outlines Energy Answers' process to consider thirty-three potential Brownfield or inactive industrial sites for the facility, but does not add any critical analysis of Energy Answers' methods, assumptions, or ultimate determination for the site location. DEIS at 2-1 to 2-2. RUS, for example, notes that Energy Answers considered "project-specific parameters, such as philosophical objectives, community and regional considerations, and schedule and feasibility" when paring down the list of sites, *id.* at 2-2, but fails to mention the

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[82] Landfill Gas Energy Basics, EPA, 1-1 (last visited Nov.. 11, 2015), http://www3.epa.gov/lmop/documents/pdfs/pdh_chapter1.pdf.

[83] *Id.* at 1-5.

[84] *Id.* at 1-8.

very strong "philosophical objections" throughout the Arecibo community and surrounding region to the Project. RUS accepts without question Energy Answers' selection of the Global Fibers Paper Mill as the final site location for the Project, *id.*, despite the site being located in an area designated as nonattainment for lead.[85]

RUS's final decision to choose incineration over other alternatives is self-serving and based entirely on Energy Answers' previous experience operating an incinerator in Massachusetts. RUS merely analyzed the different options for providing funding to Energy Answers, specifically, rather than the true range of reasonable alternatives to meet the stated purpose and need of the project. RUS selected incineration as the preferred alternative based solely on the applicant's preference and prior experience. Relying on the applicant's prior experience, rather than considering the environmental impacts, violates NEPA because the outcome of the alternatives analysis is predetermined.

D. The No-Action Alternative Presents an Inaccurate Baseline for Comparison with the Action Alternative.

The examination of alternatives to the proposed project is the "heart of the environmental impact statement." 40 C.F.R. § 1502.14. One of the most critical evaluations is the comparison of the action alternative to the "no-action" alternative. This comparison "allows policymakers and the public to compare the environmental consequences of the status quo to the consequences of the proposed action. The no-action alternative is meant to provide a baseline against which the action alternative . . . is evaluated." *Ctr. for Biological Diversity v. U.S. Dep't of Interior*, 623 F.3d 633, 642 (9th Cir. 2010) (internal citations and quotations omitted). Selecting an inaccurate baseline will nullify or skew the alternatives analysis and render an EIS invalid.

Here, the baseline examined in the no-action alternative assumes that "electricity sources will continue to rely on imported oil and coal resources." DEIS at 2-8. While this statement is not necessarily false, it is an inaccurate baseline for comparing the action alternative to the no-action alternative. While some of Puerto Rico's power may be generated by oil and coal resources, the dirtiest and most inefficient power plants are already slated for retirement or limited use. PREPA's "preferred strategy," as identified in the IRP, for satisfying its electric power requirements for the next 20 years includes retiring or placing on limited use each of its existing units that run on No. 6 fuel oil.[86] The combined capacity of these units is 2,892 MW, which constitutes more than half of PREPA's generating fleet.[87] PREPA's preferred portfolio also includes forty-three renewable energy projects that account for 1,056 MW of generating

[85] Green Book: Lead (2008) Nonattainment Areas, EPA, http://www3.epa.gov/airquality/greenbook/mnp.html (last updated Oct. 30, 2015).

[86] PREPA, Integrated Resource Plan Volume I: Supply Portfolios and Futures Analysis, Draft for the Review of the Puerto Rico Energy Commission 4-19 (July 7, 2015), http://goo.gl/01ATcr. "Limited use" units "cannot be dispatched with capacity factors greater than 8 percent averaged over two years and are assumed available only to confront Major Events, such as large disruptions to the transmission system produced by hurricanes." Id. at xvi n.4.

[87] *Id.* at 2-2.

capacity.[88] RUS's no-action alternative baseline should account for this reasonably foreseeable future in which most of PREPA's oil-fired capacity is retired.

In addition, Puerto Rico's Renewable Energy Portfolio Standard "require[es] PREPA to obtain 12 percent of its electricity from renewable sources starting in 2015, scaling up to 15 percent by 2020, and 20 percent by 2035." DEIS at 1-7. Burning MSW to generate energy meets this standard. *Id*. From the perspective of meeting the REPS, the Incinerator would directly compete with cleaner technologies such as wind and solar that do not emit GHGs, traditional pollutants, or toxins like mercury, lead, and dioxins. Thus, the no-action alternative would likely lead to additional wind or solar generating capacity in Puerto Rico.

The no-action alternative also fails to account for landfill gas control systems like flaring. *See* DEIS at 2-8 (lacking a discussion on the potential to receive energy from landfills or non-carbon-based sources). The DEIS acknowledges that "[d]etailed information on the extent to which methane flaring or landfill gas collection occurs at Puerto Rico's landfills is not available, but it would be reasonable to assume the percent of methane combusted is substantially less than 100 percent, given the observation of a lack of gas control at most of the facilities." *Id.*at 3-53. But the Dynamic Itinerary includes information about flaring and landfill gas collection at specific landfills,[89] and PREPA's IRP references two landfill gas projects that account for 8 MW of capacity,[90] so it is unclear from the DEIS just how unavailable this information truly is. Furthermore, the DEIS fails to acknowledge that Puerto Rico regulations *require* some form of gas control at landfills. *See* P.R. J.C.L. Reg. 5812, Rule 702(f)(2) (affected landfills "shall . . . [i]nstall a collection and control system . . . ."). Since these controls are required under Puerto Rico law, the no-action alternative should include a baseline that reflects efforts to bring the landfills into compliance with the law.

The DEIS also assumes that the demand for electricity in Puerto Rico will remain constant or increase over time. It fails to account for the reasonably foreseeable future in which the demand for electricity in Puerto Rico will decline. PREPA's IRP indicates that system peak demand will decline by 100-200 MW until 2022 and will not return to 2015 levels until sometime after 2035.[91] The no-action alternative should account for this declining demand to ensure the supposed need and merits of the 67 MW Incinerator are evaluated properly. For example, the Final EIS should address whether Puerto Rico needs an additional 67 MW of generating capacity given declining demand. Likewise, the Final EIS should consider whether the Incinerator would actually displace *any* existing or future generating capacity on the island.

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[88] *Id*. at xvi.

[89] Dynamic Itinerary at 2-6.

[90] PREPA, Integrated Resource Plan Volume III: Demand and Fuel Forecasts and Demand Side Management, Draft for the Review of the Puerto Rico Energy Commission 3-20 (Aug. 17, 2015).

[91] *Id.* at 1-20 to 1-21, 1-27 to 1-28. (base scenario).

III. THE DEIS FAILS TO TAKE A HARD LOOK AT THE INCINERATOR'S IMPACTS.

The DEIS's assessment of impacts relies in large part on analyses undertaken by Energy Answers during the 2010 PRIDCO EIS process. To comply with NEPA, "[t]he agency shall independently evaluate the information submitted and shall be responsible for its accuracy."[92] 40 C.F.R. § 1502.17. Courts have fully enforced this requirement, finding that

> the applicable federal agency must bear the responsibility for the ultimate work product designed to satisfy the requirement of § 102(2)(c). NEPA's commands . . . do not permit the responsible federal agency to abdicate its statutory duties by reflexively rubber stamping a statement prepared by others. The agency must independently perform its reviewing, analytical and judgmental functions and participate actively and significantly in the preparation and drafting process.

Sierra Club v. Lynn, 502 F.2d 43, 59 (5th Cir. 1974) (citations omitted); *see also Coliseum Square Ass'n, Inc. v. Jackson*, 465 F.3d 215, 236 (5th Cir. 2006) (reinforcing that an agency may not "reflexively rubber stamp information prepared by others" (internal quotation marks and citations omitted)). As detailed below, the DEIS does not reflect that RUS has satisfied this obligation.

A. The DEIS's Assessment of Impacts on Public Health Does Not Withstand Scrutiny.

Epidemiological studies of incinerators around the world support a conclusion that human health impacts from incinerators cannot be lightly ignored. A 2013 study published in the peer-reviewed journal Environment International examined municipal mortality from 1997 to 2006 due to 33 types of cancer.[93] The study found excess cancer mortality in the population residing in the vicinity of incinerators and installations for the recovery or disposal of hazardous waste, and principally, in the vicinity of incinerators and scrap metal/end-of-life vehicle handling facilities.[94] Another recent study published in Environment International "report[ed] a strong and consistent association between [Non-Hodgkin lymphoma] risk and serum levels of [dioxins, furans, and dioxin-like polychlorinated biphenyls]] among people residing in the vicinity of a[]

[92] Moreover, "[i]f the agency chooses to use the information submitted by the applicant in the environmental impact statement, either directly or by reference, then the names of the persons responsible for the independent evaluation shall be included in the list of preparers." 40 C.F.R. § 1502.17.

[93] Javier García-Pérez et al., *Cancer Mortality in Towns in the Vicinity of Incinerators and Installations for the Recovery or Disposal of Hazardous Waste*, 51 Env't Int'l 31, 31 (2013).

[94] *Id.* at 31.

[municipal solid waste incinerator] with high dioxin emission levels."[95] A 2013 study in the peer-reviewed journal Epidemiology found that "[m]aternal exposure to incinerator emissions, even at very low levels, was associated with preterm delivery."[96]

Under NEPA, and particularly in light of this body of scientific literature, it is incumbent upon RUS to undertake the careful consideration necessary to fully evaluate and disclose to the public the Project's impacts on human health. RUS fails this responsibility. For all of the reasons explained below, the DEIS's conclusion that "the Project is not expected to have an adverse impact on human health," DEIS at 3-119, is unsupportable.

1. The DEIS cannot lawfully rely on the Human Health Risk Assessment conducted by Energy Answers.

The DEIS's assessment of human health impacts relies almost exclusively on a 2010 Human Health Risk Assessment ("HHRA"),[97] supplemented in 2011,[98] that Energy Answers' consultant prepared using proprietary software. *See* Statement of Steven Klafka (attached as Exhibit 6); *see also* Comments of Dr. Juleen Lam, Ph.D (attached as Exhibit 7). The use of proprietary software means that risk assessment assumptions used to predict exposure and risk to the population are not disclosed. *Id.* As Dr. Lam, a research scientist and risk assessment expert with the University of California, San Francisco Program on Reproductive Health and the Environment notes, the proprietary nature of the software used to produce the HHRA makes it impossible to "adequately evaluate the assumptions used to predict the cancer risk and health hazards." *Id.*

NEPA does not permit such a lack of transparency. Where an agency seeks to incorporate materials by reference, it must cite the incorporated material and describe its contents. 40 C.F.R. § 1502.21. NEPA is explicit that:

> No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. *Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference.*

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[95] Jean-François Viel et al., *Increased Risk of Non-Hodgkin Lymphoma and Serum Organochlorine Concentrations Among Neighbors of a Municipal Solid Waste Incinerator*, 37 Env't Int'l 449, 449 (2011).

[96] Silvia Candela et al., *Air Pollution from Incinerators and Reproductive Outcomes*, 14 Epidemiology 24, 24 (2013).

[97] Arcadis, Human Health Risk Assessment for the Renewable Energy Power Plant Located in Arecibo (Oct. 2010), http://www.rd.usda.gov/files/PRIDCO-AppK.pdf (2010 HHRA).

[98] Arcadis, Energy Answers Arecibo, LLC: Environmental Justice Evaluation (Oct. 2011), http://goo.gl/wTzlWF. (2011 HHRA Supplement)

40 C.F.R. § 1502.21 (emphasis added). NEPA further demands that agencies "insure the professional integrity, including scientific integrity of the discussions and analyses in [EISs]." *Id.* § 1502.24. Crucially, agencies "shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other source relied upon for conclusions in the statement." *Id.* Thus, unless RUS conducts its own assessment (rather than incorporating the HHRA by reference) or reveals the methodologies and assumptions underlying the HHRA's calculations, it cannot rely on the HHRA to draw any conclusions in the EIS.

2. The projected emission rates underlying the HHRA are erroneous and substantially underestimate risks.

Even if RUS could legitimately rely on the HHRA, doing so would not be justifiable given the highly suspect assumptions underlying that analysis, which render its conclusions an inadequate measure of the extent to which the Project may affect human health. First, the HHRA's inputs are based on stack test data from an Energy Answers incinerator located in Massachusetts, known as the SEMASS facility, DEIS at 3-55, but the waste stream for that facility is likely significantly different, and less toxic, than the waste stream destined for the Project. Second, the HHRA assumed without basis that the Project's filter technologies would be so effective that the HHRA's inputs inexplicably reduced SEMASS particulate matter emissions by nearly two-thirds. If instead, Energy Answers' actual permitted emission limits are used as inputs in calculating excess lifetime cancer risk ("ELCR"), as common sense would dictate, those ELCRs become significantly higher than the HHRA calculates.

a. Air emissions from Energy Answers' SEMASS facility in Massachusetts are likely to be less toxic than air emissions from the proposed Project.

The HHRA's reliance on SEMASS stack test data as the basis of its air emission inputs is deeply flawed because the analysis never establishes that the SEMASS data adequately represents emissions rates for the proposed Incinerator. In fact, the waste streams in Massachusetts and Puerto Rico are likely significantly different.

Unlike SEMASS, the Arecibo Incinerator will be authorized to burn automotive shredder residue, tires or tire derived fuel, and processed urban wood waste as "alternative fuels." DEIS at 2-14. These materials are not authorized fuels under SEMASS's operating permit,[99] and in fact, the table below shows that metal, tires, and wood actually are banned from the waste stream altogether in Massachusetts. By contrast, the proposed Incinerator's permit authorizes 330 tons per day of tire-derived fuel,[100] 286 tons per day of automotive-shredder residue,[101] and 898 tons

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[99] Massachusetts Department of Environmental Protection, Final Air Quality Operating Permit, SEMASS Resource Recovery Facility 6–12 (Feb. 12, 2004), http://goo.gl/LxcwvW.

[100] [100] EPA, Energy Answers Arecibo, LLC, Arecibo Puerto Rico Renewable Energy Project Final Permit 24 (Apr. 10, 2014).

[101] *Id.* at 23.

per day of processed urban wood waste.[102] If the stream of MSW dries up, as discussed in Section I.B, *supra*, EA will be left to burn increasing amounts of these "alternative fuels," which likely have a more toxic profile.

Massachusetts restricts a number of substances from disposal at MSW landfills and incinerators. As indicated in Table 1 below, many of these restrictions have been in place for decades.[103] These prohibitions likely significantly reduce the toxicity of SEMASS's waste stream.

Table 1: Regulatory Restrictions on MSW Disposal in Massachusetts

Restricted Material	Effective Date of Restriction for Landfills or Combustion Facilities	Effective Date of Restriction for Transfer Facilities	Restriction
Lead Batteries	December 31, 1990	April 1, 2000	Ban on disposal or incineration or transfer for disposal at solid waste disposal facility
Leaves	December 31, 1991	April 1, 2000	Ban on disposal or incineration or transfer for disposal at solid waste disposal facility
Tires	December 31, 1991	April 1, 2000	Ban on disposal or transfer for disposal of whole tires only at landfills. Tires must be shredded prior to disposal at landfills.
White Goods[104]	December 31, 1991	April 1, 2000	Ban on disposal or incineration or transfer for disposal at solid waste disposal facility
Aluminum Containers	December 31, 1992	April 1, 2000	Ban on disposal or incineration or transfer for disposal at solid waste disposal facility
Metal or Glass Containers	December 31, 1992	April 1, 2000	Ban on disposal or incineration or transfer for

[102] *Id*. at 23.

[103] *See* Table 310 C.M.R. 19.017(3), http://goo.gl/YCG0qf (last visited Nov. 11, 2015).

[104] The definition of "white goods" include washing machines, laundry machines, dryers, and other household appliances. 310 C.M.R. 19.006.

			disposal at solid waste disposal facility
Single Polymer Plastics	December 31, 1994	April 1, 2000	Ban on disposal or incineration or transfer for disposal at a solid waste disposal facility.
Recyclable Paper	December 31, 1994	April 1, 2000	Ban on disposal or incineration or transfer for disposal at solid waste disposal facility
Cathode Ray Tubes	April 1, 2000	April 1, 2000	Ban on disposal, incineration, or transfer for disposal, at a solid waste disposal facility.
Asphalt Pavement, Brick and Concrete	July 1, 2006	July 1, 2006	Ban on disposal or incineration or transfer for disposal at a solid waste disposal facility.
Metal	July 1, 2006	July 1, 2006	Ban on disposal or incineration or transfer for disposal at a solid waste disposal facility.
Wood	July 1, 2006	July 1, 2006	Ban on disposal or transfer for disposal at a solid waste disposal facility.
Clean Gypsum Wallboard	July 1, 2011	July 1, 2011	Ban on disposal or incineration or transfer for disposal at a solid waste disposal facility.
Commercial Organic Material	October 1, 2014	October 1, 2014	Ban on disposal or incineration or transfer for disposal at a solid waste disposal facility.

In 2007, Massachusetts also promulgated regulations implementing the Mercury Management Act that establish "requirements for the removal of mercury switches from 'end of life' cars and trucks, and mercury lamp manufacturers' plans."[105] These regulations also establish "performance standards for 'end of life' mercury product collection and recycling programs that manufactures are required to implement for mercury products they sell or distribute in the Commonwealth."[106] With regulations like these in place, the amount of mercury

[105] Massachusetts Department of Environmental Protection, Overview: Solid Waste Management in Massachusetts, 7 (citing 310 CMR 74.00 and 75.00), http://www.mass.gov/eea/docs/dep/recycle/solid/swminma.pdf (last visited Nov. 11, 2015).

[106] *Id.*

entering the waste stream for SEMASS is likely less than the Arecibo waste stream. Consequently, the SEMASS data for mercury emissions may underestimate emission rates, ambient air concentrations, deposition rates, and the corresponding health risks for the Arecibo plant.

Moreover, Massachusetts has a much higher recycling rate than Puerto Rico. In contrast to Puerto Rico's 14% recycling rate as of 2014, DEIS at 1-5, Massachusetts recycles at an overall rate of 47%, which is "among the best in the nation."[107] Because the burning of plastic creates dioxins and furans,[108] higher recycling rates can reduce the amount of toxic emissions from an incinerator.

b. The HHRA is based on an arbitrarily deflated particulate matter emissions rate.

While the SEMASS facility's emissions likely are less toxic than the emissions from the proposed Project as a result of differing waste streams and are therefore not appropriately used as inputs in the HHRA, the HHRA is made further implausible by its arbitrary reduction of SEMASS's measured particulate emissions rates by nearly two-thirds. This unjustified underestimate of particulate matter emissions, including lead emissions, from the Project not only underestimates impacts on ambient air quality, but also results in a dramatic underestimate of human exposure and risk, as shown by the analysis undertaken by environmental engineer Steven Klafka. *See* Klafka Statement, Ex. 6.

Instead of conservatively relying on the highest measured emissions rates, the HHRA averaged years of stack test data from SEMASS to develop baseline emissions rates for the proposed Project.[109] It then arbitrarily reduced this baseline rate by 62%, reasoning that "[v]ery recent advancements in filter technologies . . . have proven to be considerably more effective at capturing particulate emissions than traditional filter materials evidenced in the SEMASS stack tests."[110] The HHRA references EPA's Environmental Technology Verification Program, which demonstrated that some manufacturers of fabric filters have achieved outlet concentrations of less than 0.0000073 grains per dry standard cubic foot.[111] Applying a "safety factor of 100" and

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[107] *Id.* at 1.

[108] Dioxins and Their Effects on Human Health, World Health Organization, http://www.who.int/mediacentre/factsheets/fs225/en/ (last updated June 2014).

[109] HHRA at 12. The HHRA methodology also does not account for excess emissions during periods of startup, shutdown, and malfunction, which can "swamp the amount of pollutants emitted at other times."

State Implementation Plans: Response to Petition for Rulemaking; Restatement and Update of EPA's SSM Policy Applicable to SIPs; Findings of Substantial Inadequacy; and SIP Calls To Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown and Malfunction, 80 Fed. Reg. 33,840, 33,850 (Jun. 12, 2015) (final action) (citing petition and concluding that exempting excess emissions in State Implementation Plan provisions cause "real-world consequences that adversely affect public health.").

[110] HHRA at 13.

[111] *Id.*

then comparing 0.00073 grains per dry standard cubic foot to the "SEMASS stack test value of 0.0019 [grains] per dry standard cubic foot,"[112] the HHRA calculates that "the new filters can reasonably be expected to collect particulate at least (1 – 0.00073/0.0019) x 100 = 62 percent better than traditional filter technology."[113] The HHRA then accounts for this by "multiplying the average SEMASS stack test emission rates for chemicals emitted as particles by 0.38."[114]

The major problem with this artificial deflation of the Incinerator's projected particulate emission rate is that there is no evidence whatsoever that the Project will in fact utilize the new filter technology. The 0.0000073 grains per dry standard cubic foot referenced by HHRA appears to correspond to one filtration product: W.L. Gore & Associate, Inc.'s L3650 Filtration Media.[115] Energy Answers' Clean Air Act PSD Permit does not require the use of this filter, and Energy Answers has at no point indicated that it will use this product.[116] The HHRA's 0.38 multiplier to calculate the Project's estimated particulate emissions is, in other words, effectively random.

A far more rational approach would simply use Energy Answers' actual permitted emission limits to calculate risk. The attached analysis of Steven Klafka, an environmental engineer with expertise in air modeling, does just this, using the HHRA's own particulate matter ("PM") and dioxin/furan ("PCDD/F") emission inputs and risk assessment numbers (Scenario 1) to linearly estimate increases in Excess Lifetime Cancer Risk with increases in PM and PCDD/F under various scenarios. *See* Ex. 6. Specifically, Scenario 2 uses as inputs actual SEMASS stack test results without the 0.38 multiplier; Scenario 3 uses as inputs Energy Answers' PM permit limit and SEMASS's PCDD/F stack test result; and Scenario 4 uses as inputs Energy Answers' permit limits for both PM and PCDD/F.

Table 2: PM and PCDD/F Risk Assessment under Different Scenarios

	Scenario 1 Original Risk Assessment		
PM Emissions Basis	Laboratory Test on Unspecified Filters		
PCDD/F Emissions Basis	SEMASS Tests		
Fisher Resident	Adult	Child	Total
Total Combined Risk	2.0E-06	1.7E-06	3.7E-06

[112] *Id.*

[113] *Id.*

[114] *Id.*

[115] EPA, Environmental Technology Verification: Baghouse Filtration Products 4 (April 2010), http://archive.epa.gov/nrmrl/archive-etv/web/pdf/600etv10023.pdf.

[116] Even if it did, the outlet concentrations achieved in a laboratory setting do not necessarily reflect actual emissions under real world conditions. *See* Klafka Statement, Ex. 6.

	Scenario 2 SEMASS Stack Test Results		
PM Emissions Basis	SEMASS Tests		
PCDD/F Emissions Basis	SEMASS Tests		
Fisher Resident	Adult	Child	Total
Total Combined Risk	5.2E-06	4.3E-06	9.5E-06

	Scenario 3 Approved PM Emissions		
PM Emissions Basis	Energy Answers Permit Limit		
PCDD/F Emissions Basis	SEMASS Tests		
Fisher Resident	Adult	Adult	Adult
Total Combined Risk	2.7E-05	2.2E-05	4.9E-05

	Scenario 4 Approved PM & PCDD/F Emissions		
PM Emissions Basis	Energy Answers Permit Limit		
PCDD/F Emissions Basis	Energy Answers Permit Limit		
Fisher Resident	Adult	Adult	Adult
Total Combined Risk	3.3E-05	3.0E-05	6.3E-05

The results are telling. Whereas the HHRA's artificially-deflated inputs predicted an adult cancer risk of 2 in a million, an assessment using Energy Answers' actual permit limits for PM and PCDD/F predicts an adult cancer risk of 33 in a million. Similarly, whereas the HHRA predicts a 1.7 in a million child cancer risk, the same assessment using Energy Answers' actual permit limits predicts a 30 in a million child cancer risk. These are substantially higher risks that RUS must consider in its Final EIS in order to comply with NEPA.[117]

3. Even apart from its erroneous inputs, the HHRA's analysis is fundamentally flawed.

The attached comments of Dr. Juleen Lam detail the inadequacies and flaws in the HHRA that render it an unreliable basis for evaluating the Project's impacts on human health. *See* Lam Comments, Ex. 7. One central and glaring error in the HHRA, and in RUS's interpretation of the HHRA, is that despite the fact that HHRA's methodology *only* ascertains the *additional incremental risk* posed by the facility, Energy Answers and RUS draw unsupported conclusions that potential exposure from the Project "were deemed acceptable."[118] Notably, nowhere in the HHRA or in the DEIS is the ascertained incremental risk (as underestimated as it

[117] By comparison, the acceptable cancer risk used by New York's Department of Environmental Conservation, Division of Air Resources to make regulatory permitting decisions about the need for further air pollution controls ranges from one in a million to ten in a million. New York State Dep't of Envtl. Conservation, Controlling Sources of Toxic Air Pollutants, http://www.dec.ny.gov/chemical/89934.html (last visited Nov. 11, 2015).

[118] 2011 HHRA at 9.

is) considered together with background and cumulative exposures to assess the true impact of the facility on the population. Additionally, as Dr. Lam's comments point out, the HHRA omits consideration of several exposure scenarios such that "conclusions regarding the health impacts of this proposed project cannot be reached with confidence." Lam Comments at 2.

Both Energy Answers in the HHRA and RUS in the DEIS examine the values of incremental risk produced in the risk assessment, find them sufficiently low, and conclude without more that "the Project is not expected to have an adverse impact on human health." DEIS at 3-119. This conclusion is fundamentally nonsensical because it effectively considers the Project in a vacuum, as if it were the *only* source of contamination and pollution exposure for the affected public. In reality, the Project's incremental risk is being introduced to an environment already contaminated with pollutants from other sources and where background disease rates already exist in the affected population. *See* Section III.B, *infra*; *see also* Lam Comments at 4-5.

Perhaps most significantly, as discussed further below, Arecibo is an area already designated in non-attainment for lead, a persistent and bioaccumulative pollutant with permanent neurotoxic effect. Historically, Arecibo's main source of lead exposure has been the Battery Recycling Company, a secondary lead smelter located less than a mile south of the proposed Project.[119] In studying the take-home lead exposure of children with relatives employed at the Battery Recycling Company, the Centers for Disease Control and Prevention ("CDC") concluded that"[t]he high proportion of dust samples from employee vehicles and homes with elevated lead levels suggests that lead brought home by employees caused elevated [blood lead levels] among family members."[120] Failing to consider this existing exposure, along with other exposures, in reaching a conclusion that the Incinerator will have no adverse impacts on human health is simply unjustifiable.

Likewise, the Project is proposed for an area where approximately 30% of children will be diagnosed with asthma.[121] Asthma rates in Puerto Rico are higher for children across every age group as compared to the United States average.[122] Moreover, Arecibo has higher cancer rates than the median in Puerto Rico (more than 300 incidences per 100,000 from 2007 to 2011), with among the island's highest rates of breast cancer and thyroid cancer.[123] As Dr. Lam notes, these "[e]xisting exposures and burden of health diseases need to be incorporated into the risk

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[119] EPA, News Release, *EPA Takes Action on Lead Problems at Arecibo, Puerto Rico Battery Recycling Facility* (Jun. 9, 2011), http://yosemite.epa.gov/opa/admpress.nsf/77c7e0009ec27b4985257359003f5341/b609baaa64b7b23b852578aa005c370b!OpenDocument (last visited Nov. 11, 2015)

[120] CDC, Morbidity and Mortality Weekly Report, Take-Home Lead Exposure Among Children with Relatives Employed at a Battery Recycling Facility — Puerto Rico, 2011 (Nov. 30, 2012).http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6147a4.htm (last visited Nov. 11, 2015).

[121] CDC, Asthma in Puerto Rico, http://www.cdc.gov/asthma/stateprofiles/asthma_in_pr.pdf.

[122] *Id.*.

[123] CDC, Morbidity and Mortality Weekly Report, Invasive Cancer Incidence, 2007 — 2011 (April 17, 2015) http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6414a5.htm#fig2 (last visited Nov. 11, 2015).

calculations and interpretations to adequately assess the potential impacts of the proposed facility . . . ." Lam Comments at 4-5.[124]

In addition to its fatally flawed conclusion that the calculated exposures to contaminants were "acceptable for all receptors," the HHRA also omits consideration of several factors and exposure scenarios that call into question the validity of its analysis. First, the HHRA limits its examination to a 10 km radius around the proposed Project, but EPA has explicitly encouraged a greater-than-10 km radius investigation where topographic features like hills may increase potential deposition. Lam Comments at 6. The National Research Council too has observed that while "[s]ome contaminants that are released from incineration facilities are likely to contribute primarily to environmental compartments on a local scale (within 10 km)," "others that are more persistent in the environment, can be distributed over much greater distances—even up to a regional scale over hundreds of kilometers."[125] Dioxins, furans, and mercury, for instance, are "[p]ersistent air pollutants" that "can be dispersed over large regions—well beyond the local areas and even the countries from which the sources first emanate."[126] The National Research Council therefore notes that "an investigation . . . should examine large space- and time-scales, in addition to a combination of local environmental media over the short term."[127] It specifically recommends that "[e]nvironmental assessments and management strategies for emissions from individual incineration facilities should include an appropriate regional-scale framework for assessing the collective dispersion, persistence, and potential long-term impacts of incinerator emissions on human health."[128] The HHRA fails to do so.

The HHRA also explicitly refused to consider impacts to "off-site commercial/industrial workers" on the unexplained basis that the relative exposure for this population "would be much less than that of residential receptors."[129] As CDC's study of take-home lead exposure among employees of the Battery Recycling Company shows, however, commercial and industrial

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[124] The need to consider background exposure and cumulative impacts to assess a facility's actual impact is not only common sense, but also backed by the National Research Council, which has called for risk assessments to "consider all the particular conditions of exposure, including the complete mix of other potential contaminants from incineration, and *exposures to the same and different chemicals from other sources*." National Research Council, Waste Incineration and Public Health 116 (2000) ("NRC Report") (emphasis added). The National Research Council has observed that risk assessment of individual incinerator facilities under normal operating conditions "may inadequately characterize the risks or lack of risks because of . . . the collective effects of multiple facilities not considered in plant-by-plant risk assessments, potential synergisms in the combined effects of the chemicals to which people are exposed, the possible effect of small increments in exposure on unusually susceptible people, and the potential effects of short-term emission increases due to off-normal operations." *Id.* at 179. To the extent this is the case with the HHRA, RUS—in order to comply with NEPA—cannot rely solely on the HHRA to reach its conclusion of no adverse human health impacts.

[125] NRC Report at 73 (2000).

[126] *Id.* at 74.

[127] *Id.* at 73.

[128] *Id.* at 75..

[129] 2010 HHRA at 28.

workers likely suffer existing exposures and burdens from their employment that actually weigh in favor of their inclusion in the risk assessment as a receptor population of concern.[130]

The HHRA similarly omitted consideration of the Incinerator's on-site workers because it "assumed the potential for the exposure and the potential for adverse health effects in workers is regulated under the federal Occupational Safety and Health Act (OSHA) regulations and guidance."[131] But this assumption is not grounded in science. Two studies of four municipal incinerators that have documented "very high exposures of workers to hazardous waste during the routine cleaning of the incinerator chambers and the electrostatic precipitators."[132] Similarly, a National Institute for Occupational Safety and Health study of three New York City municipal solid waste incinerators concluded that cleanout operations at these incinerators posed a health hazard.[133] Specifically, airborne concentrations of aluminum, arsenic, cadmium, lead, and nickel during some periods of the cleanout of the facilities' electrostatic precipitators, and airborne concentrations of dioxins and furans during cleaning of the lower cooling chamber were high enough to exceed even the protection capabilities of the air-purifying respirators worn by workers during these operations.[134] A separate study of 56 incinerator workers found the workers to have "substantially higher blood lead concentrations than a comparison group of high-pressure plant tenders working at heating plants"—a finding that the National Research Council concluded "is consistent with the high lead exposures observed and suggests that incinerator workers in general are at risk of measurably increased lead absorption."[135]

Citing these studies, the National Research Council has observed that "[i]ncinerator operators and maintenance workers, and those involved in the collection, transport, and disposal of fly ash and emission control equipment residues, have the potential to be the most exposed to toxic substances associated with incineration."[136] The Council noted its "substantial concern" about the exposures of incinerator workers to lead, in particular, as implementation of technology controls are not designed to reduce worker exposures.[137] In light of the scientific literature and the National Research Council's conclusions, the HHRA's failure to consider the human health impacts of workers at the proposed Project is a significant omission and yet another reason why the DEIS's reliance on the HHRA to conclude that the Project will have no adverse health impacts is arbitrary and capricious.

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[130] Lam Comments at 8.

[131] 2010 HHRA at 28.

[132] NRC Report at 164.

[133] National Institute for Occupational Safety and Health,, Health Hazard Evaluation Report, HETA 90-0329-2482 (1995), *available at* http://www.cdc.gov/niosh/hhe/reports/pdfs/1990-0329-2482.pdf.

[134] *Id.*

[135] NRC Report at 165.

[136] *Id.* at 163.

[137] *Id.* at 174.

4. The DEIS does not take a hard look at the impacts of lead exposure posed by the Incinerator.

Lead exposure, which occurs from a combination of inhalation and ingestion pathways, can cause a range of significant adverse health effects in children and adults.[138] Even in small amounts, lead can have serious, irreversible, long-term health consequences, including diminished I.Q., learning disabilities, and hyperactivity.[139] Multiple studies show children are particularly susceptible even to low levels of lead exposure.[140]

Currently, the largest sources of airborne lead exposure include emissions from lead smelters (e.g. lead recycling facilities known as secondary smelters) and waste incinerators.[141] Emissions from these facilities also contribute to an oral exposure pathway because lead settles out of the air into soil, dust, and water. Children are particularly vulnerable to lead exposure because they "commonly put hands, toys, and other items in their mouths, which may come in contact with lead-containing dust and dirt."[142] Once in the environment, lead is difficult to remove because it does not degrade; it is persistent in the environment and may bioaccumulate in the food chain.[143] Arecibo is only one of 21 lead nonattainment areas in all of the U.S. and its territories.[144] Despite the particular vulnerability of the proposed location, the DEIS's consideration of impacts to public health from lead ignores science and monitoring data, as explained below.

a. Contrary to the DEIS's apparent assumption, there is no safe level of lead.

The DEIS's consideration of human health impacts posed by the Incinerator's projected lead emissions is incomplete and flies in the face of the scientific consensus that there is "no safe

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[138] EPA, Lead Compounds, Hazard Summary (Revised 2011), http://www3.epa.gov/airtoxics/hlthef/lead.html (last visited Nov. 1, 2015).

[139] *See* National Center for Healthy Housing, At a Glance: Childhood Lead Exposure and Educational Outcomes, http://www.nchh.org/Portals/0/Contents/Glance_Childhood_Exposure.pdf. *See also* Ramya Chari et. al., *Integrating Susceptibility into Environmental Policy: An Analysis of the National Ambient Air Quality Standard for Lead,* Int'l J. of Envtl. Res. and Pub. Health 1085 (2012), *available at* http://www.mdpi.com/1660-4601/9/4/1077/htm ("Chari lead study").

[140] See Jennifer Richmond- Bryant, et. al., *The Influence of Declining Air Levels on Blood Lead-Air Slope Factors in Children. Children's Health*,122 Envtl. Health Perspectives 7, July 2014, *available at* http://ehp.niehs.nih.gov/1307072/. *See also*, Advisory Committee on Childhood Lead Poisoning Prevention, Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention (January 4, 2012).

[141] *Id.*

[142] *Id.*

[143] *Id.*

[144] EPA, *Green Book Lead Nonattainment Areas*, http://goo.gl/AOT9Nh (last visited Oct. 30, 2015).

blood lead level."[145] The DEIS repeatedly suggests that the Project's lead emissions are minimal and therefore harmless. *See, e.g.*, DEIS at 3-40 ("[T]he Project's proposed emissions of lead (0.31 ton per year) are well below the *de minimis* threshold for lead . . . ."); *id.* at 3-5140 ("Energy Answers completed a lead dispersion modeling analysis . . . [that] indicated that the maximum predicted concentration of lead is 0.00056 $\mu g/m^3$, which is well below the 0.15 $\mu g/m^3$ NAAQS [National Ambient Air Quality Standard] (3-month average).").

In fact, it is well understood that there is *no safe level of lead exposure*. In its final Integrated Risk Assessment for Lead, EPA reiterated that "it is clear that [lead] exposure in childhood presents a risk; further, *there is no evidence of a threshold below which there are no harmful effects on cognition from [lead] exposure*."[146] Prior to 2012, CDC set the level of concern for childhood blood lead levels at 10 µg/dL. In 2012, CDC revised its guidance, noting that "no safe blood lead level in children has been identified" and recognizing that "[e]ven low levels of lead in blood have been shown to affect IQ."[147] CDC therefore eliminated the "level of concern" language and now uses a "reference level" of 5 µg/dL "to identify children with blood lead levels that are much higher than most children's levels."[148] Notably, though, blood lead levels lower even than 5 µg/dL have been found harmful to children. The Department of Health and Human Services' National Toxicology Program has observed that:

> *[i]n children*, there is *sufficient* evidence that blood Pb levels <5 µg/dL are associated with increased diagnosis of attention–related behavioral problems, greater incidence of problem behaviors, and decreased cognitive performance as indicated by (1) lower academic achievement, (2) decreased intelligence quotient (IQ), and (3) reductions in specific cognitive measures. There is also *limited* evidence that blood Pb <5 µg/dL is associated with delayed puberty and decreased kidney function in children ≥12 years of age.[149]

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[145] CDC, What Do Parents Need to Know to Protect Their Children, (June 19, 2014), http://www.cdc.gov/nceh/lead/ACCLPP/blood_lead_levels.htm (last visited Nov. 11, 2015) ("CDC lead page").

[146] EPA, Integrated Science Assessment for Lead lxxxviii(2013), *available at* http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=518908 (emphasis added).

[147] *See* CDC lead page.

[148] *Id.*

[149] United States Department of Health and Human Services, NTP Monograph: Health Effects of Low-Level Lead xviii (June 2012), https://ntp.niehs.nih.gov/ntp/ohat/lead/final/monographhealtheffectslowlevellead_newissn_508.pdf (emphasis original).

California's lead benchmark directs actions to protect children from any blood-lead level change of as little as *1.0 µg/dL*.[150]

Contrary to the DEIS's suggestion, then, there is no *de minimis* level of lead exposure, and compliance with the lead NAAQS is no indication that exposed populations will not be harmed.[151] In fact, EPA's own Children's Health Protection Advisory Committee ("CHPAC" or "the Committee") has noted the "[s]trong evidence" that "lead exposure at low levels poses even greater harm per unit of lead than does exposure at higher levels."[152] Thus,

> even low exposures to lead, such as those from ambient lead-containing particulates, have significant adverse impacts on children's neurological development. The data provide support for preventing even small increases in blood lead levels from inhaled lead as part of avoiding cumulative exposures to lead in children.[153]

The Committee concluded that the 0.15 µg/m^3 lead NAAQS set by EPA in 2008 was not sufficiently protective of children because "there is clear scientific evidence to support a lead standard below 0.1 µg/m^3."[154] The Committee has repeatedly called for the lead NAAQS to be set protectively at 0.02 µg/m^3 and has "respectfully disagree[d]" with EPA's decision to retain the 0.15 µg/m^3 lead NAAQS:

> While the reduction of the standard from 1.5 to 0.5 µg/m^3 in 2008 was an important step in protecting children's health, it was *insufficient to prevent the lifetime impacts from neurodevelopmental damage* and the consequences of low birthweight in children from this persistent and debilitating element for which there is no safe level of exposure.[155]

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[150] Jim Carlisle, Cal. Envtl. Protect. Agency, Development of Health Criteria for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(g): Child-Specific Benchmark Change in Blood Lead Concentration for School Site Risk Assessment Final Report 1 (April 2007), http://oehha.ca.gov/public_info/public/kids/pdf/PbHGV041307.pdf.

[151] "[F]or young children and accounting for both the direct route (inhalation) and the indirect route (ingestion of soil, dust, and food contaminated by airborne lead) of exposure, each microgram of airborne lead per cubic meter could increase blood lead by about 4 µg/dL." NRC Report at 175.

[152] Letter from Melanie Marty, Chair, CHPAC, to Stephen Johnson, Administrator, EPA, at 2 (June 16, 2008), *available at* http://www2.epa.gov/sites/production/files/2014-05/documents/61608.pdf (2008 CHPAC Letter).

[153] *Id.*

[154] *Id.*

[155] Letter from Dr. Sheela Sathyanarayana, Chair, CHPAC, to Gina McCarthy, Administrator, EPA, at 1 (Jan. 8, 2015), *available at* http://www2.epa.gov/sites/production/files/2015-01/documents/naaqs_for_lead_letter.pdf (emphasis added) ("2015 CHPAC Letter"). *See also* 2008 CHPAC Letter at 1.

Since 2008, "the evidence of the harm to children from exposure to low levels of lead has become even more compelling."[156] One pooled analysis of seven studies, for instance, estimated that blood lead level *as low as 0.1 μg/dL* was associated with a one-point IQ loss.[157] As the Committee observed, "[o]n a population level, loss of one IQ point has significant societal, economic, and health implications."[158]

These significant societal, economic, and health implications are all the more troubling in light of recent research by a consortium of authors, including researchers from Johns Hopkins Bloomberg School of Public Health, indicating that the degree to which lead exposure resulted in cognitive detriment was greater among populations with a lower socio-economic status than among the general population.[159] The study evaluated the 0.15 $\mu g/m^3$ lead NAAQS incorporating the increased susceptibility of populations with a low socio-economic status and found that the NAAQS was not sufficient to protect this population from significant cognitive detriment, measured as the loss of more than 2 IQ points.[160]

The 0.31 tons per year estimated to be emitted by the Project will, therefore, by the very nature of a highly toxic, persistent, and bioaccumulative neurotoxin, have adverse impacts on the exposed population, particularly children. And it will have these adverse impacts even if the Project's predicted lead emissions do not exceed the NAAQS. Moreover, the population in Puerto Rico—with 45% below the poverty level, as compared to 15.8 % nationwide[161]—is precisely the population that would be most susceptible to the harms from this lead emission. Contrary to DEIS's irrational claim, then, the fact that the Project's lead emissions are not projected to cause an exceedance of the NAAQS does not support the conclusion that the Project's incremental impact from lead emissions would be trivial, much less that it "would not have a cumulative adverse impact on sensitive populations (e.g., asthmatics, children, and the elderly), agriculture (e.g., soils and livestock), and vegetation/wildlife." DEIS at 4-7.

b. Any reliance on the HHRA for conclusions about lead impacts is misplaced.

For all of the reasons already explained above, the HHRA is not a reliable analysis. In addition, any reliance on the HHRA for considerations of impacts from lead would be irrational on at least two further counts.

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[156] 2015 CHPAC Letter. at 2.

[157] *Id.* (citing E. Budtz-Jorgensen An International Pooled Analysis for Obtaining a Benchmark Dose for Environmental Lead Exposure in Children. 33 Risk Analysis 3 (2013). DOI: 10.1111/j.1539-6924.2012.01882.x).

[158] *Id.*

[159] *See* Chari lead study.

[160] *Id.*

[161] U.S. Census Bureau, Poverty: 2012 and 2013 (Sept. 2014), https://www.census.gov/content/dam/Census/library/publications/2014/acs/acsbr13-01.pdf (last visited Nov. 12, 2015).

First, the HHRA assesses lead impacts based on the outdated 10 µg/dL blood lead level.[162] *See* Lam Comments at 5-6. New developments since the HHRA was finalized—namely CDC's new reference level of 5 µg/dL for blood lead—demand a re-assessment of lead impacts by RUS. Without a new assessment based on the current blood lead reference levels, the HHRA's conclusion that the Project's lead emissions "should not result in increases in PbB levels above the health-protective goal" is meaningless. HHRA at 67. Second, the HHRA fails to account for fetal lead exposure. Lam Comments at 7. Unborn children are susceptible to lead's harmful effects.[163] In 2010, the CDC published guidelines recognizing that "prenatal lead exposure at maternal blood lead levels below 10 µg/dL is inversely related to neurobehavioral development independent from the effects of postnatal exposure."[164] The National Research Council also has identified fetuses as one of several "susceptible subpopulations" for lead.[165] The HHRA recognizes that lead has "effects on developing fetuses" and is therefore "evaluated differently than most constituents,"[166] but nevertheless ignored this important pathway in its analysis and therefore likely underestimated the human health impacts from operating the Incinerator.[167]

c. The DEIS has no basis for any conclusion that lead emissions in Arecibo are declining.

