BEFORE THE

GEORGIA PUBLIC SERVICE COMMISSION

In Re: Georgia Power Company's 2019 Rate Case	Docket No. 42516

Direct Testimony of Rachel S. Wilson

PUBLIC VERSION

On Behalf of
Sierra Club

October 17, 2019

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I. INTRODUCTION AND QUALIFICATIONS

Q Please state your name, business address, and position.

A My name is Rachel Wilson and I am a Principal Associate with Synapse Energy Economics, Incorporated ("Synapse"). My business address is 485 Massachusetts Avenue, Suite 2, Cambridge, Massachusetts 02139.

Q Please describe Synapse Energy Economics.

A Synapse Energy Economics is a research and consulting firm specializing in electricity industry regulation, planning, and analysis. Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities.

Q Please summarize your work experience and educational background.

A At Synapse, I conduct analysis and write testimony and publications that focus on a variety of issues relating to electric utilities, including integrated resource planning, resource adequacy, electric system dispatch, environmental regulations and compliance strategies, and power plant economics.

I also perform modeling analyses of electric power systems. I am proficient in the use of spreadsheet analysis tools, as well as optimization and electricity dispatch models to conduct analyses of utility service territories and regional energy markets. I have direct experience running the Strategist, PROMOD IV, PROSYM/Market Analytics, PLEXOS, EnCompass, and PCI Gentrader models, and I have reviewed input and output data for several other industry models.

Prior to joining Synapse in 2008, I worked for the Analysis Group, Inc., an economic and business consulting firm, where I provided litigation support in the form of research and quantitative analyses on a variety of issues relating to the electric industry.

I hold a Master of Environmental Management from Yale University and a Bachelor of Arts in Environment, Economics, and Politics from Claremont McKenna College in Claremont, California.

A copy of my current resume is attached as Exhibit RW-1.

Q On whose behalf are you testifying in this case?

A I am testifying on behalf of the Sierra Club.

Q Have you testified previously before the Georgia Public Service Commission?

A Yes. I testified in Georgia Power Company's ("Georgia Power" or "Company") 2019 Integrated Resource Plan case, Docket 42310.

Q What is the purpose of your testimony?

A The purpose of my testimony is to describe the deficiencies in Georgia Power's request for rate recovery of past and future expenses associated with the management of coal combustion residuals (CCRs) and environmental compliance cost recovery (ECCR).

Q Please identify the documents and filings on which you base your opinions.

A My findings rely primarily upon the testimony and discovery responses of Georgia Power witnesses. I also rely on the attached expert report of Mark Quarles, and to an extent on external documents such as industry publications and materials from other utility dockets in other jurisdictions.

Q Are you sponsoring any exhibits with your testimony?

A Yes. I am sponsoring six exhibits.

Exhibit Number	Contents
RW-1	Resume of Rachel S. Wilson
RW-2	Company response to STF-L&A 5-13 Amended TRADE SECRET
RW-3	Company response to STF-L&A 10-1 TRADE SECRET
RW-4	Expert report of Global Environmental, LLC/Mark Quarles
RW-5	Excerpt of Bednarcik Exhibit 4 from the Direct Testimony of Jessica L. Bednarcik Before the North Carolina Utilities Commission
RW-6	Paul Exhibit A-12 Schedule B5.1, from the Direct Testimony of Matthew Paul Before the Michigan Public Service Commission

II. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q Please summarize your primary conclusions.

A I conclude that Georgia Power failed to show that its spending on past costs associated with CCRs was reasonable and prudent. This includes the $241 million CCR ARO regulatory balance that Georgia Power projects to be under-collected as of December 31, 2019 for which the Company is currently requesting cost-recovery.[1] The Company did not provide a cost breakdown or line item expenses for any of its coal plants, ash basins, or landfills that would allow review of the individual expenses it seeks to recover from its customers.