Finally, RUS appears to have no basis for its supposition that decreasing ambient lead concentrations means Arecibo "may potentially be redesignated to 'maintenance' . . . ." DEIS at 3-39. The DEIS relies on its Table 3-18 showing "existing air quality monitoring data" from 2012 to 2014 to make this assertion, but for unknown reasons, Table 3-18 cites monitoring data from only one of two lead monitoring stations in Arecibo. *Id.* at 3-43, Table 3-18.[168] Data from EPA's air monitoring database show that, in fact, the second lead monitoring station—the one not included in the DEIS's Table 3-18—showed exceedances of the NAAQS in each of the last four years.

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[162] *See, e.g.*, 2010 HHRA at 57. It also references EPA's "stated goal for lead is that children have no more than a 5 percent probability of exceeding a [blood lead] level of 10 µg/dL." *Id.*. However, this is a 21year-old standard that is under review in light of the CDC's 2012 recommendations. EPA Region 8, Evaluation of Risks from Lead,(April 27, 2015) available at http://www2.epa.gov/region8/hh-evaluation-risks-lead.

[163] CDC, Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women 5 (Nov. 2010), *available at* http://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf (last visited Nov. 1, 2015). *See also* NRC Report at 161.

[164] CDC Guidelines for the Identification and Management of Lead Exposure at 12.

[165] NRC Report at 142.

[166] 2010 HHRA at 57.

[167] *Id.*at 27-28.

[168] Notably, DEIS Table 3-18 also contains the caveat that "[l]ead monitoring data for 2013 and 2014 is based on a low number of valid measurements, below EPA criterion of 75 percent completeness." DEIS at 3-43.

Table 3: EPA Annual Monitoring of Lead (Total Suspended Particulate) in Arecibo

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
001 - 1	3 exceedances	3 exceedances	1 exceedance	0 exceedances	0 exceedances	0 exceedances
	Arithmetic mean: 0.1775	Arithmetic mean: 0.206296	Arithmetic mean: 0.139831	Arithmetic mean: 0.083729	Arithmetic mean: 0.032655	Arithmetic mean: 0.006536
001 - 2	0 exceedances	1 exceedance	1 exceedance	0 exceedances	0 exceedances	-
	Arithmetic mean: 0.326	Arithmetic mean: 0.195854	Arithmetic mean: 0.147193	Arithmetic mean: 0.0793	Arithmetic mean: 0.045857	-
002 - 1	-	-	1 exceedance	4 exceedances	3 exceedances	1 exceedance
	-	-	Arithmetic mean: 0.757826	Arithmetic mean: 1.391103	Arithmetic mean: 0.714526	Arithmetic mean: 0.198929
002 -2	-	-	-	-	0 exceedances	1 exceedance
	-	-	-	-	Arithmetic mean: 0.420333	Arithmetic mean: 0.219926

The data from this table are drawn from EPA's AirData database, http://www3.epa.gov/airdata/ad_maps.html. The leftmost column identifies monitoring reported from the two source-oriented monitors located in Arecibo (001 and 002). Exceedances refer to monitored exceedances of the 0.15 $\mu g/m^3$ lead NAAQS. The arithmetic mean unit is $\mu g/m^3$.

B. The DEIS Does Not Comply with NEPA's Mandate to Consider Cumulative Impacts.

As written, the DEIS clearly violates NEPA by inexplicably refusing to consider cumulative impacts on various resources affected by the Project, including soils and geology, biological resources, land resources, public health and safety, and cultural resources. DEIS at 4-4. RUS gives a circular and nonsensical reason for omitting consideration of these cumulative impacts: "The cumulative effects analysis excludes from consideration those resources where significant cumulative effects are not expected." *Id.* Such circular reasoning makes a mockery of the agency's obligations under NEPA and would not withstand judicial review.

First of all, NEPA's requirement that agencies consider cumulative impacts in an EIS includes no exception for instances "where significant cumulative effects are not expected." *Id.* Under NEPA, agencies are required to consider cumulative impacts, period. 40 C.F.R. § 1508.8(b). Without having undertaken the cumulative impacts analysis as required, RUS has no basis for its conclusion that the Project would not have significant cumulative impacts on certain resources. A baseless conclusion is the hallmark of arbitrary and capricious agency decisionmaking.

The DEIS's refusal to consider cumulative impacts on biological resources, for instance, is patently arbitrary and capricious given EPA's observation that "[e]cosystems near smelters, mines and other industrial sources of [lead] have demonstrated a wide variety of adverse effects including decreases in species diversity, loss of vegetation, changes to community composition, decreased growth of vegetation, and increased number of invasive species." National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964 (Nov. 12, 2008). Ecosystems near the Project, including Caño Tiburones, will be in close proximity not only to the lead-emitting Project, but also to a smelter and an oil-fired power plant, another industrial source of lead, and yet the DEIS concludes without analysis or support that cumulative impacts on ecosystems will be insignificant.

The section below focuses in particular on cumulative human health impacts because it is quite likely that the Project's cumulative impacts on human health will be tremendously detrimental. Moreover, as explained below, to the extent the DEIS attempts a consideration of cumulative impacts, its analysis both fundamentally misunderstands the very concept of cumulative impacts and relies on undisclosed, un-examined mitigation measures to reach a conclusion that cumulative impacts would be minimal.

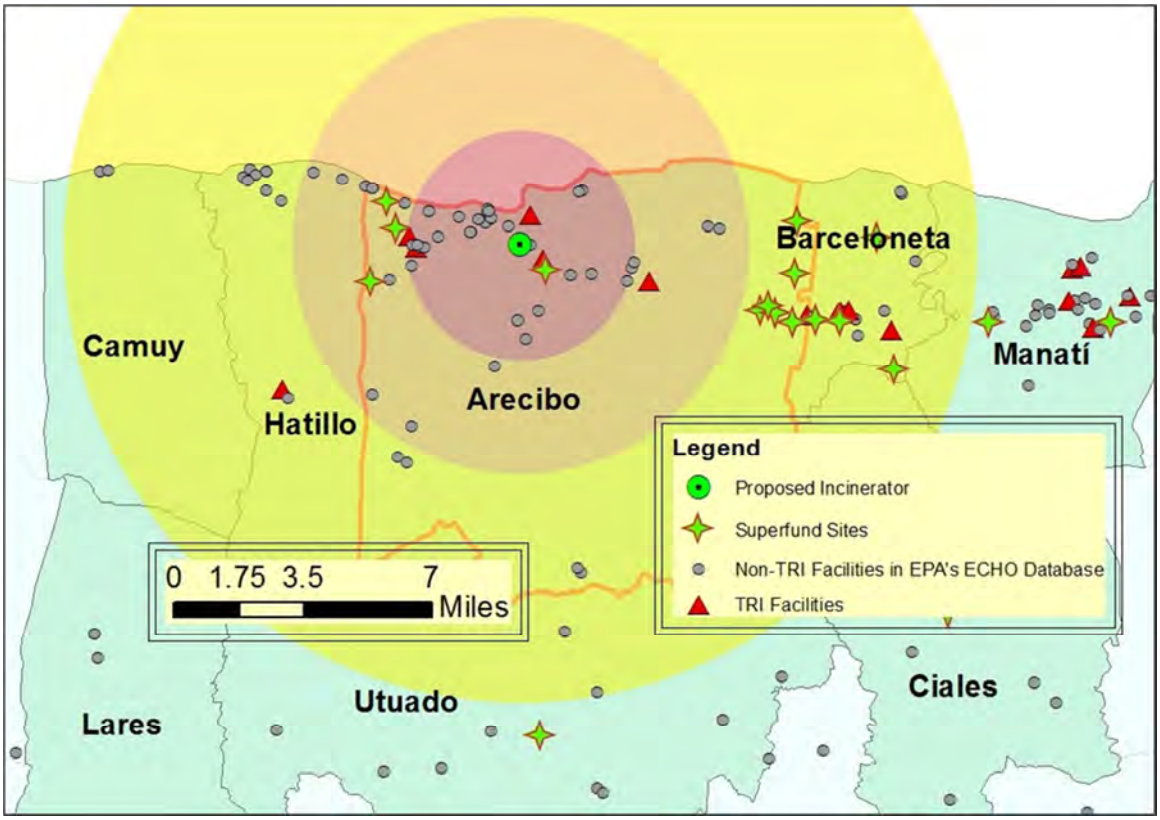
1. The DEIS unlawfully omits any consideration of the Project's cumulative impacts on human health.

The HHRA relied on by RUS does not consider the cumulative effects of the Project on human health, *see* Section III.A, *supra*, and the DEIS's cumulative effects analysis explicitly "excludes from consideration" public health and safety. DEIS at 4-4.[169] In contravention of NEPA, then, RUS has failed to fully consider the cumulative impacts of its financial assistance to the Project. In the Final EIS, RUS must consider the facts outlined below in a cumulative impacts analysis.

As the map below shows, the Project will be sited in an area already substantially burdened by polluting sources.

[169] The DEIS notes that "Energy Answers originally conducted a cumulative effects analysis as part of the 2010 preliminary draft EIS (PRIDCO 2010)," DEIS at 4-3, but does not summarize or describe that analysis. That cumulative impacts analysis is therefore not properly incorporated by reference into the DEIS. *See* 40 C.F.R. § 1502.21.

Figure 2: Map of Polluting Facilities Near the Project Site



The zip code that covers most of Arecibo contains five facilities that report to the Toxics Release Inventory ("TRI").[170] These are facilities within specific industry sectors that manufacture or process more than 25,000 pounds of a TRI-listed chemical or use more than 10,000 pounds of a listed chemical in a given year.[171] TRI-listed chemicals are those that cause cancer or other chronic human health effects, significant adverse acute human health effects, and/or significant adverse environmental effects."[172] Together, these five facilities dispose or release 31,900 pounds of TRI-listed chemicals, mostly in the form of air emissions.[173] Barceloneta, the municipality immediately east of Arecibo is home to five other facilities reporting 46,400 pounds

[170] *2014 TRI Factsheet: ZIP Code – 00612*, EPA (October 2015), http://iaspub.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=00612&pyear=2014&pParent=TRI&pDataSet=TRIQ1.

[171] 40 C.F.R. §§ 372.22, 372.25; *see generally* Emergency Planning and Community Right-to-Know Act, 42 U.S.C. §§ 11021-23.

[172] *TRI-Listed Chemicals*, EPA (Nov. 6, 2015), http://www2.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals.

[173] *2014 TRI Factsheet: ZIP Code – 00612*, EPA (October 2015), http://iaspub.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=00612&pyear=2014&pParent=TRI&pDataSet=TRIQ1.

of TRI-listed chemicals into the air.[174] Hatillo, the municipality immediately to the west of Arecibo, has yet another facility releasing 12,500 pounds of hydrogen sulfide, a TRI-listed chemical, into the air.[175]

Additionally, there are seven Superfund sites in Arecibo[176] and six in neighboring Barceloneta.[177] U.S. EPA's Enforcement and Compliance ("ECHO") database identifies a total of 59 EPA-permitted facilities in Arecibo, including nine facilities with current violations, and twelve with violations in the last three years.[178] Among these facilities, as detailed in Section III.A.3, *supra*, is the Battery Recycling Company. The Project will be sited less than a mile from this secondary lead smelter. Notably, the health risk assessment for a similar battery recycling plant in California estimated substantial cancer risk from arsenic, 1,3-butadiene, benzene, and chromium VI, with 111,422 people in the residential population estimated to be exposed to a cancer risk of at least 10 in a million.[179]

Equally as alarming as the potential cancer risks posed by secondary lead smelters is the Battery Recycling Company's actual lead emissions, which were the cause of EPA's designation of a lead non-attainment area in Arecibo. Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards, 76 Fed. Reg. 72,097, 72, 119 (Nov. 22, 2011). A 2011 study by CDC found that, among the children of employees at the battery recycling facility who were voluntarily screened, a devastating 57% of children under six years of age had blood lead levels above 5 µg/dL, CDC's reference value.[180] Additionally, 85% of vehicle dust samples and 49% of home dust samples exceeded EPA's level of concern of 40 µg/square feet.[181] Notably, EPA's Clean Air Scientific Advisory Committee has determined, based on epidemiological studies, that the 40 µg/square feet dust lead cleanup levels "are insufficiently protective of children's health."[182] EPA's Children's Health Protection Advisory Committee has noted that

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[174] *2014 TRI Factsheet: ZIP Code – 00617*, EPA (October 2015), http://iaspub.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=00617&pyear=2014&pParent=TRI&pDataSet=TRIQ1.

[175] *2014 TRI Factsheet: ZIP Code – 00659*, EPA (October 2015), http://iaspub.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=00659&pyear=2014&pParent=TRI&pDataSet=TRIQ1.

[176] *Search Superfund Site Information*, EPA (Nov. 10, 2015), http://cumulis.epa.gov/supercpad/Cursites/srchsites.cfm [enter 00612 for Zip Code and click Search].

[177] *Id.* [enter 00617 for Zip Code and click Search].

[178] Enforcement and Compliance History Online (ECHO), EPA, http://echo.epa.gov/?redirect=echo [use zip codes 00612 and 00688 to search].

[179] Exide Techs., *Revised AB2588 Health Risk Assessment* ES. viii (Jan. 2013), http://www.aqmd.gov/docs/default-source/planning/risk-assessment/exide-hra.pdf.

[180] Ctrs. for Disease Control & Prevention, *Take-Home Lead Exposure Among Children with Relatives Employed at a Battery Recycling Facility — Puerto Rico, 2011*, 61 Morbidity & Mortality Wkly Rep. 967 (Nov. 30, 2012), http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6147a4.htm.

[181] *Id.*

[182] Letter from Dr. Rogene Henderson, Chair, Clean Air Scientific Advisory Committee, to Stephen Johnson, Administrator, EPA 3 (Aug. 30, 2007), http://yosemite.epa.gov/sab%5Csabproduct.nsf/96CFAD50E89BE5638525734D00452675/$File/casac-07-006.pdf.

"[t]he half-life of lead is sufficiently long that repeated short-term elevated exposures may result in significant accumulation of lead within a child's body."[183] Where it is well-established that lead is persistent in the environment and bio-accumulative, "thereby providing long-term multi-pathway exposures to organisms and ecosystems," 73 Fed. Reg. 66,964, such background exposures cannot be ignored just because, as RUS claims without evidence, "control measures have substantially reduced ambient lead concentrations," DEIS at 3-39.

In a 2015 letter, EPA's Children's Health Protection Advisory Committee pointed to a 2014 review of several studies suggesting the increased neurotoxicity of lead in the presence of other metals, such as manganese and cadmium.[184] The Committee noted that "[r]eal-world settings include exposures to multiple neurotoxic chemicals (e.g. metals) and the combined exposures can exacerbate the effects of lead on children's brains.[185] For the purposes of a cumulative impacts analysis, then, RUS cannot rationally ignore consideration of another facility in close proximity to the Project: PREPA's Cambalache Power Plant, a 165 MW oil-fired power plant located less than 1.4 km, or 0.85 miles, from the Project. In 2011, the plant emitted 440 pounds of formaldehyde and 74 pounds of benzene, substances known to be human carcinogens, in addition to 23 pounds of lead and 44 pounds of naphthalene, substances reasonably anticipated to be human carcinogens, among a long list of other air emissions.[186]

The CDC has emphasized "the importance of environmental assessments to identify and mitigate lead hazards *before* children demonstrate[] [blood lead levels] at or higher than the reference value."[187] The following map shows what is at stake.

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[183] Letter from Melanie Marty, Chair, Children's Health Protection Advisory Committee, to Stephen Johnson, Administrator, EPA 3 (June 16, 2008), http://www2.epa.gov/sites/production/files/2014-05/documents/61608.pdf

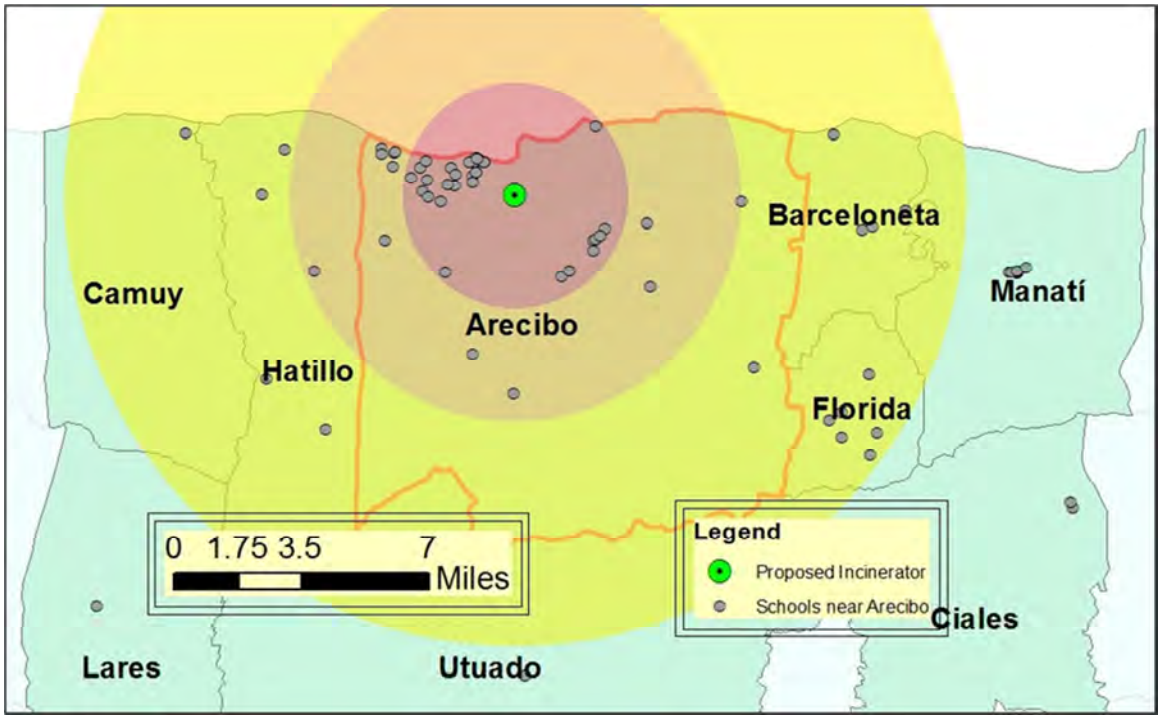
[184] Letter from Dr. Sheela Sathyanarayana, Chair, CHPAC, to Gina McCarthy, Administrator, EPA (Jan. 8, 2015), http://www2.epa.gov/sites/production/files/2015-01/documents/naaqs_for_lead_letter.pdf.

[185] *Id.*

[186] *See ECHO Air Pollutant Report*, EPA (June 2, 2015), http://echo.epa.gov/air-pollutant-report?fid=110000602571. *See also* Nat'l Toxicology Program, *Substances Listed in the Thirteenth Report on Carcinogens* (2014), http://ntp.niehs.nih.gov/ntp/roc/content/listed_substances_508.pdf.

[187] CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "*Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention*" 13 (June 7, 2012), http://www.cdc.gov/nceh/lead/acclpp/cdc_response_lead_exposure_recs.pdf.

Figure 3: Map of Schools Near the Project Site



Given the presence of at least 37 schools within 5 km of the proposed Project, and at least 48 schools within 10 km of the site, not to mention the heavily-populated neighborhoods nearby, it is incumbent on RUS to ensure through its NEPA process that it is not subjecting the children of Arecibo to lifelong impacts from toxic lead emissions. When a proposed project is sited in an area already suffering from known, unsafe levels of a pollutant that has no safe level of exposure, RUS has an extraordinarily high burden to meet to rationally justify its decision to fund the project. Its utter failure to engage in a cumulative impacts analysis of this Project's human health consequences only exemplifies how unlikely it is the agency *can*, with a complete and good faith analysis, justify its proposed action.

2. The DEIS's purported cumulative impacts analysis fails to satisfy NEPA.

The DEIS's attempt at a cumulative impacts analysis is characterized by two sleights of hand, both of which violate NEPA. First, the DEIS points to allegedly minimal *incremental* impacts to conclude that cumulative impacts will be insignificant. Second, to the extent that the DEIS acknowledges that cumulative impacts may occur, it diminishes their import by pointing vaguely, and impermissibly, to undisclosed and un-analyzed mitigation measures.

The DEIS notes, for instance, that the Project "would not have a cumulative effect on the potential degradation of groundwater and the public water supply because any potential Project effects on groundwater quality would be mitigated by measures presented in the Project's Spill Prevention Plan." DEIS at 4-5. Even assuming measures could be implemented to successfully

mitigate the Project's impacts, the fact that the Project's incremental impact is minimal does not translate logically to a conclusion of minimal cumulative effects. Cumulative impacts are:

> Impact[s] on the environment which result[] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. *Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

40 C.F.R. § 1508.7 (emphasis added). Thus, the mitigated or minimal nature of the Project's impacts cannot alone justify a conclusion of insignificant cumulative impacts. RUS has to actually undertake the cumulative impacts analysis to ascertain whether the Project's incremental impacts "*when added to other past, present, and reasonably foreseeable future action*" would have cumulative impacts. *Id.* (emphasis added). It does not perform this analysis in the DEIS.

Moreover, RUS cannot escape the obligation to undertake a cumulative impacts analysis by vague reference to mitigation measures, like the "Spill Prevention Plan" or "proposed stormwater best management practices," DEIS at 4-5 to 4-6, that have neither been disclosed to the public nor studied by the agency. NEPA requires a reasoned discussion of mitigation that goes beyond a mere listing of best management practices. *See, e.g.*, *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1151 (9th Cir. 1998), *rev'd on other grounds,* 537 F.3d 981 (9th Cir. 2008) ("The Forest Service also argues that water quality will not be affected by the proposed logging because of the mitigation measures described in the EA that will be undertaken . . . . Without analytical data to support the proposed mitigation measures, we are not persuaded that they amount to anything more than a "mere listing" of good management practices."). The DEIS does not contain such a discussion—an omission that must be corrected in the Final EIS for RUS's final agency action to withstand judicial review.

C. The DEIS's Cursory Analysis of the Project's Ash Production and Proposed Management Methods Fails to Take the Hard Look Required by NEPA.

The DEIS's scant analysis of Energy Answers' proposed management of the Project's ash fails to take the hard look required by NEPA at this significant and potentially hazardous waste stream. The Project will produce about 420 tons per day (or 140,000 tons per year) of ash in two waste streams: bottom ash and fly ash. DEIS at 2-19, 3-76. Bottom ash is the unburned remains of MSW and consists mainly of unburned organic materials (char), inorganic fine particles, and large pieces of metal, glass, and ceramics.[188] Fly ash is the vapor-phase matter that leaves the furnace chamber suspended in combustion gases and is collected in the air pollution control devices.[189] Fly ash is a mixture of fine particles with volatile heavy metals and metal

[188] NRC Report (2000) at 64-65.

[189] *Id.*

compounds, organic chemicals, and acids condensed onto particle surfaces, and may also contain residues from reagents like lime or activated carbon.[190]

Although the DEIS references the concerns of "many regulatory agencies", such as the Federal Highway Administration, over "the presence of trace metals, such as lead and cadmium, in MSW combustion ash, and concern over leaching of these metals, as well as the presence of dioxins and furans in selected ash fractions (fly ash)," DEIS at 3-119, at no point does the DEIS actually undertake an assessment of the impacts of the ash produced by the proposed Project on the quality of the human environment. This is a significant oversight considering the potential hazards of the ash produced at the incinerator, and should be included in the Final EIS's discussion of the Incinerator's ash.

1. The DEIS accepts as true, without further study or analysis, Energy Answers' claim that it can effectively make the ash waste stream nonhazardous.

Similarly absent from the DEIS's discussion of the Incinerator's ash is a recognition that MSW incinerator ash is not exempt from hazardous waste regulation under Subtitle C of the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 *et seq.* ("RCRA"). *See City of Chicago v. Envtl. Def. Fund*, 511 U.S. 328 (1994). EPA requires MSW incinerator operators to determine whether incinerator ash exhibits a hazardous waste characteristic and, if it does, to manage that hazardous ash in full compliance with all applicable RCRA Subtitle C requirements. Determination of Point at Which RCRA Subtitle C Jurisdiction Begins for Municipal Waste Combustion Ash at Waste-to-Energy Facilities, 60 Fed. Reg. 6666, 6668 (Feb. 3, 1995). The DEIS, however, does not mention whether Energy Answers will perform the required toxicity testing on the bottom and fly ash, how often it must perform such testing, or how Energy Answers would manage the ash if it were determined to be hazardous waste.

Instead, the DEIS notes that the fly ash "would be conditioned with the addition of a conditioning agent (if required) and water," and takes at face value Energy Answers' contention that this process "is expected to result in a material that is considered nonhazardous based on Toxicity Characteristic Leaching Procedure testing." DEIS at 2-19. According to the DEIS, bottom ash from the Incinerator will also be conditioned. *Id.* at 3-119.

But the DEIS does not specify what conditioning agent will be used on the ash or how Energy Answers will determine whether the use of this conditioning agent is, in fact, "required." DEIS at 2-19. Identification of the characteristics of the ash and the conditioning process is vital because selection of the proper treatment method is highly dependent on the chemical and physical characteristics of the ash.[191] Without this information, the public is unable to assess the DEIS's claim that the conditioning process will "essentially lock[] in heavy metals and other harmful elements into a mortar-like compound" and effectively render the ash nonhazardous

[190] *Id.*

[191] Margarida J. Quina et al., *Treatment and use of air pollution control residues from MSW incineration: An overview*, 28 Waste Mgmt 2097, 2101 (2008).

prior to transport to the landfill. *Id.* at 3-119. Without identification of the chemicals that will be used as conditioning agents and their material safety data, the public cannot determine whether transport, storage, and handling of the conditioning agent itself may be a cause of concern.

Furthermore, the DEIS does not specify how much of the conditioning agent may be added to each ton of ash, so it is impossible to discern whether the conditioning agent is being used purely for treatment of the ash or, instead, to dilute the ash in order to circumvent the requirements of Subtitle C, in clear violation of RCRA regulations. *See* 40 C.F.R. § 268.3 ("Dilution prohibited as a substitute for treatment."). If the quantity of conditioning agent is indeed significant, then that intensifies the potential safety and traffic impacts that may come from transport and storage of the agent. Moreover, if this ash stream of 140,000 tons per year must be augmented with significant amounts of a conditioning agent, this further undermines the Project's purpose to reduce the volume of waste being sent to landfills in Puerto Rico.

The DEIS correctly discounts as commercially and legally unviable Energy Answers' proposal to beneficially use bottom ash as an aggregate product in construction.[192] DEIS at 2-19, 3-119 to 3-120. Therefore, all ash from the Project (except for metals separated from the bottom ash) will have to be landfilled. *Id.* If nonhazardous, this incinerator ash must be sent to a MSW landfill that complies with Subtitle D of RCRA. *See* 40 C.F.R. pt. 258. But, as the DEIS makes clear, only six landfills in Puerto Rico are currently certified to be in compliance with Subtitle D. DEIS at 1-6 to 1-7. The only landfill to have expressed its intent to accept ash from the Project is a landfill currently being built by the company Ecosystems in the town of Peñuelas, located 70 km south of Arecibo.[193] Ecosystems claimed, in a communication with Energy Answers, that acceptance of nonhazardous incinerator ash at its landfill is "part of [the] company's strategic business and development plan for the future."[194] Thus, while the DEIS touts construction of the Incinerator as a way to reduce the demand for landfills in Puerto Rico, in an absurd twist, the

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[192] Indeed, regulatory approval for the use of bottom ash as aggregate is not guaranteed and is not likely to occur in the near future. The Federal Highway Administration has echoed concerns about the environmental acceptability of using incinerator ash as an aggregate due to "[t]he presence of a relatively high salt content and trace metal concentrations, including such elements as lead, cadmium, and zinc." FHA Report at PDF 7. At least two municipalities in Puerto Rico have already banned the use of ash in road and construction projects because of health concerns, *see* Eva Laureano, *AES demanda a alcaldes por prohibir productos de cenizas* [AES sues mayors for banning ash products], Noticel (Oct. 19, 2014), http://www.noticel.com/noticia/167601/aes-demanda-a-alcaldes-por-prohibir-productos-de-cenizas.html, and the Environmental Quality Board has issued fines for the unauthorized use of industrial ash as fill in road construction, *see Junta De Calidad Ambiental v. Ecosystems, Inc.*, No. JCAOA14-RP-044-R, 2015 WL 4878646 (P.R. Cir. June 2, 2015) (upholding fine against Ecosystems for using coal ash to construct road). And as of 2006, MSW incinerator ash is not approved for use in asphalt production in Hawaii and Pennsylvania, nor for use as an additive in concrete roads in Michigan, nor for use in construction, generally, in Mississippi. Ass'n of State & Territorial Solid Waste Mgmt Officials, *2006 Beneficial Use Survey Report* B-36 (2007), http://www.astswmo.org/Files/Policies_and_Publications/Solid_Waste/2007BUSurveyReport11-30-07.pdf. Thus, the likelihood is low that ash from the Incinerator would be commercially and legally viable as an aggregate material.

[193] Letter from Ivelisse Estrada Rivero, Executive VP of Ecosystems, Inc., to Mark J. Green, Project Director of Energy Answers Arecibo LLC (Mar. 28, 2014), https://noticiasmicrojuris.files.wordpress.com/2015/02/20150226132552991_cartaecosystems.pdf.

[194] *Id.*

Incinerator may, in fact, be creating demand for the construction of new landfills that are willing and equipped to handle the Incinerator's ash.

In addition, a critical factor completely ignored by the DEIS is the strong local opposition to the landfilling of industrial ash in Puerto Rico. The Municipality of Peñuelas passed an ordinance in 2013 banning the acceptance of coal ash at its landfills, and legal battles ensued after Ecosystems continued to landfill the ash. *See Municipio Autónomo De Peñuelas v. Ecosystems, Inc*., No. JPE2014-0457, 2015 WL 1565878, at *1-*3 (P.R. Cir. Feb. 25, 2015). The issue is now before the Supreme Court of Puerto Rico.[195] Meanwhile, opposition to the landfilling of industrial ash remains strong in Peñuelas, and local activists blocked trucks carrying industrial ash from entering the municipality in June 2015.[196] Finally, on June 30, 2015, the Environmental Quality Board ordered the Peñuelas landfill to stop accepting coal ash.[197]

In fact, at least 40 of Puerto Rico's 78 municipalities ban the landfilling of industrial ash.[198] These municipalities include Humacao, Salinas, and Vega Baja—three of the other municipalities with Subtitle D-compliant landfills.[199] Much of this opposition grew in response to controversies surrounding ash from the AES Cogeneration Plant in Guayama[200]—the island's only coal-fired power plant. Puerto Rican officials initially required the plant to dispose of its coal ash outside of Puerto Rico "due to the serious health hazards associated with its presence," so between 2003 and 2004 the AES plant dumped thousands of tons of its ash in the Dominican Republic. *See Pallano v. AES Corp*., No. CIV.A.N09C-11-021JRJ, 2011 WL 2803365, at *1 (Del. Super. July 15, 2011). But the Dominican Republic sued AES in 2005 for the environmental damage, respiratory problems, skin lesions, hospitalizations, and deaths and

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[195] La Rama Judicial de Puerto Rico, Tribunal Supremo [Puerto Rico Judicial Branch, Supreme Court], Disposición de los Recursos Atendidos [Disposition of Considered Appeals] (June 26, 2015), http://www.ramajudicial.pr/TablaPleno/2015/PLENO-26-JUNIO-2015.pdf.

[196] Cristina del Mar Quiles, *Comunidad de Peñuelas detiene paso de camiones con cenizas* [Community of Peñuelas blocks ash-carrying trucks], El Nuevo Dia (June 26, 2015), http://www.elnuevodia.com/noticias/locales/nota/comunidaddepenuelasdetienepasodecamionesconcenizas-2065508

[197] Jason Rodriguez Grafal, *Peñuelas: JCA frena depósito de Agremax* [Peñuelas: JCA puts the brakes on dumping by Agremax], La Perla del Sur (July 15, 2015), http://www.periodicolaperla.com/index.php?option=com_content&view=article&id=7349:dramatico-giro-jca-ordena-cese-el-deposito-de-cenizas-agremax-en-penuelas&catid=81:locales&Itemid=198

[198] Cindy Burgos, *Celebran decisión de tribunal para prohibir depósito de cenizas en Peñuelas* [Court upholds decision to ban ash disposal in Peñuelas], Metro (Sept. 25, 2014), http://www.metro.pr/locales/celebran-decision-de-tribunal-para-prohibir-deposito-de-cenizas-en-penuelas/pGXniy!MhaorRfAX95FI/.

[199] *See, e.g.*, Vilmar Trinta Negrón, *Denuncian depósito ilegal de cenizas de carbón en Humacao* [Denouncing illegal coal ash dumping in Humacao], Periódico el Oriental (n.d.), http://lafederacionpr.com/noticias/45-denuncian-deposito-ilegal-de-cenizas-de-carbon-en-humacao; Aniel Bigio, *Vega Baja Prohíbe el Depósito de Cenizas en su Vertedero* [Vega Baja bans dumping of ash in its landfill], Mi Puerto Rico Verde (Oct. 15, 2015), http://www.miprv.com/vega-baja-prohibe-el-deposito-de-cenizas-en-su-vertedero/.

[200] Guayama has also banned the landfilling of coal ash from its coal plant. Víctor Alvarado Guzmán, *Aprueban en Guayama ordenanza contra las peligrosas cenizas de carbon* [Guayama ordinance against dangerous coal ash approved], Encuentro al Sur (Apr. 4, 2012), https://abeyno.wordpress.com/2012/04/04/aprueban-en-guayama-ordenanza-contra-las-peligrosas-cenizas-de-carbon/.

serious illnesses that the government alleged were caused by AES's coal ash. *Gov't of Dominican Republic v. AES Corp*., 466 F. Supp. 2d 680, 683-86 (E.D. Va. 2006). After a 2007 settlement of the case prohibited any more dumping in the Dominican Republic, AES began to dispose of its coal ash exclusively in Puerto Rico, leading to a groundswell of opposition that led over half of Puerto Rico's municipalities to ban the landfilling of coal ash and nearly led to a RCRA citizen suit against AES.[201] Given the entrenched opposition to the landfilling of coal ash in Puerto Rico, it is far from likely that Energy Answers will be able to locate a municipality in which to dispose of its nonhazardous incinerator ash.

2. To satisfy NEPA's hard look, RUS must analyze the possibility that the Incinerator's ash will be hazardous.

As noted above, the DEIS utterly fails to consider how the ash will be managed if it is found to be hazardous. This hazardous waste determination must occur at the point at which the ash leaves the combustion building, and, if found to be hazardous, the ash must be managed in full compliance with all applicable RCRA Subtitle C requirements. 60 Fed. Reg. at 6668.

According to EPA, the RCRA hazardous waste characteristic that incinerator ash would most likely exhibit is the toxicity characteristic, based on the ash's potential to leach lead and cadmium above levels of concern during the Toxicity Characteristic Leaching Procedure ("TCLP"). *Id.* at 6667; *see also* 40 C.F.R. § 261.24. Indeed, just like air emissions from incinerators, incinerator ash can contain pollutants that remain through the combustion process, such as lead and other heavy metals.[202] Fly ash can contain considerable amounts of heavy metals such as lead and chromium,[203] and has been found to leach heavy metals such as antimony and arsenic at levels that violate EPA's safe drinking water standards.[204] While EPA recognizes that fly ash is more likely to exhibit toxicity than bottom ash alone or a mixture of bottom ash and fly ash, *see* 60 Fed. Reg. at 6667, heavy metals of concern, such as cadmium, have also been found at high levels in bottom ash.[205]

Thus, the potential for incinerator ash to exhibit toxicity is considerable, and EPA therefore requires MSW incinerator operators to conduct hazardous waste determinations, either by testing the ash product under the TCLP or "by using knowledge of the combustion process to

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[201] Public Justice Notice of Intent to Sue AES Corp. (Sept. 26, 2012), http://publicjustice.net/sites/default/files/downloads/Final-AES-Notice-Letter-with-Appendicies-26Sep2012.pdf.

[202] NRC Report (2000) at 53-55. Incinerator ash may also contain pollutants that are newly produced by the combustion process such as dioxins and furans. *Id.*

[203] Jizhi Zhou et al., *Enrichment of heavy metals in fine particles of municipal solid waste incinerator (MSWI) fly ash and associated health risk*, 43 Waste Mgmt 239 (2015).

[204] YongHai Jiang et al., *Leaching Characteristics of Fly Ash from Municipal Solid Waste Incineration*, 22 Res. of Envtl. Sci. 1478 (2009).

[205] Kelly Sinoski & Gordon Hoekstra, *High levels of cadmium found in Delta landfill*, The Vancouver Sun (Sept. 6, 2013), http://www.vancouversun.com/technology/High+levels+cadmium+found+Delta+landfill/8874559/story.html?__lsa=991f-710f.

determine whether the ash would exhibit the [toxicity characteristic]." 60 Fed. Reg. at 6667. But the DEIS contains no reference to or assessment of the expected toxicity characteristic of the bottom or fly ash. Given that the waste characterization study referenced in the 2010 PRIDCO EIS is hopelessly out of date and no characterization study of Puerto Rico's current waste stream exists,[206] it is unlikely that Energy Answers has enough data to make a scientifically valid determination whether the ash from the Project would exhibit any hazardous waste characteristics. RCRA regulations therefore require Energy Answers to perform toxicity testing of both its bottom ash and fly ash waste streams.

Moreover, the conditioning process outlined in the DEIS suggests that conditioning will take place *after* the point at which a hazardous waste determination must be made, thereby increasing the likelihood that this ash would be considered hazardous. The DEIS states that fly ash conditioning will take place in the ash processing building, after transport out of the boiler building. DEIS at 2-21. Similarly, any conditioning of the bottom ash will presumably take place after the bottom ash has been conveyed from the boilers to the ash processing building and after the ferrous and non-ferrous metals have been separated out of the ash. *Id.* at 2-19. But EPA makes clear that the hazardous waste determination must be made at the point the ash leaves the combustion building, so otherwise hazardous ash can only be classified as nonhazardous if the ash is "conditioned . . . at the end of the combustion process and *within the combustion building*, and exhibits no hazardous waste characteristics (i.e., it passes the TCLP) *when it exits that building*." 60 Fed. Reg. at 6669 (emphasis added). Thus, it is possible that the ash will exhibit a toxicity characteristic as it leaves the combustion building in an unconditioned state and will therefore need to be regulated under Subtitle C.

Improper management of incinerator ash at the Incinerator site is no trivial matter. In 2011, for example, Wheelabrator paid $7.5 million to settle claims by the Massachusetts Attorney General that it allowed fly ash to be released into the air and failed to properly treat ash before disposal at three of its MSW incinerators, among other claims.[207] RUS must take a harder look at Energy Answers' toxicity testing and management of the ash within the Incinerator facility.

Nor does the DEIS even consider what types of disposal options may be necessary if, upon leaving the combustion building, the incinerator ash is determined to be hazardous waste. Puerto Rico has no Subtitle C landfill that can accept hazardous ash waste. If any of the Incinerator's ash is determined to be hazardous—which, as explained above, is not an unlikely

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[206] The most recent solid waste characterization study in Puerto Rico was released in 2003 and was based on data from 2000. *See* Dynamic Itinerary at 1-1 to 1-2; *see also* Ramon Cruz, *¿Qué hacer con la basura?* [What to do with the garbage?], El Nuevo Día (Dec. 15, 2014), http://www.elnuevodia.com/opinion/columnas/quehacerconlabasura-columna-10303/ (noting that the 2003 study is not relevant to today's waste stream because it was completed at a time when product packaging was greater than it is now, before the arrival of big box stores like Walmart and Costco in Puerto Rico and before smart phones and other consistently replaced electronics became popular on the island).

[207] Press Release, Att'y Gen. of Mass., Operator of Municipal Waste Incinerators to Pay $7.5 Million to Resolve Multiple Environmental Violations (May 2, 2011), http://www.mass.gov/ago/news-and-updates/press-releases/2011/operator-of-waste-incinerators-to-pay-75-million.html.

proposition—then Energy Answers would have to ship the hazardous waste to an appropriate facility located in the mainland United States or overseas at great expense.

Thus, the DEIS's scant discussion of incinerator ash fails to take a hard look at Energy Answers' management of the ash, the likelihood that Energy Answers may find no landfill that is willing and equipped to accept its nonhazardous ash waste, or the likelihood that some or all of Incinerator's ash may be determined to be hazardous and, therefore, must be managed in accordance with Subtitle C.

D. The DEIS's Consideration of Impacts on Water Resources Falls Short of the Hard Look Required under NEPA.

The Project's impacts on water resources include impacts from the withdrawal of potable and non-potable water, impacts on surface water and groundwater quality, and impacts from siting in a floodplain. In all three areas, as discussed below, the DEIS's assessment does not satisfy NEPA's twin goals of ensuring that an agency, "in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts" and "guarantee[ing] that the relevant information [concerning environmental impacts] will be made available to the larger audience." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

1. The DEIS's assessment of the impacts of required water withdrawals is unsupported, arbitrary, and capricious.

RUS's assessment of the environmental impacts of the Project's water withdrawals omits consideration of central relevant facts and is unsupported by any data or evidence. Operation of the Project would require 100,000 gallons per day of potable water from a water treatment plant,[208] and two million gallons per day of non-potable water, which Energy Answers proposes to extract from the biologically rich wetlands east of the facility known as Caño Tiburones. The DEIS concludes, with no support or analysis, that these daily water requirements over the projected 30-year life of the Project would have "no adverse impacts on existing drinking water infrastructure," DEIS at 3-31, and also is "not anticipated to have an impact on the existing non-potable water infrastructure." DEIS at 3-36.

These conclusions are not only unsupported, but unsupportable, in light of key facts completely ignored in the DEIS. With respect to potable water requirements, the DEIS fails to acknowledge the current reality that Puerto Rico is suffering a historic drought.[209] Nearly 85% of Puerto Rico is undergoing a water deficit.[210] Secretary Vilsack has declared a drought disaster

[208] Energy Answers' projected demand for potable water increased from initial estimates of 10,000 gallons per day at the time the 2010 PRIDCO EIS was prepared, to 100,000 gallons per day in 2012. DEIS at 3-35. Construction of the Project will require an estimated 6,500 gallons per day of potable water as well. *Id.* at 3-31.

[209] News Release, USDA, USDA Declares Drought Disaster in Puerto Rico (Aug. 7, 2015), http://www.nrcs.usda.gov/wps/portal/nrcs/detail/pr/newsroom/releases/?cid=nrcseprd385827.

[210] *Id*.

in 36 of Puerto Rico's municipalities,[211] and strict water rationing has been implemented as a result of drying reservoirs.[212] Some 340,000 households and businesses are going without water for up to 48 hours at a time.[213] Some reservoirs have come within 30 days of running out of water altogether.[214] The circumstances are so dire that Puerto Rico's water and sewer company recently announced a pilot project to seed clouds in hopes of creating rain over three of Puerto Rico's rapidly-drying main reservoirs.[215] Under these circumstances, the impacts of Energy Answers' projected demand for 100,000 gallons of potable water each day for at least 30 years cannot be lightly dismissed.

Moreover, the Council of Environmental Quality's ("CEQ") Draft Guidance on the consideration of the effects of climate change in NEPA reviews calls on agencies to consider "the implications of climate change for the environmental effects of a proposed action." Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, 79 Fed. Reg. at 77,824 (Dec. 24, 2014). The Caribbean climate as a whole is significantly influenced by large-scale cycles such as the El Niño-Southern Oscillation and the North Atlantic Oscillation,[216] and the current severe drought in Puerto Rico is attributed to an extreme El Niño-Southern Oscillation event.[217] Scientists agree that, although the precise effects of climate change on the El Niño-Southern Oscillation and North Atlantic Oscillation are not yet well understood, the anticipated changes for the quality of the human environment are likely only to be for the worse.[218] The possibility of future droughts during the Project's lifespan and the implications of this water-restricted scenario for the Project's impacts are therefore considerations "squarely within the realm of NEPA, informing decisions on whether to proceed with and how to design the proposed action . . . ." 79 Fed. Reg. at 77,828.

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[211] Press Release, U.S. Congressman Pedro Pierluisi, Pierluisi Announces USDA Drought Disaster Declaration for Six More Municipalities (Aug. 20, 2015), https://pierluisi.house.gov/media-center/press-releases/pierluisi-announces-usda-drought-disaster-declaration-for-six-more.

[212] Lizette Alvarez, *Water Crisis Brings Out Puerto Rico's Creative Side*, N.Y. Times (July 14, 2015), http://www.nytimes.com/2015/07/15/us/in-drought-puerto-rico-rations-water-setting-off-a-collection-frenzy.html.

[213] *Id.*

[214] *Id.*

[215] Associated Press, *Puerto Ricans Learn How to Live Without Water Amid Punishing Drought,* The Weather Channel (Aug. 7, 2015), http://www.weather.com/news/news/puerto-rico-drought-economic-slump.

[216] *See* Björn A. Malmgren et al., *El Niño–Southern Oscillation and North Atlantic Oscillation Control of Climate in Puerto Rico,* 11 J. of Climate 2713 (1998).

[217] *See generally* Alice Ollstein, *Water Rationing in Puerto Rico Hits the Poor, Leaves Resorts Untouched,* ThinkProgress (Aug. 10, 2015), http://thinkprogress.org/climate/2015/08/10/3689223/as-puerto-rico-runs-out-of-cash-it-is-also-running-out-of-water/.

[218] *See, e.g.*, Puerto Rico Climate Change Council (PRCCC), *Puerto Rico's State of the Climate 2010-2013: Assessing Puerto Rico's Social-Ecological Vulnerabilities in a Changing Climate* 61 (2013); Wenju Cai et al., *Increasing frequency of extreme El Niño events due to greenhouse warming,* 4 Nature Climate Change 111 (2014) ("PRCCC State of the Climate").

RUS's blithe assertions that the increase in Energy Answers' potable water demand from 10,000 gallons per day to 100,000 gallons per day would "have little to no impact on surface water," DEIS at 3-31, and that "[n]o adverse impacts on the existing drinking water infrastructure are expected," *id.* at 3-36, are simply assumptions. Untethered to any data or evidence and ignoring the on-the-ground reality of limited potable water supplies on the island and the likelihood of similar future scenarios in a climate changed world, these assumptions do not satisfy RUS's duty to take a hard look at the Project's impacts.

With respect to the withdrawal of two million gallons per day of non-potable water from Caño Tiburones, RUS again omits and misstates key relevant facts, rendering its assessment meaningless. The DEIS claims that the two million gallons per day (mgd) of water that Energy Answers hopes to extract from the Caño Tiburones is simply a small fraction—approximately 2 to 7 percent—of "*the existing 30 to 100 mgd discharge*" pumped by DNER from the El Vigía Pumping Station into the Atlantic Ocean. DEIS at 3-35 (emphasis added). Significantly, however, there *is* no existing 30 to 100 mgd discharge from Caño Tiburones, and RUS fails to provide any evidence otherwise.[219]

José Raúl Colón Roque, former management official and chief scientist with DNER charged with managing the Caño Tiburones Natural Reserve, explained DNER's practice in operating the El Vigía Pumping Station in a letter to the U.S. Army Corps of Engineers. *See* Letter from José Raúl Colón Roque to (attached as Exhibit 8). In contrast to historical pumping practices, which sought to drain Caño Tiburones to water levels on average three feet below mean sea level, DNER's practice since the year 2000 has been to pump only as much as necessary to maintain the wetlands at mean sea level. *Id.* This has meant that operation of the El Vigía Pump is limited usually to major rain events to remove water above mean sea level so as to avoid the flooding of neighboring properties. *Id.*

In its denial of Energy Answers' application for a water franchise on December 20, 2013, DNER itself indicated that its "evaluation of operation practice of the El Vígia pumps highlighted that there are extensive periods of *up to a month in duration in which the pumping system is not activated* to extract water from the Caño Tiburones Natural Reserve." DNER Denial, Ex. 2. The reality, in other words, is that contrary to RUS's assertions, 30 to 100 million gallons is *not* pumped daily from Caño Tiburones. The two million gallons per day that Energy Answers is proposing to withdraw thus is not "excedant" or "excess" water, but rather, an integral part of the Caño Tiburones wetlands ecosystem and hydraulic balance that would not be removed but for this Project.[220]

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[219] We incorporate by reference pages 49 to 59 of the Amended Comments submitted by the University of Puerto Rico School of Law and Puerto Rico Legal Services, Inc. concerning the potential impacts of the Project on Caño Tiburones.

[220] To the extent, as the DEIS claims, "[t]he pumping proposed by Energy Answers would *only apply* to the *excedant* brackish water that PRDNER *discharges daily* into the outflow channel," DEIS at 2-7 to 2-8 (emphasis added), the proposed Project is not feasible given that such water does not actually exist.

Caño Tiburones is a designated Important Bird Area, and one of 356 "globally in danger" sites that is habitat for hundreds of species of birds.[221] As DNER pointed out, Energy Answers' proposed water withdrawals from Caño Tiburones could alter the natural balance of and degrade the delicate wetlands ecosystem.[222] The Wetlands Program Director of the Biodiversity Research institute concurs with this assessment, noting the "high probability" that daily water withdrawals would cause irreversible damage to those wetlands.[223] To properly undertake NEPA's hard look, RUS is required to actually evaluate the impacts of such long-term, continuous water withdrawal on the ecology of Caño Tiburones and on the condition of the downstream estuary, rather than assume without analysis that "a minor reduction in flow would pose little to no impact," DEIS at 3-35.[224]

2. The DEIS also fails to adequately consider impacts on the quality of surface water and groundwater.

In its cursory assessment of the Project's impacts on water quality, RUS does not, as is required, "carefully consider[] detailed information concerning significant environmental impacts." *Methow Valley*, 490 U.S. at 349. The DEIS's assessment of the Project's impacts on surface water quality omits, for instance, consideration of several central issues, including existing contamination of the brownfield site and the implications of karst geology on the potential for water contamination. In dismissing impacts on surface water and groundwater as minimal and temporary, *see, e.g.*, DEIS at 3-27, 3-30, moreover, RUS relies on vague allusions to alleged mitigation measures, including a Soil Erosion Control Plan and a Spill Prevention Plan, that are not actually discussed or disclosed to the public. In so doing, RUS fails to guarantee that relevant information is made available to the public, in contravention of NEPA's aim. *Methow Valley*, 490 U.S. at 349.

The DEIS effective ignores the key fact that the proposed site of the Project is the site of a former paper and pulp mill. DEIS at 1-2. An analysis of the contamination present on this brownfield site is critical to an understanding of the environmental impacts of constructing on this land, but the DEIS entirely fails to undertake this analysis. EPA's National Risk Management Research Laboratory notes that "[c]ontamination from pulp and paper mills can pose a very real danger to human and environmental health" and that contaminants from

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[221] Oksana Lane, Comments on the Rural Utilities Service's Assessment of Impacts to Biological Resources From the Proposed Arecibo Incinerator Project (Nov. 10, 2015) ("BRI Comments") (attached as Exhibit 10).

[222] DNER Denial; *see also id.* ("[A] water franchise like the one sought would cause an impact to the ecosystem [of the Caño Tiburones Natural Reserve] that would affect the saturation level and soil conditions to sustain the wetlands, swamps, and marshes of the Natural Reserve.").

[223] BRI Comments at 3.

[224] *See also* DNER Denial (finding that "[a]n increase in water extraction from the El Vígia Pumping Station or the activation of extraction to comply with a water flow rate established by a Franchise would have an impact on the ecosystem of the Caño Tiburones Natural Reserve that has not been studied and is not documented in the applicant's analysis"); Colón Roque Letter, Ex. 8 (noting that a hydrological and hydraulics study and an ecological study must be conducted to adequately assess the environmental consequences of Energy Answers' proposed water withdrawals).

manufacturing "can remain on site for years."[225] EPA advises that "[d]evelopers wishing to pursue brownfields projects should investigate the mill that operated on site to determine what contaminants they will have to deal with, and on what scale these contaminants may be present."[226] Groundwater contamination, in particular "is a very long term problem, where contamination can persist in aquifers for years without treatment."[227]

In integrated mills, like the former Global Fibers mill, where both pulp and paper were produced,[228] the list of possible on-site contaminants is long. Pulping contaminants can include sodium hydroxide residues, sulfuric/sulfurous acid, hydrochloric acid, hydrogen sulfide, ammonia, lead, cyanide, zinc, chromium, resin, and unnatural fatty acids and chlorinated analogs.[229] Papermaking contaminants can include waste sludge, volatile organic compounds, slimicides, chlorinated phenols, some organosulfur compounds, some silver compounds, titanium residues, oil and grease discharges collected in sediments, and polychlorinated biphenyls ("PCBs").[230] If bleaching was carried out at the Global Fibers mill, then dioxins and furans would have been produced on the site as well.[231] Other bleaching contaminants include hydrogen peroxide, elemental chlorine, chlorinated compounds, sodium hydrosulfite, and PCBs.[232]

As the DEIS acknowledges, "[e]xcavation and land-clearing activities associated with construction of the Project have the potential to contribute to sedimentation and the release of pollutants into nearby surface waters." DEIS at 3-30. The sedimentation and pollutants that will be released as a result of construction activities could include any or all of the paper and pulp mill contaminants identified by EPA above. Yet without an assessment of existing brownfield contamination, RUS cannot evaluate, nor disclose to the public, the impacts of Project-induced

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[225] EPA, *Technical Approaches to Characterizing and Cleaning up Brownfields Sites: Pulp and Paper Mills* 5, 8 (2002), http://goo.gl/RRVYp3 ("EPA Brownfields Guide").

[226] *Id.* at 7.

[227] *Id.* at 8.

[228] Alethea Abuyan et al., *Waste Equals Food: Developing a Sustainable Agriculture Support Cluster for a Proposed Resource Recovery Park in Puerto Rico*, 106 Yale Univ. Sch. of Forestry & Envtl. Stud. Bull. 303, 316 (1999), http://environment.yale.edu/publication-series/documents/downloads/0-9/106puerto_rico.pdf.

[229] EPA Brownfields Guide at 5.

[230] *Id.* at 6.

[231] *Id.* at 5-6.

[232] *Id.* at 6.

runoff and sedimentation on surface water quality.[233] Notably, the DEIS also fails to mention that the Río Grande de Arecibo is already impaired with respect to copper, cyanide, dissolved oxygen, turbidity, and fecal coliform.[234] Having omitted consideration of all of the above, the DEIS concludes without support that "[i]mpacts on surface waters would occur during both construction and operation of the project and would likely be temporary." DEIS at 3-27.

Furthermore, despite its recognition that the Project area is characterized by "sinkholes and other karst features," DEIS at 3-18, RUS arbitrarily and capriciously fails to consider the implications of karst geology on the Project's potential impacts on water resources. It is well-understood that karst terrain is characterized by "unique hydrogeology that results in aquifers that are highly productive but extremely vulnerable to contamination."[235] *See also Frey v. EPA*, 751 F.3d 461, 464 (7th Cir.), *cert. denied*, 135 S. Ct. 494 (2014) (noting that "limestone karst, which is characterized by fissures, fractures, and conduits that can make clean-up of contaminated groundwater and bedrock extremely difficult"); *Four Cnty. (NW) Reg'l Solid Waste Mgmt. Dist. Bd. v. Sunray Servs., Inc.*, 971 S.W.2d 255, 259 (1998) ("Karst terrains are more likely to have sink holes, underground caverns, and greater porosity, all of which enhances the potential for groundwater movement and contamination.").

Yet, the DEIS fails to assess at all the impacts of Energy Answers' proposal to place unlined stormwater retention ponds on site, "to provide filtration and temporary retention of waters exiting the site, helping to control nutrient and contaminant runoff, and sediment filtration into the Río Grande de Arecibo." DEIS at 3-69. The placement of unlined ponds intended to hold contaminant runoff on karst terrain over an unconfined aquifer, *id.* at 3-17, makes little sense. In karst regions, where the groundwater and surface waters are so intimately connected—where, for instance, "[w]ater infiltration from the Río Grande de Arecibo near the former Central Cambalache Sugar Mill accounts for about 11.6 mgd of the total flow of the groundwater system," *Id.* at 3-18—it is not at all clear that unlined stormwater retention ponds would be effective in limiting contamination of surface waters. The DEIS also fails to consider the potential for sinkhole collapse of the stormwater ponds. Engineers familiar with karst areas

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[233] The DEIS's vague reference to "Energy Answers' investigative studies, which indicated some areas of contamination on the property ("most notably, asbestos contained in existing buildings and areas of 'spot' contamination," DEIS at 3-72), patently does not suffice for the "careful[] consider[ation of] detailed information" required under NEPA. *Methow Valley Citizens Council*, 490 U.S. at 349. As discussed *supra*, to the extent the DEIS seeks to incorporate by reference Energy Answers' "investigative studies," the agency must cite the incorporated material and describe its contents. 40 C.F.R. § 1502.17. Moreover, to the extent RUS relies on information submitted by the applicant in preparing the EIS, "[t]he agency shall independently evaluate the information submitted and shall be responsible for its accuracy." *Id.* § 1506.5.

[234] EPA, Waterbody Quality Assessment Report: 2014 Waterbody Report for Rio Grande de Arecibo, http://iaspub.epa.gov/tmdl_waters10/attains_waterbody.control?p_au_id=PRNR7A1&p_list_id=PRNR7A1&p_cycle=2014. The DEIS's description of surface water quality is incomplete and misleading. *See* DEIS at 3-14, 3-17 (Table 3-8). Although it is not clear about doing so, *see* DEIS at 3-14, the DEIS describes only EPA's 2010 Total Maximum Daily Loads ("TMDL") report for fecal coliform. *See id.* In this limited description of existing surface water quality, the DEIS omits reference to the other impairments in the Río Grande de Arecibo watershed for which TMDLs have yet to be established, namely copper, cyanide, dissolved oxygen, and turbidity.

[235] U.S. Geological Surv., *What is Karst?*, USGS Groundwater Information, http://water.usgs.gov/ogw/karst/pages/whatiskarst (last visited Nov. 11, 2015).

seldom recommend unlined (earth-lined) storage ponds in karst areas, given the possibility of catastrophic sinkhole collapses.[236] Although the probability that any particular holding pond will collapse into a sinkhole is relatively low, "the risk of severe off-site impacts are substantial" in karst terrain.[237]

As RUS itself notes, "[g]roundwater flow within the Project area is from southwest to northeast with almost half of the flow going to the eastern area of Caño Tiburones where it discharges as springs and seeps . . . . The other half flows directly to the Atlantic Ocean." DEIS at 3-18. Thus, a consideration of indirect impacts under NEPA, *see* 40 C.F.R. § 1508.8(b), requires evaluation of the potential for contaminants collected in the unlined stormwater ponds to enter the groundwater system and to travel beyond the confines of the Project site. The potential for such adverse impacts is all the more of concern if pre-existing contaminants from the Global Fibers paper mill are not properly remediated prior to construction of the Project.

The DEIS also claims, without analysis or support, that "[t]here would be little to no impact on local groundwater resources during construction of the Project." DEIS at 3-30. It acknowledges that "[c]onstruction activities would result in soil compaction and a related decrease in soil permeability and the reduction in infiltration area around the plant," but dismisses these impacts out of hand. *See id.* ("[T]he anticipated soil compaction would have a small effect on the underlying large aquifer (600 square mile [1,554 square kilometers]). Impacts related to soil impermeability and a reduction in infiltration area would be confined to the plant site itself and would not extend beyond the plant footprint and its immediate vicinity."). This cursory dismissal of potential construction impacts on the underlying aquifer based on the proposition that foreseeable impacts would be limited to the plant footprint is not backed by any science. In light of the fact that "[t]he groundwater systems in the karst region of northern Puerto Rico are highly productive and offer important freshwater resources for human consumption, ecological integrity, and industrial and urban development," *Id.* at 3-19, the Project's potential impacts on this large aquifer require further consideration in order to meet NEPA's requirement.

Finally, in reaching its conclusions of minimal and temporary impacts to water resources, the DEIS relies on "the Project's Soil Erosion Control Plan to prevent impacts on the Río Grande de Arecibo and surface water quality." DEIS at 3-30; *see also id.* at 3-35 ("The installation of grease traps, rip-rap, and settlement ponds . . . would mitigate the majority of adverse effects. With proper maintenance of these stormwater best management practices . . . the Project would have little to no impact to surface waters throughout its operational lifetime."). The DEIS also relies on the Project's "Spill Prevention Plan" to "prevent[] or limit[]" adverse effects of any chemical spills or releases on groundwater. *Id.* at 3-35. It is not clear that Energy Answers actually has developed a Soil Erosion Control Plan or a Spill Prevention Plan, however.

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[236] *See* Tom Aley, *A Technical Assessment of the Adequacy and Accuracy of the Draft Environmental Assessment for C&H Hog Farms, Newton County, Arkansas* 9-12 (2015) (attached as Exhibit 9).

[237] *Id.* at 9.

Certainly the DEIS does not disclose the plans or discuss them beyond reference to their hypothetical existence.[238]

This does not suffice under NEPA. The Supreme Court has found that the "omission of a reasonably complete discussion of possible mitigation measures would undermine the 'action forcing' function of NEPA." *Methow Valley*, 490 U.S. at 352. "Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects." *Id.* Moreover, courts have made it clear that "[a] mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA." *Nw. Indian Cemetery Protective Ass'n v. Peterson*, 795 F.2d 688, 697 (9th Cir. 1986), *rev'd on other grounds*, 485 U.S. 439 (1988). Instead, RUS is required to provide supporting analytical data to substantiate its claim that these mitigation measures will result in only minor and temporary impacts. *See Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1151 (9th Cir. 1998), *rev'd on other grounds*, 537 F.3d 981 (9th Cir. 2008); *see also San Juan Citizens Alliance v. Stiles*, 654 F.3d 1038, 1054 (10th Cir. 2011) ("Detailed quantitative assessments of possible mitigation measures are generally necessary when a federal agency prepares an EIS to assess the impacts of a relatively contained, site-specific proposal.") (citations omitted).

This failure to adequately consider mitigation violates NEPA also because the "reasonably complete discussion of possible mitigation measures" that must be included in the "[e]nvironmental consequences" section of an EIS "forms the scientific and analytic basis for the comparisons" of alternatives. 40 C.F.R. § 1502.16; *see also id.* § 1502.16(h); *Okanogan Highlands Alliance v. Williams*, 236 F.3d 468, 473 (9th Cir. 2000). The consideration of alternatives, in turn, "is the heart of the [EIS]." 40 C.F.R. § 1502.14. The agency's failure to take a hard look at mitigation consequently implicates the adequacy of its consideration of alternatives.

3. RUS is not in compliance with Executive Order 11988 and CEQ Guidance concerning floodplain management and flood risks.

The Project will be constructed in a floodplain notwithstanding the stated policy of the federal government "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains . . . ." Exec. Order No. 11,988, 42 Fed. Reg. 26,951 (May 24, 1977). The existence of other practicable alternatives to the Project means that RUS's financial assistance to this Project would not survive judicial review under Executive Order 11988. *See City of Waltham v. U.S. Postal Serv.*, 786 F. Supp. 105, 131 (D. Mass. 1992), *aff'd,* 11 F.3d 235 (1st Cir. 1993) (finding that Executive Order 11988 "possess[es] the full force of law and [is] as fully judicially enforceable as NEPA itself"); *see also City of Carmel-By-The-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1166 (9th Cir. 1997) (finding that Executive Orders 11988 and 11990 "are subject to judicial review under the Administrative Procedure Act").

[238] The DEIS also references a plan to treat the Project's discharge, but includes no discussion or consideration of the effectiveness or impacts of this plan. *See* DEIS at 3-36 ("[Puerto Rico Aqueduct and Sewer Authority's] approval for the Project is conditional on Energy Answers preparing a plan for treating the discharge in accordance with the wastewater treatment plant's industrial pretreatment program requirements.").

For the reasons discussed in Sections I and II, *supra*, RUS's determination that "there is a demonstrated need for the Project and that there are no practicable alternatives to avoiding the conversion of floodplains," DEIS at 3-29, is wrong. The record simply does not show that construction of this incinerator is "*the only practicable alternative*." 42 Fed. Reg. 26,951 (emphasis added). For one thing, the current excess generation of electricity in Puerto Rico is a clear indication that the Project is not needed for energy generation. As detailed above, there is also tremendous potential for waste reduction and recycling—practicable alternatives—to significantly lower the volume of the waste stream in Puerto Rico. On this record, RUS cannot move forward with financing and assisting construction and operation of the Project without violating Executive Order 11988.

Moreover, as noted above, CEQ Draft Guidance requires NEPA documents to analyze "the implications of climate change for the environmental effects of a proposed action." 79 Fed. Reg. at 77,824. While RUS recognizes that Puerto Rico is at risk from climate change related impacts such as higher sea levels and more powerful storms, DEIS at 3-44, the DEIS's brief treatment of flood risk relies on FEMA maps, which explicitly "[do] not map flood hazards based on anticipated future sea level rise or climate change."[239] But islands like Puerto Rico are likely to feel the greatest near-term impact of climate change in the form of sea level rise. The DEIS does not discuss possible impacts of climate change despite the project's location on the coast and in a floodplain. This fact alone suggests the project is vulnerable to sea level rise and damage from increases in major storm and flood events.

The entire project site is located within the floodplain of the Río Grande de Arecibo. The lasting effects of climate change will necessarily change the existing landscape, infrastructure, and land use patterns of Arecibo as a whole since it is a coastal municipality. One need only look to the example of Hurricane Georges, which triggered severe flooding in the immediate area when it made landfall in September 1998.[240] Relevant data is readily available to help RUS make a better-informed decision as to whether the Project site is a wise choice. The Puerto Rico Climate Change Council has created various working groups and developed publications on the impacts of climate change on the island. According to one report, the U.S. Army Corps of Engineers estimates that developers and land use planners in Puerto Rico should prepare for a rise of approximately 0.57 meters by 2060.[241] Notably, the effects of already-observed sea level rise in Puerto Rico are exacerbated due to poor coastal management practices. For example, a 2007 U.S. Geological Survey report shows that some parts of the island's the coastline erodes up to 1.0 m/yr.[242]

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[239] *Coastal Frequently Asked Questions*, Federal Emergency Management Agency (FEMA) (Feb. 25, 2015), http://www.fema.gov/coastal-frequently-asked-questions.

[240] Heriberto Torres-Sierra, U.S. Geological Surv., Water-Resources Investigations Report No. 01-4247, Flood of September 22, 1998, in Arecibo and Utuado, Puerto Rico (2002).

[241] PRCCC State of the Climate at 61.

[242] E. Robert Thieler et al., U.S. Geological Surv., Open-File Report No. 2007-1017, Historical Shoreline Changes at Rincón, Puerto Rico, 1936-2006 (2007), at 3.

E. The DEIS Inadequately Assesses the Project's Impacts on Biological Resources and Federally Protected Species.

The DEIS's assessment of impacts to biological resources, including protected species, is wholly inadequate. The current evaluation in the DEIS, which limits this assessment to the footprint of the Project and asks only whether species are present on the site or inhabit the site, falls far short of meeting the agency's duty under both NEPA and the Endangered Species Act.

RUS takes an inappropriately narrow approach to its examination of impacts by assessing impacts only within the footprint of the Project site. The DEIS notes, for instance, that DNER's database "did not show any reports of special-status species *at the Project site*." DEIS at 3-63 (emphasis added). The DEIS also points to the Flora and Fauna Study done by Energy Answers' consultant in 2010, which "did not identify any Commonwealth listed or special-status species *in the Project area*" to conclude that "[t]herefore, the Project would have no effect on Commonwealth-listed species." DEIS at 3-69 (emphasis added).[243] Similarly, with respect to federally protected species, the DEIS notes that "[b]ecause USFWS indicated that suitable habitat for federally listed species *is not present within the Project site*, Project construction and operation would have no effect on federally listed species." DEIS 3-69 (emphasis added).

This myopic focus is inconsistent with NEPA's mandate. Under NEPA, the effects that agencies must consider explicitly include indirect effects, "which are caused by the action and are later in time *or farther removed in distance,* but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b) (emphasis added). Effects, including indirect effects, include ecological ones, "such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems." *Id.* The Endangered Species Act ("ESA"), too, requires RUS to consider the indirect effects of the proposed Project on protected species. The ESA makes it incumbent on RUS to insure that "any action authorized, funded, or carried out by" the agency is "not likely to jeopardize" any threatened or endangered species or adversely modify their critical habitat, 16 U.S.C. § 1536(a)(2), where "jeopardize" is defined to mean instances where an action "would be expected, directly *or indirectly*, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02 (emphasis added).

Under both NEPA and ESA, then, RUS has an independent and affirmative obligation—irrespective of Fish and Wildlife Service's actions—to assess the indirect impacts that the Project will have. *See* 16 U.S.C. § 1536(a)(2) (requiring "all Federal departments and agencies" to comply with the no-jeopardy mandate); 50 C.F.R. § 402.14 ("Each Federal agency shall review its actions at the earliest possible time . . . ."). To the extent Fish and Wildlife Service's

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[243] That Flora and Fauna Study was attached as Appendix D to the 2010 PRIDCO EIS. *See* the 2010 PRIDCO EIS App. D, http://www.rd.usda.gov/files/PRIDCO-AppDeng.pdf, at 10-11. [Note: the cover of the document is mistakenly labeled "Appendix E"]. As the Biodiversity Research Institute points out in its attached comments, the Flora and Fauna Study was incomplete and likely overlooked the range and diversity of species in the potentially affected area. *See* BRI Comments, Ex. 10 (noting, for instance, that the site surveys were conducted at times that overlooked the vast numbers of birds migrating through Puerto Rico).

consultation pursuant to Section 7 of the ESA was limited to questioning whether there were species on site, that agency is itself in violation of the ESA and potentially subject to citizen suit.

Limiting the consideration of impacts to species found to be present or to inhabit the immediate Project site leaves unexamined the whole host of impacts that an incinerator built in the estuarine floodplain of a river, adjacent to a biologically rich coastal wetlands complex, might be expected to have. For instance, the DEIS concludes that "Energy Answers would follow best management practices to ensure that no vegetation beyond the approved limits of disturbance would be impacted," and "*[t]herefore, the Project would not impact the nearby Caño Tiburones Nature Reserve . . . .*" DEIS at 3-66. This unsupported assertion does not account for the impacts of the proposed two million gallons of daily water withdrawal from Caño Tiburones, which the Biodiversity Research Institute's Wetlands Program Director noted has "a high probability of causing irreversible damage to those wetlands." *See* BRI Comments at 3. The DEIS's unsupported assertion that best management practices would avoid impacts to Caño Tiburones also fails to consider the potential ecological impacts from soil compaction on the unconfined aquifer underlying the Project site, or the possibility of surface discharge or pond leakage to reach Caño Tiburones via underground conduits in the karst landscape. All of these are potential impacts, with concomitant implications for species, that the DEIS ignores in its unlawfully narrow assessment.[244]

The DEIS's reference to the 2010 Screening Level Ecological Risk Assessment ("SLERA")[245] prepared by Energy Answers' consultant, which assessed impacts of projected air emissions from the Project in a 10-km radius, does not rectify the inadequate assessment. The DEIS over-relies on the SLERA, not recognizing that the SLERA, by its own definition, does not provide a full assessment of ecological impacts from the proposed Project. The SLERA claims only to address risk that arises from deposition of air emissions from the Project's combustion units. It does not purport to consider the Project's non-deposition impacts on biological resources. For instance, the potential water resource impacts identified in the preceding section could alter habitat and species behavior, but none of these impacts are considered in the SLERA. The SLERA also explicitly does not consider the impacts of increased emissions from ancillary equipment or truck traffic.[246]

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[244] In addition this unlawfully narrow assessment, the DEIS's evaluation of ecological impacts is characterized by a sloppiness that does not pass muster under NEPA's hard look standard. The DEIS notes, for instance, that Energy Answers would cut "some trees" during construction, which "would result in the permanent loss of . . . forested habitat" on the Project site. DEIS at 3-66. It dismisses the possibility of any long-term impact from this loss of habitat, however, by noting that "[b]ecause trees would be replanted on site, overall, the Project would not have a long-term impact on forest habitat." *Id.* This "analysis" omits key relevant information. How many trees currently exist on site? How many trees would be cut? How many trees would be replanted, and are they comparable to the ones that would be cut? The failure to consider this information, and to disclose it to the public, typifies the inadequacy of the DEIS.

[245] *See* PRIDCO EIS App. L, http://www.rd.usda.gov/files/PRIDCO-AppL.pdf.

[246] *Id*. at 16.

Moreover, as with the HHRA, the SLERA was prepared using proprietary software that is not accessible to the public.[247] Thus, unless RUS conducts its own assessment or reveals the methodologies and assumptions underlying the SLERA, it cannot rely on the SLERA to draw conclusions about the Project's impacts. *See* 40 C.F.R. §§ 1502.21, 1502.24; *see also* Section III.A.1, *supra*. Furthermore, because the SLERA uses the same air emissions modeling and data as the HHRA,[248] its outcome is equally likely to have substantially underestimated risks. As explained in Section III.A.2.b, *supra*, the air emission inputs in the risk assessments likely underestimates the toxicity of the waste stream and hence the air emissions from the Project, and arbitrarily deflates the PM emissions even further by 62 percent. RUS is required to ensure the adequacy of the science it relies on and to independently evaluate information, but the DEIS instead unquestioningly accepts the SLERA's conclusions as truth, *See* 40 C.F.R. § 1502.17.

Finally, just as RUS is not in compliance with Executive Order 11988, governing floodplain management, so the agency is also out of compliance with Executive Order 11990, governing wetlands management. Executive Order 11990 requires RUS to "avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use." Exec. Order No. 11,990, 42 Fed. Reg. 26,961 (May 25, 1977). As detailed in Section II, *supra*, there plainly are multiple practical alternatives to the construction of an incinerator in Puerto Rico, much less in a floodplain and on wetlands. The DEIS's determination that "there is demonstrated need for the Project and that there are no practicable alternatives to avoiding the conversion of wetlands," DEIS at 3-69, therefore has no support in the record and cannot withstand challenge. *See City of Waltham*, 786 F. Supp. at 131 (finding that like Executive Order 11988, Executive Order 11990 possesses "the full force of law" and is "fully judicially enforceable").

F. The DEIS Fails to Take a Hard Look at GHG Emissions from the Incinerator.

1. The DEIS incorrectly concludes that the Incinerator will reduce GHG emissions.

The DEIS states that "the Project would directly emit 924,750 tons/year CO_2e. However, these emissions would be offset by displaced landfill and oil-fired power plant emissions avoided by the project." DEIS at 3-53. Ultimately, the DEIS concludes the project would lead to net reduction in GHG emissions ranging from -93,721 to -1,107,818 tons/year of carbon dioxide

[247] SLERA at 17 ("The exposure media calculations were facilitated with the use of commercially available software, Industrial Risk Assessment Program-Health (IRAP-h View, or IRAP, version 4.0) developed by Lakes Environmental.").

[248] *See id.* (referring to the HHRA for "[a] detailed description of the air modeling effort and characterization of Facility emissions").

equivalents ("CO_2e")[249] depending on how much of the displaced landfill gas would have been flared. *Id*.

But the DEIS's methodology is fundamentally flawed. Without performing any of the necessary electricity market analysis to reach that conclusion, RUS assumes the Project's electricity will displace oil-fired power plant emissions. It also fails to adequately address the extent of existing and future landfill gas controls in Puerto Rico. By failing to account for these two critical issues, any suggestion that the Project will lead to a net reduction in GHG emissions is nothing more than speculation.

The DEIS claims that electricity generated by the Incinerator will displace electricity from more carbon intensive oil-derived electricity and thereby reduce GHG emissions by 712,679 tons per year ("tpy") of CO_2e. DEIS at 3-54, Table 3-23. Its conclusion is based entirely on Energy Answer's PSD Permit application materials. DEIS at 3-51 n.11. However, both the DEIS and the PSD permit materials fail to explain why the Incinerator would displace an equal amount of oil-derived electricity.[250]

As noted above, there is little indication that an additional 67 MW of electricity is even needed to meet Puerto Rico's current or future electricity demand. Puerto Rico possesses 50% more electricity-generating capacity than the island currently needs.[251] Likewise, PREPA's IRP indicates that system peak demand will decline by 100-200 MW until 2022 and will not return to 2015 levels until 2035.[252] The IRP makes no mention of the Project or similar projects as part of its supply portfolio. Thus, there is little indication that the additional capacity is needed in the first place and, even if it were needed, that PREPA would actually purchase power from the Incinerator to supplement its own fleet.

Net GHG emissions estimates for the Project change drastically once the assumed oil-fired power plant emissions offset is removed from the analysis. Using RUS's own numbers, net GHG emissions increase from -93,721 to 618,958 tpy CO_2e assuming 100% landfill flaring. Assuming no landfill flaring, the benefit is reduced from 1,107,818 to 395,139 tpy CO_2e.

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[249] As explained in the DEIS, CO_2e is a "metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential." DEIS at 3-51 n.10.

[250] *See* Energy Answers, Arecibo Puerto Rico Renewable Energy Project, Prevention of Significant Deterioration (PSD) Air Permit Application (Feb. 2011); Energy Answers, Arecibo Puerto Rico Renewable Energy Project, Additional Information Requested by EPA for the PSD Air Permit Application (Sep. 2011); Email from Kevin Scott, Project Manager, Arcadis U.S., Inc., to Viorica Petrimen, Environmental Engineer, U.S. EPA Region 2, (Nov. 30, 2011), http://www.arecibo.inter.edu/reserva/epa/No.%2020%20-%20Supplemental%20Project%20and%20BACT%20Information%20-E-mails.pdf, at PDF pg. 20.

[251] Greg Allen & Marisa Peñaloza, *Power Problems: Puerto Rico's Electric Utility Faces Crippling Debt,* Nat'l Pub. Radio (May 7, 2015), http://www.npr.org/2015/05/07/403291009/power-problems-puerto-ricos-electric-utility-faces-crippling-debt (quoting Puerto Rico's top energy official). *See also* Nat'l Renewable Energy Lab., *Energy Snapshot: Puerto Rico* (2015), http://www.nrel.gov/docs/fy15osti/62708.pdf, at 2 (showing that Puerto Rico's generation capacity is 5,839 MW, and its peak demand is 3,685 MW).

[252] PREPA, *Integrated Resource Plan Volume III: Demand and Fuel Forecasts and Demand Side Management* (Draft), 1-20 to 1-21; 1-27 to 1-28 (Aug. 17, 2015), http://goo.gl/VkeKIf (using a conservative "base scenario").

However, this "no flaring" scenario is entirely unrealistic. Landfills are or likely will control their methane emissions. Puerto Rico regulations require flaring or other landfill gas emissions controls for municipal landfills.[253] Indeed, some landfills already collect landfill gases to fuel power projects, two of which are listed in PREPA's IRP.[254] Even if only half the landfills flared methane emissions, net GHG emissions would *increase* by 111,909 tpy CO_2e using the DEIS numbers.[255]

Table 4: Greenhouse Gas Emissions from the Project (Maximum tpy of CO_2e)

	DEIS Scenario 1 (a)	**DEIS Scenario 2** (b)	**Business As Usual Scenario 1** (c)	**Business As Usual Scenario 2** (d)
Incinerator Stack Emissions	924,750	924,750	924,750	924,750
Transportation to Incinerator	1,187	1,187	1,187	1,187
Oil-Fired Power Plant Emissions	-712,679	-712,679	0	0
Landfill Emissions (100% Methane Flaring)	-305,257	n/a	-305,257	n/a
Landfill Emissions (50% Methane Flaring) (e)	n/a	n/a	n/a	964,934
Landfill Emissions (0% Flaring)	n/a	-1,319,354	n/a	n/a
Transportation to Landfills	-1,722	-1,722	-1,722	-1,722
Total	**-93,721**	**-1,107,818**	**618,958**	**111,909**

[a] Displaced Oil-Generated Electricity; Displaced Landfill Emissions (100% Flaring).
[b] Displaced Oil-Generated Electricity; Displaced Landfill Emissions (0% Flaring).
[c] Displaced Landfill Emissions (100% Flared); Oil-Fired Emissions (0% Displacement).
[d] Displaced Landfill Emissions (50% Flared); Oil-Fired Emissions (0% Displacement).
[e] Calculated by taking the average of 100% methane flaring and 0% methane flaring.

[253] P.R. Reg. 6303 - Enmiendas al Reglamento para el Control de la Contaminación Atmosférica de la Junta de Calidad Ambiental para cumplir con los requisitos para Planes Estatales de la Sección 111(d) de la Ley Federal de Aire Limpio para implantar las Guías de Emisiones para Sistemas de Relleno Sanitario [Amendments to the Environmental Quality Board Regulation for the Control of Atmospheric Pollution to comply with the State Implementation Plan requirements of Section 111(d) of the federal Clean Air Act to establish Solid Waste Landfill Emission Guidelines], PRS ADC JCL REG. 6303.

[254] PREPA, *Integrated Resource Plan Volume I: Supply Portfolios and Futures Analysis* (Draft) 3-20, Table 3-2 (Jul. 7, 2015), http://goo.gl/1xJ6Tu.

[255] EA Stack Emissions (924,750) + Transport (1,187) – 50% Landfill Flaring (659,678) = 266,258.5 tpy CO_2e.

Moreover, Puerto Rico's REPS sets a renewable energy target of 15% by 2020 and 20% by 2035. DEIS at 1-7. Burning MSW to generate energy meets this standard, meaning that the Incinerator would compete with cleaner technologies such as wind and solar. *See id*. (indicating that PREPA considers MSW incineration as a form of renewable energy).[256] Thus, to the extent the Incinerator displaces any kind of electricity, it is likely to displace clean energy. Puerto Rico has installed approximately 168 MW of renewable capacity since 2012, which is more than the 67 MW capacity of the EA Incinerator. DEIS at 1-7 to 1-8. Likewise, the cost of generating renewable energy continues to decline. Wind and solar power are competitive or outcompete fossil fuel generation.[257]

The DEIS also fails to account for the GHG benefits of reducing, recycling, and reusing constituents of MSW. More energy is conserved by reducing waste and reusing and recycling materials than is generated by combusting them.[258] The "energy generation potential, per ton of MSW handled at combustion facilities, is less than one-quarter of the energy generation potential of recycling."[259] The DEIS should have considered the GHG emissions benefits of these alternatives to the Project.

2. RUS did not use a readily available tool for analyzing the social cost of carbon from the proposed Incinerator.

There are significant economic impacts associated with climate change from anthropogenic sources of GHG emissions. To account for these impacts, various federal agencies, including USDA, have developed a tool known as the social cost of carbon ("SCC"), which provides an "estimate of the monetized damages associated with an incremental increase in carbon dioxide emissions in a given year."[260] The SCC "has been developed over many years, using the best science available, and with input from the public."[261] It is "intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages

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[256] This is despite the fact that incinerators "emit more CO_2 per megawatt-hour than coal-fired, natural-gas fired, or oil-fired power plants." Brenda Platt et al., Institute for Local Self Reliance, *Stop Trashing the Climate* 9 (2008), http://ilsr.org/wp-content/uploads/2008/06/fullreport_stoptrashingtheclimate.pdf.

[257] Ethan Zindler, *Wind and Solar Boost Cost-Competitiveness Versus Fossil Fuels*, Bloomberg New Energy Finance (Oct. 6, 2015), http://about.bnef.com/content/uploads/sites/4/2015/10/BNEF_PR_20151006_Global-Cost-of-Energy.pdf.

[258] N.Y. State Dep't of Envtl. Conservation, *Beyond Waste* 52 (Dec. 27, 2010), http://www.dec.ny.gov/docs/materials_minerals_pdf/frptbeyondwaste.pdf.

[259] *Id.* (internal citation omitted); *see also* Platt et al., Institute for Local Self Reliance, *Stop Trashing the Climate* (2008), http://ilsr.org/wp-content/uploads/2008/06/fullreport_stoptrashingtheclimate.pdf.

[260] Interagency Working Grp. on Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis* 1 (Feb. 2010), https://www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf.

[261] Howard Shelanski, *Refining Estimates of the Social Cost of Carbon*, The White House Blog (Nov. 1, 2013), https://www.whitehouse.gov/blog/2013/11/01/refining-estimates-social-cost-carbon.

from increased flood risk, and the value of ecosystem services due to climate change."[262] Agencies, including USDA, have used SCC to analyze the costs and benefits of various actions.[263]

While the SCC was developed to assist agencies in rulemaking decisions, "EPA has expressed support for its use in other contexts" such as NEPA. *High Country Conservation Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174, 1190 (D. Colo. 2014). It is useful in the context of NEPA particularly where, as here, an agency monetizes benefits of a project in its analysis of environmental impacts.[264] At least one federal court so far has recognized that the SCC is available for use in an EIS. *High Country Conservation Advocates*, 52 F. Supp. 3d at 1190. Indeed, beyond merely holding that the SCC is available, the court found it was "arbitrary and capricious to quantify the *benefits* of the [project] and then explain that a similar analysis of the *costs* was impossible when such an analysis was in fact possible . . . ." *Id.* at 1191 (emphasis in original).

It would also be arbitrary and capricious for RUS to ignore the cost of the Project's GHG emissions when it monetized the Project's benefits in terms of job creation. DEIS 3-130. In particular, the DEIS notes that the Project's construction phase would create 4,286 full-time equivalent jobs paying $32,680 each (totaling approximately $140 million) and $9.5 million in annual wages (2015 dollars) during the operational phase. *Id.* Because the RUS took part in cost-benefit analysis that included the benefits created by emitting more carbon, it should also then include the costs. The SCC tool is obviously available to RUS and failure to use the tool left a void in its analysis.

G. The DEIS's Socioeconomic and Environmental Justice Section Are Inadequate.

1. The DEIS's employment estimates are grossly overstated.

The DEIS's discussion of the socioeconomic impacts of the Project is one-sided and exceedingly narrow, focusing only on employment impacts without considering the broader economic implications of construction and operation of the Incinerator. Even so, the DEIS's

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[262] *See* Interagency Working Grp. on Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis* 1 (Feb. 2010), https://www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf

[263] USDA, *Final Benefit-Cost Analysis for the Grassland Reserve Program* 13 (Mar. 31, 2010), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_007508.pdf (analyzing the benefit of carbon sequestration); *see also* 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions, 77 Fed. Reg. 62,624, 63,004-06 (Oct. 15, 2012) (to be codified at 49 C.F.R. pts. 523, 531, 533, 536, 537); Energy Conservation Program: Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens, 78 Fed. Reg. 36,316, 36,349-52 and 36,363-64 (June 17, 2013) (to be codified at 10 C.F.R. pts. 429, 430).

[264] *See* Council on Envtl. Quality, Revised Draft Guidance on Consideration of Greenhouse Gas Emissions and Climate Change in NEPA Reviews 16 (Dec. 2014), https://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf; *see also* 40 C.F.R. § 1502.23.

projection that the Project will create 4,286 full-time equivalent construction jobs and 150 full-time operating jobs is a gross overestimate. DEIS at 3-130. These numbers come directly from a study appended to the 2010 PRIDCO EIS that estimates construction jobs based solely on data about the overall construction sector in Puerto Rico, and appears to take the project proponent's operating jobs estimate at face value. 2010 PRIDCO EIS App. I at 41-42. Data specific to the MSW incineration industry, however, suggest that these estimates are excessive.

A 2013 article in a waste management industry publication looked at data from six operational or planned MSW incinerators and determined that a 1,500 tpd incinerator would result in 248 direct employment construction jobs, or 683 full-time equivalent construction jobs—less than a sixth of the DEIS's full-time equivalent construction jobs estimate.[265] Direct employment for operating jobs, meanwhile, averaged only 59 jobs, nowhere near the 150 jobs estimated in the DEIS.[266] Even adjusting for the proposed size of the Incinerator of 2,100 tpd, with the assumption that the ratio of operation jobs to incinerator capacity holds constant, operating jobs would increase to about 80 jobs only.[267] RUS should use data specific to the incineration industry and revise its employment estimates downward accordingly.

Moreover, the DEIS's discussion of employment should consider that other waste management options such as reuse and recycling create ten to twenty times more jobs than incineration.[268] According to the Institute of Local Self-Reliance, incineration, together with landfilling, is estimated to be the waste management method that creates the *fewest* jobs, only one per 10,000 tons of waste managed per year, compared to ten to about 300 jobs per 10,000 tpy for reuse and recycling.[269] The DEIS's section on employment should therefore analyze the likelihood that even more employment could be gained through truly renewable waste management options.

2. The DEIS fails to fully analyze the economic implications of the Project from both a waste management and energy generation perspective.

Even more egregiously, the DEIS's myopic focus on employment ignores the many adverse, long-term effects that may stem from locking half of Puerto Rico's municipalities into a thoroughly uneconomic waste management and energy generation system. As noted in Section II, incinerators are the most expensive method to generate energy and handle waste, and far-

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[265] Jeremy K. O'Brien, *Economic Benefits of Waste-to-Energy Jobs Creation and Community Development,* Solid Waste Ass'n of N. Am. (June 2013), http://digital.mswmanagement.com/publication/index.php?p=12&i=158276, at Table 2.

[266] *Id*. at Table 4.

[268] Tellus Inst. with Sound Res. Mgmt., *More Jobs, Less Pollution: Growing the Recycling Economy in the U.S.* 34 (2011), http://www.no-burn.org/downloads/MoreJobsLessPollutionFinal.pdf.