Similarly, Georgia Power provided no such cost accounting for future CCR costs, despite the fact it is requesting to recover $158 million in 2020, $140 million in 2021, and $227 million in 2022 from its customers. Information on future costs related to Effluent Limitation Guidelines (ELG) is lacking.

[1] *See* Direct Testimony of Poroch, Adams, Robinson at 26.

Finally, the Company bases its closure plans on permit applications rather than actual permits, meaning that these costs can be expected to change if the Georgia Environmental Protection Division (EPD) does not approve the plans or alters them. Customers may then have to pay even more money if Georgia Power has to undo parts of its closure plans.

Q Please summarize your primary recommendations.

A I make several recommendations. First, the Commission should disallow the costs that have already been incurred by Georgia Power because the Company has not presented any detailed evidence, in the form of a breakdown of costs or line item expenses, on how this money was spent in order to determine if the expenses were reasonable and prudent. Cost recovery should also not be allowed to the extent that the historical CCR storage and disposal did not comply with state and federal regulations, as described in the report by Mark Quarles, attached to my testimony as Exhibit RW-4, and described in more detail in Section VI.

Second, I recommend that the Commission disallow recovery for future expenses for the same lack of detailed information as with past expenditures. The EPD has not yet approved Georgia Power's closure plans and issued the necessary permits, so it is not yet known if the Company's proposed plans follow state and federal law. The Commission should consider withholding cost recovery on these future CCR costs until permits are issued and expenditure details are provided. With respect to any future spending on ELG compliance at the Bowen plant, I would recommend that the Commission disallow cost recovery on any spending that is above the cap set in the IRP docket, to the extent that Georgia Power is seeking recovery of these costs.

Third, Georgia Power should issue a Request for Proposal (RFP) on the beneficial uses of coal ash before estimated costs are accepted for rate recovery. As I describe in Section V, Dominion Energy was recently able to substantially lower its cost estimates associated with beneficial reuse of coal ash by conducting an RFP rather than relying on estimates.

Finally, I recommend that the Commission initiate a separate hearing specifically to address the Company's CCR Asset Recovery Obligation (ARO) compliance costs, both historical and forward-going since the closure of these ash basins and landfills are a multi-billion-dollar expense spanning fifty or more years.

III. GEORGIA POWER'S COAL ASH MANAGEMENT SPENDING AND REVENUE REQUIREMENTS

Q What is Georgia Power seeking in this rate case with respect to CCRs?

A Georgia Power is seeking cost recovery for past and future CCR spending. This includes a projected under-collected CCR ARO regulatory balance through December 31, 2019 and planned spending from 2020 through 2022. This section describes Georgia Power's projected long-term spending on CCR ARO compliance, as it has been described by the Company, and its plan to develop a center for beneficial use of reclaimed CCR.

Q What is the amount of the projected under-collected balance of CCR ARO regulatory balance for which the Company is requesting recovery?

A The Company is projecting an under-collected CCR ARO regulatory balance of $241 million as of December 21, 2019.[2] This balance reflects the capital investments made by the Company to comply with state and federal regulations for CCR ARO since 2013 that have not been recovered in current rates.[3]

Q Does the Company explain why it projects under-collected CCR ARO compliance costs at the end of 2019?

A No. The Company does not provide any analysis or discussion in the rate case filing, nor in any responses to discovery, of the factors leading to an under-collected balance of CCR ARO compliance costs from investments starting in 2013 and projected through the end of 2019.

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[2] *See* Direct Testimony of Poroch, Adams, Robinson at 26.

[3] *See* Direct Testimony of Poroch, Adams, Robinson at 6.

Q Does the Company provide a detailed description of all CCR ARO compliance costs incurred since 2013 and projected through the end of 2019?

A No. The Company provides virtually no information in either the rate case filing or responses to discovery of its CCR ARO compliance costs incurred since 2013 and projected through the end of 2019.

In the Company's response to discovery, it provides CCR ARO spending by plant, ash pond, landfill and by year.[4] Based on confidential information contained in response to STF-L&A-10-1a TRADE SECRET.xlsx, the Company's **********REDACTED**********. As stated above, the Company expects to under-collect some portion of these expenditures and thus is seeking to also recover $241 million in this rate case.[5]

Q How much does the Company plan to spend on CCR ARO compliance over the three-year alternate rate plan and what portion of these planned expenditures are included in the Company's estimated revenue requirement deficiency?

A The Company projects annual spending on ash ponds and CCR landfills of $277 million, $395 million, and $655 million for 2020, 2021, and 2022, respectively. Including the under-recovered balance and the CCR ARO accrual currently reflected in the Company's base rate, the Company projects annual revenue deficiency of $158 million, $298 million, and $525 million for 2020, 2021, and 2022, respectively.[6]

[4] *See* STF-L&A-10-1, attachment STF-L&A-10-1a TRADE SECRET.xlsx, attached as Exhibit RW-2.

[5] *See* Direct Testimony of Poroch, Adams and Robinson at 26.

[6] *See* Direct Testimony of Poroch, Adams and Robinson at 26.

Q What is the requested annual increase in the Company's rate base to recover its CCR ARO regulatory compliance costs?

A The Company is requesting an increase in the rate base of $158 million in 2020, $140 million in 2021, and $227 million in 2022.[7]

Q Does the Company provide a detailed description of all planned CCR ARO compliance costs from 2020−2022?

No. Once again, the Company provides virtually no information in the rate case filing, or responses to discovery, of its planned CCR ARO compliance costs projected from 2020 through 2022.

Referring again to the Company's response to STF-L&A-10-1a, information is provided for future CCR spending only by plant, ash basin, landfill and by year.[8] Trade Secret Table 1 below provides the spending by plant, year, and category (ash pond vs. landfill).

[7] *See* Direct Testimony of Poroch, Adams and Robinson at 9.

[8] *See* Exhibit RW-2.

Trade Secret Table 1. Past and future CCR spending at Georgia Power plants

Power Plant	Ash Sites	Closure Status	Costs ($ in millions) Project to Date 2018	Costs ($ in millions) Future Spend	Costs ($ in millions) Total
Arkwright	Pond	AP-1, AP-2DAS, AP-3 CIP in 2010 under Solid Waste Regulations. Under new CCR rules, future CBR to an onsite landfill	REDACTED	REDACTED	REDACTED
Arkwright	Landfill		REDACTED	REDACTED	REDACTED
Arkwright	**Total**		REDACTED	REDACTED	REDACTED
Bowen	Pond	AP-1 CBR in process	REDACTED	REDACTED	REDACTED
Bowen	Landfill	LF active, future CIP	REDACTED	REDACTED	REDACTED
Bowen	**Total**		REDACTED	REDACTED	REDACTED
Branch	Pond	AP-A CBR 2016, AP-B, C, D future CBR, AP-E regulated as a dam, future CBR	REDACTED	REDACTED	REDACTED
Branch	Landfill	No mention of a LF in the Environmental Compliance Strategy, despite future spending	REDACTED	REDACTED	REDACTED
Branch	**Total**		REDACTED	REDACTED	REDACTED
Hammond	Pond	AP-3 CIP 2018, AP-1, 2, 4 will be CBR	REDACTED	REDACTED	REDACTED
Hammond	Landfill	LF active, future CIP	REDACTED	REDACTED	REDACTED
Hammond	**Total**		REDACTED	REDACTED	REDACTED
Kraft	Pond	AP-1 CBR	REDACTED	REDACTED	REDACTED
Kraft	Landfill	LF inactive, future CIP	REDACTED	REDACTED	REDACTED
Kraft	**Total**		REDACTED	REDACTED	REDACTED
McDonough	Pond	AP-1 CIP 2017, AP-2 CBR 2019, AP-3, 4 CIP in process	REDACTED	REDACTED	REDACTED
McDonough	Landfill	None	REDACTED	REDACTED	REDACTED
McDonough	**Total**		REDACTED	REDACTED	REDACTED
McIntosh	Pond	AP-1 future CBR	REDACTED	REDACTED	REDACTED
McIntosh	Landfill	LF3 closed 2008, now in post-closure care. LF-4 active, future CIP	REDACTED	REDACTED	REDACTED
McIntosh	**Total**		REDACTED	REDACTED	REDACTED
McManus	Pond	AP-1 CBR in process	REDACTED	REDACTED	REDACTED
McManus	Landfill	None	REDACTED	REDACTED	REDACTED
McManus	**Total**		REDACTED	REDACTED	REDACTED
Mitchell	Pond	AP-A, 1, 2 future CBR	REDACTED	REDACTED	REDACTED
Mitchell	Landfill	None	REDACTED	REDACTED	REDACTED
Mitchell	**Total**		REDACTED	REDACTED	REDACTED
Scherer	Pond	AP-1 future CIP	REDACTED	REDACTED	REDACTED
Scherer	Landfill	LF active, future CIP	REDACTED	REDACTED	REDACTED
Scherer	**Total**		REDACTED	REDACTED	REDACTED
Wansley	Pond	AP-1 future CIP	REDACTED	REDACTED	REDACTED
Wansley	Landfill	LF active, future CIP	REDACTED	REDACTED	REDACTED
Wansley	**Total**		REDACTED	REDACTED	REDACTED
Yates	Pond	AP-1 CBR 2018, AP-A CBR 2017. AP-3, B' CIP in process. AP-2, B CBR in process	REDACTED	REDACTED	REDACTED
Yates	Landfill	LF (inclusive of R-6 and AP-C) CIP in process	REDACTED	REDACTED	REDACTED
Yates	**Total**		REDACTED	REDACTED	REDACTED
Grand Total	Pond		REDACTED	REDACTED	REDACTED
	Landfill		REDACTED	REDACTED	REDACTED
	Total		REDACTED	REDACTED	REDACTED