[269] *Recycling Means Business,* Inst. for Local Self-Reliance (Feb. 1, 2002), https://ilsr.org/recycling-means-business/.

reaching financial impacts have befallen communities that amassed crippling debt due to their decision to build an incinerator.

The United States Energy Information Administration's most recent *Annual Energy Outlook* finds that, per unit of energy or power produced, MSW incinerators are costlier to build and operate than any other electricity generating technology in the United States—costlier than coal, nuclear, or even nascent technologies like offshore wind and fuel cells.[270] Capital costs per kW for MSW incineration are more than double that of solar and four times that of onshore wind.[271] Meanwhile, MSW incineration's astoundingly high fixed operations and maintenance costs (nearly $400 per kW per year) is over *ten* times greater than that of coal, photovoltaic solar, or onshore wind, and over four times greater than the next most costly energy sources in terms of operation and maintenance (geothermal, biomass, and nuclear).[272]

The costs to society of MSW incineration only grow worse after accounting for the resulting pollution. A 2011 study found that the air pollution from solid waste combustion and incineration created the highest gross environmental damage to society per unit of value added of any industry in the United States (defined by NAICS code), even more so than petroleum- or coal-fired electric power generation.[273] According to this study, the cost to society of air pollution from solid waste incineration is 6.72 times greater than the benefits society gains from burning its waste. And as noted above, the GHG emissions from the incinerator will also impose costs on society that must be accounted for in any analysis of the impacts of the Project.

Pollution from incineration may have direct financial effects on other industries as well. The discovery of high levels of dioxins in milk from an area in the Netherlands near a MSW incinerator, for example, led to a five-year ban on the production and sale of dairy products that cost the Dutch economy up to €141.2 million.[274] The Incinerator is similarly planned to be built in an area with much dairy farming,[275] and Arecibo has already seen the seizure of thousands of quarts of locally produced milk after elevated levels of lead were found in dairy cows near the Battery Recycling Company and the milk they produced.[276] T DEIS should seriously consider

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[270] U.S. Energy Info. Admin., *Annual Energy Outlook 2015*, Table 8.2 (Apr. 14, 2015), http://www.eia.gov/forecasts/aeo/assumptions/pdf/table_8.2.pdf.

[271] *Id*.

[272] *Id.*

[273] Nicholas Z. Muller et al., *Environmental Accounting for Pollution in the United States Economy,* 101 Am. Econ. Rev. 1649, 1664-65 (Aug. 2011).

[274] V.H. Lascano Alcoser et al., *Financial impact of a dioxin incident in the Dutch dairy chain*, 74 J. Food Protection 967 (June 2011).

[275] The neighboring Municipality of Hatillo is known as the dairy capital of Puerto Rico, producing one third of the milk consumed on the island. *See Hatillo*, Puerto Rico Encyclopedia, http://www.enciclopediapr.org/ing/article.cfm?ref=07121901 (last visited Nov. 11, 2015).

[276] *Decomisan leche comtaminada en Arecibo* [Contaminated Milk is Seized in Arecibo], Primerahora.com, Sept. 18, 2012, http://www.primerahora.com/noticias/puerto-rico/nota/decomisanlechecontaimadaenarecibo-700259 (last visited Nov. 12, 2015).

the economic implications of pollution from the Project, in addition to the health and safety implications.

MSW incineration is not only incredibly costly as a source of electricity, it is also incredibly costly as a solid waste management method. The city of Detroit, Michigan spent over $1 billion more to send its waste to a 3,600 tpd MSW incinerator over the first twenty years of operation than it would have spent to send the waste to landfills.[277] In fact, on October 8, 2010, this incinerator was closed down as a financial failure, only to be bought by a different company and propped up with a no-bid eleven-year waste disposal contract less than three months later.

One reason that incinerating MSW is so expensive is because incinerator contracts are designed to be that way: these contracts distort the market to create financial lifelines for an otherwise financially unviable industry. Waste disposal contracts with MSW incinerators often mandate above-market tipping fees or include "put-or-pay" clauses. Under a put-or-pay clause, municipalities are obligated to pay incinerators a minimum amount of "tipping fees" per month, regardless of whether the incinerator collected enough MSW from the municipality to warrant those tipping fees. Because of onerous long-term contracts like these, residents of areas such as Detroit, Michigan and Dutchess, Warren, and Washington Counties in New York have paid above-market fees of $69 to $150 per ton for decades, bound by contracts that prevent them from choosing cheaper waste management options.[278]

True to form, the contract between SWMA and Energy Answers includes a tipping fee of $36.05 per ton—*twice* the island's average tipping fee of $18 per ton—and specifies that this above-market tipping fee will increase at 2.5% of Puerto Rico's inflation rate. Furthermore, the contract mandates that if a municipality does not supply the set tonnage of MSW designated in the contract, the municipality must still pay Energy Answers for the difference at the above-market contract rate. In other words, municipalities are penalized for diverting MSW away from the incinerator, and must subsidize Energy Answers at a minimum rate whether or not the Incinerator is providing a service to the municipality. The municipality of Mayagüez estimates that, under this contract, it would have to pay $6 million more per year to send its waste to the Incinerator than to landfill it.[279] And Mayagüez is only one of the 34 municipalities that will be required to pay the Incinerator, whether or not they actually send waste to the Incinerator. It is because of the financial constraints that the Incinerator will place on the municipalities of Puerto Rico that coalitions representing all municipalities across Puerto Rico—even those municipalities not subject to the SWMA contract with the incinerator—have expressed their opposition to the Project. *See supra* Sections I.B, I.D.

The municipalities of Puerto Rico are correct to fear the potentially disastrous financial effects of this type of contract, since time and again the subsidization of MSW incinerators has

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[277] Global Alliance for Incinerator Alt. (GAIA), *Burning Public Money for Dirty Energy* 13 (Nov. 2011).

[278] *Id*. at 14-15, 28.

[279] Mayaguez letter at 7-8. http://nebula.wsimg.com/5cb5d60c0da29addfa9c267cb7e1fc67?AccessKeyId=CA8929B36EA4B8693354&disposition=0&alloworigin=1

pushed United States cities to the brink of, or into, bankruptcy. The over $300 million dollars in debt that Harrisburg, Pennsylvania incurred by propping up its city-owned MSW incinerator led the city to file for Chapter 9 bankruptcy and the State of Pennsylvania to declare a fiscal emergency in 2011.[280] At the time, Harrisburg was the largest city to declare bankruptcy in the United States. That distinction was later claimed by Detroit, which had amassed $1.2 billion in debt associated with the city's incinerator before it, too, filed for bankruptcy in 2013.[281] Over the past two decades, the State of New Jersey has doled out over $1.5 billion in bailouts to local governments to help them cover their incinerator debt.[282] Dutchess County, New York, meanwhile, does not expect to pay off its incinerator debt until 2027—forty years after the incinerator first began to operate—and must annually budget millions of dollars of subsidies to the incinerator, which cannot break even based on tipping fees and electricity revenues alone.[283]

The financial crises that costly MSW incinerators have brought to so many communities are especially relevant to Puerto Rico. Governor Alejandro García Padilla of Puerto Rico recently declared that $72 billion of Puerto Rico's debts are "not payable" and is seeking authorization from the United States Congress to allow Puerto Rico's municipalities the ability to declare bankruptcy just like municipalities in other states can.[284] Given the financial "death spiral"[285] that is afflicting Puerto Rico and the significant likelihood that construction and operation of the Incinerator will only deepen the island's financial woes, RUS should take a much harder look at the financial implications of the Project.

3. RUS must conduct a proper environmental justice analysis.

The DEIS's environmental justice analysis suggests that the Project will have no environmental justice impacts because, even if the Project's region of influence is predominantly minority and impoverished, the entire island of Puerto Rico is 99.2% minority and classified as an "extreme poverty area." DEIS at 3-129, Table 3-45; *id.* 3-131. In support of this notion that no environmental justice analysis is required, the DEIS cites language from EPA Region 2's

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[280] *See Money up in smoke,* The Economist (Oct. 29, 2011), http://www.economist.com/node/21534811; Mary Williams Walsh & Jon Hurdle, *Harrisburg Sees Path to Restructuring Debts Without Bankruptcy Filing*, N.Y. Times (July 24, 2015), http://www.nytimes.com/2013/07/25/us/harrisburg-sees-path-to-restructuring-debts-without-bankruptcy-filing.html.

[281] Global Alliance for Incinerator Alt. (GAIA), *Burning Public Money for Dirty Energy* 13 (Nov. 2011).

[282] *Id.* at 18.

[283] Mary Beth Pfeiffer, *Dutchess County Resource Recovery Agency: Inefficient, expensive & in debt*, Poughkeepsie Journal (May 9, 2009), http://archive.poughkeepsiejournal.com/article/20090510/NEWS01/905100344/Dutchess-County-Resource-Recovery-Agency-Inefficient-expensive-debt.

[284] Michael Corkery & Mary Williams Walsh, *Puerto Rico's Governor Says Island's Debts Are 'Not Payable'*, N.Y. Times (June 28, 2015), http://www.nytimes.com/2015/06/29/business/dealbook/puerto-ricos-governor-says-islands-debts-are-not-payable.html.

[285] Sophia Yan, *Governor: Puerto Rico near 'death spiral'*, CNN (June 29, 2015), http://money.cnn.com/2015/06/29/news/economy/puerto-rico-default/.

Interim Environmental Justice Policy. *Id.*at 3-131. But the DEIS mischaracterized the Region 2 policy, which states, in full,

> Notwithstanding the Region's effort to develop consistent and comprehensive methodologies for EJ analyses, there will arise exceptions and situations that are not easily adaptable to a prescribed methodology and, therefore, flexibility has been built into the Guidelines. Examples of such exceptions may include . . . . certain circumstances [in which] a COC [Community of Concern] may be virtually indistinguishable from any of its neighbors for a given EJ demographic factor. The examples in Region 2 are in Puerto Rico and the U.S. Virgin Islands (USVI), where every community is classified as Hispanic, in the case of Puerto Rico, and as communities of color in the case of the USVI, even though additional racial differences may exist. When the population in the larger area incorporating the COC is relatively homogeneous for a given EJ demographic factor, it is usually not useful to compute a difference in that factor between the COC and the reference area.[286]

By the very terms of EPA Region 2's Interim Policy, then, the fact that Puerto Rico, as a whole, is minority and poor does not mean, as the DEIS absurdly suggests, that Puerto Rico is immune from environmental justice impacts. Instead, the EPA policy clearly states that, in cases such as Puerto Rico's, the analysis should *not* use a rigid comparison of the COC to the reference area, but rather should take a more flexible and adaptable approach accounting for a totality of factors.

CEQ guidance on environmental justice under NEPA echoes this notion, stating that "[t]here is not a standard formula for how environmental justice issues should be identified or addressed" in NEPA documents.[287] As relevant to the DEIS, this guidance further specifies that "[t]he selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to *not artificially dilute* or inflate the affected minority population."[288] The DEIS's statement that the Project's region of influence is demographically similar to Puerto Rico as a whole, without any further analysis, artificially dilutes the fact that the region of influence is predominantly minority and low-income.

Flexibility in the definition of the reference areas or of the population characteristics of concern can reveal environmental inequities in Puerto Rico. For example, a 2013 study found

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[286] U.S. EPA Region 2, *Interim Environmental Justice Policy* (Dec. 2000), http://pubweb.epa.gov/region02/ej/ejpolicy.pdf, at 24.

[287] Council on Envtl. Quality, *Environmental Justice: Guidance Under the National Environmental Policy Act* (Dec. 1997), http://www3.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf, at 8.

[288] *Id*. at 26 (emphasis added).

that Puerto Rican municipalities with higher percentages of non-Puerto Rican Hispanics or higher rates of unemployment were subject to higher releases under the Toxic Release Inventory than other Puerto Rican municipalities.[289] Indeed, educational attainment, per capita income, and household income are lower in the Municipality of Arecibo and the surrounding region[290] than Puerto Rico as a whole, while poverty rates and rates of households with public assistance income are higher in Arecibo and the region.[291]

Comparison of Puerto Rico to other U.S. states can also be insightful. For example, of all U.S. states, only New Jersey has more pharmaceutical production facilities than Puerto Rico, and the concentration of these facilities in Puerto Rico is double that of New Jersey given the island's smaller area.[292] Puerto Rico, in fact, has one of the highest concentrations of pharmaceutical plants in the world.[293] Just as an environmental justice analysis of the U.S. pharmaceutical industry should question the impacts of an industry whose plants are concentrated in the predominantly poor and minority Commonwealth, so too should a comprehensive environmental justice analysis of the EIS question why Puerto Rico should be the stage for one of the first new MSW incinerators in the country in two decades. Given that the modern environmental justice movement has its roots in opposition to waste facilities and incinerators, in particular, the DEIS's avoidance of a searching environmental justice analysis is striking.[294] RUS must study the full justice implications of supporting this polluting and costly Project.

H. The DEIS Fails to Adequately Analyze the Project's Impacts on Historic and Cultural Resources.

The DEIS's discussion of cultural and historic properties is internally inconsistent and fails to take the hard look mandated by law. NEPA requires federal agencies to ensure that their actions do not obstruct the "preserv[ation of] important historic, cultural, and natural aspects of our national heritage." 42 U.S.C. § 4331(b)(4). Accordingly, NEPA determinations must consider "[u]nique characteristics of the geographic area such as proximity to historic or cultural resources," and "[t]he degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or

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[289] Shanshan Wu & Matthew T. Heberling, *The distribution of pollution and environmental justice in Puerto Rico: a quantitative analysis*, 35 Population & Env't., 113 (2013).

[290] The surrounding region includes the municipalities of Arecibo, Hatillo, Camuy, Quebradillas, Utuado, Barceloneta, Florida, and. Manatí. 2010 PRIDCO EIS App. J at 11.

[291] 2010 PRIDCO EIS App. J at 21-25.

[292] U.S. EPA, Development Document for Final Effluent Limitations Guidelines and Standards for the Pharmaceutical Manufacturing Point Source Category (1998), http://water.epa.gov/scitech/wastetech/guide/pharm/upload/1998_09_21_guide_pharm_techdev_tdd.pdf at 3-24.

[293] *Manufacturing at a crossroads,* Caribbean Bus., http://www.caribbeanbusinesspr.com/cbdirectory/cb_manufacturing.php?cat_id=11 (last visited Nov. 11, 2015).

[294] United Church of Christ, *Toxic Wastes and Race at Twenty, 1987-2007* (2007), http://d3n8a8pro7vhmx.cloudfront.net/unitedchurchofchrist/legacy_url/491/toxic-wastes-and-race-at-twenty-1987-2007.pdf?1418423933, at 17-37.

may cause loss or destruction of significant scientific, cultural, or historical resources." 40 C.F.R. § 1508.27(b) (3), (8).

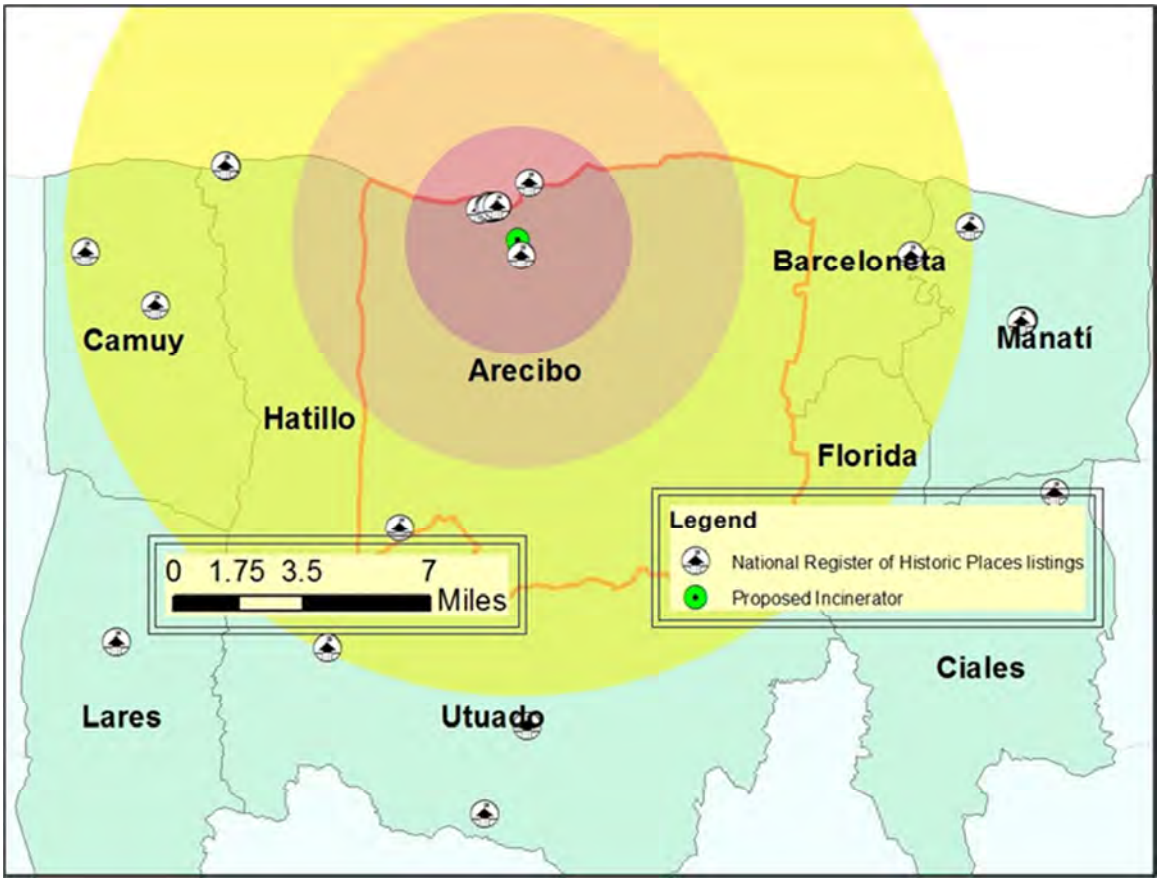
Despite listing three known historic properties in the Project's area of potential effects—two prehistoric sites, *El Caney* and *Pozo del Obispo*, and the ruins of the *Hacienda Santa Bárbara*—the DEIS then inexplicably states, just three paragraphs later, that "there are no known historic properties identified within the current [area of potential effects], [so] no historic properties would be affected by the Project." DEIS at 3-115. The DEIS must, at the very least, recognize the historic properties listed in the DEIS itself and analyze the Project's potential impacts on those properties.

Moreover, the DEIS fails to recognize other sites listed in the National Register of Historic Places in the vicinity of the Project that may be adversely affected by it. These sites are highlighted in the map below. Sites within two miles of the Project site include:[295]

- Cambalache Bridge (0.4 miles from the Project site), a historic railway bridge across Río Grande de Arecibo in the Cambalache Ward;
- Paseo Víctor Rojas (1.1 miles from the Project site), a promenade built in 1881 over the ruins of an old Spanish fort;
- Casa Ulanga (1.1 miles from the Project site), "one of the most charming and majestic buildings of Arecibo;"
- Casa Cordova (1.1 miles from the Project site), an architecturally eclectic residence in Arecibo's historic urban center;
- Edificio Oliver (1.2 miles from the Project site), the first building in Arecibo to combine residential and commercial space, and the first to use reinforced concrete;
- Calle Gonzalo Marín No. 61 (1.2 miles from the Project site), a historic residence that is one of Arecibo's "most valuable structures;"
- Palacio del Marqués de las Claras (1.2 miles from the Project site), a building that served as a social center for Puerto Rican aristocracy, artists, and intellectuals;
- Gonzalo Marín 101 (1.2 miles from the Project site), one of the island's last buildings designed in the Spanish neoclassical style;
- Casa Alcaldía de Arecibo (1.2 miles from the Project site), Arecibo's city hall built in 1866;
- Corregimiento Plaza Theater (1.2 miles from the Project site), a neoclassical theater built in 1876;
- Casa de la Diosa Mita (1.4 miles from the Project site), a beaux-arts residence in Arecibo's historic urban center;
- Faro de Arecibo (1.6 miles from the Project site), the last lighthouse built by the Spanish government on the island;

[295] Information on all these sites is available from the National Register of Historic Places: http://focus.nps.gov/nrhp/SearchResults/ff17abc87aa9416d85e764b208225073?view=list.

Figure 4: National Register of Historic Places Listed Sites Near the Project Site



RUS must consider the degree to which the Project would adversely affect these sites on the National Register of Historic Places, as required by NEPA.

Moreover, the DEIS's focus on archeological sites and sites eligible for listing in the National Register of Historic Places suggests that other types of cultural resources need not be considered—which is clearly not what NEPA demands. CEQ regulations specify that NEPA documents must consider adverse effects on *both* "sites . . . listed in or eligible for listing in the National Register of Historic Places . . . [as well as other] significant scientific, cultural, or historical resources." 40 C.F.R. § 1508.27(b) (8). But instead of taking the hard look required by NEPA at other cultural resources such as recreational resources, the DEIS flatly contends that there are "no recreation resources in the vicinity [of the Project] that could potentially be affected," and therefore eliminates those resources from consideration without further discussion. DEIS at 1-17, 3-1.

A harder look, however, would reveal many other cultural, recreational, and tourist resources around the Project site that could be adversely affected by the construction of a major polluting facility like the Incinerator. These resources include:

- The Cambalache State Forest, which includes picnic areas, miles of hiking trails, and one of the few mountain bike trails through shaded forest on the island;

- The Caño Tiburones Natural Reserve, the largest wetland in Puerto Rico, where visitors can partake in activities such as fishing and kayaking;
- The Arecibo Lighthouse and Historical Park, which includes museums, a playground, and other amenities around Faro de Arecibo, listed above;
- La Poza del Obispo, a popular beach next to Faro de Arecibo known for its clear waters and sea turtle nesting grounds. This beach was recently adopted by a local community group—the first time that a community group, as opposed to a hotel, has adopted a beach under DNER's "Adopt a Beach" Program;[296]
- Cueva Ventana, a cave with a view of the valley beneath it that has become a popular tourist attraction;
- Cueva del Indio, a limestone cavern on the coast with pre-Columbian petroglyphs;
- The National Astronomy and Ionosphere Center, a.k.a. Arecibo Observatory, the world's largest and most sensitive radiotelescope.

The construction of a major polluting facility near these historic and recreational resources is likely to impact the use and enjoyment of these resources, and may adversely affect tourism in Arecibo generally. RUS must identify the historical, cultural, and recreational resources around the Project and take a harder look at the Project's potential impacts on these resources.

CONCLUSION

For all the reasons set forth in these comments, the DEIS does not meet the standards set by NEPA. We urge RUS to consider all of the information presented in these comments in finalizing the EIS and complying with its obligations to fully evaluate the proposed Project's impacts. This incinerator is neither needed nor wanted by the local communities, and indeed by 77 of Puerto Rico's 78 municipalities. RUS should carefully heed this groundswell of democratic opposition and deny Energy Answers' request. Federal money is not well spent adding to the legacy of existing pollution on a predominantly minority and overburdened low-income community.

Sincerely,

Hannah Chang
Jonathan Smith

Kenneth Rumelt
Assistant Professor of Law

[296] *Grupo comunitario adopta la Poza del Obispo* [Community group adopts the Poza del Obispo], Primera Hora (Feb. 8, 2015), http://www.primerahora.com/noticias/puerto-rico/nota/grupocomunitarioadoptalapozadelobispo-1064301/.

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On behalf of:
Amigos del Río Guaynabo, Inc.
Ciudadanos en Defensa del Ambiente,
Comité Basura Cero Arecibo
Madres de Negro de Arecibo
Sierra Club de Puerto Rico

Exhibit 1

FOIA Appeal to Rural Development (with attachments)

EARTHJUSTICE

ALASKA CALIFORNIA FLORIDA MID-PACIFIC NORTHEAST NORTHERN ROCKIES
NORTHWEST ROCKY MOUNTAIN WASHINGTON, D.C. INTERNATIONAL

October 13, 2015

Via Email and Priority Mail

Administrator
Rural Development
1400 Independence Ave., SW
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Ssd.foia@wdc.usda.gov

RE: Freedom of Information Act Appeal in FOIA Case No. 2015-RD-04644-F

Dear Administrator:

Pursuant to 5 U.S.C. § 552(a)(6)(A)(ii) and 7 C.F.R. § 1.14, Earthjustice, on behalf of Angel González, MD, appeals the United States Department of Agriculture ("USDA") Rural Development's September 3, 2015 denial in Freedom of Information Act ("FOIA") Case No. 2015-RD-04644-F. *See* Letter from Charles Schnepfe, USDA, to Angel González (Sept. 3, 2015) (attached as Exhibit 1).

On July 16, 2015, Dr. González sought records from USDA Rural Development ("Rural Development") regarding any proposed or actual request from Energy Answers Arecibo, LLC ("Energy Answers") to USDA for financial assistance for a proposed incinerator in Arecibo, Puerto Rico ("Project"). *See* Email from Angel González to Joseph Shank, USDA (July 16, 2015) (attached as Exhibit 2). Rural Development claimed to possess no records responsive to this request. *See* Exhibit 1. Dr. González hereby timely appeals this determination.

FACTUAL BACKGROUND

On July 16, 2015, Angel González, MD emailed Joseph Shank, FOIA Liaison at USDA Rural Development, with a request for "all the information regarding a possible or actual request for financial or other assistance by the Energy Answers Corporation, or Energy Answers Arecibo, LLC or any other name related to this incineration or so called Waste to Energy project in Arecibo, Puerto Rico." Exhibit 2. Dr. González clarified that his request included "any paperwork or any form of communications (telephone, fax, email, written communications or other) that ha[s] occurred between your office and Energy Answers," and emphasized that he was "interested in all the documents that pertain to this file." *Id.*

On August 8, 2015, Dr. González received a letter from Charles Schnepfe of USDA, postmarked August 6, 2015, noting that "[a] search of our records was conducted and we were unable to locate any information pertaining to your request. USDA Rural Development (RD)

does not maintain records such as those you have described." Letter from Charles Schnepfe, USDA, to Angel González (August 6, 2015) (attached as Exhibit 3).[1]

The day after that letter was postmarked, Rural Utilities Service ("RUS"), an agency within USDA Rural Development, made available for public comment a 264-page Draft Environmental Impact Statement ("EIS") assessing RUS's proposed action of providing financial assistance to Energy Answers for construction of the Project. *See* Energy Answers Arecibo, LLC: Notice of Availability of a Draft Environmental Impact Statement and Notice of a Public Meeting, 80 Fed. Reg. 47,452 (Aug. 7, 2015).

On August 26, 2015, Dr. González sent a letter to Rural Development requesting that the agency explain why it did not produce any records and requesting that the agency conduct a second search. *See* Letter from Angel González to Administrator, USDA Rural Development (August 26, 2015) (attached as Exhibit 4). Dr. González noted,

> I have been in contact with Ms Lauren McGee Rayburn and Ms Stephanie Strength since 2013 regarding the possible financial assistance request by [Energy Answers] and they confirmed that this corporation was in a "pre application status" for such a request. There was an Environmental Impact Study (EIS) scoping meeting on Jan 28, 2015 in Arecibo; a[n] EIS is currently out for public comments and a Public Hearing was held locally just last week, on August 20, 2015. These meetings were announced in the Federal Register.
>
> I do not understand how these proceedings could have occurred without your Agency having any communication with Energy Answers Arecibo, LLC, according to your FOIA request response.

Id.

Rural Development responded to the August 26, 2015 correspondence on September 3, 2015. Exhibit 1. The response states that "no application for funds exists to date;" "[a]gency personnel that are involved with the RUS project funding process have indicated that they have no e-mail or meeting notes concerning any funding for Energy Answers;" and that the agency was "unable to speculate as to when records such as those [sought] may or may not become available." *Id.* The September 3, 2015 correspondence indicated that an appeal of the determination explained therein could be made to the Administrator of Rural Development within 45 days from the date of the letter. *Id.*

LEGAL BACKGROUND

FOIA is intended to "ensure an informed citizenry, vital to the functioning of a democratic society, needed to check against corruption and to hold the governors accountable to the governed." *NLRB v. Robbins Tire & Rubber Co.*, 437 U.S. 214, 242 (1978). The Supreme Court has interpreted the disclosure provisions of FOIA broadly, noting that the Act is animated by a "philosophy of full agency disclosure." *John Doe Agency v. John Doe Corp.*, 493 U.S. 146,

[1] The letter is erroneously dated July 6, 2015. The envelope in which it was sent was postmarked August 6, 2015.

152 (1989). FOIA requires federal agencies to disclose records and information to citizens upon request unless the information falls within one of nine narrowly construed exemptions. *See* 5 U.S.C. § 552(b); *Milner v. Dep't of Navy*, 562 U.S. 562, 564 (2011); *Dep't of the Air Force v. Rose*, 425 U.S. 352, 361 (1976) (noting that "disclosure, not secrecy, is the dominant objective of the Act"). In addition, President Obama has directed all agencies to administer FOIA with a presumption in favor of disclosure, and to resolve doubts in favor of openness. Memorandum from President Obama to the Heads of Executive Departments and Agencies (Jan. 21, 2009), *available at* http://www.whitehouse.gov/the-press-office/freedom-information-act. The United States Attorney General has also supported a policy of openness, explaining that an "agency should not withhold records merely because it can demonstrate, as a technical matter, that the records fall within the scope of a FOIA exemption." Memorandum from Attorney General Holder to the Heads of Executive Departments and Agencies (Mar. 19, 2009), *available at* http://www.justice.gov/ag/foia-memo-march2009.pdf.

When assessing the adequacy of an agency's search efforts under FOIA, courts look to whether the agency's efforts were "reasonable." *See Krikorian v. Dep't of State*, 984 F.2d 461, 468 (D.C. Cir. 1993) ("The adequacy of an agency's search is measured by a 'standard of reasonableness,' and is 'dependent upon the circumstances of the case.'") (quoting *Weisberg v. United States Dep't of Justice*, 705 F.2d 1344, 1351 (D.C. Cir. 1983)). To rebut a claim that its FOIA search efforts were inadequate, an agency must "demonstrate beyond material doubt" that its search was "reasonably calculated to uncover all relevant documents." *Truitt v. Dep't of State*, 897 F.2d 540, 542 (D.C. Cir. 1990). In determining whether an agency's search was reasonable, "[t]he issue is *not* whether any further documents might conceivably exist but rather whether the government's search for responsive documents was adequate." *Id.* (quotations omitted). An adequate search means that the agency used proper methods and looked in every place that is "likely to turn up the information requested," *Valencia-Lucena v. U.S. Coast Guard*, 180 F.3d 321, 326 (D.C. Cir. 1999), including every record system that might reasonably contain responsive documents, *Oglesby v. U.S. Dep't of Army*, 920 F.2d 57, 68 (D.C. Cir. 1990). Courts will find that the methodology or scope of an agency's search was insufficient where there are "positive indications of overlooked materials." *See Valencia-Lucena*, 180 F.3d at 327.

ARGUMENT

In this case, Rural Development's failure to identify a single document responsive to Dr. González's request—notwithstanding RUS's preparation of a 264-page EIS assessing its proposed action of financially assisting Energy Answers' proposed facility—evinces an inadequate search by the agency. Rural Development's insufficient response runs counter to FOIA's presumption in favor of disclosure as espoused by both the executive branch and Supreme Court precedent.

In light of numerous compelling indications of overlooked materials, Rural Development plainly did not conduct an adequate search under FOIA. In the past two and a half years, RUS has published five separate notices in the Federal Register related to its consideration of

financing for Energy Answers' proposed facility.[2] In multiple notices, RUS has described its intent to prepare an environmental review "in association with *a financial assistance request* for a proposal *submitted to the Agency* by Energy Answers Arecibo, LLC . . . " and indicated that "RUS is considering *funding this application*." 79 Fed. Reg., at 70,846 (emphasis added); *see also* 80 Fed. Reg. at 1892 (describing RUS's intent to prepare a Draft EIS "in association with *a financial assistance request* for a proposal *submitted to the Agency* by Energy Answers" and noting that "RUS is considering *funding this application*") (emphasis added). A public meeting on the scoping process for RUS's environmental review of its proposed action to financially assist the Project was held on January 28, 2015. *Id.* On August 7, 2015, RUS made available to the public its Draft EIS, which has the stated purpose of assisting the agency in "making decisions related to providing financial assistance . . . for the proposed Project." Rural Utilities Service, Draft Environmental Impact Statement for the Arecibo Waste-to-Energy and Resource Recovery Project 1-8 (Jul. 2014), *available at* http://www.rd.usda.gov/files/RUSAreciboDraftEIS_July2015_Eng.pdf. On August 20, 2015, RUS held a public hearing on the Draft EIS. 80 Fed. Reg. at 47,452.

On this record, Rural Development's insistence that it possesses not a single document in response to a request for "all the information regarding a possible or actual request for financial or other assistance by the Energy Answers . . . related to [the Project]," Exhibit 2, plainly would not withstand challenge in court. Indeed, in its September 3rd letter to Dr. González, Rural Development explicitly stated that "Energy Answers *has notified RUS* of their intention to seek financial assistance with the Arecibo project." Exhibit 1 (emphasis added). This notification itself is directly responsive to Dr. González's request, and yet in the same breath, Rural Development claims that agency staff "have indicated that they have no e-mail or meeting notes concerning any funding for Energy Answers."[3] It strains credulity that—as suggested by Rural Development's FOIA determination—RUS published five Federal Register notices, conducted two public meetings, and prepared a draft EIS on the basis of entirely verbal communications related to Energy Answers' intent to seek financial assistance.

Rural Development's September 3, 2015 letter, moreover, indicates a fundamental misunderstanding of the scope of Dr. González's request that supports the conclusion that the agency's search for documents was inadequate. The September 3rd letter clarifies that RUS "has placed [Energy Answers'] notice [of an intent to seek financial assistance] in an anticipated

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[2] *See* Energy Answers Arecibo, LLC: Notice of Intent To Prepare a Supplemental Final Environmental Impact Statement, 78 Fed. Reg. 21,907 (Apr. 12, 2013); Energy Answers Arecibo Puerto Rico Renewable Energy Project: Notice of Cancellation of a Supplemental Final Environmental Impact Statement and Notice of Public Scoping and Intent To Prepare an Environmental Impact Statement, 79 Fed. Reg. 70,846 (Nov. 8, 2014); Energy Answers Arecibo Puerto Rico Renewable Energy Project: Notice of Extension of Public Comment Period, Notice of Public Scoping Meeting and Intent to Prepare an Environmental Impact Statement, 80 Fed. Reg. 1892 (Jan. 14, 2015); Energy Answers Arecibo, LLC: Notice of Availability of a Draft Environmental Impact Statement and Notice of a Public Meeting, 80 Fed. Reg. 47,452 (Aug. 7, 2015); Energy Answers Arecibo, LLC: Extension of Comment Period for a Draft Environmental Impact Statement, 80 Fed. Reg. 55,828 (Sept. 17, 2015).

[3] To be clear, Dr. González's request was not limited to "email or meeting notes" and instead sought "all the documents that pertain to" Energy Answers' proposed or actual request for financial assistance, including "any paperwork or any form of communications." Exhibit 2. Under such an explicitly broad request, Dr. González's own communications with staff at Rural Development since 2013 "regarding the possible financial assistance request" by Energy Answers are also records responsive to the FOIA request.

status; as such, no application for funds exists to date." Exhibit 1. The letter further reiterates that, as of August 14, 2015, RUS "had, to date, received no application for funds from Energy Answers . . . ." *Id.* But these statements are of no import, because Dr. González requested "all the information regarding *a possible* or actual request for financial assistance by Energy Answers," Exhibit 2 (emphasis added)—a request that Dr. González reiterated and clarified in his August 26, 2015 letter, Exhibit 3—which includes records pertaining to pre-filing procedures or Energy Answers' plan to file a formal application.

Rural Development's arbitrarily narrow reading of an explicitly expansive FOIA request runs afoul of D.C. Circuit precedent finding that agencies have "a duty to construe a FOIA request liberally." *Nation Magazine, Washington Bureau v. U.S. Customs Serv.*, 71 F.3d 885, 890 (D.C. Cir. 1995). If Rural Development did not identify any responsive documents because it misconstrued or improperly limited the scope of Dr. González's request, FOIA requires that it conduct a search that reflects the actual parameters of the request. *See Truitt*, 897 F.2d at 545-46 (noting that the agency, "[h]aving learned of [the requester's] interest in [certain] documents . . . , came under a duty to conduct a reasonable search for [those] items, and to either disclose them to [the requester] if they were nonexempt or, if deemed exempt, to treat them in its Vaughn index") (citations omitted).

Ultimately, Rural Development cannot meet its burden of demonstrating beyond material doubt that its search was "reasonably calculated to uncover all relevant documents" because of the overwhelming positive indications that the agency overlooked materials. *Id.* at 542. As the D.C. Circuit has recognized, "[i]f the agency can lightly avoid its responsibilities by laxity in identification or retrieval of desired materials, the majestic goals of [FOIA] will soon pass beyond reach." *Founding Church of Scientology of Washington, D. C., Inc. v. Nat'l Sec. Agency*, 610 F.2d 824, 837 (D.C. Cir. 1979). To comply with FOIA, Rural Development must conduct additional searches for any information related to "a possible or actual request" by Energy Answers for financial assistance from RUS, which includes documents generated in anticipation of Energy Answers' application for financial assistance.

CONCLUSION

For all of the foregoing reasons, USDA Rural Development's failure to provide the requested documents is unlawful and in violation of FOIA.

Please contact Jonathan Smith at the email or telephone number below if you have any questions concerning this appeal. We look forward to a response to this appeal as soon as possible and in no event later than the twenty working days mandated by FOIA. 5 U.S.C. § 552(a)(6)(A)(ii); 7 C.F.R. § 1.14(c).

Sincerely,

/s/ Jonathan Smith
Jonathan Smith
Claire Vallin
Hannah Chang
Earthjustice
48 Wall Street, 19th Floor
New York, NY 10005
(212) 845-7379
jjsmith@earthjustice.org

Submitted on behalf of:

Angel González, member of Amigos del Río Guaynabo

Exhibit 1

USDA
United States Department of Agriculture

Rural Development

Operations and Management

Procurement and Administrative Services

1400 Independence Ave SW
Washington, DC 20250
Voice 202.690-5394
Fax 202.692.0034

September 3, 2015

Angel Gonzalez, MD
PMB 74 HC-01
Box 29030
Caguas, PR 00725

Re: FOIA Case No. 2015-RD-04644-F

Dear Dr. Gonzalez:

This letter is in response to your correspondence dated August 26, 2015 and is intended to expand upon our no records determination. This office responded to your Freedom of Information Act (FOIA) request indicating that no records, such as those described in your request, could be located at the responsible program office.

To elaborate further, we were notified by the Rural Electric Service (RUS) that Energy Answers has notified RUS of their intention to seek financial assistance with the Arecibo project and that RUS has placed their notice in an anticipated status; as such, no application for funds exists to date. Agency personnel that are involved with the RUS project funding process have indicated that they have no e-mail or meeting notes concerning any funding for Energy Answers. In an e-mail message dated August 14, 2015, Ms. Lauren McGee Rayburn informed you that RUS Electric Programs had, to date, received no application for funds from Energy Answers and that the agency conducts and completes its environmental review before it accepts a loan or loan guarantee application.

This office may only release the information that the Agency currently possess and we are unable to speculate as to when records such as those you seek may or may not become available. As indicated by our previous response, a search of our records was conducted and we were unable to locate any information pertaining to your request. USDA Rural Development (RD) does not maintain records such as those you have described. If, upon receipt of this correspondence, you still wish to appeal this determination you may do so by writing to the address below:

Administrator
Rural Development
1400 Independence Ave., SW
Stop 0706
Washington, DC 20250-0706

Angel Gonzalez, MD
2015-RD-04644-F

The appeal must be received within 45 days from the date of this letter. The phrase "FOIA APPEAL" should be placed in capital letters on the front of the envelope.

Sincerely,

Mr. Charles Schnepfe
Government Information Specialist

Exhibit 2

De: Angel Gonzalez <sjotp@yahoo.com>
Fecha: 16 de julio de 2015 09:30:05 a.m. GMT-4
Para: "Ssd.foia@wdc.usda.gov" <Ssd.foia@wdc.usda.gov>
Cc: Angel Gonzalez <sjotp@yahoo.com>, Myrna Conty <gmchg24@gmail.com>, Pedro Saade <saadellorensp@microjuris.com>, Obed Garcia Acevedo MD <ogarciamd@yahoo.com>
Asunto: USDA RD FOIA
Responder a: Angel Gonzalez <sjotp@yahoo.com>

Joseph Shank
FOIA Liason
Rural Development, USDA
1400 Independence Ave, SW
Stop 0706
Washington, DC 20250-0706

RE: Arecibo Renewable Energy Generation and Resource Recovery Plant

Hello, Mr Shank.
I'm a member of the Public and Environmental Health Committee of the Puerto Rico Medical College and of the Coalition of Anti-Incineration Organizations. I participated in the scoping meeting held on January 2015 by the USDA regarding the EIS of this project.

I hereby request via the Freedom of Information Act (FOIA) all the information regarding a possible or actual request for financial or other assistance by the Energy Answers Corporation, or Energy Answers Arecibo, LLC or any other name related to this incineration or so called Waste to Energy project in Arecibo, Puerto Rico. This has been handled thru the

Rural Utilities Service (RUS) office of the USDA.

Please include any paperwork or any form of communications (telephone, fax, email, written communications or other) that have occurred between your office and Energy Answers. I'm interested in all the documents that pertain to this file.
I can easily be reached on my cell phone or by email, in case you need to contact me.
Thanks in advance,

Angel Gonzalez, MD, FASAM
cell 787 233-6316
sjotp@yahoo.com

Exhibit 3

USDA

United States Department of Agriculture

Rural Development

Operations and Management

Procurement and Administrative Services

1400 Independence Ave SW
Washington, DC 20250
Voice 202.690-5394
Fax 202.692.0034

July 6, 2015

Angel Gonzalez, MD
PMB 74 HC-01
Box 29030
Caguas, PR 00725

Re: FOIA Case No. 2015-RD-04644-F

Dear Dr. Gonzalez:

This responds to your request for information received in the Rural Development Freedom of Information Act (FOIA) Unit on July 16, 2015 and received on July 16, 2015. You requested all information regarding a possible or actual request for financial or other assistance by the Energy Answers Corporation, or Energy Answers Arecibo, LLC or any other name related to this incineration or so called Waste to Energy project in Arecibo, Puerto Rico.

A search of our records was conducted and we were unable to locate any information pertaining to your request. USDA Rural Development (RD) does not maintain records such as those you have described. The FOIA provides you the right to appeal this determination. Any appeal must be made in writing to:

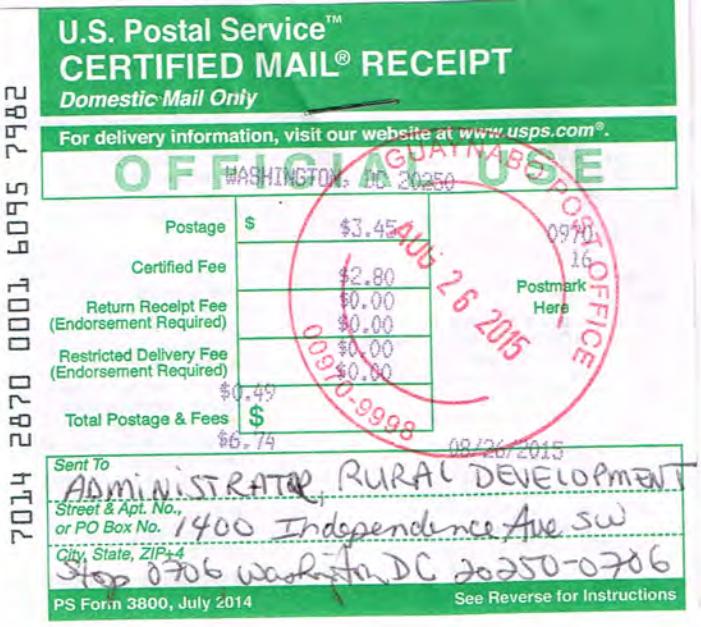
Administrator
Rural Development
1400 Independence Ave., SW
Stop 0706
Washington, DC 20250-0706

The appeal must be received within 45 days from the date of this letter. The phrase "FOIA APPEAL" should be placed in capital letters on the front of the envelope.

Sincerely,

Mr. Charles Schnepfe
Government Information Specialist

Exhibit 4



August 26, 2015.

Administrator
Rural Development
1400 Independence Ave, SW
Stop 0706
Washington, DC 20250-0706

Re: FOIA APPEAL
Case No. 2015-RD-04644-F

Certified Mail

Dear Administrator:

On July 16, 2015 I made a FOIA request of "all information regarding a possible or actual request for financial or other assistance by the Energy Answers Corporation, or Energy Answers Arecibo LLC, or any other name related to this incineration or so called Waste to Energy project in Arecibo, Puerto Rico".