Sources: Georgia Power Environmental Compliance Strategy Table 4.3-1, Docket No. 42310; Cost data from TS STF-L&A-5-13, attached as TS Exhibit RW-3; Global Environmental, LLC Preliminary Analysis of Closure Permit Applications, attached as Exhibit RW-4.

As indicated in TS Table 1, the CCR ARO planned expenditures vary significantly by plant. The Company provides no discussion to characterize the nature of these differences, nor does the Company provide any additional details on the cost categories beyond "ash pond" versus "landfill."

Q Is it possible to determine the reasonableness of CCR ARO spending given the limited information the Company provided in this rate case filing?

A No. There is insufficient information to assess whether the Company's spending on CCR ARO compliance is reasonable, which is a prerequisite to allowing cost recovery. I would expect to see line by line expenses detailing how Georgia Power spent historical money and how it plans to spend future money, which would include but not be limited to, permitting, well drilling, groundwater monitoring, hiring experts, technical analysis, etc. Section IV of my testimony gives examples of the types of expenses provided by other utilities in CCR-related dockets in other states. **********REDACTED**********; however, there is no mention of a landfill in Georgia Power's *Environmental Compliance Strategy*. This is the sort of oddity that an itemized accounting of expenses would clarify.

Q Is it possible to determine whether Georgia Power's actions with respect to CCRs are reasonable?

A No. Because Georgia Power has provided no evidence that its closure plans are compliant with state and federal law, or that it has been historically handling its coal ash in compliance with state law, it is almost impossible to determine if the Company's spending is reasonable.

Q Can you provide an example where Georgia Power failed to properly justify its CCR ARO spending?

A Yes. Georgia Power's plans for the closing of Bowen Plant AP-1 ash basin provides a useful example of the need for more detailed information prior to committing ratepayer funds. The Company plans to comply with CCR regulations by moving one half of the coal ash contained in the basin to one side, lining the

basin, and then moving the ash back to its original location. Georgia Power will then do the same thing for the other half of the coal ash as it lines the other half of the basin.[9] According to Mark Quarles' Report, the Company did not look at alternatives such as using the on-site landfill to place the excavated coal ash from Bowen AP-1.[10] This type of closure seems to lead to unnecessary expenses associated with moving the ash multiple times. Georgia Power has provided no evidence that its strategy for Bowen AP-1, as currently planned, is reasonable or cost-effective for ratepayers—information which is required prior to recovering hundreds of millions of dollars from ratepayers.

Q What should Georgia Power provide in support of cost recovery for CCRs?

A The Company should provide several things in support of a request for cost recovery: (1) a detailed accounting of all CCR ARO compliance expenditures, including an itemized cost breakdown indicating how much will be spent on each step of the project. These line items could include, but are not limited to engineering, design, drilling, technical reports, permitting processes, groundwater monitoring, environmental health and safety, etc; (2) the EPD permits indicating that Georgia Power's projects are approved and compliant with state and federal law; and (3) analysis and documentation confirming that the least-cost alternatives were selected to meet CCR ARO compliance. I recommend that the Commission initiate a separate hearing specifically to address the Company's CCR ARO historical compliance costs as well as the $7.58 billion in forward-going CCR management costs.

[9] *See* Exhibit RW-4 at 33.

[10] *See* Exhibit RW-4 at 33.

IV. SUPPORT FOR COST RECOVERY IN OTHER JURISDICTIONS

Q You assert that Georgia Power has not been transparent about how it has spent the money it is seeking, nor has it detailed how it plans to spend future money. What evidence should the Company provide to support its request for recovery of CCR management costs?

A In seeking cost recovery for capital and operating expenses, it is good practice for utilities to provide breakdowns of these costs to facilitate a prudence review by utility commissions and intervenors. This is true for rate cases and preapproval-type dockets.

As an example, Duke Energy Carolinas (DEC) recently filed its 2019 rate case, in which it is seeking more than $200 million in cost recovery for its coal ash costs incurred in 2018 and 2019. Duke Energy Witness Jessica L. Bednarcik filed Direct Testimony and Exhibits providing a detailed breakdown of these incurred costs in order to demonstrate their reasonableness.[11] In contrast to Georgia Power, which provided only high-level trade secret costs by ash basin and landfill and only in response to discovery requests, DEC made its detailed costs public.

On page 17 of Ms. Bednarcik's Direct Testimony, she presents a summary of the activities performed and costs incurred during an 18-month period at four of DEC's coal plants, which is reproduced below as Table 2.

[11] *See* the DEC Direct testimony of Jessica Bednarcik at 17.

Table 2. Duke Energy Carolinas coal ash management cost summary

Table 1	Actual cost incurred 1/1/2018 through 6/30/2019			
	Allen	Belews Creek	Cliffside/Rogers	Marshall
EHS	$4,711,010	$4,788,547	$5,803,812	$4,437,090
Basin Closure / Engineering Design	$2,195,969	$2,784,491	$2,487,578	$5,421,021
Basin Support Projects	$2,564	$0	$48,402	$11,228,600
Permanent Water Supply	$9,326,407	$565,895	$1,766,241	$1,077,337
Permitting	$415,244	$687,758	$565,534	$265,127
Other	$1,402,680	$3,647,793	$2,023,193	$2,380,727
Total Cost	**$18,053,874**	**$12,474,484**	**$12,694,760**	**$24,809,902**

Source: Direct Testimony of Jessica L. Bednarcik Before the North Carolina Utilities Commission. Docket No. E-7 SUB 1214. September 30, 2019. Page 17, Table 1, available at https://starw1.ncuc.net/NCUC/page/docket-docs/PSC/DocketDetails.aspx?DocketId=27d5fcbf-d84b-4b74-933d-33dc87827bb7.

In addition, Ms. Bednarcik's exhibits went into even more detail and included descriptions and costs associated with all the various closure options, by ash basin. An excerpt of her Exhibit 4 for Duke's Allen power plant is attached to my testimony as Exhibit RW-5.