On August 8, 2015, I received a certified letter on a postmarked envelope of August 6, 2015, but dated July 6, 2015, notifying me that "a search of our records was conducted and we were unable to locate any information pertaining to your request. USDA Rural Development (RD) does not maintain records such as those you have described". (copy attached)

I have been in contact with Ms Lauren McGee Rayburn and Ms Stephanie Strength since 2013 regarding the possible financial assistance request by this corporation and they confirmed that this corporation was in a "pre application status" for such a request. There was an Environmental Impact Study (EIS) scoping meeting on Jan 28, 2015 in Arecibo; a EIS is currently out for public comments and a Public Hearing was held locally just last week, on August 20, 2015. These meetings were announced in the Federal Register.

I do not understand how these proceedings could have occurred without your Agency having any communication with Energy Answers Arecibo, LLC, according to your FOIA request response.

I will appreciate an explanation and request that a second search be conducted.

Sincerely yours,

Angel González, MD
PMB 74 HC-01 Box 29030
Caguas, PR 00725
787 233-6316
sjotp@yahoo.com

Exhibit 2

DNER Denial of
Water Franchise Application

ESTADO LIBRE ASOCIADO DE
PUERTO RICO
Departamento de Recursos Naturales
y Ambientales

20 DIC. 2013

DENEGATORIA
SOLICITUD DE FRANQUICIAS DE AGUA

El Departamento de Recursos Naturales y Ambientales (DRNA) recibió la Solicitud de Franquicia para el aprovechamiento de las aguas públicas de Puerto Rico bajo las disposiciones de la Ley Núm. 136 de 3 de junio de 1976, mejor conocida como la *Ley de Aguas de Puerto Rico.*

DESCRIPCIÓN DE LA SOLICITUD

1. Solicitud número: O-FA-FAID6-SJ-00168-26102011
2. Peticionario: ENERGY ANSWERS ARECIBO LLC
3. Dirección: THE ATRIUM BUSINESS CENTER
   530 AVENIDA CONSTITUCIÓN SUITE 229
   SAN JUAN, PUERTO RICO 00901

DETERMINACIONES DE HECHOS

1. La Ley Núm. 314 del 24 de diciembre de 1998 Ley de Política Pública sobre Humedales en Puerto Rico, Ley de Tierra; declara la política pública sobre humedales en Puerto Rico; y a esos fines ordena la designación de los terrenos pertenecientes a la Autoridad de Tierras, incluyendo el Caño o Ciénaga Tiburones, inclusive como Reserva Natural.

2. La Ley Núm. 314 del 24 de diciembre de 1998 establece que la Autoridad de Tierras y el Departamento de Recursos Naturales y Ambientales (DRNA) deberán establecer un acuerdo para la designación de los humedales y los terrenos que se mantienen secos por acción de bombeo o diques u otros métodos de drenaje, que pertenecen a la Autoridad de Tierras, el Caño o Ciénaga Tiburones, inclusive como reservas naturales.

3. Para cumplir con el mandato de la Ley Núm. 314 del 24 de diciembre de 1998 el DRNA tiene que mantener los terrenos identificados de la Reserva Natural del Caño Tiburones saturados por aguas superficiales o subterráneas a un intervalo y duración lo suficiente como para sostener y el cual bajo circunstancias normales sostiene o sostendría una vegetación típicamente adaptada a condiciones de suelos saturados, inundados o empozados, la cual incluye a humedales tales como los pantanos y ciénagas, entre otros.

4. El 26 de octubre de 2011, se recibió en la División de Permisos y Franquicias de Agua, una solicitud de Franquicia por parte de Energy Answer Arecibo LLC, para el aprovechamiento de agua superficial con fines industriales en terrenos del DRNA a extraerse de forma continua de la instalación localizada en la Estación de Bomba El Vigía en la PR 681, Bo. Jarealito en el Municipio de Arecibo.

5. Una evaluación realizada por personal del DRNA se encontró que los datos de la extracción de agua de la estación de bomba El Vigía que consideran los documentos presentados por el peticionario son diferentes a los registros reportados por los operadores del DRNA para esta misma estación de bomba.

6. **La evaluación realizada por el DRNA sobre la práctica de operación de las bombas** en El Vigía destaca que existen periodos extensos que pueden llegar a un mes de **duración en el que el sistema de bombas no se activa para extraer aguas de la Reserva Natural de Caño Tiburones.**

P.O. Box 366147 San Juan Puerto Rico 00936
Tel: 787.999.2200 Fax: 787.999.2303
www.drna.gobierno.pr

7. Existe documentación objetiva en el DRNA y otras agencias de Gobierno sobre la diversidad de uso de terrenos en la periferia de la Reserva Natural que inciden en la aportación de agua fresca, nutrientes y sustratos orgánicos necesarios para el equilibrio natural del ecosistema del Caño Tiburones y la exposición a otro tensor o aprovechamiento de agua de forma continua puede causar la degradación del ecosistema de la Reserva Natural.

8. La Declaración de Impacto Ambiental (DIA) desarrollada para el proyecto de Energy Answers, circulada y considerada por la Junta de Calidad Ambiental (JCA) en el año 2010 no consideró el impacto ambiental de la extracción de agua propuesta en el ecosistema del humedal, a pesar que reconoció correctamente la sensibilidad ecológica de la Reserva Natural de Caño Tiburones.

9. En la evaluación realizada sobre la solicitud de Franquicia se destaca por parte del Negociado de Costas, Reservas y Refugios la necesidad de evaluar la petición considerando los impactos acumulativos en la cuenca que provee agua a la Reserva Caño Tiburones y los escenarios de uso de agua subterránea que debe llegar a esta. No consta en la documentación en apoyo a la solicitud un análisis de impactos acumulativos relacionados a la extracción propuesta vis a vis la condición funcional actual del Caño Tiburones.

10. El aumentar la extracción de agua desde la Estación de Bombas El Vigía o el activar la extracción para cumplir con un caudal de agua establecido por una Franquicia tendría un impacto en el ecosistema de la Reserva Natural de Caño Tiburones que no se ha estudiado y que no está documentado en el análisis presentado por el proponente.

11. Aún cuando el DRNA produjo una comunicación con fecha del 13 de octubre de 2010 presentada como el anejo 2 del documento "Alternative for Water Sources" donde se expresa un caudal de agua extraído diario desde la Estación de Bombas El Vigía de 100 millones de galones diarios (MGD) el dato verificado para extracción diaria por un año no sustenta esa cantidad de extracción.

12. Los datos en la gráfica 1 del anejo 4 del documento "Alternative for Water Sources" indican que la misma representa la cantidad diaria de galones de agua salobre que se extraen pero los datos no son diarios sino de días de funcionamiento por lo que la representación gráfica induce a error al considerar que existe una disponibilidad diaria cuando la gráfica no tiene o provee esa información.

13. Considerando la información evaluada y la responsabilidad del DRNA establecidos por Ley 314 del 24 de diciembre de 1998 se entiende que comprometer el ecosistema de la Reserva Natural de Caño Tiburones con una franquicia de agua como la solicitada causaría un impacto sobre el mismo que afectaría el nivel de saturación y condiciones de suelos para sustentar los humedales, pantanos y ciénagas de la Reserva Natural.

CONCLUSIONES DE DERECHO

1. El Secretario del Departamento de Recursos Naturales y Ambientales está facultado por el Artículo 5 (g) de la Ley Núm. 23 (Ley Orgánica del Departamento de Recursos Naturales y Ambientales) del 20 de junio de 1972, según enmendada, para establecer los derechos a pagarse por los permisos de hincado de pozo para extracción de agua subterránea en terrenos públicos y privados a tenor con las facultades que le son transferidas por el inciso (h) del artículo 6 de la Ley antes señalada, controlar el uso y la extracción de las aguas subterráneas, fijar su ritmo de extracción y establecer los derechos a pagarse por el agua subterránea que se extraiga de pozos en terrenos públicos o privados.

2. Al amparo de la Ley Núm. 136 del 3 de junio de 1976, según enmendada, se promulgó el Reglamento Núm. 6213, Reglamento para el Aprovechamiento, Uso, Conservación, y Administración de las Aguas de Puerto Rico del DRNA.

3. El Reglamento Núm. 6213 faculta al Secretario a denegar solicitudes de Franquicias al amparo del artículo 5.8, inciso (f), al considerar el impacto del aprovechamiento propuesto sobre otros recursos y del inciso (j), sobre su impacto sobre la integridad de los sistemas naturales y, en general, sobre el ecosistema.

Conforme a las **DETERMINACIONES DE HECHOS Y CONCLUSIONES DE DERECHO** antes mencionadas, resolvemos **DENEGAR** la Solicitud de Franquicia para el aprovechamiento de agua en la Estación de Bomba El Vigía en la PR 681, Bo. Jarealito en el Municipio de Arecibo.

Se APERCIBE que por virtud de la Sección 5.4 de la Ley Núm. 170 de 12 de agosto de 1988, según enmendada, mejor conocida como *Ley de Procedimiento Administrativo Uniforme*, toda persona adversamente afectada por la otorgación, denegatoria o revocación de una licencia, franquicia, permiso, endoso, autorización o gestión similar, tendrá dentro de un término de veinte (20) días contados a partir de la notificación de la determinación, tiene derecho a solicitar la impugnación de dicha determinación por medio de un procedimiento de VISTA ADJUDICATIVA, el cual se iniciará con la presentación de un escrito de impugnación presentado en la Oficina de Secretaría del DRNA o dirigido a la Secretaria y el cual se regirá por la Sección 3.1 a la 3.18 de la Ley Núm. 170, *supra*, y por las disposiciones aplicables del Reglamento de Procedimientos Adjudicativos del DRNA.

Expedida hoy 20 de Diciembre de 2013.

Edgardo González González
Sub-Secretario Interino

UNOFFICIAL TRANSLATION

Free Associated State of Puerto Rico
Department of Natural and Environmental Resources

Dec. 20, 2013

DENIAL
WATER FRANCHISE APPLICATION

The Department of Natural and Environmental Resources (DNER) received a Franchise Application for the use of the public waters of Puerto Rico under the provisions of Law No. 136 of June 3, 1976, commonly known as the *Puerto Rico Law of Waters*.

DESCRIPTION OF THE APPLICATION

1. Application Number: O-FA-FAID6-SJ-00168-26102011

2. Applicant: ENERGY ANSWERS ARECIBO LLC

3. Address: THE ATRIUM BUSINESS CENTER
530 AVENIDA CONSTITUCIÓN SUITE 229
SAN JUAN, PUERTO RICO 00901

FINDINGS OF FACT

1. Law No. 314 of Dec. 24, 1998, Law of Public Policy about Wetlands in Puerto Rico, Land Law [12 L.P.R.A. §§ 5001-5005], declares Puerto Rico's public policy concerning wetlands and, to that end, orders the designation of lands that pertain to the Land Authority, including the Caño Tiburones Channel or Marsh, as Natural Reserves.

2. Law No. 314 of Dec. 24, 1998 establishes that the Land Authority and the Department of Natural and Environmental Resources (DNER) shall establish an agreement for the designation of wetlands and lands that are kept dry by pumping, dikes, or other drainage methods that belong to the Land Authority, including the Caño Tiburones Channel or Marsh, as natural preserves.

3. To comply with the mandate of Law No. 314 of Dec. 24, 1998, DNER must maintain the lands identified in the Caño Tiburones Natural Reserve saturated by surface or ground water, at an interval or duration sufficient to sustain, and under normal circumstances, does sustain or would sustain vegetation typically adapted to saturated, flooded, or marshy soil conditions, which include wetlands such as swamps, marshes, and other areas.

4. On October 26, 2011, the Water Permit and Franchise Division received a Franchise application from Energy Answers Arecibo LLC for the use of surface water from DENR lands to be extracted for industrial purposes on a continuous basis from the facility located at the El Vígia Pumping Station at PR 681, Bo. Jarealito in the Municipality of Arecibo.

5. DNER staff's evaluation found that data about water extraction from the El Vígia pump taken into account in the applicant's documents differ from records reported by DNER operators from this very same pumping station.

6. **The DNER evaluation of operation practice of the El Vígia pumps** highlighted that there are extensive periods of up to a month in duration **in which the pumping system is not activated to extract water from the Caño Tiburones Natural Reserve.**

7. There exists objective documentation from DNER and other Government agencies about the diversity of land uses in the periphery of the Natural Reserve that influence the provision of freshwater, nutrients, and organic substrates for the natural equilibrium of the Caño Tiburones ecosystem, and the exposure to another stressor or the continuous use of water can cause the degradation of the ecosystem of the Natural Reserve.

8. The Environmental Impact Statement (EIS) developed for the Energy Answers project and circulated and considered by the Environmental Quality Board (EQB) in 2010 did not consider the environmental impact of the proposed water extraction on the wetlands, despite having correctly recognized the ecological sensitivity of the Caño Tiburones Natural Reserve.

9. The Coasts, Reserves, and Refuges Section highlights in its evaluation of the Franchise application the necessity, when evaluating the application, to consider the cumulative impacts on the basin that provides water to the Caño Tiburones Reserve and scenarios of the use of groundwater that should flow to the Reserve. The application's supporting documents do not include an analysis of the cumulative impacts related to the proposed extraction vis-à-vis the current functional condition of Caño Tiburones.

10. An increase in water extraction from the El Vígia Pumping Station or the activation of extraction to comply with a water flow rate established by a Franchise would have an impact on the ecosystem of the Caño Tiburones Natural Reserve that has not been studied and is not documented in the applicant's analysis.

11. Even at the time of DNER's communication dated October 13, 2010, presented as Annex 2 to the document "Alternative for Water Sources," which shows the volume of water extracted from the El Vígia Pumping Station to be 100 million gallons per day (mgp), verified data for daily extraction over the course of a year do not sustain that amount of extraction.

12. Data in Graph 1 of Annex 4 to the document "Alternative for Water Sources" indicate that the graph represents the daily amount of brackish water extracted in gallons; but the data do not represent daily extraction but, instead, extraction on working days, so the graphic representation may have led to a misunderstanding that this a daily availability of water when the graph does not contain or provide that information.

13. Taking into consideration the evaluated information and DNER's responsibility established under Law No. 314 of Dec. 24, 1998, it is understood that jeopardizing the ecosystem of the

Caño Tiburones Natural Reserve with a water franchise like the one sought would cause an impact to the ecosystem that would affect the saturation level and soil conditions to sustain the wetlands, swamps, and marshes of the Natural Reserve.

CONCLUSIONS OF LAW

1. The Secretary of Natural and Environmental Resources is authorized under § 5(g) of Law No. 23 of June 20, 1972, as amended (Organic Act of the Department of Natural and Environmental Resources) [3 L.P.R.A. §§ 151-163], to establish the fees paid for permits for the sinking of wells for the pumping of subterranean waters in public and private lands in accordance with the faculties transferred by § 6(h) of this Law, to control the use and extraction of subterranean waters, to fix its extraction rhythm, and to establish the fees to be paid for the subterranean waters to be extracted from the wells in public or private lands.

2. DNER Regulation 6213, Regulation of the Exploitation, Use, Conservation, and Administration of the Waters of Puerto Rico, was promulgated under the authority of Law No. 136 of June 3, 1976, as amended.

3. Regulation 6213 authorizes the Secretary to deny Franchise applications under the authority of § 5.8(f) upon consideration of the impact of the proposed use on other resources and, under § 5.8(j), upon consideration of the impact on the integrity of natural systems and the ecosystem, generally.

In accordance with the **FINDINGS OF FACT AND CONCLUSIONS OF LAW** detailed above, we resolve to **DENY** the Franchise Application for the use of water from the El Vígia Pumping Station at PR 681, Bo. Jarealito in the Municipality of Arecibo.

It is NOTED that, pursuant to § 5.4 of Law No. 170 of Aug. 12, 1988, as amended [3 L.P.R.A. § 2184], commonly known as the *Uniform Administrative Procedure Act*, any person who has been adversely affected by the granting, denial, or revocation of a license, franchise, permit, endorsement, authorization, or similar matter shall have the right to question the agency's determination, within a term of twenty (20) days counted from notice of the determination, through the process of an ADJUDICATORY HEARING, which is initiated by the filing of a written challenge with the Office of the DNER Secretary or addressed to the Secretary, and will be governed by §§ 3.1-3.18 of Law No. 170, *supra*, and by the applicable provisions of DNER's Regulations on Adjudicative Procedures.

Issued today, the 20th of December, 2013.

Edgardo González González
Interim Deputy Secretary

DECLARATION OF JONATHAN SMITH

I, Jonathan Smith, do hereby declare as follows:

1. My full name is Jonathan James Smith. I am of legal age and competent to give this declaration. All of the information herein is based on my own personal knowledge unless otherwise indicated.

2. I am fluent in English, Spanish, and Japanese, and have professional experience working in all of these languages and translating documents in these languages.

3. Specifically, I worked as a Coordinator for International Relations for the prefectural government of Yamanashi Prefecture, Japan from 2005 to 2008; as a legal intern at the Interamerican Association for Environmental Defense ("AIDA") in 2009; and as a freelance translator for Crimson Interactive, Inc. ("Crimson") from 2012 to 2013. My work at Yamanashi Prefecture, AIDA, and Crimson involved the translation of documents between English, Spanish, and Japanese, among other tasks. At Yamanashi Prefecture and AIDA, I routinely translated documents, including legal documents, into and from Spanish.

4. I hereby certify that I have translated from Spanish to English the attached Denial of Water Franchise Application submitted by the Puerto Rico Department of Natural and Environmental Resources to Energy Answers Arecibo LLC on December 20, 2013. I declare, to the best of my abilities and belief, that this is a true and correct translation from the Spanish language version of the above-named document.

EXECUTED this 12th day of November 2015 in New York, New York.

Jonathan Smith

Exhibit 3

DNER Rescission of Agreement with Energy Answers Arecibo LLC

ESTADO LIBRE ASOCIADO DE
PUERTO RICO
Departamento de Recursos Naturales
y Ambientales

27 de enero de 2014

Sr. Mark Green
Director Proyecto
Energy Answer Arecibo, LLC
The Atrium Business Center
530 Avenida Constitución Suite 229
San Juan, Puerto Rico 00901

Estimado señor Green:

ACUERDO (AGREEMENT) ENTRE EL DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES Y ENERGY ANSWERS ARECIBO, LLC

El pasado 30 de agosto de 2012 el Departamento de Recursos Naturales y Ambientales (DRNA) y Energy Answers Arecibo, LLC, suscribieron un ACUERDO (Agreement) dirigido a permitir la ocupación de las tierras, facilidades y propiedades sitas en la Estación de Bombas "El Vigía" (en adelante Estación de Bombas), en la PR 681, Bo. Jarealito, Municipio de Arecibo.

La Estación de Bombas está ubicada en terrenos cuya titularidad recae sobre la Autoridad de Tierras (en adelante AT) y que en virtud de la Ley Núm. 314 del 24 de diciembre de 1998, *Ley de Política Pública sobre Humedales en Puerto Rico*, designó la Reserva Natural Caño Tiburones. Eventualmente la AT cede el uso y disfrute de los terrenos de la Reserva Natural Caño Tiburones por un periodo de noventa y nueve (99) años a cambio del pago de cinco mil dólares ($5,000) anuales y se le transfiere la operación del sistema de bombas al costo del DRNA.

La transferencia de la operación del sistema de bombas imponía garantizar que se mantuviese los niveles de agua necesarios para mantener inundados los terrenos de la Reserva Natural Caño Tiburones en armonía con los usos periferales existentes y sin afectar por razón de inundación las comunidades aledañas a la Reserva.

El 26 de octubre de 2011 Energy Answers Arecibo, LLC presentó una Solicitud de Franquicia para el aprovechamiento de aguas superficiales con fines industriales a extraerse de forma continua de la Estación de Bombas El Vigía antes mencionada.

P.O. Box 366147 San Juan Puerto Rico 00936
Tel: 787.999.2200 Fax: 787.999.2303
www.drna.gobierno.pr

DRNA

El resultado de la evaluación de la Solicitud de Franquicia culminó con una Denegatoria expedida el 20 de diciembre de 2013, suscrita por el Sr. Edgardo González González, Sub-secretario Interino designado, el 13 de diciembre de 2013 y notificada el 7 de enero de 2014, donde se determina y de manera suscinta resumimos que, el aprovechamiento de las aguas superficiales a extraerse de forma continua de la Estación de Bombas El Vigía ha de causar la degradación del ecosistema de la Reserva Natural, ya que el aumentar la extracción de agua desde la Estación de Bomba, antes referida, o el activar la extracción para cumplir con un caudal de agua establecido por una Franquicia con fines industriales tendría un impacto sobre el ecosistema de la Reserva Natural Caño Tiburones que no se ha estudiado y que no fue documentado en el análisis presentado por la parte proponente. Concluyendo además que dicha extracción podría afectar el nivel de saturación y condiciones de suelos necesarios para sustentar los humedales, pantanos y ciénagas comprendidas dentro de la Reserva Natural Caño Tiburones.

Habida cuenta que el ACUERDO antes referido tenía como objetivo primario que se le garantizara el uso de las facilidades de la Estación de Bombas y mediante una operación y mantenimiento compartido con el DRNA para la viabilización de la extracción de aguas superficiales de forma continua de la referida Estación de Bombas mediante la correspondiente Franquicia; y que evaluada la Solicitud de Franquicia, en cumplimiento con el deber ministerial de conservar y proteger los recursos naturales en armonía con el interés público, ha encontrado que las actividades propuestas no garantizan tal cumplimiento del deber ministerial impuesto por carecer de información técnico-científica fehaciente que conduzcan a una determinación responsable e indelegable, se ha determinado tomar todas aquellas medidas cautelares y de prevención en armonía con la Ley Núm. 314, *Supra*. Por lo tanto, se ha resuelto rescindir el ACUERDO por entender inviable el aprovechamiento de aguas públicas mediante Franquicia desde el punto de extracción identificado en el mismo.

Atentamente,

Irma Pagán Villegas
Subsecretaria

MSB/IPV/msb

UNOFFICIAL TRANSLATION

Free Associated State of Puerto Rico
Department of Natural and Environmental Resources

January 27, 2014

Mr. Mark Green
Project Director
Energy Answers Arecibo, LLC
The Atrium Business Center
530 Avenida Constitución Suite 229
San Juan, Puerto Rico 00901

Dear Mr. Green:

AGREEMENT BETWEEN THE DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES AND ENERGY ANSWERS ARECIBO, LLC

On August 30, 2012, the Department of Natural and Environmental Resources (DNER) and Energy Answers, LLC signed an AGREEMENT addressing the permission to occupy the lands, facilities, and properties situated in the "El Vígia" Pumping Station (hereinafter, "Pumping Station") at PR 681, Bo. Jarealito, Municipality of Arecibo.

The Pumping Station is situated in lands whose title is held by the Land Authority (hereinafter, "LA") and are designated, pursuant to Law No. 314 of Dec. 24, 1998, *Law of Public Policy about Wetlands in Puerto Rico*, the Caño Tiburones Natural Reserve. LA cedes the use and enjoyment of the lands of the Caño Tiburones Natural Reserve temporarily, for a period of ninety-nine (99) years, in exchange for the annual payment of five thousand dollars ($5,000) and transfers the operation of the pumping system to the charge of DNER.

The transfer of the operation of the pumping system required the guarantee that water be maintained at levels necessary to keep the lands of the Caño Tiburones Natural Reserve inundated, in harmony with the existing peripheral uses and without affecting, through inundation, the communities adjacent to the Reserve.

On October 26, 2011, Energy Answers Arecibo, LLC submitted a Franchise Application for the use of surface waters for industrial purposes to be extracted on a continuous basis from the above-mentioned El Vígia Pumping Station.

The evaluation of the Franchise Application resulted in a Denial issued on December 20, 2013, signed by Mr. Edgardo González González, Interim Deputy Secretary designated December 13, 2013, and notified January 7, 2014, whose determination, we briefly summarize here, was that the use of surface waters extracted on a continuous basis from the El Vígia Pumping Station must cause the degradation of the ecosystem of the Natural Reserve, since an increase in the extraction of water from the above-named Pumping Station or the activation of the extraction to comply with a flow rate established by a Franchise for industrial purposes would have an impact on the ecosystem of the Caño Tiburones Natural Reserve that has not been studies and that was not documented in the analysis submitted by the proponent. The Denial also concluded that this extraction could affect the saturation level and soil conditions necessary to sustain the wetlands, swamps, and marshes contained in the Caño Tiburones Natural Reserve.

Considering that the primary objective of the above-mentioned AGREEMENT was to guarantee the use of the facilities of the Pumping Station and to make viable, through operation and maintenance shared with DNER, the extraction of surface waters on a continuous basis from said Pumping Station through the corresponding Franchise; and that, upon evaluation of the Franchise Application, in compliance with the ministerial duty of conserving and protecting natural resources in harmony with the public interest, we have discovered that the proposed actions do not guarantee said compliance with the ministerial duty for lack of reliable scientific and technical information that lead to a determination that is responsible and non-delegable; we have determined to take all precautionary and preventive measures in harmony with Law No. 314, *supra*. As such, we have decided to rescind the AGREEMENT based on the understanding that the use of public waters through the Franchise from the extraction point identified in the AGREEMENT is not viable.

Sincerely,

Irma Pagan Villegas
Deputy Secretary

MSB/IPV/msb

DECLARATION OF JONATHAN SMITH

I, Jonathan Smith, do hereby declare as follows:

1. My full name is Jonathan James Smith. I am of legal age and competent to give this declaration. All of the information herein is based on my own personal knowledge unless otherwise indicated.

2. I am fluent in English, Spanish, and Japanese, and have professional experience working in all of these languages and translating documents in these languages.

3. Specifically, I worked as a Coordinator for International Relations for the prefectural government of Yamanashi Prefecture, Japan from 2005 to 2008; as a legal intern at the Interamerican Association for Environmental Defense ("AIDA") in 2009; and as a freelance translator for Crimson Interactive, Inc. ("Crimson") from 2012 to 2013. My work at Yamanashi Prefecture, AIDA, and Crimson involved the translation of documents between English, Spanish, and Japanese, among other tasks. At Yamanashi Prefecture and AIDA, I routinely translated documents, including legal documents, into and from Spanish.

4. I hereby certify that I have translated from Spanish to English the attached Letter from the Puerto Rico Department of Natural and Environmental Resources to Energy Answers Arecibo LLC dated January 27, 2014. I declare, to the best of my abilities and belief, that this is a true and correct translation from the Spanish language version of the above-named document.

EXECUTED this 12th day of November 2015 in New York, New York.

Jonathan Smith

Exhibit 4

PSD Permit Extension Request

EnergyAnswers Arecibo

30 JUL 2015 RCVD

July 26, 2015

Steven C. Riva, Chief
USEPA Region 2
Permitting Section, Air Programs Branch
290 Broadway
New York, NY 10007-1866

Subject: Energy Answers Arecibo, LLC (EAA)
Prevention of Significant Deterioration Air Permit Expiration Date

Dear Mr. Riva:

I am writing to request an extension of the Expiration Date of the Energy Answers Arecibo Resource Recovery Facility (the Project) PSD permit.

As you may recall, the initial Project PSD permit was issued on June 11, 2013. Within the 30-day comment period, a challenge was filed with the EPA Environmental Appeals Board (EAB). The EPA, with the support of the DOJ and participation of Energy Answers, successfully defended the permit with a final ruling being issued by the EAB on March 25th, 2014 and the final permit being issued on April 10th, 2014.

On July 16th, 2014, a subgroup of the original group that challenged the PSD permit filed an appeal with the D.C. Circuit Court against the EAB decision. The challenge presented by this group focuses primarily on the intersection of the nonattainment new source review regulations and the attainment based PSD review regulations, as they pertain to the lead review for the Project.

Since the commencement of the D.C Circuit Court appeal, a series of motions have been filed by the opposition group, EPA/DOJ and Energy Answers. In December 2014, the court chose not to make a summary judgment on the case and requested that a full set of arguments be submitted by all parties. The final set of motions was delivered to the court on July 7, 2015 and the parties are now waiting for the oral arguments schedule to be set. The date for these arguments and the issuance of the final ruling are expected to fall after the October 10th, 2015 Expiration Date of our existing PSD permit.

While it is understood that we are fully authorized to commence construction of the Project under the PSD permit regulations, for multiple reasons it is not feasible or practicable to finance and/or commence an intensive construction program until the appeal is resolved. It is our hope

Energy Answers Arecibo, LLC
SAN JUAN: The Atrium Business Center • Suite 229 • 530 Constitution Avenue • San Juan • PR • 00901-2304 • Phone: 787 289-7804
NEW YORK: 79 North Pearl Street • Albany • NY • 12207 • Phone: 518 434 1227 • Fax: 518 436 6343

that the court case will be completed and a favorable ruling issued in December 2015; however, we must be prepared for this to take longer, as there is no time limit on when the ruling must be issued. For these reasons we request an extension of the PSD permit for an additional 18 months.

Thank you in advance for your consideration of this important matter. We are available to discuss this and any other related issue at your earliest convenience.

Best regards,

Mark J. Green
Vice President
Energy Answers Arecibo, LLC

Exhibit 5

PSD Permit Extension

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

OCT - 1 2015

Mr. Patrick Mahoney
President
Energy Answers, LLC
79 North Pearl Street
Albany, New York 12207

Re: Prevention of Significant Deterioration (PSD) of Air Quality
Request for a PSD Permit Extension for the Energy Answers Arecibo Puerto Rico Renewable Energy Project

Dear Mr. Mahoney:

EPA is in receipt of your letters dated July 26, 2015 and August 14, 2015 requesting an extension of the final PSD permit for the proposed Energy Answers Arecibo, LLC (Energy Answers) facility. We have reviewed the information you provided, considered nationally issued guidance on PSD permit extensions, and determined that an extension of 18 months is warranted in this case.

Background

On April 10, 2014, EPA Region 2 issued a final and effective PSD permit decision for construction of the Energy Answers Arecibo Puerto Rico Renewable Energy Project. EPA regulations at 40 CFR 52.21 (r) (2) provide that the permit will become invalid if construction is not commenced within 18 months of your receipt of the final permit decision. Given the April 10, 2014 permit issuance date, and your receipt of the permit on that date, the 18-month period will end on October 10, 2015. However, 40 CFR 52.21 (r) (2) also provides that EPA may extend the 18-month period for commencement of construction upon a satisfactory showing that an extension is justified.

Following issuance of the final PSD permit decision for Energy Answers, Sierra Club de Puerto Rico, et al., filed a petition for judicial review on July 16, 2014 in the D.C. Circuit Court. While no specific condition of the PSD permit was challenged, the petitioners argue that when EPA granted the PSD permit, it erroneously concluded that nonattainment New Source Review did not apply. The case has already been fully briefed but the Court has not yet scheduled oral argument.

Discussion

EPA's interpretation of the permit extension provision of 40 CFR 52.21(r) (2) is discussed in EPA's Memorandum dated January 31, 2014, titled "Guidance on Extension of Prevention of

Significant Deterioration (PSD) Permits under 40 CFR 52.21(r) (2)" (Extension Memorandum). This Memorandum clarifies what EPA considers adequate justification for such an extension and indicates that a request for extension should be evaluated on a case-by-case basis. However, for first-time PSD permit extension requests, the Memorandum specifically cites ongoing litigation and "inability to secure financial resources necessary to commence construction," as relevant factors in determining whether adequate justification has been provided. The memorandum also references "significant or unusual economic impediments (including inability to secure financial resources necessary to commence construction)" as relevant factors that may justify a first-time extension.

Your August 14, 2015 letter indicates that the ongoing litigation "precludes the completion of financing and release of construction funds for the Project' and "precludes the execution of the design-build construction contract." We are mindful of the fact that the D.C. Circuit case might not be decided until as late as next summer and recognize, as your August 14, 2015 letter notes, the time necessary to complete the financing after a decision. Your August 14, 2015 letter also references, among other factors, the impact of Puerto Rico's economic situation on the project which has required your company to adopt new strategies for financial viability including a request for the use of a federally-backed loan program from the United States Department of Agriculture Rural Utilities Service that requires an Environmental Impact Statement. These details, along with others in your letter, provide adequate justification under the Extension Memorandum for a permit extension without any revisions or reconsideration of the substantive conditions of the permit. Therefore, EPA is extending the Energy Answers PSD permit for an additional 18-month period, until April 10, 2017.

The Memorandum encourages the permitting authority to notify the public once it has issued the permit extension, particularly where there has been significant public interest in the permit. Given the large number of commenters on the Energy Answers PSD permit, Region 2 will be posting this decision to extend the Energy Answers PSD permit on its website and placing notice of this decision in a local newspaper.

In conclusion, EPA has determined that Energy Answers has provided adequate justification for its request for an 18-month extension, consistent with what EPA has described as an adequate justification in the Extension Memorandum. Therefore, EPA extends the effective date of the Energy Answers' PSD permit until April 10, 2017. Please note that this action does not alter the substantive PSD permit conditions found in Enclosure I and the Enclosure II-General Permit Conditions which were included with the April 10, 2014 PSD permit. Also note that in the event that Energy Answers does not commence construction by April 10, 2017, Region 2 is not inclined to grant another extension. As observed by EPA in the Extension Memorandum, "it is significantly more likely that technology and air quality considerations will become outdated when construction does not begin until 36 months or longer" after the final PSD permit is issued.

If you have any questions regarding this letter, please call me at (212) 637-3736 or Steven Riva, Chief, Permitting Section, Air Programs Branch, at (212) 637-4074.

Sincerely,

John Filippelli, Director
Clean Air and Sustainability Division

cc: Luis Sierra, Puerto Rico Environmental Quality Board
Jose Font, EPA Region 2, Caribbean Environmental Protection Division

Exhibit 6

Statement of
Steven Klafka, P.E., BCEE

Evaluation of Lifetime Cancer Risk Analysis for Energy Answers Project in Puerto Rico

Wingra Engineering, S.C.
Steven Klafka, P.E., BCEE, President & Environmental Engineer
(November 11, 2015)

1.0 INTRODUCTION

Energy Answers Arecibo, LLC is proposing to construct a waste to energy facility in Arecibo, Puerto Rico ("the Facility"). ARCADIS, a consultant for Energy Answers, prepared a Human Health Risk Assessment (HHRA) for the proposed facility in 2010. The purpose of the HHRA was to evaluate the potential for exposure to emissions from the two proposed combustion units at the Facility considering both direct (i.e., inhalation) and indirect (i.e., ingestion) exposure pathways.

The HHRA is presented in the "Human Health Risk Assessment for the Proposed Energy Answers International Waste to Energy Facility Located in Arecibo Puerto Rico" dated October 2010, which is Appendix K of the Environmental Impact Statement prepared by the Puerto Rico Industrial Development Company and available from the U.S. Department of Agriculture.[1]

On April 10, 2014, the Facility was issued a Prevention of Significant Deterioration (PSD) air permit by U.S. Environmental Protection Agency (EPA) Region 2.[2] This permit established the final approved air pollution emission limitations for the Facility.

When evaluating the air pollution impacts of a new air pollution source such as the Facility, it is common practice to use the allowable or approved emissions from the facility. These allowable emissions will be verified through compliance testing and monitoring after the facility is constructed. Actual emissions will vary depending on facility operating conditions as well as the design and condition of the air pollution control equipment. However, rather than basing the HHRA on the allowable emissions from the proposed Facility, ARCADIS based the HHRA on estimated emissions that likely under-estimate the Facility's actual emissions.

Wingra Engineering[3] evaluated the HHRA and estimated cancer risk to determine the effect of using more realistic emissions values from the Facility rather than the likely under-estimated emissions used by the HHRA. The calculations and results of this evaluation are provided in Appendix A of this report.

[1] ARCADIS, Human Health Risk Assessment for the Proposed Energy Answers International Waste to Energy Facility Located in Arecibo Puerto Rico, October 2010. http://www.rd.usda.gov/publications/environmental-studies/impact-statements/arecibo-waste-energy-generation-and-resource

[2] USEPA, Final Permit Prevention of Significant Deterioration (PSD) of Air Quality Energy Answers Arecibo Puerto Rico Renewable Energy Project, April 10, 2014.

2.0 EMISSIONS UNDERYLING THE HHRA's CALCULATION OF EXCESS LIFETIME CANCER RISKS

Rather than using realistic, or permitted emissions, the HHRA is based on likely under-estimates of emissions from the Facility. These are presented in *Table 1 – Emission Rates for Chemicals of Potential Concern* in the HHRA.

Particulate Matter (PM) emissions from the Facility will be controlled using a baghouse air pollution control system. The baghouse will capture metals and organics contained in the PM. As discussed on Page 13 of the HHRA, the actual emissions of metals and organics associated with the PM emissions in Table 1 are based on a PM emission rate of 0.00073 grains per dry standard cubic foot (gr/dscf). This emission rate is unrealistically low. It is based on applying a 100 safety factor to concentrations measured during laboratory tests on baghouse filters material as part of USEPA's Environmental Technology Verification Program.[4] These laboratory tests do not reflect the control of actual real-life PM emissions from an air pollution source, real-life operating conditions of a baghouse, or reflection of the actual fabric material to be used by the Facility. As noted in the HHRA, actual emissions measured from the SEMASS facility in Massachusetts were 0.0019 gr/dscf, three times higher than used for the HHRA.

The actual emissions of metals and organics from the Facility were calculated using the actual emissions measured during stack tests at the SEMASS facility in Massachusetts reduced by 62% to reflect the anticipated PM emissions of 0.00073 gr/dscf compared to the measured emissions of 0.0019 gr/dscf. The metals include emissions of antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, tin, vanadium, and zinc. The organics include one poly aromatic hydrocarbon and several isomers of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/F).

Emissions of other non-PM air pollutants in Table 1 were based on emissions as measured during stack tests at the SEMASS facility in Massachusetts.

3.0 EVALUATION PROCEDURES AND RESULTS

Table 16 of the HHRA presents the estimated Total Excess Lifetime Cancer Risks for urban, suburban, farmer and fisher residents. Pathways to resident exposure from the Facility's emissions included the following:

- Air inhalation
- Soil ingestion
- Ingestion of locally-grown produce
- Ingestion of drinking water from surface water source

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[3] Wingra Engineering, S.C., based in Madison, Wisconsin, provides professional environmental engineering consulting services. President Steven Klafka, the author of this evaluation, is a Professional Engineer with expertise in air pollution emission estimates, control, modeling and risk assessment. His resume is attached as Appendix B.

[4] USEPA, Environmental Technology Verification Report Baghouse Filtration Products, W.L. Gore & Associates, Inc., L3650 Filtration Media, (Tested November–December 2009). http://archive.epa.gov/nrmrl/archive-etv/web/pdf/600etv10023.pdf

- Ingestion of beef
- Ingestion of milk from dairy cows
- Ingestion of poultry
- Ingestion of eggs
- Ingestion of pork
- Ingestion of fish

The residents with the highest estimated cancer risk were the Fishers, with a risk of 2 in one million for adults and 1.7 in one million for children. Since the Fisher residents had the highest estimated risk, they were used for this evaluation to determine the effect of changing the facility emissions to reflect more realistic and allowable stack emissions.

Assuming a linear relationship between emissions and risk, the estimated risk was adjusted under various scenarios:

1. Scenario 1 is the HHRA's analysis. It is presented in Table 16 of the HHRA, which is based on laboratory test results for PM and SEMASS stack tests for PCDD/F.
2. Scenario 2 is based on actual emissions from SEMASS stack tests for PM and PCDD/F.
3. Scenario 3 is based on the Facility's permit limit for PM and actual emissions from SEMASS stack tests for PCDD/F.
4. Scenario 4 is based on the Facility's permit limits for both PM and PCDD/F.

Results of the evaluation are summarized in Table A. Based on this evaluation, the total excess lifetime cancer risk increased from 4 in one million (3.7×10^{-6}) as shown in Table 16 of the HHRA to 63 in one million (6.3×10^{-5}) in Scenario 4 based on the allowable emissions contained in the Facility's PSD air permit.

For a new air pollution source like this Facility, it would be more common to estimate compliance with air quality standards using the approved emissions in the air permit rather than estimated emissions. Thus, the estimated 63 in one million cancer risk is more realistic and relevant than the 3.7 in one million risk calculated by the HHRA.

4.0 USE OF PROPRIETY SOFTWARE TO ESTIMATE CANCER RISKS

This evaluation was limited to adjusting the emission rates and cancer risks which were presented in the HHRA. It was not possible to evaluate the assumptions used by the HHRA to predict the cancer risk and health hazards of the proposed Facility. No risk assessment calculations were publicly available to show how Arcadis converted air pollutant concentrations and deposition rates into exposure of surrounding residents.

Wingra Engineering filed a Freedom of Information Act request to EPA Region 2 for the AERMOD input and output files used by Arcadis in its risk assessment. EPA Region 2 produced two DVDs of AERMOD files predicting pollutant air concentrations and deposition. The files contained no risk assessment calculations showing how the AERMOD results were converted to exposure of surrounding residents.

Page 30 of the HHRA says:

The exposure media calculations were facilitated with the use of commercially available software, Industrial Risk Assessment Program-Health (IRAP-h View, or IRAP, version 4.0) developed by Lakes Environmental. IRAP was developed to compute human health risk assessments in direct conformance with USEPA's Final 2005 HHRAP.

IRAP is software sold by Lakes Environmental which allows the AERMOD dispersion model output to be processed to predict exposure and risk. The following is a description of the software:

IRAP-h View is a user-friendly graphical interface for conducting a comprehensive multi-pathway human health risk assessment. It simultaneously calculates risk values for multiple chemicals, from multiple sources, at multiple exposure locations. Regardless of experience, risk assessors, trial burn planners, permit writers, and toxicologists can readily produce expert results and professional reports. Most of all, they are completing these projects within only a fraction of the time and cost traditionally absorbed during in-depth risk assessments.[5]

Many of the assumptions for converting air pollutant concentrations and deposition rates into exposure are contained within the IRAP software. This includes the type of resident (i.e. urban or suburban resident, farmer, fisher, etc.) and their food consumption. It was not possible to evaluate the assumptions underlying the HHRA's calculations of cancer risk and health hazards since these are contained within the proprietary IRAP software.

[5] http://www.weblakes.com/products/iraph/index.html

Table A - Estimated Cancer Risk to Fisher Resident at Various Emission Scenarios

Scenario	Scenario 1 Original Risk Assessment			Scenario 2 SEMASS Stack Test Results			Scenaro 3 Approved PM Emissions			Scenario 4 Approved PM & PCDD/F Emissions		
PM Emissions Basis	Laboratory Test on Unspecified Filters			SEMASS Tests			Energy Answers Permit Limit			Energy Answers Permit Limit		
PCDD/F Emissions Basis	SEMASS Tests			SEMASS Tests			SEMASS Tests			Energy Answers Permit Limit		
Fisher Resident	Adult	Child	Total	Adult	Child	Total	Adult	Child	Total	Adult	Child	Total
Total Combined Risk	2.0E-06	1.7E-06	3.7E-06	5.2E-06	4.3E-06	9.5E-06	2.7E-05	2.2E-05	4.9E-05	3.3E-05	3.0E-05	6.3E-05

Appendix A

Evaluation Calculations

Scenario			Scenario 1 Original Risk Assessment			Scenario 2 SEMASS Stack Test Results			Scenaro 3 Approved PM Emissions			Scenario 4 Approved PM & PCDD/F Emissions		
PM Emissions Basis			Laboratory Test on Unspecified Filters			SEMASS Tests			Energy Answers Permit Limit			Energy Answers Permit Limit		
PCDD/F Emissions Basis			SEMASS Tests			SEMASS Tests			SEMASS Tests			Energy Answers Permit Limit		
PM Emissions (qr/dscf @7% O2)			0.00073			0.0019			0.01			0.01		
PCDD/F (ng/dscm @7% O2)			0.225			0.225			0.225			10		
			Adult Cancer Risk	**Child Cancer Risk**	**Total Cancer Risk**	**Adult Cancer Risk**	**Child Cancer Risk**	**Total Cancer Risk**	**Adult Cancer Risk**	**Child Cancer Risk**	**Total Cancer Risk**	**Adult Cancer Risk**	**Child Cancer Risk**	**Total Cancer Risk**
Total Combined Risk for All Pollutants as Calculated Below			**2.03E-06**	**1.68E-06**	**3.71E-06**	**5.23E-06**	**4.27E-06**	**9.51E-06**	**2.72E-05**	**2.21E-05**	**4.93E-05**	**3.33E-05**	**3.00E-05**	**6.32E-05**

Inhalation Exposure Pathway

(Based on Table E-3, Page 1 of 3)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	
COPC Name	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	
Antimony	7440-36-0	Inhalation	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Arsenic	7440-38-2	Inhalation	2.01E-09	4.02E-10	2.63	5.29E-09	1.06E-09	5.26	2.78E-08	5.56E-09	1.0	2.78E-08	5.56E-09	
Beryllium	7440-41-7	Inhalation	1.15E-10	2.30E-11	2.63	3.02E-10	6.05E-11	5.26	1.59E-09	3.18E-10	1.0	1.59E-09	3.18E-10	
Cadmium	7440-43-9	Inhalation	9.71E-10	1.94E-10	2.63	2.55E-09	5.10E-10	5.26	1.34E-08	2.68E-09	1.0	1.34E-08	2.68E-09	
Chromium, hexavalent	18540-29-9	Inhalation	1.66E-08	1.77E-08	2.63	4.37E-08	4.66E-08	5.26	2.30E-07	2.45E-07	1.0	2.30E-07	2.45E-07	
Cobalt	7440-48-4	Inhalation	1.08E-09	2.16E-10	2.63	2.84E-09	5.68E-10	5.26	1.49E-08	2.99E-09	1.0	1.49E-08	2.99E-09	
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Inhalation	8.76E-12	1.75E-12	2.63	2.30E-11	4.60E-12	5.26	1.21E-10	2.42E-11	44.4	5.38E-09	1.08E-09	
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Inhalation	6.41E-12	1.28E-12	2.63	1.69E-11	3.37E-12	5.26	8.87E-11	1.77E-11	44.4	3.94E-09	7.86E-10	
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Inhalation	1.75E-12	3.49E-13	1.00	1.75E-12	3.49E-13	1.00	1.75E-12	3.49E-13	44.4	7.77E-11	1.55E-11	
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Inhalation	6.26E-12	1.25E-12	2.63	1.65E-11	3.29E-12	5.26	8.66E-11	1.73E-11	44.4	3.85E-09	7.68E-10	
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Inhalation	1.55E-11	3.10E-12	2.63	4.08E-11	8.15E-12	5.26	2.14E-10	4.29E-11	44.4	9.52E-09	1.90E-09	
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Inhalation	1.57E-11	3.13E-12	2.63	4.13E-11	8.23E-12	5.26	2.17E-10	4.33E-11	44.4	9.64E-09	1.92E-09	
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Inhalation	3.68E-11	7.36E-12	2.63	9.68E-11	1.94E-11	5.26	5.09E-10	1.02E-10	44.4	2.26E-08	4.52E-09	
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Inhalation	6.28E-11	1.26E-11	1.00	6.28E-11	1.26E-11	1.00	6.28E-11	1.26E-11	44.4	2.79E-09	5.60E-10	
HexaCDF, 1,2,3,7,8,9-	72918-21-9	Inhalation	1.32E-11	2.64E-12	1.00	1.32E-11	2.64E-12	1.00	1.32E-11	2.64E-12	44.4	5.86E-10	1.17E-10	
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Inhalation	5.88E-11	1.18E-11	1.00	5.88E-11	1.18E-11	1.00	5.88E-11	1.18E-11	44.4	2.61E-09	5.24E-10	
Indeno(1,2,3-cd) pyrene	193-39-5	Inhalation	1.67E-14	1.78E-14	2.63	4.39E-14	4.68E-14	5.26	2.31E-13	2.46E-13	1.0	2.31E-13	2.46E-13	
Lead	7439-92-1	Inhalation	1.88E-10	3.76E-11	2.63	4.94E-10	9.89E-11	5.26	2.60E-09	5.20E-10	1.0	2.60E-09	5.20E-10	
Manganese	7439-96-5	Inhalation	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Mercury	7439-97-6	Inhalation	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Nickel	7440-02-0	Inhalation	2.77E-10	5.54E-11	2.63	7.29E-10	1.46E-10	5.26	3.83E-09	7.66E-10	1.0	3.83E-09	7.66E-10	
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Inhalation	6.10E-13	1.22E-13	2.63	1.60E-12	3.21E-13	5.26	8.44E-12	1.69E-12	44.4	3.75E-10	7.49E-11	
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Inhalation	1.46E-13	2.93E-14	1.00	1.46E-13	2.93E-14	1.00	1.46E-13	2.93E-14	44.4	6.48E-12	1.30E-12	
PentaCDD, 1,2,3,7,8-	40321-76-4	Inhalation	2.58E-10	5.17E-11	1.00	2.58E-10	5.17E-11	1.00	2.58E-10	5.17E-11	44.4	1.15E-08	2.30E-09	
PentaCDF, 1,2,3,7,8-	57117-41-6	Inhalation	1.54E-11	3.08E-12	1.00	1.54E-11	3.08E-12	1.00	1.54E-11	3.08E-12	44.4	6.84E-10	1.37E-10	
PentaCDF, 2,3,4,7,8-	57117-31-4	Inhalation	2.13E-10	4.25E-11	1.00	2.13E-10	4.25E-11	1.00	2.13E-10	4.25E-11	44.4	9.46E-09	1.89E-09	
Selenium	7782-49-2	Inhalation	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00	
TetraCDD, 2,3,7,8-	1746-01-6	Inhalation	1.17E-10	2.33E-11	1.00	1.17E-10	2.33E-11	1.00	1.17E-10	2.33E-11	44.4	5.20E-09	1.03E-09	
TetraCDF, 2,3,7,8-	51207-31-9	Inhalation	2.16E-10	4.31E-11	1.00	2.16E-10	4.31E-11	1.00	2.16E-10	4.31E-11	44.4	9.59E-09	1.91E-09	
Vanadium	7440-62-2	Inhalation	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Zinc	7440-66-6	Inhalation	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cancer Risk		Pathway Total:	2.23E-08	1.88E-08		5.71E-08	4.92E-08		2.96E-07	2.58E-07		3.92E-07	2.77E-07	

Soil Ingestion Exposure Pathway

(Based on Table E-3, Page 3 of 3)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	
COPC Name	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	
Antimony	7440-36-0	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Arsenic	7440-38-2	Soil Ingestion	5.54E-11	1.03E-10	2.63	1.46E-10	2.71E-10	5.26	7.66E-10	1.42E-09	1.0	7.66E-10	1.42E-09	
Beryllium	7440-41-7	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cadmium	7440-43-9	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Chromium, hexavalent	18540-29-9	Soil Ingestion	3.64E-11	3.63E-10	2.63	9.57E-11	9.55E-10	5.26	5.04E-10	5.02E-09	1.0	5.04E-10	5.02E-09	
Cobalt	7440-48-4	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Copper	7440-50-8	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Soil Ingestion	1.03E-11	1.93E-11	2.63	2.71E-11	5.08E-11	5.26	1.42E-10	2.67E-10	44.4	6.33E-09	1.19E-08	
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Soil Ingestion	7.49E-12	1.40E-11	2.63	1.97E-11	3.68E-11	5.26	1.04E-10	1.94E-10	44.4	4.60E-09	8.60E-09	
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Soil Ingestion	1.95E-12	3.64E-12	1.00	1.95E-12	3.64E-12	1.00	1.95E-12	3.64E-12	44.4	8.66E-11	1.62E-10	
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Soil Ingestion	7.23E-12	1.35E-11	2.63	1.90E-11	3.55E-11	5.26	1.00E-10	1.87E-10	44.4	4.44E-09	8.29E-09	
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Soil Ingestion	1.78E-11	3.31E-11	2.63	4.68E-11	8.71E-11	5.26	2.46E-10	4.58E-10	44.4	1.09E-08	2.03E-08	
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Soil Ingestion	1.81E-11	3.38E-11	2.63	4.76E-11	8.89E-11	5.26	2.50E-10	4.68E-10	44.4	1.11E-08	2.08E-08	
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Soil Ingestion	4.13E-11	7.71E-11	2.63	1.09E-10	2.03E-10	5.26	5.71E-10	1.07E-09	44.4	2.54E-08	4.74E-08	
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Soil Ingestion	7.03E-11	1.31E-10	1.00	7.03E-11	1.31E-10	1.00	7.03E-11	1.31E-10	44.4	3.12E-09	5.82E-09	

HexaCDF, 1,2,3,7,8,9-	72918-21-9	Soil Ingestion	1.42E-11	2.66E-11	1.00	1.42E-11	2.66E-11	1.00	1.42E-11	2.66E-11	44.4	6.31E-10	1.18E-09
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Soil Ingestion	6.56E-11	1.23E-10	1.00	6.56E-11	1.23E-10	1.00	6.56E-11	1.23E-10	44.4	2.91E-09	5.46E-09
Indeno(1,2,3-cd) pyrene	193-39-5	Soil Ingestion	2.03E-14	2.02E-13	2.63	5.34E-14	5.31E-13	5.26	2.81E-13	2.79E-12	1.0	2.81E-13	2.79E-12
Lead	7439-92-1	Soil Ingestion	1.10E-10	2.05E-10	2.63	2.89E-10	5.39E-10	5.26	1.52E-09	2.84E-09	1.0	1.52E-09	2.84E-09
Manganese	7439-96-5	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Molybdenum	74939-98-7	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Nickel	7440-02-0	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Soil Ingestion	7.19E-13	1.34E-12	2.63	1.89E-12	3.52E-12	5.26	9.95E-12	1.85E-11	44.4	4.42E-10	8.23E-10
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Soil Ingestion	1.72E-13	3.22E-13	1.00	1.72E-13	3.22E-13	1.00	1.72E-13	3.22E-13	44.4	7.64E-12	1.43E-11
PentaCDD, 1,2,3,7,8-	40321-76-4	Soil Ingestion	2.69E-10	5.03E-10	1.00	2.69E-10	5.03E-10	1.00	2.69E-10	5.03E-10	44.4	1.19E-08	2.23E-08
PentaCDF, 1,2,3,7,8-	57117-41-6	Soil Ingestion	1.36E-11	2.54E-11	1.00	1.36E-11	2.54E-11	1.00	1.36E-11	2.54E-11	44.4	6.04E-10	1.13E-09
PentaCDF, 2,3,4,7,8-	57117-31-4	Soil Ingestion	1.98E-10	3.69E-10	1.00	1.98E-10	3.69E-10	1.00	1.98E-10	3.69E-10	44.4	8.79E-09	1.64E-08
Selenium	7782-49-2	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00
TetraCDD, 2,3,7,8-	1746-01-6	Soil Ingestion	5.19E-11	9.68E-11	1.00	5.19E-11	9.68E-11	1.00	5.19E-11	9.68E-11	44.4	2.30E-09	4.30E-09
TetraCDF, 2,3,7,8-	51207-31-9	Soil Ingestion	7.22E-11	1.35E-10	1.00	7.22E-11	1.35E-10	1.00	7.22E-11	1.35E-10	44.4	3.21E-09	5.99E-09
Tin	7440-31-5	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Vanadium	7440-62-2	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Zinc	7440-66-6	Soil Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Cancer Risk		Pathway Total:	1.06E-09	2.28E-09		1.56E-09	3.68E-09		4.97E-09	1.34E-08		9.96E-08	1.90E-07

Locally-grown Produce Exposure Pathway

(Based on Table E-3, Page 2 of 3)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child
COPC Name	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk
Antimony	7440-36-0	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Arsenic	7440-38-2	Locally-grown Produce	5.32E-09	1.19E-08	2.63	1.40E-08	3.13E-08	5.26	7.36E-08	1.65E-07	1.0	7.36E-08	1.65E-07
Beryllium	7440-41-7	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Cadmium	7440-43-9	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Chromium, hexavalent	18540-29-9	Locally-grown Produce	5.17E-09	6.19E-08	2.63	1.36E-08	1.63E-07	5.26	7.15E-08	8.56E-07	1.0	7.15E-08	8.56E-07
Cobalt	7440-48-4	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Copper	7440-50-8	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Locally-grown Produce	9.75E-11	2.19E-10	2.63	2.56E-10	5.76E-10	5.26	1.35E-09	3.03E-09	44.4	5.99E-08	1.35E-07
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Locally-grown Produce	7.22E-11	1.62E-10	2.63	1.90E-10	4.26E-10	5.26	9.99E-10	2.24E-09	44.4	4.44E-08	9.95E-08
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Locally-grown Produce	1.98E-11	4.44E-11	1.00	1.98E-11	4.44E-11	1.00	1.98E-11	4.44E-11	44.4	8.79E-10	1.97E-09
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Locally-grown Produce	6.94E-11	1.56E-10	2.63	1.83E-10	4.10E-10	5.26	9.60E-10	2.16E-09	44.4	4.26E-08	9.58E-08
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Locally-grown Produce	1.73E-10	3.89E-10	2.63	4.55E-10	1.02E-09	5.26	2.39E-09	5.38E-09	44.4	1.06E-07	2.39E-07
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Locally-grown Produce	1.76E-10	3.93E-10	2.63	4.63E-10	1.03E-09	5.26	2.43E-09	5.44E-09	44.4	1.08E-07	2.41E-07
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Locally-grown Produce	4.02E-10	9.01E-10	2.63	1.06E-09	2.37E-09	5.26	5.56E-09	1.25E-08	44.4	2.47E-07	5.53E-07
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Locally-grown Produce	6.84E-10	1.53E-09	1.00	6.84E-10	1.53E-09	1.00	6.84E-10	1.53E-09	44.4	3.04E-08	6.79E-08
HexaCDF, 1,2,3,7,8,9-	72918-21-9	Locally-grown Produce	1.39E-10	3.12E-10	1.00	1.39E-10	3.12E-10	1.00	1.39E-10	3.12E-10	44.4	6.17E-09	1.39E-08
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Locally-grown Produce	6.39E-10	1.43E-09	1.00	6.39E-10	1.43E-09	1.00	6.39E-10	1.43E-09	44.4	2.84E-08	6.35E-08
Indeno(1,2,3-cd) pyrene	193-39-5	Locally-grown Produce	8.37E-13	1.00E-11	2.63	2.20E-12	2.63E-11	5.26	1.16E-11	1.38E-10	1.0	1.16E-11	1.38E-10
Lead	7439-92-1	Locally-grown Produce	1.11E-09	2.48E-09	2.63	2.92E-09	6.52E-09	5.26	1.54E-08	3.43E-08	1.0	1.54E-08	3.43E-08
Manganese	7439-96-5	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Molybdenum	74939-98-7	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Nickel	7440-02-0	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Locally-grown Produce	6.80E-12	1.53E-11	2.63	1.79E-11	4.02E-11	5.26	9.41E-11	2.12E-10	44.4	4.18E-09	9.40E-09
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Locally-grown Produce	1.64E-12	3.67E-12	1.00	1.64E-12	3.67E-12	1.00	1.64E-12	3.67E-12	44.4	7.28E-11	1.63E-10
PentaCDD, 1,2,3,7,8-	40321-76-4	Locally-grown Produce	2.75E-09	6.16E-09	1.00	2.75E-09	6.16E-09	1.00	2.75E-09	6.16E-09	44.4	1.22E-07	2.74E-07
PentaCDF, 1,2,3,7,8-	57117-41-6	Locally-grown Produce	1.36E-10	3.04E-10	1.00	1.36E-10	3.04E-10	1.00	1.36E-10	3.04E-10	44.4	6.04E-09	1.35E-08
PentaCDF, 2,3,4,7,8-	57117-31-4	Locally-grown Produce	2.00E-09	4.48E-09	1.00	2.00E-09	4.48E-09	1.00	2.00E-09	4.48E-09	44.4	8.88E-08	1.99E-07
Selenium	7782-49-2	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00
TetraCDD, 2,3,7,8-	1746-01-6	Locally-grown Produce	5.32E-10	1.19E-09	1.00	5.32E-10	1.19E-09	1.00	5.32E-10	1.19E-09	44.4	2.36E-08	5.28E-08
TetraCDF, 2,3,7,8-	51207-31-9	Locally-grown Produce	7.30E-10	1.63E-09	1.00	7.30E-10	1.63E-09	1.00	7.30E-10	1.63E-09	44.4	3.24E-08	7.24E-08
Tin	7440-31-5	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Vanadium	7440-62-2	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Zinc	7440-66-6	Locally-grown Produce	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Cancer Risk		Pathway Total:	2.02E-08	9.56E-08		4.08E-08	2.24E-07		1.82E-07	1.10E-06		1.11E-06	3.19E-06

Drinking Water Ingestion Exposure Pathway

(Based on Table E-1, Page 5 of 9)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child
COPC Name	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk
Arsenic	7440-38-2	Drinking Water Ingestion	1.90E-12	7.38E-13	2.63	5.00E-12	1.94E-12	5.26	2.63E-11	1.02E-11	1.0	2.63E-11	1.02E-11
Beryllium	7440-41-7	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Cadmium	7440-43-9	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00
Chromium, hexavalent	18540-29-9	Drinking Water Ingestion	1.88E-12	3.91E-12	2.63	4.94E-12	1.03E-11	5.26	2.60E-11	5.41E-11	1.0	2.60E-11	5.41E-11
Cobalt	7440-48-4	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00

Copper	7440-50-8	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Drinking Water Ingestion	9.97E-16	3.19E-16	2.63	2.62E-15	8.39E-16	5.26	1.38E-14	4.41E-15	1.0	1.38E-14	4.41E-15	
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Drinking Water Ingestion	2.54E-15	8.13E-16	2.63	6.68E-15	2.14E-15	5.26	3.51E-14	1.12E-14	44.4	1.56E-12	4.99E-13	
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Drinking Water Ingestion	6.91E-16	2.22E-16	2.63	1.82E-15	5.84E-16	5.26	9.56E-15	3.07E-15	44.4	4.24E-13	1.36E-13	
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Drinking Water Ingestion	1.11E-15	3.57E-16	1.00	1.11E-15	3.57E-16	1.00	1.11E-15	3.57E-16	44.4	4.93E-14	1.59E-14	
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Drinking Water Ingestion	7.37E-15	2.37E-15	2.63	1.94E-14	6.23E-15	5.26	1.02E-13	3.28E-14	44.4	4.53E-12	1.46E-12	
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Drinking Water Ingestion	7.37E-15	2.36E-15	2.63	1.94E-14	6.21E-15	5.26	1.02E-13	3.26E-14	44.4	4.53E-12	1.45E-12	
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Drinking Water Ingestion	2.90E-14	9.29E-15	2.63	7.63E-14	2.44E-14	5.26	4.01E-13	1.29E-13	44.4	1.78E-11	5.71E-12	
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Drinking Water Ingestion	5.15E-14	1.65E-14	2.63	1.35E-13	4.34E-14	5.26	7.12E-13	2.28E-13	44.4	3.16E-11	1.01E-11	
HexaCDF, 1,2,3,7,8,9-	72918-21-9	Drinking Water Ingestion	1.06E-14	3.41E-15	1.00	1.06E-14	3.41E-15	1.00	1.06E-14	3.41E-15	44.4	4.71E-13	1.51E-13	
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Drinking Water Ingestion	4.71E-14	1.51E-14	1.00	4.71E-14	1.51E-14	1.00	4.71E-14	1.51E-14	44.4	2.09E-12	6.71E-13	
Indeno(1,2,3-cd) pyrene	193-39-5	Drinking Water Ingestion	6.56E-17	1.20E-16	1.00	6.56E-17	1.20E-16	1.00	6.56E-17	1.20E-16	44.4	2.91E-15	5.33E-15	
Lead	7439-92-1	Drinking Water Ingestion	2.93E-13	9.31E-14	2.63	7.71E-13	2.45E-13	5.26	4.05E-12	1.29E-12	1.0	4.05E-12	1.29E-12	
Manganese	7439-96-5	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Molybdenum	74939-98-7	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Nickel	7440-02-0	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Drinking Water Ingestion	4.48E-17	1.44E-17	2.63	1.18E-16	3.79E-17	5.26	6.20E-16	1.99E-16	1.0	6.20E-16	1.99E-16	
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Drinking Water Ingestion	1.69E-17	5.41E-18	2.63	4.44E-17	1.42E-17	5.26	2.34E-16	7.48E-17	44.4	1.04E-14	3.32E-15	
PentaCDD, 1,2,3,7,8-	40321-76-4	Drinking Water Ingestion	4.19E-13	1.36E-13	1.00	4.19E-13	1.36E-13	1.00	4.19E-13	1.36E-13	44.4	1.86E-11	6.04E-12	
PentaCDF, 1,2,3,7,8-	57117-41-6	Drinking Water Ingestion	1.88E-14	6.10E-15	1.00	1.88E-14	6.10E-15	1.00	1.88E-14	6.10E-15	44.4	8.35E-13	2.71E-13	
PentaCDF, 2,3,4,7,8-	57117-31-4	Drinking Water Ingestion	3.54E-13	1.15E-13	1.00	3.54E-13	1.15E-13	1.00	3.54E-13	1.15E-13	44.4	1.57E-11	5.11E-12	
Selenium	7782-49-2	Drinking Water Ingestion	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00	
TetraCDD, 2,3,7,8-	1746-01-6	Drinking Water Ingestion	9.55E-14	3.13E-14	2.63	2.51E-13	8.23E-14	5.26	1.32E-12	4.33E-13	44.4	5.87E-11	1.92E-11	
TetraCDF, 2,3,7,8-	51207-31-9	Drinking Water Ingestion	3.94E-13	1.30E-13	1.00	3.94E-13	1.30E-13	1.00	3.94E-13	1.30E-13	44.4	1.75E-11	5.77E-12	
Tin	7440-31-5	Drinking Water Ingestion	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	1.00	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00	
Vanadium	7440-62-2	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Zinc	7440-66-6	Drinking Water Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cancer Risk		Pathway Total:	5.51E-12	5.21E-12		1.25E-11	1.30E-11		6.03E-11	6.69E-11		2.31E-10	1.22E-10	

Milk Ingestion Exposure Pathway														
(Based on Table E-1, Page 7 of 9)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	
	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	
Antimony	7440-36-0	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Arsenic	7440-38-2	Milk Ingestion	2.45E-10	2.85E-10	2.63	6.44E-10	7.50E-10	5.26	3.39E-09	3.94E-09	1.0	3.39E-09	3.94E-09	
Beryllium	7440-41-7	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cadmium	7440-43-9	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Chromium, hexavalent	18540-29-9	Milk Ingestion	5.95E-09	3.69E-08	2.63	1.56E-08	9.70E-08	5.26	8.23E-08	5.10E-07	1.0	8.23E-08	5.10E-07	
Cobalt	7440-48-4	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Copper	7440-50-8	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Milk Ingestion	1.76E-10	2.00E-10	2.63	4.63E-10	5.26E-10	5.26	2.43E-09	2.77E-09	44.4	1.08E-07	1.23E-07	
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Milk Ingestion	2.54E-10	2.88E-10	2.63	6.68E-10	7.57E-10	5.26	3.51E-09	3.98E-09	44.4	1.56E-07	1.77E-07	
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Milk Ingestion	9.19E-11	1.05E-10	1.00	9.19E-11	1.05E-10	1.00	9.19E-11	1.05E-10	44.4	4.08E-09	4.66E-09	
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Milk Ingestion	1.71E-10	1.94E-10	2.63	4.50E-10	5.10E-10	5.26	2.37E-09	2.68E-09	44.4	1.05E-07	1.19E-07	
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Milk Ingestion	7.03E-10	7.99E-10	2.63	1.85E-09	2.10E-09	5.26	9.73E-09	1.11E-08	44.4	4.32E-07	4.91E-07	
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Milk Ingestion	6.73E-10	7.65E-10	2.63	1.77E-09	2.01E-09	5.26	9.31E-09	1.06E-08	44.4	4.13E-07	4.70E-07	
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Milk Ingestion	1.94E-09	2.21E-09	2.63	5.10E-09	5.81E-09	5.26	2.68E-08	3.06E-08	44.4	1.19E-06	1.36E-06	
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Milk Ingestion	3.32E-09	3.77E-09	1.00	3.32E-09	3.77E-09	1.00	3.32E-09	3.77E-09	44.4	1.47E-07	1.67E-07	
HexaCDF, 1,2,3,7,8,9-	72918-21-9	Milk Ingestion	7.15E-10	8.13E-10	1.00	7.15E-10	8.13E-10	1.00	7.15E-10	8.13E-10	44.4	3.17E-08	3.61E-08	
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Milk Ingestion	3.12E-09	3.54E-09	1.00	3.12E-09	3.54E-09	1.00	3.12E-09	3.54E-09	44.4	1.39E-07	1.57E-07	
Indeno(1,2,3-cd) pyrene	193-39-5	Milk Ingestion	4.18E-12	2.61E-11	2.63	1.10E-11	6.86E-11	5.26	5.78E-11	3.61E-10	1.0	5.78E-11	3.61E-10	
Lead	7439-92-1	Milk Ingestion	2.47E-10	2.77E-10	2.63	6.50E-10	7.29E-10	5.26	3.42E-09	3.83E-09	1.0	3.42E-09	3.83E-09	
Manganese	7439-96-5	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Molybdenum	74939-98-7	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Nickel	7440-02-0	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Milk Ingestion	9.80E-12	1.11E-11	2.63	2.58E-11	2.92E-11	5.26	1.36E-10	1.54E-10	44.4	6.02E-09	6.82E-09	
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Milk Ingestion	3.00E-12	3.40E-12	1.00	3.00E-12	3.40E-12	1.00	3.00E-12	3.40E-12	44.4	1.33E-10	1.51E-10	
PentaCDD, 1,2,3,7,8-	40321-76-4	Milk Ingestion	1.95E-08	2.23E-08	1.00	1.95E-08	2.23E-08	1.00	1.95E-08	2.23E-08	44.4	8.66E-07	9.90E-07	
PentaCDF, 1,2,3,7,8-	57117-41-6	Milk Ingestion	9.11E-10	1.04E-09	1.00	9.11E-10	1.04E-09	1.00	9.11E-10	1.04E-09	44.4	4.05E-08	4.62E-08	
PentaCDF, 2,3,4,7,8-	57117-31-4	Milk Ingestion	1.48E-08	1.69E-08	1.00	1.48E-08	1.69E-08	1.00	1.48E-08	1.69E-08	44.4	6.57E-07	7.50E-07	
Selenium	7782-49-2	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00	
TetraCDD, 2,3,7,8-	1746-01-6	Milk Ingestion	5.38E-09	6.17E-09	1.00	5.38E-09	6.17E-09	1.00	5.38E-09	6.17E-09	44.4	2.39E-07	2.74E-07	
TetraCDF, 2,3,7,8-	51207-31-9	Milk Ingestion	1.06E-08	1.22E-08	1.00	1.06E-08	1.22E-08	1.00	1.06E-08	1.22E-08	44.4	4.71E-07	5.42E-07	
Tin	7440-31-5	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Vanadium	7440-62-2	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Zinc	7440-66-6	Milk Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cancer Risk		Pathway Total:	6.88E-08	1.09E-07		8.57E-08	1.77E-07		2.02E-07	6.47E-07		5.10E-06	6.23E-06	

Fish Ingestion Exposure Pathway														
(Based on Table E-5, Page 1 of 1)		Exposure	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	Adjustment	Adult	Child	
COPC Name	CAS Number	Pathway	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	Factor	Cancer Risk	Cancer Risk	
Antimony	7440-36-0	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Arsenic	7440-38-2	Fish Ingestion	1.85E-06	1.21E-06	2.63	4.87E-06	3.18E-06	5.26	2.56E-05	1.67E-05	1.0	2.56E-05	1.67E-05	
Beryllium	7440-41-7	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cadmium	7440-43-9	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Chromium, hexavalent	18540-29-9	Fish Ingestion	6.92E-08	2.42E-07	2.63	1.82E-07	6.36E-07	5.26	9.57E-07	3.35E-06	1.0	9.57E-07	3.35E-06	
Cobalt	7440-48-4	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
HeptaCDD, 1,2,3,4,6,7,8-	35822-46-9	Fish Ingestion	5.79E-13	3.80E-13	2.63	1.52E-12	9.99E-13	5.26	8.01E-12	5.26E-12	44.4	3.56E-10	2.33E-10	
HeptaCDF, 1,2,3,4,6,7,8-	67562-39-4	Fish Ingestion	1.70E-13	1.12E-13	2.63	4.47E-13	2.95E-13	5.26	2.35E-12	1.55E-12	44.4	1.04E-10	6.88E-11	
HeptaCDF, 1,2,3,4,7,8,9-	55673-89-7	Fish Ingestion	4.57E-14	3.00E-14	1.00	4.57E-14	3.00E-14	1.00	4.57E-14	3.00E-14	44.4	2.03E-12	1.33E-12	
HexaCDD, 1,2,3,4,7,8-	39227-28-6	Fish Ingestion	2.25E-12	1.48E-12	2.63	5.92E-12	3.89E-12	5.26	3.11E-11	2.05E-11	44.4	1.38E-09	9.09E-10	
HexaCDD, 1,2,3,6,7,8-	57653-85-7	Fish Ingestion	1.85E-12	1.22E-12	2.63	4.87E-12	3.21E-12	5.26	2.56E-11	1.69E-11	44.4	1.14E-09	7.49E-10	
HexaCDD, 1,2,3,7,8,9-	19408-74-3	Fish Ingestion	1.86E-12	1.22E-12	2.63	4.89E-12	3.21E-12	5.26	2.57E-11	1.69E-11	44.4	1.14E-09	7.49E-10	
HexaCDF, 1,2,3,4,7,8-	70648-26-9	Fish Ingestion	3.09E-12	2.03E-12	2.63	8.13E-12	5.34E-12	5.26	4.27E-11	2.81E-11	44.4	1.90E-09	1.25E-09	
HexaCDF, 1,2,3,6,7,8-	57117-44-9	Fish Ingestion	8.10E-12	5.32E-12	1.00	8.10E-12	5.32E-12	1.00	8.10E-12	5.32E-12	44.4	3.60E-10	2.36E-10	
HexaCDF, 1,2,3,7,8,9-	72918-21-9	Fish Ingestion	1.28E-12	8.41E-13	1.00	1.28E-12	8.41E-13	1.00	1.28E-12	8.41E-13	44.4	5.68E-11	3.73E-11	
HexaCDF, 2,3,4,6,7,8-	60851-34-5	Fish Ingestion	5.76E-12	3.79E-12	1.00	5.76E-12	3.79E-12	1.00	5.76E-12	3.79E-12	44.4	2.56E-10	1.68E-10	
Indeno(1,2,3-cd) pyrene	193-39-5	Fish Ingestion	5.34E-11	1.87E-10	2.63	1.40E-10	4.92E-10	5.26	7.39E-10	2.59E-09	1.0	7.39E-10	2.59E-09	
Molybdenum	74939-98-7	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Nickel	7440-02-0	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
OctaCDD, 1,2,3,4,6,7,8,9-	3268-87-9	Fish Ingestion	1.49E-15	9.78E-16	2.63	3.92E-15	2.57E-15	5.26	2.06E-14	1.35E-14	44.4	9.15E-13	6.01E-13	
OctaCDF, 1,2,3,4,6,7,8,9-	39001-02-0	Fish Ingestion	8.21E-16	5.40E-16	1.00	8.21E-16	5.40E-16	1.00	8.21E-16	5.40E-16	44.4	3.65E-14	2.40E-14	
PentaCDD, 1,2,3,7,8-	40321-76-4	Fish Ingestion	3.81E-11	2.50E-11	1.00	3.81E-11	2.50E-11	1.00	3.81E-11	2.50E-11	44.4	1.69E-09	1.11E-09	
PentaCDF, 1,2,3,7,8-	57117-41-6	Fish Ingestion	3.54E-12	2.33E-12	1.00	3.54E-12	2.33E-12	1.00	3.54E-12	2.33E-12	44.4	1.57E-10	1.03E-10	
PentaCDF, 2,3,4,7,8-	57117-31-4	Fish Ingestion	2.58E-11	1.69E-11	1.00	2.58E-11	1.69E-11	1.00	2.58E-11	1.69E-11	44.4	1.15E-09	7.50E-10	
Selenium	7782-49-2	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	44.4	0.00E+00	0.00E+00	
TetraCDD, 2,3,7,8-	1746-01-6	Fish Ingestion	6.01E-12	3.95E-12	1.00	6.01E-12	3.95E-12	1.00	6.01E-12	3.95E-12	44.4	2.67E-10	1.75E-10	
TetraCDF, 2,3,7,8-	51207-31-9	Fish Ingestion	4.06E-12	2.67E-12	1.00	4.06E-12	2.67E-12	1.00	4.06E-12	2.67E-12	44.4	1.80E-10	1.19E-10	
Tin	7440-31-5	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Zinc	7440-66-6	Fish Ingestion	0.00E+00	0.00E+00	2.63	0.00E+00	0.00E+00	5.26	0.00E+00	0.00E+00	1.0	0.00E+00	0.00E+00	
Cancer Risk		Pathway Total:	1.9E-06	1.5E-06		5.0E-06	3.8E-06		2.7E-05	2.0E-05		2.7E-05	2.0E-05	

Background

Cancer risk values are taken from Arcadis, "Human Health Risk Assessment for the Proposed Energy Answers International Waste to Energy Facility Located in Arecibo Puerto Rico", October 2010
Table 16 provides baseline Total Excess Lifetime Cancer Risks for Urban, Suburban, Farmer and Fisher residents. Risk to Fisher residents is adjusted upward depending on air pollutant emission rates.
Estimated cancer risks are adjusted upward linearly based on anticipated emission rates from the waste to energy facility.

Appendix B

CV of Steven Klafka

CURRICULA VITAE OF STEVEN KLAFKA, P.E., BCEE

Experience with Current Firm

President/Environmental Engineering Consultant
Wingra Engineering, S.C., Madison, Wisconsin (1991 to Present)

- Conducts environmental engineering projects related to air pollution control, hazardous waste management, compliance with regulations, and environmental impact studies. Formed Wingra Engineering in 1991.

- Provides environmental and regulatory consulting services for a diverse range of clients including manufacturing plants, electrical utilities, environmental advocacy groups, law firms and individuals.

- Worked for a wide range of industrial operations including foundries, glass manufacture, painting, coating, mineral quarries, lime manufacturing, coal handling, chemical manufacture, and electrical utilities.

- Completed projects in numerous states including Wisconsin, Minnesota, Iowa, Illinois, Ohio, Virginia, North Carolina, Tennessee, Oklahoma, Texas, Colorado, California, Oregon, and Washington.

- Services provided to clients include preparation of permit applications; dispersion modeling; risk assessment; environmental impact analysis; regulatory training; expert witness services; compliance inspections and audits; reporting and recordkeeping development; testing programs; and air pollution control system design and selection.

- Significant projects include approval of permit applications for major air pollution sources located near Class I national parks and wilderness areas; evaluation of cumulative air toxic risk of iron foundry operations; development of a pollution prevention program at a glass coating facility; and, expert witness for litigation regarding air pollution control, dispersion modeling and emission control methods.

Past Experience

Associate/Senior Environmental Engineer
Dames & Moore Consultants, Madison, Wisconsin (1988-1991)

- Conducted environmental audits and analyses to verify compliance with local air pollution control regulations at manufacturing facilities throughout the U.S., as well as Canada, India, Singapore and Taiwan.

- Managed and developed multi-disciplinary environmental impact studies for a wide variety of projects including utility turbine generating stations, a biomedical waste disposal facility, and a flat glass manufacturing facility.

Environmental Engineer, Wisconsin Department of Natural Resources
Bureau of Air Management, Madison, Wisconsin (1981-1988)

- Evaluated air pollution control permit applications for diverse range of air pollution sources. Evaluations included estimating air pollution emissions, verifying compliance with applicable regulations and policies, and using computer dispersion models to predict air quality impacts and determine health risks.

- Developed the air pollution control permit application forms used by the agency.

- Assisted in the development of the Wisconsin state policy for the control of hazardous air pollutant emissions.

Academic Background
B.S., Mechanical Engineering, University of Wisconsin, Madison, Wisconsin (1980).
M.S., Civil & Environmental Engineering, University of Wisconsin (1994).

Professional Affiliations
Air and Waste Management Association, Past Chair for Wisconsin Chapter
American Academy of Environmental Engineers

CURRICULA VITAE OF STEVEN KLAFKA, P.E., BCEE

Registration Registered Professional Engineer
Wisconsin (#E-24305), Illinois (#062-045104) and North Carolina (PE #023787)

Professional Honors Certified by the American Academy of Environmental Engineers
Designated Board Certified Environmental Engineer (BCEE) in 2002.

Publications

"Recent Air Pollution Control and Permit Experience in the Lime Industry", Annual Meeting of the Air & Waste Management Association, Pittsburgh, Pennsylvania, 2007.

"Evaluation of Cumulative Risk from an Iron Foundry", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"The Challenge of Air Quality Permit Approval for a Glass Plant near Mount Rainier and Olympic National Parks", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"New Source MACT and Residual Risk at an Iron Foundry", Presented at the Annual Meeting of the Air & Waste Management Association, San Diego, California, 2003.

"Influence of Emission Estimates on a BACT Determination for Iron Foundry Core Making Operations", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Challenging a Title V Operation Permit with the Part 70(8) Petition Process: An Aluminum Foundry Case Study", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluating Local Impacts of a Utility SCR Retrofit Project", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Using a Flexible Compliance Strategy to Issue a Title V Operation Permit", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Electric Utilities Environmental Conference, Tucson, Arizona, January 2002.

"Recent New Source MACT Determinations and Air Quality Compliance Experience in the Iron Foundry Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Complexities of Air Quality Permit Issuance for an Iron Foundry near Great Smoky Mountains National Park", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Air Quality Permit Issuance and Varying Interpretations of BACT in the Flat Glass Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Benzene Emissions and Exposure - Targeting Sources for the Greatest Benefit", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Measurement of Organic Air Toxics at Iron Foundries", Annual Meeting of the Air & Waste Management Association, San Antonio, Texas, 1995.

"Air Toxics Emission from Two Wood and RDF-Fired Fluidized Bed Combustors", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Recent Air Quality Compliance Experience at Wisconsin Gray and Ductile Iron Foundries", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Composition of VOC Emissions from the Sycamore Landfill", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Sulfur Dioxide Control in a Rotary Lime Kiln", Annual Meeting of the Air & Waste Management Association, Denver, Colorado, 1993.

"Air Toxics Control Alternatives for Iron Foundry Pouring, Cooling and Shakeout Operations", Annual Meeting of the Air & Waste Management Association, Kansas City, Missouri, 1992.

Last Page

Exhibit 7

Comments of
Dr. Juleen Lam, Ph.D.

Comments from the
University of California, Program on Reproductive Health and the Environment
on the Human Health Risk Assessment for the Proposed Energy Answers Incinerator
Located in Arecibo, Puerto Rico

Juleen Lam, PhD, MHS, MS
November 10, 2015

I appreciate this opportunity to submit the following comments from the University of California, San Francisco Program on Reproductive Health and the Environment. I have a PhD in Environmental Health Policy and a Master of Health Science in Biostatistics from Johns Hopkins University, Bloomberg School of Public Health. As a research scientist at University of California San Francisco's Program on Reproductive Health and the Environment, I develop and apply analytic methods to issues within epidemiology and risk assessment and evaluate maternal and fetal exposures to industrial chemicals. I have extensive experience with environmental health and human health hazard and risk assessment and management. My CV is attached.

I have reviewed the "Human Health Risk Assessment for the Renewable Energy Power Plant Located in Arecibo" dated October 2010 and prepared by ARCADIS G&M for Energy Answers International, including Appendix A (SEMASS Unit 3 Stack Test Data), Appendix C (Local Information), Appendix D (Chemical of Potential Concern (COPC) Database), and Appendix E (Pathway and COPC-Specific Cancer Risks and Noncancer Hazards). I have also reviewed the "Environmental Justice Evaluation" dated October 2011 also prepared by ARCADIS G&M for Energy Answers, and its Appendix B (Supplemental Risk Assessment) and Appendix C (Target Organic Specific HI Calculations for Fisher (child)). In addition, I have reviewed sections of the Draft Environmental Impact Statement (EIS) prepared by the US Department of Agriculture (USDA) Rural Utilities Service containing USDA's assessment of the proposed incinerator's impacts on human health.

My comments below focus on the original 2010 Human Health Risk Assessment (HHRA) and 2011 supplemental HHRA prepared for Energy Answers and referenced in the Draft EIS.[i] I first provide general overarching comments related to the original/supplemental HHRA, followed then by more detailed comments on specific topics.

[i] I refer to the original 2010 HHRA and supplemental 2011 HHRA jointly as "the HHRA."

GENERAL OVERARCHING COMMENTS:

1. Lack of overall transparency and reproducibility is a serious concern across the original and supplemental HHRA, resulting in limited confidence in the findings and interpretations of each.
2. There are serious limitations in the HHRA's calculation and interpretation of risk estimates, in particular the failure to account for existing exposures of the population and background disease rates and the implications of such on interpreting estimated increases in risk of cancer and non-cancer health effects.
3. Several scenarios of exposure were not considered in estimating risk, with limited to no justification. Without a thorough investigation of potential health risks to the affected population, conclusions regarding the health impacts of this proposed project cannot be reached with confidence.

DETAILED COMMENTS:

1. **Lack of transparency and reproducibility is a serious concern across the original and supplemental HHRA.**

The opportunity for public input to weigh in on the assumptions and methodology used to determine the final outcomes of these assessments is a critical component of the process. However, when there is a lack of transparency and reproducibility, this hinders the ability of the public to participate in this process. Several factors contribute to this overall problem with the HHRA:

a. **Recommendation: Transparency of financial conflicts of interest and use of independent, scientific peer review**. The original and supplemental HHRA are performed by ARCADIS through a contract from Energy Answers, the company proposing to build the facility. This constitutes a clear financial conflict of interest and should be addressed accordingly. If these risk estimates are to be used to interpret risk and health impacts to the affected population, this document should be subjected to a thorough scientific peer review by independent parties with the appropriate expertise. This burden should not be laid upon members of the public.

b. **Recommendation: Limit use of proprietary software, or make data files and results from such software easily accessible to the public**. There are serious transparency issues that bar the public from reviewing and commenting on the assumptions, defaults, and calculations used in the risk assessment calculations. In particular, the American

Meteorological Society—Environmental Protection Agency Regulatory Model (AERMOD) was used for the air quality analysis. AERMOD is publically available; however, a commercial version of AERMOD was used (version 6.7.1, by Lakes Environmental) as it was designed to be compatible with another commercially available software used to compute human health risk assessments, Industrial Risk Assessment Program—Health (IRAP, version 4.0, also developed by Lakes Environmental).

The use of these commercially available software programs that are not publically available seriously limits the public's ability to critique assumptions and defaults used within the modeling program, evaluate the models being used, test the reproducibility of model outputs, or in general provide comments regarding the air quality hazard assessment. As this is one of the major exposure routes to potential chemical pollutants, this is a significant limitation. To exemplify this issue, a Freedom of Information Act (FOIA) request was recently filed with U.S. Environmental Protection Agency (USEPA) Region 2 to receive ARCADIS's AERMOD risk assessment modeling files. The files that were obtained contained the information used to predict pollutant air concentrations and depositions, but not the risk assessment assumptions used to predict exposure and risk to the resulting population. These are contained within the IRAP software, and without access to this information it is not possible to adequately evaluate the assumptions used to predict the cancer risk and health hazards. As such, proprietary software results in a serious lack of transparency that must be appropriately addressed in order to ensure the ability of the public to fully participate in providing comments.