Q Do you have any other examples related to coal ash?

A Yes. In 2016, Northern Indiana Public Service Company (NIPSCO) requested a Certificate of Public Convenience and Necessity for environmental compliance projects associated with the CCR rule and Effluent Limitation Guidelines (ELGs). The Direct Testimony of Mr. Kurt W. Sangster from NISPCO describes the cost analyses done by NIPSCO in determining compliance with these rules and lays out the specific costs at issue. An excerpt from his testimony shows those costs, in Table 3, below.

Table 3. NIPSCO CCR and ELG compliance costs

Project	Direct Capital ($)	Indirect Capital ($)	Total Capital (direct and controllable) ($)	AFUDC ($)	Total Capital ($)	Annual O&M ($)	Construction Start Date	In-Service Date
CCR Compliance Plan								
Bailly Generating Station								
Ground Water Monitoring	1,200,000	180,000	1,380,000			117,000	6/6/2016	10/19/2017
Incremental Surface Impoundment (O&M)	-	-	-			346,000	10/21/2015	ongoing
Total	**1,200,000**	**180,000**	**1,380,000**			**463,000**		
Michigan City Generating Station								
Ground Water Monitoring	1,200,000	180,000	1,380,000			117,000	6/13/2016	10/19/2017
Remote Ash Conveying	53,500,000	8,025,000	61,525,000			2,252,000	4/1/2017	10/19/2018
Material Management Area	3,000,000	450,000	3,450,000				4/1/2017	10/19/2018
Incremental Surface Impoundment (O&M)	-	-	-			346,000	10/21/2015	ongoing
Total	**57,700,000**	**8,655,000**	**66,355,000**			**2,715,000**		
R.M. Schahfer Generating Station								
Ground Water Monitoring	3,100,000	465,000	3,565,000			280,000	5/23/2016	10/19/2017
Remote Ash Conveying (U14 & U15)	107,600,000	16,140,000	123,740,000			2,382,000	4/1/2017	10/19/2018
Material Management Area	2,000,000	300,000	2,300,000				4/1/2017	10/19/2018
Process and Storm Water Pond	5,400,000	810,000	6,210,000					TBD
Landfill-Pond Closure	15,900,000	2,385,000	18,285,000				10/21/2018	10/19/2028
Incremental Surface Impoundment (O&M)	-	-	-			801,000	10/21/2015	ongoing
Total	**134,000,000**	**20,100,000**	**154,100,000**			**3,463,000**		
Total CCR	**192,900,000**	**28,935,000**	**221,835,000**	**6,700,000**	**228,535,000**	**6,641,000**		
ELG Compliance Plan								
R.M. Schahfer Generating Station								
Piping Bottom Ash to FGD	4,600,000	690,000	5,290,000			-	1/1/2020	12/1/2023
ZLD	137,900,000	20,685,000	158,585,000			2,600,000	1/1/2020	12/1/2023
Total ELG	**142,500,000**	**21,375,000**	**163,875,000**	**6,400,000**	**170,275,000**	**2,600,000**		
Environmental Compliance Project	**Direct Capital ($)**	**Indirect Capital ($)**	**Total Capital (direct and controllable) ($)**	**AFUDC ($)**	**Total Capital ($)**	**Annual O&M ($)**		
	335,400,000	**50,310,000**	**385,710,000**	**13,100,000**	**398,810,000**	**9,241,000**		

Source: Reproduced from Direct Testimony of Kurt W. Sangster before the Indiana Utility Regulatory Commission. Cause No. 44872. November 23, 2016. Attachment 4-A, available at https://iurc.portal.in.gov/legal-case-details/?id=5e18aadd-5ca0-e611-80f7-1458d04e2f50.

Q Do you offer any additional examples?