2. There exist serious limitations in the HHRA's calculation and interpretation of risk estimates.

There are several serious limitations in the calculation and interpretation of risk estimates, outlined below in further detail. In particular, an overarching failure of the HHRA is the lack of consideration for existing exposures of the population to chemicals from industrial sources as well as background disease rates. This failure to consider cumulative impacts affects the interpretation of estimated increases in risk of cancer and non-cancer health effects and whether these should be considered acceptable or of concern.

a. **Recommendation: Obtain an independent third-party scientific peer review of methods.** The Supplemental HHRA segregates the non-cancer Hazard Index (HI) calculated for the child fisher receptor by target organ/critical effect because the calculated HI is close to 1 and concludes that for each target organ/system the resulting HI is less than 1 and therefore of minimal concern.[1]

b. EPA guidelines specifically state that "(t)his analysis is not simple and should be performed by a toxicologist. If the segregation is not carefully done, an underestimate of true hazard could result."[2]
c. Therefore, we recommend an independent third party be brought in to evaluate the methods and assumptions that were used to perform these segregations to ensure that the true hazard is not being underestimated. This is a very important component to this risk assessment, as this represents one of the most sensitive subpopulations of highly exposed children in period of development and growth.

d. **Recommendation: Incorporate background exposures in the calculation and/or interpretation of the risk assessment.** Arecibo is an area that has been designated in nonattainment by the USEPA for lead. Each year between 2010 and 2015 at least one of the two source-oriented monitors in the area has measured exceedances for lead (an exceedance defined as >0.15ug/m^3).[3] This is primarily due to the presence of a battery recycling company and a combustion turbine plant in this area that in 2009 collectively reported a contribution of 1.385 tons of lead emissions annually.[4]

These existing sources of pollution exemplify the fact that people in this area do not live in a bubble without other exposures to chemicals. Ignoring this fact to only calculate and interpret risks from the proposed incinerator alone—without any consideration of background and cumulative exposures—as the HHRA does is therefore not appropriate. Existing background levels of exposure to chemicals from other industrial sources must be incorporated into the risk assessment calculations and interpretations. Cumulative exposures to lead and other chemicals have the potential for contributing to serious and long-lasting impacts on this population's health.

e. **Recommendation: Incorporate background disease rates in the interpretation of the risk assessment.** The CDC estimates that approximately 30% of children in Puerto Rico will be diagnosed with asthma in their lifetime. Asthma rates in Puerto Rico are higher for children across every age group, as compared to the United State (for instance, 14.1% in Puerto Rico compared to 5.7% in the age group 0-4 years). In particular, Hispanic children appear to bear a high amount of the burden, with 14% of Hispanic children having asthma (compared to 7.7% of Hispanic children in the US).[5] Arecibo is also a municipality with some of the higher cancer rates across Puerto Rico (>300 per 100,000 between 2007 and 2011)[6] and Puerto Rico ranks ninth in obesity in the US.[7] These general health statistics illustrate the current burden of pre-existing disease within this population, further illustrating the concept that health impacts from the proposed incinerator need to be interpreted in the context of existing conditions within the affected population. Existing exposures and burden of health diseases need to be

incorporated into the risk calculations and interpretations to adequately assess the potential impacts of the proposed project on this population by adding further toxic exposures to an already burdened population.

f. **Recommendation: Rather than rely on the Clean Air Act ambient air quality standard as a standard point of comparison, consider exposure for sensitive developmental endpoints and sensitive populations to ensure their protection.** For lead, the National Ambient Air Quality Standards (NAAQS) set by USEPA in 2008 is 0.15 ug/m^3. However, it is widely accepted that any exposure to lead, even small amounts, can be dangerous for human health in terms of children's neurological development as well as increased risk of chronic issues such as cardiovascular illness and mortality.[8] EPA's analysis during the development of 2008 NAAQS standard determined that the lead standard would need to be set as low as 0.02ug/m^3 in order to prevent a measurable decrease in IQ for the most vulnerable children in the country.[9] Considering the fact that Arecibo is an area in nonattainment for lead, utilizing the NAAQS—a standard that has been identified as not fully protective of the entire population—as the standard comparison, as the HHRA does in finding that the risks from lead are acceptable, is of great concern.

g. **Recommendation: Incorporate the current blood lead reference level in the calculation and interpretation of the HHRA.** In addition to an interpretation that fails to account for existing exposures to lead from other industrial sources, the HHRA's interpretation of lead risk estimates is seriously flawed and underestimates actual exposure and resulting risk because it is based on an outdated blood lead reference level. The HHRA evaluates exposure to lead by comparing the predicted lead concentrations in air, soil, drinking water, and daily dietary intake to USEPA (Integrated Exposure Uptake Biokinetic) IEUBK model defaults, which are interpreted as "typical" media concentrations and dietary exposures. Furthermore, predicted soil concentrations are compared to USEPA's risk-based screening level for lead for residential use (400 mg/kg). However, these screening levels were determined by estimating exposure levels that would lead to no more than a 5% probability of a child exceeding a blood lead level of 10 ug/dL.[2]

The CDC in 2012 established a reference level of 5 ug/dL blood lead level to represent the level at which public health action is needed.[10] It is also generally accepted that there is no safe exposure to lead and any small amount could have serious implications for adverse neurodevelopmental outcomes. Therefore, this comparison to a soil screening level based on the outdated 10 ug/dL blood lead level is not truly protective of children's health. A more appropriate assessment of risk would need to account for and incorporate existing background exposures to lead to

determine whether the additional exposures resulting from the power plant would raise blood levels of individuals in the populations to the 5 ug/dL CDC-established blood lead reference level.

h. **Recommendation: Better justify the modeled air emission distance from source.** The air modeling conducted for the HHRA focused on human exposure scenarios within 10 km of the proposed Facility, citing USEPA guidance that the most significant atmospheric deposition of emissions from waste combustion units would occur in this radius. However, EPA also explicitly states that there may be scenarios where a >10k m radius should be also incorporated, in particular if there are conditions (topographic features like hills) that may increase potential deposition.[11] It is not clear within the document whether this additional consideration was addressed. The statement on page 6 of the 2010 HHRA, "Consistent with this guidance, air modeling conducted for this risk assessment predicts the highest air concentrations and greatest deposition fluxes will occur within the 10-km radius," appears to suggest modeling outside the 10 km range was evaluated, but a more thorough explanation and presentation of results would be appropriate. Given the mountain ranges near the proposed facility site and the potential for higher deposition in this particular area, an evaluation of residential and agricultural uses within this area would be appropriate. We would recommend the assessment of land areas within a 50 km radius of the proposed facility and incorporation into the risk assessment.

i. **Recommendation: Provide support for calculation of reasonable maximum exposure and consider incorporating Monte Carlo probabilistic methods.** The exposure calculations for the HHRA were identified as "reasonable maximum exposure (RME) conditions." Page 49 of the 2010 HHRA states that "studies of the compounding of conservatism in probabilistic risk assessments show that setting as few as two factors at RME levels or high end while setting the remaining variables at 'central tendency' or average values results in output insignificantly different from output generated using all RME input variables. In this HHRA, high end (e.g., 90th percentile) values were used for exposure frequency and duration. All other exposure parameters represent average exposure levels." We recommend providing justification and a citation for this statement as it is difficult to believe that estimates calculated under these assumptions would not be different from those where *all* inputs were instead set at the "reasonable maximum" level. Furthermore, we would also recommend that the HHRA instead utilize a probabilistic approach to estimating a reasonable maximum value, such as through EPA's recommended Monte Carlo estimating methods.[12]

j. **Recommendation: Incorporate a reasonable high-end exposure scenario to represent the subpopulation exposed to the highest levels and to ensure their protection.** Even were there scientific support for the HHRA's treatment of RME as general practice, the scenario where all parameters within the exposure calculation are set at RME levels may very well be representative of an actual individual's exposure and represent the reality for the more highly exposed population (as these are **reasonable** maximums and not unrealistic exposure scenarios). Without inclusion of this scenario, the assertion on page 69 of the 2010 HHRA that the RME scenarios are "intended to provide a conservative estimate of intake and is therefore most likely to overestimate rather than underestimate exposure and risk" is not accurate. We would recommend that the risk assessment re-evaluate the exposure calculation inputs and provide the risk estimates for a subpopulation that might be subject to a reasonable high-end level of exposure, as this would be a vulnerable population representing those needing the most protection.

3. **Several scenarios of exposure were not considered in estimating risk, with limited to no justification.**

There are several exposure scenarios that were not addressed in the HHRA, either with limited discussion to justify this decision, or completely lacking justification for why they were not considered. Several of these scenarios were particularly concerning, as they represent sensitive subpopulations or those who might have the greatest potential for adverse and long-lasting impacts. Without a thorough investigation of potential health risks to all potentially affected population, conclusions regarding the health impacts of this proposed project cannot be reached with confidence.

a. **Prenatal exposures or breastfeeding infants and children at various life stages or with variations in exposure**: The chemicals of interest evaluated in the HHRA, in particular lead, are of great concern for effects on developing fetuses and children. The risk assessment covers the scenario of children as urban residents, suburban residents, local farmers, fishers, and also nursing infants. However, there are several key gaps in this analysis—1) the fetal development stage is not included; 2) breast-fed infants are only considered for exposure to dioxins and furans through mother's milk;[ii] 3) children are not considered at various life stages or with varying exposure conditions. In particular, the fetal development and breast-fed infancy are critical periods of development where toxic exposures may have the greatest and long-lasting impacts. These critical time periods should be carefully examined to accurately reflect the potential impacts of

[ii] Risk estimates for breast-fed infants appear to have been omitted from the HHRA, or were at least not clearly delineated anywhere in the HHRA.

chemical exposures. Additionally, children grow and develop rapidly and their exposure characteristics (including body weight, food/water/air intake rates, external chemical exposures, etc.) are expected to change rapidly during their development. These variations should be explicitly incorporated into the risk assessment to develop estimates of both cancer and non-cancer risk during different life stages. At the very least, additional default safety factors have been developed by the USEPA to address the life stages of children and these should be incorporated into the estimation of risk to better reflect this period of growth and susceptibility.

b. **Off-site commercial/industrial workers**: This subpopulation was not considered in the assessment of risk, with justification that their relative exposure would be much less than the residential population and therefore the risk assessment for resident/farmers would be fully protective of this subpopulation. However, we disagree with this statement—in particular when considering industrial workers already exposed to high levels of lead and other chemicals from their current occupation. For instance, workers at the nearby battery recycling facility have previously been identified as a population with extremely elevated blood levels, for both employees as well as their children. Screening studies of the blood lead levels in children of relatives employed at the battery recycling facility discovered that 64% of children had blood lead levels >5 ug/dL,[13] the reference value established by the CDC in 2012. Of these, 16% had BLL>10 ug/dL, the level at which CDC recommended individual intervention. The average BLL for employees was 30.7 ug/dL, with 42% reporting BLL>10 ug/dL.[13] This demonstrates the concern regarding existing exposures and burdens to industrial workers, making a case for their inclusion in the risk assessment as a separate population of concern.

c. **On-site workers**: This population was not assessed because "it is assumed the potential for the exposure and the potential for adverse health effects in workers is regulated under the federal Occupational Safety and Health Act (OSHA) regulations and guidance."[14] On-site incinerator workers, particularly those responsible for clean-up, face potential exposures to a myriad of toxic chemicals in ash, including dioxins, lead, arsenic, and other metals. Although these workers may be protected through OSHA regulations and guidance, this only considers exposures at the workplace. These workers are likely to live near the facility, and therefore face additional exposures comparable to the resident. However, this collective level of exposure is not accounted for within this risk assessment and therefore a critical exposure scenario has been ignored. Again, these exposures do not occur in isolation and so it is critical that realistic scenarios of cumulative exposure are accounted for and included within this risk assessment.

d. **Pica children.** Children, younger ones in particular, tend to be exposed to higher levels of chemicals in soil and dust because of high levels of hand-to-mouth activities. The EPA has estimated that pica children may consume >200 mg of soil per day, but studies have also observed rates as high as 25-60 g of soil intake per day.[15] For these children, the conservative chronic soil exposure criteria for lead may not be protective during acute soil pica episodes. We would recommend separate consideration of this potentially highly exposed subpopulation.

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EDUCATION

2011 **PhD Environmental Health Policy**
MHS Biostatistics
Certificate in Risk Sciences and Public Policy
Johns Hopkins University, Bloomberg School of Public Health
Baltimore, MD

2006 **MS Environmental Engineering Management**
George Washington University, School of Engineering & Applied Science
Washington, DC

2003 **BS Mathematics**
BS Environmental Toxicology
University of California at Davis
Davis, CA

EMPLOYMENT

Associate Research Scientist **Jan 2015 - Present**
Program on Reproductive Health and the Environment
Department of OB/GYN and Reproductive Sciences
University of California San Francisco

Research new and innovative approaches to translating science into public policy, develop and apply analytic methods to issues within epidemiology and risk assessment, and evaluate maternal and fetal exposures to industrial chemicals. Continue to develop and apply the Navigation Guide systematic review methodology to case studies in environmental health to demonstrate and support its role in research translation to utilize scientific research in making timely decisions and policy development.

Assistant Scientist **April 2014-Dec 2015**
Postdoctoral Fellow **June 2013-Mar 2014**
Department of Health, Policy and Management
Johns Hopkins University Bloomberg School of Public Health, Baltimore MD

Science Advisor
Environmental Defense Fund (EDF), Washington DC **June 2013-Jun 2014**

Jointly funded postdoctoral position between Johns Hopkins University and Environmental Defense Fund, subsequently followed by a faculty appointment. Provided scientific and technical support for environmental health and human health hazard and risk assessment, management, and policy-related activities at EDF. Developed, coordinated, and conducted

independent research in risk assessment and regulatory policy. Developed statistical methods to advance quantitative risk assessment. Provided analytical support to estimate risks to communities from exposure to environmental contaminants. Collaborated with researchers from external departments and universities, nonprofit organizations, and local, state and federal government on interdisciplinary research and public health practice. Taught graduate-level courses on risk assessment and methods in biostatistics. Actively sought and applied for independent and collaborative external funding opportunities. Mentored graduate students. Key accomplishments included:

- Drafted and submitted public comments on proposed methodological approaches, reports, and assessments of state and federal agencies, primarily the U.S. EPA;
- Completed project to estimate adverse health risks to a community in New Jersey exposed to high levels of arsenic. Continued collaboration to oversee and monitor remediation efforts;
- Led interdisciplinary research project between Johns Hopkins University, University of California at San Francisco, Purdue University, and U.S. Environmental Protection Agency to demonstrate a new statistical approach to quantify and characterize population health risks from environmental contaminants;
- Collaborated on effort to review best practices in published systematic review approaches in environmental health field (one manuscript published).
- Taught classes of 50+ students in biostatistics, epidemiology, and risk assessment methods. Mentored 5 doctoral and 4 masters students.

ORISE Postdoctoral Fellow **Aug 2011-May 2013**
National Center for Environmental Economics, Office of Policy
U.S. Environmental Protection Agency, Washington DC

Reviewed epidemiology studies and integrated relevant findings into EPA reports. Responsible for coordinating and responding to internal, external, and peer review comments to report prior to release. Collaborated on interdisciplinary research team to develop and demonstrate a methodology adapting evidence-based medicine systematic review approaches to environmental health and was responsible for statistical analyses of toxicological data. Developed new approaches, including quantitative methods, to increase the utility, objectivity, and transparency of dose-response analysis and risk characterization. Reviewed and commented on Integrated Risk Information System (IRIS) chemical assessments and assisted with response to the National Research Council (NRC) committee reviewing IRIS assessment development process. Key accomplishments include:

- Published *America's Children and the Environment (ACE), 3rd Edition* report, which provides national indicators of children's environmental health. Managed re-designing of the ACE website: drafted web text and design layout, delegated tasks and managed student intern and ICF contractors;
- Completed "Navigating the Science" project on systematic review methodology for environmental health, supporting efforts to translate science into timely decision-making and policy development (four manuscripts published).

Data Analyst (part time) **May 2009-Aug 2010**
Food Safety and Inspection Service, Data Analysis and Integration Group
U.S. Department of Agriculture, Washington DC

Collected and analyzed domestic and international meat, poultry, and egg inspection and infectious diseases surveillance data. Drafted reports on analytical results to respond to the Office of the Inspector General audits, investigate impacts and effectiveness of new policies and regulations on public health, conduct exploratory assessments on potential hazards in regulated food products, perform needs assessments to inform the development of new Agency directives and performance measures, and explore and implement the use of advanced quantitative methods to better characterize uncertainty in performance measure estimates reported by the Agency. Responded to data analysis requests from other offices within USDA and provided analytical support, both on emergency- and long-term need. Key accomplishments include:

- Evaluated and compared alternative quantitative approaches to quantify uncertainty in the Agency's reported performance measure estimates. Presented findings to the Assistant Administrator of FSIS;
- Evaluated the humane handling procedures and violations in slaughter facilities nationwide; these findings were used by the Agency to demonstrate recent improvement in humane handling procedures, a controversial topic gaining public and media attention at the time;
- Served as primary contact to provide analytical support for the Office of Catfish, a newly developed office in response to the Agency's mandate to regulate catfish.

Researcher (part time) **June 2008-Apr 2009**
Department of Biostatistics
Johns Hopkins University, Bloomberg School of Public Health, Baltimore MD

Collaborated with research team to speciate chemical components of fine particulate air matter to investigate associations with adverse health effects. Major accomplishments include:

- Mined and maintained data from several large-scale databases (National Medicare Cohort database, U.S. EPA's PM Speciation Trends Network's National Air Monitoring Stations (NAMS) and State and Local Air Monitoring Stations (SLAMS), and U.S. EPA's Speciate database and National Emissions Inventory;
- Analyzed model results to estimate region-specific and national average associations between exposure to different components of air pollution and health outcomes, accounting for seasonal and spatial variability of data.

Biostatistics Consultant (part time) **Sep 2006-May 2011**
Department of Biostatistics
Johns Hopkins University, Bloomberg School of Public Health, Baltimore MD

Provided biostatistical support for a variety of masters- and doctoral-level research projects. Sample projects include:

- The Impact of Local Environmental Health Capacity on Food Protection and Foodborne Illness in Maryland;
- The Physical Health Impacts of Post-Disaster Displacement: A Study of the Older Adult Victims of Hurricane Katrina;
- Associations Between Clinical Renal Function Measures and Metals Exposure (Uranium, Antimony, and Thallium) Exposure in Korean Workers.

Researcher (part time) **Aug 2006-May 2009**
Department of Health Policy and Management
Johns Hopkins University, Bloomberg School of Public Health, Baltimore MD

Evaluated CDC's Environmental Health Tracking Programs by developing and designing evaluation survey and conducting interview with 17 city and state tracking programs. Key accomplishments include:

- Created and managed database to archive survey responses, performed data analysis on survey responses;
- Developed and proposed a framework to define and quantify the benefits of the Tracking Network;
- Completed and submitted two final reports to CDC upon completion of project.

Environmental Scientist (part time) **Dec 2005-Oct 2009**
Environmental & Turf Services, Silver Spring MD

Planned and performed risk assessments and management plans for golf courses, shooting ranges, and agricultural fields across the US and internationally. Collected, modeled, and analyzed field data from sites nationwide. Made recommendations for remediation or preventative actions to achieve compliance with local, state, and federal environmental regulations and to minimize operation environmental/ecological impacts.

Researcher (part time) **Oct 2004-Apr 2006**
Global Environment and Technology Foundation, Arlington VA

Performed and summarized risk assessments for several major international companies (including Coca-Cola) in to identify water quality/supply issues; develop solutions for improving water management, use efficiency, and community relations; and propose strategic directions on water sustainability. Coordinated and managed atmospheric pollution and ozone depletion projects for the Earth Science Enterprise Division of NASA. Developed and maintained state-specific websites on climate change in a jointly funded project with the Center for Climate Change Strategies.

Policy Researcher (part time) **June 2002-June 2003**
Office of Prevention, Pesticides, and Toxic Substances (OPPT)
California State Environmental Protection Agency, Sacramento CA

Developed pollution prevention guidelines for manufacturers and consumers. Performed risk assessments for new occupational chemicals (in use <2 years). Collected and analyzed field data from industrial sites to assess and monitor on-site bioremediation of hazardous waste.

Researcher (part time) **June 2002-June 2003**
Department of Epidemiology and Preventative Medicine
University of California at Davis, Davis CA

Investigated lung disease in Costa Rican agricultural workers. Mined data from over 400 administered questionnaires on work history, demographics, and health outcomes of agricultural workers in Costa Rica. Created database to analyze data for characterizing

pesticide exposure and evaluating the association between these exposures with adverse lung-related health outcomes.

Laboratory Assistant (part time) **Sept 2001-June 2002**
Department of Environmental Toxicology
University of California at Davis, Davis CA

Investigated the effect of salinity on Glutathione S-Transferase (GST) activity in fish. Conducted lab study in juvenile White Sturgeon and Chinook Salmon. Identified implications of results for pesticide detoxification capabilities of fish during migration through agricultural regions.

PUBLICATIONS

Journal Articles

Sheehan M.C. and **Lam J.** Use of Systematic Review and Meta-Analysis in Environmental Health Epidemiology: a Systematic Review and Comparison with Guidelines. *Current Environmental Health Reports,* 2015. 62:1-12.

Johnson P.I., Sutton P., Atchley D.S., Koustas E., **Lam J.**, et al. The Navigation Guide - Evidence-Based Medicine Meets Environmental Health: Systematic Review of Human Evidence for PFOA effects on Fetal Growth. *Environmental Health Perspectives,* 2014. 122(10):1028-1039.

Koustas E., **Lam J.**, Sutton P., et al. The Navigation Guide - Evidence-Based Medicine Meets Environmental Health: Systematic Review of Non-Human Evidence for PFOA effects on Fetal Growth. *Environmental Health Perspectives,* 2014. 122(10):1015-1027.

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Lam, J., Wells, E., Woodruff, T.J., Axelrad, D.A. Unification of Cancer and Non-Cancer Human Health Risk Estimation: A Case Study of di-*n*-butyl Phthalate and Male Reproductive Development. *In Progress.*

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Vesterinen H.M., Johnson P.I., Koustas E., Lam J., Sutton P., Woodruff T.J. 2013. In Support of EHP's Proposal to Adopt the ARRIVE Guidelines. *Environmental Health Perspectives*. 121:A325; http://dx.doi.org/10.1289/ehp.1307775.

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Reports

US Environmental Protection Agency (EPA), Office of Policy (OP), National Center for Environmental Economics (NCEE). America's Children and the Environment, Third Edition. 2013. Available from: http://www.epa.gov/ace

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PRESENTATIONS

"Contemporary Issues in Risk Assessment." *Society of Toxicology-U.S. Food and Drug Administration Colloquia on Emerging Toxicological Science Challenges in Food Ingredient Safety.* July 2015.

"Update from the Navigation Guide Case Study." *Environmental Epidemiology in Autism Research Network (EEARN) annual meeting.* May 2015.

"Unification of Cancer and Non-Cancer Human Health Risk Estimation: A Case Study of di-*n*-butyl Phthalate and Male Reproductive Development." *Society for Risk Analysis annual meeting*, December 2014.

"The Navigation Guide Systematic Review Methodology." Invited Speaker. Royal Society of Chemistry International Expert Workshop: Implementing Systematic Review Techniques in Chemical Risk Assessments. December 2014.

"The Navigation Guide Systematic Review Methodology Proof of Concept: PFOA and Fetal Growth." *Teratology annual meeting.* June 2014.

"Panel discussion: Frameworks for synthesizing and integrating evidence." Invited speaker on expert panel. *U.S. Environmental Protection Agency Workshop for Applying Systematic Review to Assessments of Health Effects of Chemical Exposures*, August 2013.

"The Navigation Guide as a method to synthesize evidence: a case study." Invited speaker. *U.S. Environmental Protection Agency Federal Summit on Evaluating and Synthesizing Evidence: Applying Systematic Review to Questions of the Health Effects of Chemical Exposures*, February 2013.

"Evaluating human health effects of environmental contaminants: methods to combine animal and human data for making public health decisions." *International Society for Environmental Epidemiology*, August 2012.

"Developing dose-response assessment methods to inform environmental policy: an application of Bayesian hierarchical models using trihalomethanes." *Society for Risk Analysis,* December 2011.

"Applying Bayesian hierarchical models to human health risk assessment." *CDC National Environmental Public Health Conference*, October 2009.

"Applying Bayesian hierarchical models to human health risk assessment." *Bayesian Biostatistics Conference*, February 2008.

"Prediction of pesticide toxicity to amphibians: testing a preliminary screening equation and EPA's 'ICE' equations with new data." *Society of Environmental Toxicology and Chemistry North America 27th Annual Meeting*, November 2006.

"Water quality impacts by golf courses: a metastudy." *Society of Environmental Toxicology and Chemistry North America 28th Annual Meeting*, 2007.

TEACHING EXPERIENCE

2015–present	**Volunteer teacher** Prison University Project *Teach math classes for inmates at San Quentin prison pursuing degrees*
2013-present	Instructor Department of Health Policy and Management Department of Biostatistics Johns Hopkins University Bloomberg School of Public Health *Statistical Methods in Public Health I-IV* *Introduction to the Risk Sciences and Public Policy (online)*
2011–2014	**Volunteer tutor** Adult Learning Center

Greater Homewood Community Corporation

GED math preparatory class for adult learners

Fall 2012 **Lecturer**
Department of Nutritional Sciences
Morgan State University

Introduction to Biostatistics

2007–2011 **Teaching Assistant**
Department of Health Policy and Management
Department of Biostatistics
Johns Hopkins University Bloomberg School of Public Health

Data Analysis Workshop I & II
Statistical Methods in Public Health I-IV
Public Health Practices (in-class and online)
Introduction to the Risk Sciences and Public Policy (in-class and online)
Methods in Quantitative Risk Assessment

HONORS AND AWARDS

2009 Proctor & Gamble Dissertation Fellowship
Johns Hopkins University
Bloomberg School of Public Health

2009 Student Conference Travel Award
American Public Health Association Annual Conference, Philadelphia, Pennsylvania, October 2009
Johns Hopkins University
Bloomberg School of Public Health

2009 Outstanding Teaching Assistant Award (Nominated)
Department of Biostatistics
Johns Hopkins University
Bloomberg School of Public Health

2008 Student Conference Travel Award
Bayesian Biostatistics Conference, Houston, Texas, February 2008
The University of Texas M. D. Anderson Cancer Center

2006 Sir Arthur Newsholme Scholarship
Department of Health Policy and Management
Johns Hopkins University

2006 Student Conference Travel Award
Society of Environmental Toxicology and Chemistry North America 27th Annual Meeting, Montreal, Quebec, Canada, November, 2006.

PROFESSIONAL AFFILIATIONS AND SERVICE

American Public Health Association
Society for Risk Analysis

2015	Invited reviewer for US EPA draft issue paper on Physiological and Behavioral Changes in Pregnant and Lactating Women
2015	Invited reviewer for National Toxicology Program Office of Health Assessment and Translation protocol for Transgenerational Inheritance of Health Effects assessment
2015	Manuscript reviewer for Environment International journal
2015	Abstract reviewer for APHA's Annual Meeting
2014	Manuscript reviewer for Reproductive Sciences journal
2014	Abstract reviewer for APHA's Annual Meeting
2009	Abstract reviewer for CDC's National Environmental Public Health Conference
2007 – 2008	Student Councilor, Society for Risk Analysis National Chapter Executive Board

SOFTWARE

STATA, R, WinBUGS statistical software
Oracle Crystal Ball
U.S. EPA Benchmark Dose (BMDS)
Basic knowledge of SAS, SPSS, ArcGIS, and R mapping software

Exhibit 8

Letter from
José Raúl Colón Roque

August 2, 2011

Jose M. Rosado
Deputy District Engineer for the Antilles
U.S. Army Corps of Engineers, Jacksonville District
jose.m.rosado@usace.army.mil

Re: Comments pursuant to Public Notice SAJ-2011-02033(IP-EWG)

Dear Mr. Rosado:

Energy Answers Arecibo, LLC (EA) is currently proposing an industrial facility in Arecibo, Puerto Rico. The construction of that facility will require the discharge of fill material on jurisdictional wetlands and its operation will require the extraction of 2.1 MGD of water from the Caño Tiburones Natural Reserve (CTNR). That water will be use for various industrial purposes.

Since the 1950's until the year 2000 the Puerto Rico Land Authority (PRLA) operated in the area originally known as Caño Tiburones a drainage systems composed of a series of dikes, channels and "el vijia" pump station. The purpose of this system was to drain water from 6,000 acres of Caño Tiburones for agricultural purposes. During that time the regular operation of the system kept water levels, on average, at 3.00 feet below mean sea level. In 1998 the Puerto Rico Planning Board designated 3,428 "cuerdas" of Caño Tiburones as a natural reserve. On 2000 the operation of "el vijia" pump station was transferred to the Puerto Rico Department of Natural and Environmental Resources (DNER). Since then, water levels at the CTNR have been kept at mean sea level and pumping has been mainly used to remove water above that

level, a situations always associated with major rain events. The objective of this new policy is to limit operations as much as possible in order to save money (fuel) by using the pumps only to avoid flooding of neighboring properties. This information is personally known to me because for 10 years (until 2011) I worked as management officer of the CTNR. (see attached resume)

During 10 years of DNER operation I witnessed how the flooded area in the CTNA expanded beyond its prior reach and water dependant ecosystems developed along those new boundaries. Since 2000 new herbaceous wetlands, mangrove forests and shallow lagoons have established naturally together with new fish spawning and growing areas. Fifty (50) new species of resident and migratory species have returned to the CTNR including permanent colonies of Glossy Ibis and White Ibis formerly classified as rare visitors in Puerto Rico. The new water level also provides a surface connection with the ocean that allowed the movement of fish in and out of the CTNR. An example of this movement is the ceti migration, a fish species that was not present in the CTNR until 2009. All of this restoration has been possible due to one fact: the abundance of water.

Appendix N to the EIS presented to the Puerto Rico Environmental Quality Board for the Energy Answer project provides the information related to the water intake for the project at the CTNR. On page 9 EA concludes that the CTNR yields 106 MGD through el Vijia pump station. This conclusion is based on information from the 1984 study prepared by Allen L. Zack. (Restoration of Fresh Water in the Caño Tiburones Area, Puerto Rico; Allen L. Zack and Angel Class-Cacho; USGS, Water Investigation Reports 83-4071 (1984)) The conclusion about the availability of water is basically

correct, however, it is a misrepresentation of the current operational reality with total disregard to its environmental consequences.

Zack describes in his report the pumping regime that existed in 1984. At that time 106 MGD were removed daily form Caño Tiburones to accommodate agricultural activities that required a water level of 3.00 feet below mean sea level. This will require pumping on a daily basis something that I can assure has not happened during the last 10 years and is totally inconsistent with the current water level.

That 106 MGD rate of water removal does not represent the current operation and if implemented will destroy the CTNR. A potential water yield has nothing to do with the amount of water necessary for protection and conservation. While it is true that such amount of water is available for removal, the consequences of such removal on the aquatic ecosystems of the CTNR will be catastrophic and transform the area to its pre 2000 condition, that is, a drained area for agricultural use.

While I was management officer of the CTNR I proposed changes to the operational parameters of the pumping station based on ecological considerations. Those proposals were theoretical and would have required observation over a time period to corroborate its effectiveness. However, none of those proposals were implemented due, mainly, to budget constraints.

The potential water yield of the CTNR under current conditions (that is mean sea level) is unknown because there is no study designed to answer that question. The tolerance of the ecosystems in the CTNR to a 2.1 MGD removal rate is also unknown

because there is no study designed to answer that question either and, therefore, no data to support any conclusion.

To adequately assess the environmental consequences of the 2.1 MGD proposal its is necessary to prepare a Hydrological Hydraulic and an Ecological Study to determine how much water can be removed from the CTNR without having an effect on current water patterns, lagoons, shallow lagoon, salinity, salinity in the water column, flora, fauna and fish migrations patterns.

José Raúl Colón Roque

attachments

cc

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Edgar W. García; edgar.w.garcia@usace.army.mil

Exhibit 9

C&H Hog Farms Report of Tom Aley

Ozark UNDERGROUND LABORATORY 1572 Aley Lane • Protem, MO 65733 • (417) 785-4289 • fax (417) 785-4290 • contact@ozarkundergroundlab.com

A TECHNICAL ASSESSMENT OF THE ADEQUACY AND ACCURACY OF THE DRAFT ENVIRONMENTAL ASSESSMENT FOR C&H HOG FARMS, NEWTON COUNTY, ARKANSAS

TESTIMONY FOR PRESENTATION AT A PUBLIC HEARING AUGUST 27, 2015 AT JASPER, ARKANSAS.

Tom Aley, Arkansas Professional Geologist #1646
President and Senior Hydrogeologist
Ozark Underground Laboratory, Inc.

August 27, 2015

An assessment prepared at the request of the Buffalo River Watershed Alliance.
Prepared for presentation at a public hearing on the adequacy of an
Environmental Assessment for the C&H Hog Farm
August 27, 2015, in Jasper, Arkansas.

This written testimony is being submitted at the public hearing, and for the public record, on the Environmental Assessment for the C&H Hog Farm. My oral testimony will, in the interest of time, be a condensation of this written testimony. This assessment is in response to a request from the Buffalo River Watershed Alliance.

Qualifications of Tom Aley

My name is Tom Aley. I have been continuously licensed as a Professional Geologist in Arkansas (License #1646) since 1991 and I have similar current licenses in Missouri, Kentucky, and Alabama. Since 1983 I have continuously held national certification as a Professional Hydrogeologist from the American Institute of Hydrology (PHG #179). I hold university degrees from the University of California (Berkeley) awarded in 1960 and 1962. A copy of my resume is available on-line at www.ozarkundergroundlab.com.

I am submitting my testimony as a Professional Hydrogeologist and a Professional Geologist licensed to practice in the State of Arkansas. This assessment of the adequacy of the Environmental Assessment was requested by the Buffalo River Watershed Alliance.

I have over 50 years of hydrogeologic experience in the Ozarks, with this work largely focused on interactions of surface water and groundwater in karst areas and on the subsurface migration of pollutants in karst areas. During this period I have conducted multiple hydrogeologic contract studies in the Arkansas Ozarks funded by federal agencies including the National Park Service, U.S. Forest Service, and U.S. Fish and Wildlife Service. I have similarly done hydrogeologic contract studies for Arkansas state agencies including Arkansas Highway and Transportation Department, Arkansas Natural Heritage Commission, Arkansas Game and Fish Commission, Arkansas State Parks, and Arkansas Department of Planning. Finally, I have done many other hydrogeologic investigations in the Arkansas Ozarks for various corporate, non-profit, and private clients. Most of these investigations have focused on issues related to water movement from the surface of the land into and through the Boone Formation, the extensively karstified geologic unit that underlies the C&H hog farm site and almost all of the land application fields.

Specific Comments

Comment 1. The National Environmental Policy Act (NEPA) requires that the environmental impacts of activities by federal agencies must be assessed. An Environmental Assessment (EA) is prepared to determine if a project will have significant impacts. This Public Hearing is part of the EA process. In this case, as will be demonstrated in my testimony and in the testimony of others, then the agencies can either cancel the federal loan guarantees or prepare an Environmental Impact Statement (EIS).

Federal agencies are required to make competent and accurate environmental assessments. The resulting document must identify all significant environmental impacts and accurately and competently identify and characterize them.

The FSA and SBA, through a private contractor, have totally failed to accurately identify and characterize the nature and extent of the very significant adverse impacts that this hog farm operation will have on groundwater quality within the Buffalo River Basin. They have also failed to consider and assess the terrible risk to the Buffalo River that would be created by a catastrophic sinkhole collapse of the manure ponds. I will deal with both of these topics in greater detail later in this testimony.

Comment 2. The EA conducted for the FSA and SBA shows a gross lack of understanding of the intimate and integral interactions of surface water and groundwater in karst areas of the Ozarks. This demonstrates a lack of hydrogeological expertise relevant to conditions found in karst areas of northern Arkansas. Under Arkansas state law geologic work and geologic interpretations (including hydrogeological work and hydrogeological interpretations) in Arkansas must be conducted by, or under the direction of, a person licensed to practice geology in the State of Arkansas. This law was enacted to protect the people and the resources of the State of Arkansas from persons lacking the training and experience to conduct geologic and hydrogeologic work in the state.

EA Page 5-1 lists consultation, coordination, and preparers of the EA. Krista Dearing with Ecosphere Environmental Services of Durango, Colorado, is the only geologist listed. The website for the Arkansas State Board of Registration for Professional Geologists was searched on August 14, 2015 and Ms. Dearing is not listed as a Professional Geologist. While it is doubtful, perhaps the list is not up to date or (equally doubtful) perhaps Ms. Dearing is working under some special reciprocity agreement (she is licensed as a Professional Geologist in Arizona). Absent these possibilities, any geological or hydrogeological conclusions in this EA must be dismissed as not being the work product of a Professional Geologist licensed to practice in the State of Arkansas. If such geological and hydrogeological conclusions are dismissed, and they are crucial to a FONSI (Finding of No Significant Impact), then for this reason alone the EA should be found to not be in compliance with the provisions of NEPA.

Comment 3. The EA fails to recognize that this entire hog farm operation and the associated manure disposal fields (with the exception of portions of Field 17) are located on top of a well developed karst aquifer within the Boone Formation and possibly other deeper geologic units. Were it not for the karst development in the region, there would be much more water on the surface of the land within the Big Creek topographic basin than is the case.

In karst areas the adjective "Dry" is commonly applied to streams and valleys where the proportion of surface water lost to the groundwater system is exceptionally great. The vicinity of the C&H Hog Farm is characterized by an exceptionally large

proportion of the surface water being lost to the groundwater system as illustrated by the following:

- Dry Creek, a stream with a topographic basin of 7.23 square miles, is located along the southern margin of the hog farm operations. Three of the manure disposal fields (Fields 15, 16, and 17) are topographically tributary to Dry Creek.
- Dry Branch, a stream tributary to the Left Fork of Big Creek at a point 11,600 feet west of Field 5.
- Dry Branch, a northward flowing stream tributary to Big Creek. The small community of Mt. Judea is on the ridge between Dry Branch (to the east) and Big Creek (to the west) and roughly parallels Big Creek. Dry Branch is within 2200 feet of Field 1 and is 3,500 to 6,100 feet from Fields 5, 6, 7, 9, and 10.

The hog farm operation is bordered on the west, south, and east by streams named Dry Creek and Dry Branches. The hog farm operation is on the Mt. Judea 7.5 minute topographic quadrangle map. There are few if any other 7.5 minute quadrangle maps in the karst areas of north Arkansas that have three separate streams with the adjective "Dry" in the name. The hog farm is clearly in the middle of a well developed karst area.

Comment 4. EA page 3-7. "To accurately assess the potential point source impacts from C&H Hog Farms on water quality, concentrations of nutrients and bacteria would need to be monitored at and adjacent to the site and the fields where nutrients are applied. By monitoring immediately upstream and downstream of the farm and at the fields, any measurable increase in nutrient or bacteria concentrations discharging from the operations would be recorded and the contribution from other sources would be eliminated or minimized."

This strategy would be relevant only if all the water leaving the land application sites was as surface water runoff. This is not the case in this karst setting. In this karst setting much of the annual water runoff does not contribute directly to streams but instead moves downward through permeable soils and then into limestone units of the Boone Formation. Once into the limestone units the water then flows hundreds to tens of thousands of feet to discharge from springs.

A recharge area of about 1.5 square miles is required to supply karst springs draining the Boone Formation with a mean annual flow rate of 450 gallons per minute. This represents a mean annual contribution to karst groundwater of about 245,000 gallons of water per acre per year.

Fields 3, 5, 6, 7, 8, 9, 10, 12, and almost all of Field 16 are located on moderately permeable alluvium and terrace deposits (USGS mapping of Mt. Judea Quadrangle). The most common soil series on these fields are the Spadra and Razort Soil Series (USDA, SCS 1988; EA page 3-21 and 3-22). The alluvium and terrace deposits underlying these fields are in turn underlain by the karstic Boone Formation.

Fields 1, 2, 4, 11, 13, 14, 15, and a small amount of 16 and 17 are in upland areas and are underlain by the Boone Formation. The most common soils on these fields are Noark Series soils (EA page 3-21 and 3-22). Table 1 presents data from the Newton

County soil survey (USDA, SCS 1988) and shows permeability rates in the four soil series underlying the majority of the manure application fields.

Table 1 Soil depth and permeability for the major soils in the manure application fields. Data from Newton County Soil Survey by USDA-Soil Conservation Service.

Soil Series	Depth (inches)	Permeability (in/hr)
Arkana	0- 7	0.6 to 2.0
	7-13	0.06 to 0.2
	13-33	<0.06
	33-35	----
Noark	0-14	0.6 to 2.0
	14-43	0.6 to 2.0
	43-72	0.6 to 2.0
Razort	0-12	0.6 to 2.0
	12-43	0.6 to 2.0
	43-63	2.0 to 6.0
Spadra	0- 7	0.6 to 2.0
	7–40	0.6 to 2.0
	40-72	0.6 to 2.0

As seen in the above table all of the upper horizons of the soils (and except for Arkana Series soils) all of the deeper horizons have permeability rates of 0.6 to 2.0 inches per hour. Very few precipitation events in the Arkansas Ozarks have intensities as great as these permeability rates, and when more intense precipitation period do occur they usually persist for only a few minutes. The result is that almost all of the precipitation that falls on these soil units infiltrates into the soil rather than running off on the surface and flowing into surface watercourses.

The water that infiltrates into the soil moves downward until the soils are saturated. Plants, through transpiration, extract water from the soils down to the bottom of their rooting depths which is probably about 1.5 feet for the hay and pasture species present on the manure application fields. Water volumes in excess of soil moisture saturation continue to move downward toward and into the underlying epikarstic zone of the karst units. Most of this downward movement of water and manure contaminants occurs during the period of the year when there is little to no transpiration by the plants.

EA page 3-23 states: "Surficial deposits underlying the farm consist of an approximately 4-foot thick veneer of soil and alluvium (BCRET 2014a)." This is shallower than the soil profile descriptions found in Table 1. It is also shallower than the depths of evaluation borings in the vicinity of the waste holdings ponds and hog buildings. These borings, with a maximum reported depth of 18 feet, failed to encounter bedrock.

In reality, the thickness of unconsolidated material overlying the Boone Formation is highly variable. The upper 30 feet or so of the underlying limestone bedrock (called the epikarstic zone) has been modified by solution and weathering into a

hydrologically complex matrix of cavities that conveys water to systems of dissolved out conduits in the bedrock that in turn convey groundwater to springs. Much of this water discharges from springs in a matter of a few days to a few weeks. However, some of the water is detained in the epikarstic zone and will not reach the receiving springs for many months. This detained water helps maintain the flow of springs during drier periods of the year.

Groundwater tracing with fluorescent tracer dyes is one of the methods used to identify springs that receive water from particular parcels of land. Cross (2014) in public comments to Arkansas Department of Environmental Quality (ADEQ) incorporated some information on limited groundwater tracing work done by Dr. John Van Brahana in the vicinity of some of the manure fields. Aside from this information, no groundwater tracing has been done to determine which local and/or regional springs will receive water and contaminants from the C&H Hog Farm operation. This is basic data essential for an adequate environmental assessment under the provisions of NEPA.

An understanding of the scale of karst groundwater flow in the Buffalo River basin is provided by data from groundwater tracing associated with Mitch Hill Spring, one of the largest springs in the Buffalo River area. This spring is located about 11 miles northeast of the C & H hog farm site and most of its recharge area is underlain by the Boone Formation. Aley and Aley (1989) details 26 successful groundwater traces in and around the Mitch Hill Spring recharge area. Straight-line travel distances to Mitch Hill Spring through the karst groundwater system were as great as 29,000 feet and first arrival times were as rapid as 13 days or less. For comparison purposes, the straight-line distances from the manure application fields to the Buffalo River varies from 19,100 to 33,100 feet, and the straight-line distance to the River from the manure storage ponds is 21,600 feet.

Returning to the statement quoted from the EA in Comment 5 that states that potential point source impacts from C&H Hog Farms on water quality can be accurately measured by monitoring immediately upstream and downstream of the farm (this would be in Big Creek) and at the fields. This is clearly not true since the majority of the water containing contaminants derived from the manure will move downward into the karst groundwater system rather than overland to Big Creek. This is especially true since manure is not land applied (at least as required by C&H permits) when it is raining, when rain is predicted within 12 hours, or on frozen ground.

EA pages 3-14 to 3-19 uses monitoring data from BCRET for surface water quality monitoring on Big Creek upstream and downstream of the farm in an effort to show that the C&H Hog Farm is not detectably impacting water quality. The strategy is grossly flawed because it ignores the predominant contribution of Hog Farm contaminants to the karst groundwater system and incorrectly presumes that contaminants from the Farm, if they existed, would be present in Big Creek downstream of the Farm. NEPA requires that assessments be factual and technically credible. The strategy used in the EA does not comply with this basic requirement.

The EA would have us believe that nutrients and other contaminants in the manure applied to local fields would not enter the karst groundwater system and subsequently discharge from off-site springs and reach the Buffalo National River. That is clearly false. The following is the complete abstract from a paper in an EPA document entitled "Nonpoint source contamination of ground water in karst-carbonate aquifers in Iowa"

"There are two components of groundwater recharge in karst-carbonate aquifer systems: (1) conventional infiltration, and (2) the direct entry of surface water through sinkholes. Thus, in karst areas, the better known problems of nonpoint source pollution, associated with the runoff of sediment and chemicals from agricultural land into surface waters, directly merge with the ground water system and the poorly-understood problems of the infiltration of agricultural chemicals. Three years of detailed water-quality monitoring and water, mass-balance studies show: (1) during major surface-runoff events high concentrations of suspended sediment, pesticides, and bacteria enter the ground water and move as a 'slug' through the carbonate aquifer, creating brief, but acute water quality problems; but, (2) over a water year the infiltration component delivers to ground water the greatest mass and highest concentrations of NO_3, and the greatest mass of the pesticides detected. Many of the more widely used herbicides are detected commonly in ground water, and are now present year-round. The amount of NO_3-N discharged in ground water and surface water per year, from a 267 km^2 study basin, has equaled about 30-50 percent of the fertilizer-N applied, an economic as well as an environmental concern."