A Yes. In Detroit Edison's (DTE) 2018 rate case, the Direct Testimony of Matthew Paul supports the reasonableness and prudency of the capital and operations and maintenance (O&M) costs for certain of DTE's generating units.[12] His Exhibit A-12, which is attached to my testimony as Exhibit RW-6, provides capital and O&M expenditures for the steam, hydraulic, and peaking plants owned by DTE for a historical year (2017), a bridge period, and the Projected Test Year.

Q Based on your experience, is the information provided by Georgia Power consistent with what a reasonable utility would do when asking for cost recovery?

A No. As shown in the preceding examples, reasonable utilities provide detailed cost breakdowns to demonstrate that their spending is prudent. These are public examples, and there are many more examples in which cost information is confidential, but nonetheless available to utility regulators and intervenors. Georgia Power failed to provide justification for its costs, either publicly or as trade secret information, and it is thus impossible to make a determination as to the reasonableness or prudency of its estimates.

V. BENEFICIAL USES OF CCR

Q Are there beneficial uses of CCR that could lower the costs of regulatory compliance to Georgia Power?

A Yes. Based on a report by the U.S. Environmental Protection Agency, CCR can be used in concrete and flue gas desulfurization (FGD) gypsum in wallboard. Coal fly ash can be used as a direct substitute for portland cement in concrete and

[12] Direct Testimony of Matthew T. Paul before the Michigan Public Service Commission. Case No. U-20162, available at *https://iurc.portal.in.gov/legal-case-details/?id=5e18aadd-5ca0-e611-80f7-1458d04e2f50*.

FGD gypsum can be used as a replacement for mined gypsum in wallboard. These are currently the two largest encapsulated beneficial uses of CCR.[13]

Georgia Power's decision to excavate and transport CCRs to unlined impoundments for consolidated closure-in-place is a missed opportunity to beneficially reuse those wastes. Excavated CCRs can be sufficiently processed ex-situ to be used as raw material substitutions (e.g. in concrete). As a result, the excavated CCRs would instead have a monetary value and no long-term disposal site liability with continued costs. Of course, Georgia Power might be able to excavate CCRs from closed-in-place impoundments or closed landfills for beneficial reuse at some point in the future after closure, if permitted by Georgia EPD. However, by that time it would have already incurred the substantial costs of building an engineered cap that would then be destroyed.[14] The Company would then have to rebuild the cap over the remaining waste and/or install some sort of temporary cover to prevent water infiltration. This process of closing and reopening impoundments has the potential to incur high costs for which ratepayers should not be liable.

Q Has Georgia Power considered the revenues associated with the beneficial uses of CCRs?

A Yes, but the estimated revenues in the Test Year are much lower than any of the previous years for which Georgia Power has provided actual data, shown in Table 4.

[13] U.S. EPA. *Frequent Questions about the Beneficial Use of Coal Ash*. Available at: https://www.epa.gov/coalash/frequent-questions-about-beneficial-use-coal-ash#buandccrfinalrule

[14] *See* Exhibit RW-4 at 37.

Table 4. Proceeds from the sale of coal ash, historical and Test Year

Georgia Power Company Proceeds From Sale of Ash (amounts in thousands)								
Plant	**2013 Actual**	**2014 Actual**	**2015 Actual**	**2016 Actual**	**2017 Actual**	**2018 Actual**	**12M Ended 6/30/19**	**Test Period 7/31/2020**
Scherer	$ (527)	$ (604)	$ (741)	$ (950)	$ (982)	$ (1,012)	$ (1,141)	$ (244)
Bowen	(3,004)	(3,135)	(2,850)	(2,990)	(2,821)	(2,895)	(3,408)	(2,171)
Wansley	(2)	(3)	(4)	(16)	(23)	(109)	(115)	(321)
Branch	(29)	-	(9)	-	-	-	-	-
Total	**$ (3,563)**	**$ (3,742)**	**$ (3,605)**	**$ (3,955)**	**$ (3,826)**	**$ (4,017)**	**$ (4,664)**	**$ (2,736)**

Source: Company's response to STF-L&A-1-30.

Q Does the Company have plans to expand the amount of CCR that it can divert to beneficial use?