The data in the Hallberg et al. (1985) paper are from Big Spring, Iowa. "Conventional infiltration" is the water that moves downward through the soil. The authors found that 30 to 50% of the nitrogen applied by farmers moved downward through the soil and discharged from the spring. The Iowa farmers paid lots of money for this fertilizer; it is a valuable resource. To the hog farmers manure is a waste; it costs money to get rid of it. As a result, we must expect at least 30 to 50% of the nitrate in the hog manure spread on the Newton County fields to flow out of springs and into the Buffalo River. Because it is a waste the percent could well be even greater.

In the Ozarks, nitrate is the primary nutrient causing excessive algal growth in streams and reductions in water clarity. High water quality clarity is one of the great attractions of the Buffalo National River. The EA's conclusion that the tons and tons of hog manure dumped on farm fields will not significantly impact the Buffalo River is utterly ridiculous and totally inconsistent with requirements of NEPA.

Comment 5. The manure storage ponds pose a significant risk of creating off-site water quality problems due to leakage into groundwater supplies. They are also at risk of catastrophic sinkhole collapses that could introduce large amounts of manure into the underlying karst groundwater system.

Information about the waste holding ponds is scattered through the EA. Important information, from the EA and other sources, includes the following:

- EA Page 1-1 identifies the location of the two waste holding ponds as being in the SW ¼ NW ¼ Section 26, T15N, R20W, Newton County, Arkansas.
- EA Page 1-2 indicates that the site elevation ranges between 940 to 960 feet.
- Based on USGS geologic mapping the ponds are underlain by limestone and chert units assigned to the Boone Formation.
- EA Page 1-2 indicates that the ponds are capable of holding approximately 2.1 million gallons of waste annually. The actual length, width, and depths of the ponds are not identified in the EA. These values are of critical importance since allowable leakage (EA Page 3-20) is 5,000 gallons per acre per day and without knowing the horizontal dimensions of the ponds the allowable leakage rate per pond cannot be calculated. However, from the design drawings it appears that the combined surface area of the two ponds at the must-pump-down-level is 1.23 acres. Using this value the allowable daily leakage into the karst groundwater system would be 6,150 gallons of raw hog manure per day.
- EA Page 1.4 indicates that on May 7, 2015 the Hog Farm submitted a Major Modification Request to ADEQ to install 60 mm HDPE liners over a geotextile base material in both waste ponds and to install and 80 mm cover and methane flare system on Pond 1., noting that these modifications would reduce the potential for seepage of wastes into groundwater. This would be a desirable modification, however, it is not in place now and is unlikely to be in place for some time. Unfortunately, the operation of the ponds for the past two years may have already substantially hydrologically destabilized conditions at depth beneath the ponds.
- EA Page 2- 1 indicates that the ponds are earthen and are lined with 18 inches of compacted low permeability soil. The EA indicates that at installation these liners met the specifications for ASTM D-698. Together the ponds have a capacity of 2,735,922 gallons that reportedly equates to 270 days of storage, accounting for maximum capacity of 6503 animals and a 25-year 24-hour rainfall event.
- EA Page 2-6 indicates that approval for installation of a HDPE liner could take up to 180 days and it is not clear when or whether the changes would be approved.
- EA Page 3-23 gives results from six soil samples collected from the vicinity of the manure ponds. The samples were from borings 2 and 3 and at maximum depths of 9.5 to 11 feet.
- EA Page 3-23 states: "The soil used for the holding pond liner was the fat clay with sand identified at depths of 7 to 11 feet in bore numbers 2 and 3". This statement is inconsistent with Table 3-2. The table shows that the "fat clay with sand" is limited to the interval from 7.0 to 8.5 feet. The interval from 8.5 feet to 11 feet is "sandy fat clay" in boring 2 and "clayey gravel with sand" in boring 3. This discrepancy suggests that the characteristics of the native materials used for the liner were very variable and may not have been ideal for minimizing leakage. In addition, there is no evidence that more than three borings were made. The greatest depth of any reported boring was 18.5 feet (EA Page 3-24); the text indicates that no limestone was encountered in the borings. While the extent of the subsurface investigations and the nature of the on-site materials used for the liners of the waste ponds might have been adequate for a minor facility in a rural

area where the values of off-site resources were minimal, they are not adequate in view of the potential to adversely impact waters of the Buffalo National River.

Leakage of raw hog manure out of the C&H ponds represents major environmental degradation that is not even identified much less discussed in the EA. Let me make some simple calculations. Given a combined surface area for the two ponds of 1.23 acres and an allowable leakage rate of 5,000 gallons per day per acre of surface area, this equals 6,150 gallons of raw hog manure per day. The EA states that C&H went into operation in April 2013; that was about 882 days before our hearing today. The Arkansas Department of Environmental Quality (ADEQ) has allowed, by permit, leakage of hog manure out of the ponds totaling 5.42 million gallons during this period of operation. Given the hydrogeologic setting and the negligible subsurface investigation prior to pond construction, it is unlikely that the total leakage of hog manure into the karst groundwater system and ultimately to the Buffalo National River is smaller than this volume. Unfortunately for the River it is likely to have been a lot bigger. In a giant omission, the EA does not even address where all this manure leakage has gone.

Comment 6. The EA gives no consideration to the risk of catastrophic sinkhole collapse of one or both of the manure holding ponds. Sinkholes in karst areas triggered by human activities, including the construction of sewage lagoons, waste storage ponds, and other impoundments, are unfortunately common events.

A number of earth-lined sewage lagoons and agricultural wastewater storage ponds were constructed in karst areas of the Ozarks during the 1960s and 1970s. Major leakage problems and, sometimes, catastrophic collapses plagued a number of these waste facilities and it was necessary to replace some of them with more dependable facilities. Engineers familiar with the major risks that such lagoons create in karst areas seldom recommend earth-lined lagoons in karst areas today. The probability that a particular lagoon or waste holding pond will collapse into a sinkhole is relatively low, but the risk of severe off-site impacts are substantial. In the case of the C&H Hog Farm manure ponds the off-site risks are enormous.

The Missouri Geological Survey (Aley et al., 1972) published an engineering geology monograph on catastrophic sinkholes induced by leaky impoundments in karst terrain that included case histories of two major sewage lagoon failures in Missouri. The following case histories of sinkhole collapses that have destroyed waste facilities in the karst areas of the Ozarks provide insight into the severity of the problem.

The **West Plains Sewage Lagoon** system was initially constructed as two lagoon cells. The system is located on the floor of the Howell Creek Valley, and is underlain by the Jefferson City/Cotter Formations, which are primarily dolomite. The lagoons both had compacted clay liners derived from local source material. Reference material for this case history is Aley et al. (1972) for the 1964 and 1966 collapses and Britton and Gerba (1984) for the 1978 collapse.

Two sinkholes formed in the smaller 7-acre cell of the West Plains system in 1964. A large sinkhole formed in the 42-acre cell in 1966 and completely drained all water in the lagoon into the groundwater system in a 52-hour period. This represented a mean flow out of the lagoon of 13,000 gallons per minute. Wastewater from the collapse discharged from Mammoth Spring, Arkansas. The straight-line distance from the lagoons to the spring is about 20 miles.

During the period May 5 to 6, 1978 new sinkholes formed in the lagoon system and a total of 18 million gallons of sewage entered the groundwater system. During the period May 7 to 26, 1978 there were several outbreaks of gastroenteritis traced to this collapse. There were at least 759 cases of gastroenteritis associated with ingestion of sewage-contaminated water linked to this collapse. A viral etiology was suspected as the causative agent

The town of **Republic** is located about 10 miles west of Springfield, Missouri. The town's sewage lagoon system experienced a sinkhole collapse on October 29, 1968 which introduced 4 million gallons of sewage into the groundwater system in 24 hours. On October 31, 1968 a second sinkhole collapse occurred. Several springs in Shuyler Creek and two wells 1.5 miles away were contaminated (Aley et al., 1972). This lagoon system is underlain by geologic units that are part of the Boone Formation as mapped in Arkansas. The lagoon system had a compacted clay liner that failed.

A sinkhole formed catastrophically in the bottom of a lagoon serving the **Barnhart Dairy south** of Highlandville, Missouri and completely drained the lagoon. The collapse occurred on or about October 7, 1982. The U.S. Department of Agriculture, Soil Conservation Service, had provided technical and financial assistance to the landowner for construction of the lagoon. The lagoon had a compacted clay liner derived from local sources and the site had been evaluated prior to construction by the Missouri Geological Survey.

A fish kill began on October 8, 1982 at the Mountain Spring Trout Farm, which relies on water from Montague Spring. A total of 65,000 trout were killed. The spring is about 6,200 feet from the failed lagoon. Water from the spring turned chocolate brown in color and contained numerous particles. Microscopic examination showed the particles to be essentially identical with particles in fresh cow manure. Water at the spring had low dissolved oxygen and was covered with foam that had bubbles up to ¾ inch in diameter. Water from the spring had high fecal coliform and high fecal streptococcus bacterial numbers. The mean flow of the spring is about 5 cubic feet per second and the size of the recharge area is about 7.5 square miles. Based on soil maps of the area (USDA, SCS 1985) the site was underlain by Goss series soil with published permeability rates in the first 25 inches of soil of 2.0 to 6.0 inches per hour. Permeability rates for depths of 25 to 63 inches are 0.6 to 2.0 inches per hour. The site is underlain by geologic units that are part of the Boone Formation as mapped in Arkansas.

A final example is even closer to the vicinity of the hog farm and involved a small lake at a **golf course near Ridgedale, Missouri**. The site is near US Highway 65 and

about 5 miles north of the Arkansas state line. The site is underlain by geologic units that are part of the Boone Formation as mapped in Arkansas. The collapse was covered by the press and the following information is derived from information available to the public. I am professionally involved and cannot disclose information that has not already been made available to the public.

A large sinkhole about 80 feet long, 60 feet wide, and 35 feet deep formed on May 22, 2015 in the edge of a small lake. It drained much of the water from the lake. Photos indicate that no limestone bedrock was exposed in the large sinkhole. The lake was underlain by a compacted clay liner.

The waste ponds at the hog farm can store up to 2,735,922 gallons of hog manure. A sinkhole collapse involving one or both of the ponds would be a major ecological and public health disaster for the Buffalo National River and would do major economic damage to the tourism economy in Arkansas and nearby parts of Missouri. While sinkholes related to human activities may seem like rare events, they are not. That is why you can purchase insurance that covers damage from land subsidence and sinkhole collapses. In my 50 plus years of hydrogeology studies in karst areas I have investigated over 1,000 newly formed sinkholes that directly resulted from human activities. The issue is clearly of sufficient importance that it should have been included in an adequate environmental assessment for the C&H hog farm.

Perspective on the drastic impact of a large catastrophic discharge on a river is provided by the August 5, 2015 spill of 3 million gallons of mine water into a tributary of the Animas River in Colorado. The spill turned the river a sickly yellow and seriously impacted downstream water users in Colorado, New Mexico, and Utah. It also gained national press attention. On August 16, 2015 the flow rate of the Animas River at Durango, downstream of the spill, was 379 cfs; this was over 3 times the flow rate of the Buffalo River at Highway 65 on the same date (110 cfs). While acidic mine water is more colorful than manure, the volume of manure in the waste ponds at capacity is only slightly smaller than the volume of the spill into the tributary to the Animas River.

The manure ponds, like the Silver King Mine, represented a low probability but high risk situation. From press reports it appears that EPA is accepting liability for the costs associated with the mine spill. Since the FSA and SBA have failed to require an adequate level of hydrogeologic investigation for the manure ponds before guaranteeing the loans, will they assume the economic losses and cleanup costs of significant manure discharges or, worse yet, catastrophic collapses? I find nothing in the EA to indicate that they have. Because of the high risk of the manure operations, have these federal agencies required C&H Hog Farms and/or Cargill Pork to carry Environmental Risk insurance sufficient to pay for off-site damages? Again, I find nothing in the EA to indicate that this has been required. In the absence of agency guarantees or adequate insurance, it will be those who use the Buffalo River, and those who derive income from this pristine river, that will bear the burden of economic losses. If this hog operation is to continue then a condition of the guaranteed loans should be that either C&H Hog Farms or Cargill Pork carry adequate Environmental Risk insurance valid until the operation ceases and

environmental restoration of the site has been completed. Based on the resources at risk, an Environmental Risk policy with total payout limited to $50 million would be reasonable. This is part of the cost of doing risky operations in areas with extremely valuable resources.

Comment 7. The subsurface hydrogeologic investigation of the site for the manure ponds was inadequate for such a facility overlying the Boone Formation in an area where waters that would be impacted by a catastrophic failure have high resource values.

It appears that there were only three test borings made in the area, and it is unclear if any of them were beneath the area where the ponds have been constructed. The testing that was done was clearly done to characterize the sediments encountered and their possible utility for a compacted soil liner. That is fine, but is not indicative of an adequate subsurface hydrogeologic investigation. There are no data to indicate that any of the borings extended to a depth greater than 18 feet, and the EA states that none of the borings encountered limestone.

An appropriate investigation would have included many more borings. Furthermore, for an adequate investigation the borings should have extended to bedrock. Borings in areas especially prone to sinkhole collapse commonly encounter voids within the residuum and these voids are often near the contact between residuum and underlying rock. The depth to rock is nearby borings is an important parameter to record since substantial variations in depth are indicative of pinnacled bedrock and an elevated risk of sinkhole collapses. In-situ hydrologic testing of borings is highly desirable. Electrical resistivity or natural potential geophysical surveys are often useful in site characterization for risky structures in karst areas.

The fact that the hog farm now seeks to modify the manure holding ponds by adding a liner is a good idea. The rationale for taking this step is unknown. It could be that excessive leakage has been noted or is suspected. It could also be that C&H Hog Farms and/or Cargill Pork recognize the risks of major leakage or collapse and view this approach as a prudent action (which it is). However, while this action would likely reduce the risk, most sinkhole collapses are large enough to destroy the integrity of such a synthetic liner. Furthermore, the ponds have been used for manure storage for over two years and this use has likely destabilized the underlying residuum.

Comment 8. EA page 1-5. "Given that the facilities have been constructed and are currently in operation, it is not possible to conduct fieldwork or sampling to characterize conditions as they were prior to the land acquisition and construction that occurred in 2012 and 2013, and ongoing operations, which commenced in April of 2013."

This is not true. An adequate assessment under NEPA must consider the impacts of all lands used by this operation and conduct necessary fieldwork and sampling related to all of these lands. This operation is located in a karst area where contaminated waters

disposed of on the surface can readily move into the underlying groundwater system without effective natural cleansing. Given this hydrogeologic setting an adequately detailed evaluation is required for not just the portion of the 23.43 acre tract where the CAFO and waste holding facilities are located, but also for all of the lands planned for waste disposal.

C&H Hog Farms has chosen to locate this operation in an area that has high potential to contaminate groundwater supplies that contribute to the flow of the Buffalo River. The FSA and SBA have likewise chosen to take federal actions that require compliance with the National Environmental Protection Act (NEPA). The Buffalo River is a unit of the National Park System. The River is also identified as "Outstanding National Resource Water" and as "Extraordinary Resource Water". Because of these designations more stringent water quality standards apply. Because of the risks involved, and the major state and national significance of the waters involved, a comprehensive EA, if not an actual EIS, is necessary for this facility. A less risky activity or a less risky site would not have required the level of hydrogeologic scrutiny necessary for this operation.

The lands that must be assessed include the 23.43 acre tract, a portion of which is used for the CAFO and waste holding ponds, plus 17 fields encompassing 630.7 acres (based on EA Table 2-1) identified for waste disposal. Some portions of the 23.43 acre tract could actually be investigated as part of a "hard look" and certainly all of the waste disposal acreage (which represents approximately 96% of land used for this operation) should have been investigated. The EA is acknowledging that the responsible federal agencies and/or their consultants have not conducted the on-site field work necessary for an acceptable assessment in compliance with NEPA or, it would appear, with the intent of the Federal Court for the Eastern District of Arkansas.

Some of the features that a qualified and competent hydrogeological investigator would search for on and adjacent to the fields identified for manure disposal would include:

- Surface evidence of land subsidence or sinkholes. This would include the use of air photos plus a detailed on the ground inspection of all the tracts of land involved. The air photos would not be the Google type, but instead would be those available through the NRCS (another USDA Department). Air photos would need to be examined under a stereoscope for proper analysis.
- Locations of intermittent and perennial springs in or near the tracts on which manure would be deposited. Reconnaissance measurements of water temperature and specific conductance (at a minimum) should be made in streams and springs. Specific conductance measurements in any waters that might be present in the channel of Big Creek could identify springs discharging within the bed of the stream.
- Identification of gaining or losing stream segments on Big Creek and Dry Creek adjacent to, or within a mile of, fields identified for manure disposal.
- Location of any unplugged dug or drilled wells in or near fields identified for manure disposal.

- Any other features potentially reflective of the site's surface and groundwater hydrology.

Comment 9. EA page 3-3. "Animal wastes can impact surface water quality from organic matter, nutrients, and fecal bacteria."

This is an incomplete list; a complete list and assessment of each contaminant that can impact surface water and/or groundwater is needed. This is especially true in view of the fact that surface water and groundwater derived from the hog operation flows into the Buffalo National River. Many people using the River come in direct contact with the water and some, while it is not a desirable thing to do, many people accidentally or intentionally ingest water from the River and/or from tributary springs.

In addition to the parameters listed in the EA, animal wastes also deplete dissolved oxygen in water. Manure contains viruses and other pathogens, some of which have long survival times. Antibiotics and other pharmaceuticals in feed and/or given orally or by injection can pass through the digestive systems of the confined animals and become incorporated in manure. When transported off-site in surface water and/or in groundwater, they pose health risks to people and the environment. There is scientific concern that antibiotics in waste storage facilities can build antibiotic resistance in manure before it is spread. This issue needs to be discussed. At a minimum the EA needs to identify the following:

- The scientific names of all bacterial, viral, and other pathogens or potential pathogens likely to occur occasionally or routinely in hog manure.
- The technical names of all pharmaceuticals likely to be used and thus likely to occur occasionally or routinely in hog manure from the facility.
- Any other potential water contaminants likely to be present in hog manure including chloride and heavy metals and information on their likely concentrations.

Comment 10. EA page 3-6, bottom paragraph: "Spring discharge may be contributing to increased nitrate levels at these sites. There is evidence to indicate that nitrate contamination may be coming from sources outside the river's surface water drainage area."

The nitrate contamination from outside of the river's surface water drainage area is primarily attributable to livestock grazing on permanent pasture underlain by karstic rock units, and particularly the Boone Formation. Nitrates in livestock manure leach through the soil and into the underlying karst groundwater system where they are readily transported to springs. Macropores are especially important in moving water and contaminants through soils that overlie karstic groundwater units. The loading rates for nitrates in hog manure deposited on fields by the C&H operation is undoubtedly greater than the loading rates for nitrates from cattle on permanent pasture. It is incorrect to assume or imply that some of the nitrates in manure applied to permanent pasture or hayfields underlain by the karstic Boone Formation will not reach the groundwater

system and be transported to off-site wells and to springs and ultimately into the Buffalo River.

Comment 11. In the section of the EA entitled "Affected Environment", subsection "Surface Water" pages 3-7 to 3-8 the BCRET studies are identified.

The EA described the BCRET study as an "in depth case study of the C&H Hog Farms". The BCRET team was established in late 2013 as a direct political response to citizen concern about the adverse environmental impacts of the C&H Hog Farm. The BCRET team consists of 13 people with PhDs, 3 with M.S. or M.B.A. degrees, 3 people with B.S. or B.A. degrees, and one person with an unidentified educational background.

It is disappointing how little information relevant to an EA has resulted from the formation of BCRET. The apparent explanation for this is that the study is long-term academic research. It is not a gathering and assessment of information useful for determining health and environmental impacts expected to result from this hog operation or for protecting the River and springs that feed it. It is certainly not what people concerned with the Buffalo National River had hoped for from this academic body.

The primary information from the BCRET work that is relevant to the EA is surface water quality data discussed and illustrated from pages 3-14 to 3-19. The data suggest, at least for the parameters measured, that surface water quality in Big Creek downstream of the hog farm operation is generally very similar to conditions upstream of the hog farm. An exception is nitrate-nitrogen which is higher downstream of the hog farm, however total nitrogen values upstream and downstream of the hog farm are similar.

It must be emphasized that these water quality data are for surface water. The impacts on groundwater have not been assessed. This omission is a critical fatal flaw to the adequacy of this EA. Although not mentioned in the EA, there is a large spring in the channel of Big Creek approximately 1,400 feet north of Field 5. This is the northern-most manure application field. To the best of my knowledge no work has been done to determine which manure application fields (if any) contribute recharge water to this spring or whether or not the manure holding ponds may contribute water to this spring. The lack of these data are a major omission in data needed for adequate compliance with NEPA.

Based on my count, graphs in EA Figures 3-2 through 3-7 show approximately 87 data points for the period September 1, 2013 to June 1, 2015. That is approximately one sample per week. If the contaminants that were sampled for entered the creek as surface water runoff pulses (the likely case because of the preponderance of water movement into the groundwater system rather than overland to the creek) they could easily be missed by once a week samples. Given site conditions, the few cases where downstream values substantially exceeded upstream values might be the only credible values from this portion of the BCRET studies.

Comment 12. EA Page 3-11. "One groundwater well (ID#930439555) is located adjacent to the farm buildings and supports farm operations (ANRC 2015c). The well was completed in 2013. It was drilled to a total depth of 325 feet below ground surface (bgs), and the static water level in the well was 1,138 feet bgs."

This is clearly impossible. Perhaps the values are reversed; perhaps neither is correct. Missing such a glaring error suggests that the FSA did not carefully read the EA prepared on behalf of the agency.

In addition, the reference cited (ANRC 2015c) is for well number 930355365453. There is no well by that number in the well database. Also, there is no well number 930439555 in the database. How could you confuse the two numbers and not get either of them right? The EA clearly lacks professional quality work.

Comment 13. EA Page 3-13. "Since C&H Hog Farms and the fields where wastes are applied are located along a perennial waterway..."

This is incorrect. A perennial waterway is one that has flow throughout the year. Manure Fields 15, 16, and 17 are in the Dry Creek topographic basin, a tributary to Big Creek. The Dry Creek topographic basin encompasses 7.23 square miles. I examined this watercourse on May 17, 2013 and found it to be totally dry at a point 800 feet upstream of the mouth of this creek. This point was reached by car from a public road. Unless there is major water movement into karst groundwater systems, topographic basins of about 0.5 square miles or more in this area should have had surface water flow in the middle of May, and topographic basins of about 1 square mile or more should have perennial flow.

The watershed area for Big Creek upstream of the mouth of Dry Creek is 28.50 square miles. The watershed area for Big Creek upstream of the crossing of County Road 6330 (3,700 feet downstream of the furthest downstream manure field) is 42.10 square miles. The watershed area for lands tributary to Big Creek between these two points is 13.60 square miles.

I examined an aerial photo from the National Agriculture Information program taken in the summer of 2010. At the time of the photo Big Creek appears to have dried to pools without obvious flow between pools in Big Creek downstream of the mouth of Dry Creek and upstream of a spring located about 1,400 feet north of Manure Field 5. This observation indicates that a drainage basin area of approximately 13.60 square miles in which manure application fields are located is a major groundwater recharge area for the Boone Formation aquifer. The watercourse of Dry Creek and Big Creek in this area cannot be characterized as perennial waterways.

Recommendations

I have met with several of the entities concerned with this issue and spent considerable time in preparing this assessment. While I do this type of work

professionally, in this case the time and expenses I have expended have been *pro bono;* I have not been retained by anyone or any group on this matter. The Buffalo River Watershed Alliance asked me to provide this independent assessment; again, I have done this at no charge to anyone. I am not an enemy of any group.

You FSA and SBA agency folks have made a major blunder in providing federal guarantees for loans to the C&H Hog Farm. With the information in my assessment, and with other important information you will gain from others, you will have more than sufficient information to properly assess the prudence of providing federal guarantees for these loans. There is no credible reason to drag this on by moving forward into an Environmental Impact Statement. Such a move will only further discredit the competency and integrity of your agencies and continue damage to water resources and the Buffalo National River. I urge you to use information from this Public Hearing and cancel the federal guarantees for these loans.

Thank you.

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Resume of Thomas Aley

PERSONAL DATA

Born September 8, 1938 in Steubenville, Ohio. U.S. Citizen. Married, two adult children.

EDUCATION

University of California, Berkeley. B.S. in Forestry (1960).

University of California, Berkeley. M.S. in Forestry with emphasis in forest influences and wildland hydrology. (1962).

University of California, Berkeley. Department of Geography (1962-1963); emphasis in hydrology and geology.

University of Arizona, Tucson. Department of Watershed Management (1963-1964); emphasis in wildland hydrology.

Southern Illinois University, Carbondale. Department of Geography (1972-1973). Emphasis in hydrology and geology.

PROFESSIONAL CERTIFICATION & REGISTRATION

Professional Hydrogeologist, Certificate Number 179, American Institute of Hydrology, Board of Registration. Granted 1983.

Certified Forester, Society of American Foresters. Granted 1996.

Professional Geologist, State of Arkansas Registration Number 1646. Issued 1991.

Professional Geologist, State of Kentucky Registration Number 1541. Issued 1994.

Registered Geologist, State of Missouri Registration Number 0989. Issued 1998.

Professional Geologist, State of Alabama Registration Number 1089. Issued 2003.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Institute of Hydrology
Association of Ground Water Scientists and Engineers
Society of American Foresters
Missouri Consulting Foresters Association
National Speleological Society

HONORS AND AWARDS

1960. Pack Prize in Forestry. University of California.
1961. Membership in Xi Sigma Pi, honorary forestry society.
1972. Award for outstanding performance, United States Forest Service.

1972. U.S. Forest Service nominee for the American Motors Conservation Award.
1973. Lester B. Dill Award for significant contributions to speleology. Mississippi Valley-Ozark Region of the National Speleological Society.
1977. Chairman's Conservation Award. Mississippi Valley-Ozark Region of the National Speleological Society.
1979. J Harlan Bretz Award for outstanding contributions to the study of speleology in the state of Missouri. Missouri Speleological Survey.
1981. Outstanding Service to Education Award. Phi Delta Kappa honorary educational fraternity for southwest Missouri.
1981. Fellow. National Speleological Society.
1988. In The Name of Science Award. Springfield, Missouri Public Schools. In recognition of outstanding service and dedication to science.

EMPLOYMENT HISTORY

1973 to Present. Director and President, Ozark Underground Laboratory, Protem, Missouri. Conducts or directs consulting and contract studies in hydrogeology, cave and karst related issues, and natural resource management of karst regions.

1966 to 1973. Hydrologist, United States Forest Service. Winona, Missouri and Springfield, Missouri. Directed the Hurricane Creek Barometer Watershed study, which assessed the interactions of land use and ground water hydrology in a forested karst area. Directed Grey Hollow study. Conducted "trouble shooting work" in Missouri, Arkansas, Wisconsin, Utah, Illinois, and Indiana. Left government service as GS-12.

1964 to 1965. Chief Hydrologist, Toups Engineering, Inc., Santa Ana, California. Duties included basic data collection and analysis for plaintiffs in Santa Ana Basin adjudication and similar work for defendants in San Gabriel Basin adjudication; these were both ground water basin adjudication suits. Directed technical work on ground water basin management and artificial recharge.

1963 to 1964. Teaching Assistant, Department of Watershed Management, University of Arizona, Tucson. Aerial photogrammetry and photo interpretation.

1963. Researcher, grant from Office of Naval Research, U.S. Navy, through Department of Geography, University of California, Berkeley. Conducted field studies on the origin and hydrology of caves in Jamaica, Haiti, and the Dominican Republic. Responsible for all field work. Work resulted in 3 publications.

1960 to 1963. Teaching Assistant and Research Assistant, School of Forestry, University of California, Berkeley. Teaching in aerial photogrammetry, photo interpretation, and forest influences. Research assistant in the same fields.

SUMMARY OF EXPERIENCE

39 years of professional experience in ground water and surface water hydrology, pollution control investigations, and land management issues with particular emphasis on soluble rock landscapes. The following projects are representative examples.

1. Hydrologic studies for land management and spring protection with particular emphasis on soluble rock regions. Numerous studies of this type have been conducted for local, state, and federal agencies in Missouri, Arkansas, Alabama, Kentucky, Illinois, Tennessee, Alaska, and Wyoming.

2. Expert witness testimony on pollution potential of underground injection of hazardous wastes into deep-lying soluble rocks in Oklahoma.

3. Expert witness testimony in ground water and surface water hydrology in Missouri, Arkansas, Oklahoma, Kansas, California, Alabama, Maryland, and Indiana.

4. Expert witness testimony on riverbank stability problems in Missouri before U.S. Senate Committees at request of Senator John Danforth of Missouri.

5. Member of 6-member review panel on the adequacy of testing to determine radionuclide migration from a radioactive waste disposal site at the Idaho National Engineering Laboratory, Idaho. Served as the only hydrogeologist on the panel.

6. Member of 6-member expert hydrogeology panel on hydrological issues associated with the St. Louis Airport Radioactive Waste Site.

7. Chairman of a 4-member "blue ribbon" panel established by the U.S. Forest Service to assess the significance of cave and karst resources in southeastern Alaska. The panel also assessed the extent to which land management activities were adversely impacting the resources.

8. Hydrologic consultant to St. Charles County, Missouri on clean-up of radioactive wastes at Weldon Spring Site, a former Atomic Energy Commission processing facility. Advised on actions to protect county well field from radioactive contaminants dumped in an abandoned quarry.

9. Ground water tracing in soluble rock landscapes, and delineation of recharge areas for spring systems. Work conducted in Missouri, Arkansas, Oklahoma, Indiana, Illinois, Kentucky, Tennessee, Alabama, Florida, Georgia, Texas, Maryland, Pennsylvania, New York, West Virginia, Arizona, Oregon, California, Wyoming, and Alaska. Ground water tracing in fractured rock landscapes in New Hampshire, Alabama, New Mexico, Minnesota, Idaho, Utah, and Washington. Ground water tracing in unconsolidated geologic units in New York, Massachusetts, Florida, North Carolina, South Dakota, Missouri, Arkansas, California, Oregon, Washington, Alaska, and British Columbia (Canada).

10. Hydrogeologic investigations of groundwater impacts from pipeline corridors. Missouri, Oklahoma, and Texas.

11. Ground water tracing investigations at mines in West Virginia, Pennsylvania, Missouri, Utah, Colorado, Montana, Irian Jaya Indonesia, and Peru.

12. Hydrologic investigations to determine sources of pollutants which caused fish kills at commercial fish farms in Missouri and Arkansas.

13. Hydrogeologic site investigations (and sometimes testimony) on municipal landfills with emphasis on site suitability and probability of ground water contamination. 21 sites in Arkansas, Missouri, Wisconsin, and Alabama.

14. Hazardous waste remediation investigations with emphasis on hydrogeology. Sites in Missouri, Arkansas, Kentucky, Pennsylvania, Maryland, Alabama, Tennessee, and California. Second opinion review of projects in Missouri, Kansas, and New York.

15. Impacts of food processing wastes on surface and ground water quality. Various projects in Arkansas and Missouri.

16. Hydrologic investigations of petroleum pollution of wells. Multiple sites in Missouri, Arkansas, and North Carolina.

17. Assessment of the hydrologic impacts of proposed geothermal energy development on the Santa Clara Indian Reservation, New Mexico.

18. Investigations on the extent and sources of sewage contamination in about 100 springs at Eureka Springs, Arkansas. Work involved the delineation of recharge areas for most of these springs and the identification of sewer line segments which had the greatest leakage problems.

19. Hydrogeologic hazard area mapping for proposed sewer line corridors in a sinkhole plain area south of Mammoth Cave, Kentucky. Work included hydrologic recommendations for minimizing exfiltration and monitoring strategies.

20. Hydrogeologic mapping of Greene County, Missouri to identify areas where sinkhole flooding and serious ground water contamination could result from land development.

21. Assessment of impacts of proposed highways on springs, caves, and endangered cave-dwelling species, Arkansas, Missouri, Indiana, Virginia, and West Virginia. Similar work for airports in Missouri and Arkansas, and for coal-fired power plants in Missouri and Arkansas.

22. Identification and delineation of rare, threatened, and endangered animal species' habitats in caves and ground water systems. Studies in Arkansas, Missouri, Oklahoma, Tennessee, Alabama, and Illinois.

23. Health and safety assessment of Harrison's Crystal Cave, Barbados.

24. Health and safety assessment of natural radiation as encountered in caves open to the public in the United States. Development of industry standards.

25. Various microclimate, hydrologic, biologic, interpretive, and management investigations of caves in Missouri, Arkansas, Tennessee, Kentucky, New Mexico, Arizona, California, Wyoming, Oregon, Alaska, British Columbia, New Zealand, and Australia.

26. Evaluation of 19 sites for designation as National Natural Landmarks; sites are in Indiana, Missouri, Arkansas, Iowa, Ohio, and New Mexico.

27. Assessment of hydrologic impacts of rock quarries. Multiple sites in Missouri, Arkansas, Maryland, Illinois, Alabama, and Alaska.

28. Assessment of the impacts of deep mining on regional hydrology. Missouri.

29. Preparation of sole-source aquifer designation petition. Missouri.

30. Delineation of wellhead protection zones for public ground water supplies in Arkansas, Missouri, Alabama, South Dakota, New Hampshire, Maryland, and Florida.

31. Feasibility study for creation of a national-scale American Cave and Karst Museum.

32. Instructor in numerous professional short-courses. These have included:

1) over 20 four-day courses in karst hydrogeology and groundwater monitoring sponsored by the Association of Ground Water Scientists and Engineers and by Environmental Education Enterprises;

2) two courses on groundwater site investigation techniques for health department professionals in Washington State; and

3) courses on land management in karst terrains for resource managers in West Virginia, Indiana, Kentucky, Tennessee, Missouri, Arkansas, Utah, Idaho, Oregon, Washington, Alaska, and New Mexico.

PUBLICATIONS

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Exhibit 10

Comments of
Oksana Lane, M.S.

Comments on the Rural Utilities Service's Assessment of Impacts to Biological Resources From the Proposed Arecibo Incinerator Project

November 10, 2015
Biodiversity Research Institute, Portland, Maine
Oksana Lane, M.S., Wetlands Program Director

These comments are submitted by the Biodiversity Research Institute on the assessment of biological resources in the Draft Environmental Impact Statement (DEIS) prepared by U.S. Department of Agriculture's Rural Utilities Service for a proposed waste incinerator in Arecibo, Puerto Rico. These comments are being offered after review of (1) the relevant sections in the DEIS, (2) the October 2010 Screening Level Ecological Risk Assessment (SLERA) conducted by Arcadis for Energy Answers and referenced in the DEIS, and (3) the November 2010 Flora and Fauna Study authored by CSA Group for Energy Answers and attached as Appendix E to a 2010 Environmental Impact Statement for the proposed project. These comments are not meant to be comprehensive, but rather highlight some of the major flaws and omissions in the DEIS's assessment of biological resources.

The Biodiversity Research Institute is a not-for-profit research institute dedicated to assessing emerging threats to wildlife and ecosystems through collaborative research and to using scientific findings to advance environmental awareness and inform decision makers. I am the Wetlands Program Director at the Biodiversity Research Institute. I am an environmental biologist by training, with special expertise in bird conservation and contaminant assessment work with birds, fish, and invertebrates. My CV is attached.

My comments are as follows:

1. The DEIS's wildlife diversity assessment appears to be incomplete and likely underestimates the abundance and diversity of species in the potentially affected area.

    - The Flora and Fauna Study's site surveys were conducted only on the footprint of the Project and did not survey areas that could be indirectly affected by the Project through pollution or water withdrawal.

    - The survey methods utilized for identifying potentially affected birds and mammals are vague, unclear and appear to be inadequate. The methods are not described in the DEIS or in the Flora and Fauna Study and do not appear to address the use of the Project area during a complete annual cycle of birds, other wildlife and the incumbent vegetation associations. In the Flora and Fauna Study, for example, the CSA Group states: "Bird diversity was noted throughout the whole site and all species identified by calls or seen were annotated. In addition, bird counts were conducted during fixed time periods on the different ecosystems during the morning and afternoon following methods described in Wunderle (1994) with the purpose of determining the bird diversity in each." This reference to Wunderle (1994) is not helpful in clarifying the methods used, however, because Wunderle (1994) indicates:

> "Different census methods can be used to survey the distribution of terrestrial bird species or to monitor population changes. The appropriate method depends on whether the objective is simply to document the presence of a species or to quantify its relative abundance, population density, population trends over time, habitat use, survivorship, or the physical condition of individuals. Once the objective is defined, consideration should be given to selecting a study site, the number of sampling units, the time of day, the time of year, and the experience of field personnel. The various census techniques, and their advantages and disadvantages in the Caribbean Islands are: point counts without distance estimation, variable-radius point counts, fixed-radius point counts, point counts for parrots, line transects without distance estimates, variable-distance line transects, strip transects, spot mapping, territory mapping of color-banded birds, mist petting, and use of tape-recorded playback to enhance detectability. For most studies of land birds in the Caribbean, the fixed-radius point count method is recommended."

It therefore remains unclear which of the suggested methods the Group used to assess bird diversity at the Project site.

- The CSA Group's Flora and Fauna Study did not find critical habitat or vulnerable/threatened/endangered fauna on the proposed site. However, the survey field work for the Flora and Fauna Study was conducted mostly during January, with a few visits made in August of 2010, therefore missing most of the fall and spring bird migration. Puerto Rico serves as an important stopover location for thousands of birds of over 100 species during fall (late August-November) and spring (February-April) migrations to and from breeding sites in North America. Most of the species are shorebirds (sandpipers, plovers etc.) and waterbirds (egrets, herons, ducks, etc.) and likely use nearby habitat especially Caño Tiburones wetlands.

- It does not appear that mist-netting/banding to detect secretive land birds took place during the CSA Group's survey periods. To properly assess bird diversity and abundance in the area, surveys should be conducted during each season and include audio-visual observations, point counts or auditory (songbirds) surveys (distance sampling or occupancy modeling) and capture-recapture methodologies. In addition, even though some species in Puerto Rico have an extra brood from November to January, most species are not actively vocalizing in January. Therefore by conducting acoustic surveys only in January and August it is possible to miss many resident breeding birds. By August, most species have finished breeding, or have fledged young and are normally quiet during that period. It is likely that the proposed location and the nearby large wetlands host significant numbers of migrating birds ranging from small songbirds to large waterfowl species. Therefore, surveys during fall and spring seasons should be conducted.

- Of 13 bat species found in Puerto Rico, the Flora and Fauna Study only identified Jamaican Fruit Bat (*Artibeus jamaicensis*) at the proposed location of the project. To

properly detect all bat species present in the area, bat recording devices and capture ought to be utilized during different seasons throughout the year. There is no mention of the methods used by the CSA Group to survey bats and other mammals.

2. The DEIS does not adequately emphasize the importance of the largest wetland complex in Puerto Rico, Caño Tiburones, located in close proximity (1.5 km) to the proposed incinerator.

    - There should be a great deal more emphasis placed on the potential direct and indirect effects of the proposed project on Caño Tiburones which is located in the municipalities of Arecibo, Manati and Barceloneta. Based on my experience with wetlands ecosystems, proposed daily water extraction of two million gallons from the Caño Tiburones has a high probability of causing irreversible damage to those wetlands.

    - Caño Tiburones is designated as an Important Bird Area (IBA) by Birdlife International. It is one of 356 **globally in danger** sites of over 12,000 IBAs sites and one of 15 IBA sites listed as in danger in the Caribbean Region and the only one in Puerto Rico (BirdLife International 2015). Caño Tiburones, in other words, is globally important and a fragile ecosystem. A few of the hundreds of species found in Caño Tiburones include: West Indian whistling duck *(Dendrocygna arborea*), endemic to the Caribbean (Colón 2004, Díaz and Pérez 1989), and the Puerto Rican emerald (*Chlorostilbon maugaeus***)**, or zumbadorcito de Puerto Rico in Spanish, an endemic hummingbird found only in the archipelago of Puerto Rico. Caño Tiburones is one of the few places in Puerto Rico where the endangered Piping Plover (*Charadrius melodus)* has been observed (Birdlife International, 2007) likely during spring/fall migration.

3. A significant gap in the DEIS's assessment is its failure to consider low-probability, high-risk events.

    - The DEIS does not consider the impacts of pollution that can result from a strong hurricane or a major storm event or fire that can damage or destroy the facility, potentially releasing significant amounts of toxic chemicals and exposing many species of wildlife and other biota to harmful levels of dioxin, lead, mercury and other toxins.

    - The DEIS also does not assess the effects of climate change and rising sea levels on a facility that is already at sea level and in close proximity to a river and the coastline.

4. The SLERA's assessment is not helpful in ascertaining the Project's potential impacts on ecological receptors.

    - The incinerator can emit dioxins, heavy metals such as lead, and other contaminants that have irreversible consequences on wildlife and fragile ecosystems. This pollution is difficult to predict and quantify, and the SLERA does not give much

confidence that its results are reliable. For instance, the exposure concentrations in sediment, water and air in the SLERA were calculated based on models using software not accessible to the public, instead of measuring contaminants in the field and collecting samples for laboratory analysis to establish baseline data on chemicals of potential ecological concern (COPEC). The Biodiversity Research Institute has often found that concentrations of mercury in sediment and water don't always correlate with the concentrations of the chemical in biota. We find birds/fish with high Hg levels where water and sediment concentrations are low. We believe it is more informative to measure COPEC in biota vs. abiotic mediums.

- The list of COPEC should include emerging contaminants that can end up in incinerated trash and must be measured in appropriate mediums (i.e. animal tissues). The SLERA estimates/calculates the modeled concentrations of known contaminants, however many modern products such as electronics and plastics contain potentially toxic chemicals that will be released when incinerated and ecologically-based screening levels (EBSLs) for these are likely unavailable. Chemicals that tend to bioaccumulate and biomagnify up the food chain have to be measured in the biota and the outdated methods of projecting or estimating harm based on soil and water concentrations do not apply to biota.

- Many toxins, such as mercury (Hg), bioaccumulate in biota and bioconcentrate up the food chain. Wetlands are particularly conducive to mercury methylation processes (inorganic Hg emitted into the atmosphere is deposited on the landscape and bacteria convert it into toxic methylmercury) and animals in wetland environments tend to have higher body burden of this potent neurotoxin. Some municipal garbage incinerators are known to emit high levels of Hg by burning Hg-containing products such as mercury-based thermostats (NYPIRG 2011). A study of mercury exposure in invertivorous birds on Long Island, NY found that saltmarsh sparrows breeding in the salt marshes off Hempstead NY had the highest blood and feather Hg levels of all saltmarsh sparrows from the study sites across New York and New England (Lane et al. 2011, 2013). Hempstead is home to one of New York's municipal garbage incinerators and is believed to be the source of local Hg.

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EDUCATION:

M.S. in Environmental Biology; minor in Statistics, University of Minnesota; Duluth, MN
B.A. in Environmental Studies; minor in Biology and Dance, Alfred University, Alfred, NY

RESEARCH INTERESTS:

Wildlife toxicology, conservation on a global scale, climate change and coastal avian communities. Global pollution monitoring of biota in the world's seas/oceans, biodiversity.

PROFESSIONAL EXPERIENCE:

Over 20 yrs of experience in bird banding and bird studies, over 15 yrs of contaminant assessment work with birds, fish, invertebrates. Focus on live capture and sampling of all species of birds, forage fish. Geographic areas include North and Central America, Russia and the Mediterranean Sea.

Senior Research Scientist/Wetland Program Director **1995-present**. Biodiversity Research Institute, Portland, ME. Organized, conducted and supervised multiple, long-term studies focusing on mercury exposure in salt marsh and wetland birds, fish, nekton and zooplankton in fresh and salt water. Organized, conducted and supervised the USEPA funded wildlife mercury exposure project at a Superfund site in Sudbury, Massachusetts and several NRDA studies in ME, VA, NJ and NY. Designed and organized a multi-regional water quality monitoring project, including lake water sampling and chemical analyses. Coordinated and conducted capture and banding of common loons, belted kingfishers, and ospreys and collected blood and feather samples for toxicological analyses. Managed a project to detect rare species and analyzed acoustic recording unit data for New Jersey marshes, for NJ Division of Fish and Wildlife, Endangered and Nongame Species Program.

Graduate Research Assistant **1991-1994**. University of Minnesota, Duluth, MN. Designed and conducted a research project to evaluate the effects of mosquito control agents on the diet and reproductive success of wetland nesting blackbirds. Duties included: nest searching, banding, acoustical surveys, collecting food items from live nestlings.
Research Assistant **1988-1990**. Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA and North Slope of Brooks Range, AK.
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