A The Company's *Environmental Compliance Strategy Update for 2019*, includes discussion of the development of a center for beneficial use of harvested CCR;[15] however, there are no confirmed plans identified in this rate case filing. Nonetheless, Georgia Power is proposing Test Period revenues from coal ash that are far less than historical revenues.

Q Did Georgia Power explain the decline in revenues from coal ash between the 12-month period ending June 30, 2019 and the Test Period?

A No, there were no supporting documents submitted by the Company to explain this drop of almost $2 million.

Q What more can Georgia Power do with respect to revenues associated with beneficial uses of coal ash?

A In addition to providing justification behind the deviation of Test Year revenues associated with coal ash from historical revenues, Georgia Power should issue an RFP on the beneficial uses of coal ash before estimated costs are accepted for rate recovery. This would ensure that ratepayers do not pay for closure only to have Georgia Power then make money from the sale of coal ash.

[15] *See* Georgia Power Environmental Compliance Strategy Table 4.3-1, Docket No. 42310.

As an example, Dominion Energy was asked to issue an RFP for beneficial reuse of coal ash by the Virginia General Assembly after it estimated that beneficial use of coal ash at four sites, which included recycling, would cost between $2.564 and approximately $6.5 billion.[16] In 2018, after receiving actual bids, Dominion's estimate of costs declined to between $2.773 and $3.358 billion (if one company did the work) or between $2.345 and $5.642 billion (if the work is shared by multiple companies.[17] This represents a savings of almost $1 billion from the upper end of estimates prepared by Dominion.[18]

VI. GEORGIA POWER'S PAST CCR MANAGEMENT AND FUTURE COMPLIANCE PLANS

Q Why are you recommending a disallowance of CCR cost recovery for historical CCR management and compliance?

A I am recommending disallowance of CCR costs because, according to Mark Quarles' Report, Georgia Power's historical practices were inconsistent with industry standards, which led to groundwater contamination at the unlined surface impoundments.[19]

Q How was Georgia Power's past management of CCRs inconsistent with industry standards?

A Quarles' analysis concludes that historical industry data from the 1970s, as reported by EPA in reports issued in 1980 and 1988, indicated that Georgia Power knew or should have known about CCR contamination of groundwater shortly

[16] AECOM. 2017. *Senate Bill 1398 Response: Coal Combustion Residuals Ash Pond Closure Assessment*. Prepared for Dominion Energy. Available at: https://www.dominionenergy.com/library/domcom/media/about-us/electric-projects/coal-ash/sb-1398-executive-summary.pdf?la=en.

[17] Dominion Energy. 2018. *High Level Summary: Coal Combustion Residuals Recycling/Beneficial Use Assessment Business Plan*. Available at: https://www.dominionenergy.com/library/domcom/media/about-us/electric-projects/coal-ash/ccr-recycling-beneficial-use-assessment-summary.pdf?la=en.

[18] O'Connor, Katie. 2018. *A tale of two reports: Why recycling coal ash at Dominion's sites appears more feasible now than it did a year ago*. Virginia Mercury. Available at: https://www.virginiamercury.com/2018/11/20/a-tale-of-two-reports-why-recycling-coal-ash-at-dominions-sites-appears-more-feasible-now-than-it-did-a-year-ago/.

[19] *See* Exhibit RW-4 at 2.

after disposal began, given several factors. These include the Company's disposal of CCRs into unlined impoundments, their close proximity to shallow groundwater, and their construction of impoundments over streams.[20] In response to "leaky" impoundments, disposal into lined disposal units ("wet" and "dry") has been commonplace since the mid-1970s to help mitigate the risks from leaking impoundments. Yet, Georgia Power continued to build unlined impoundments and continues to dispose of CCRs into unlined impoundments with current plans for closure-in-place at those same unlined impoundments. As Mark Quarles concluded, the Company's unlined impoundments have contaminated and continue to contaminate groundwater.[21]

Q Can you describe any previous risky decisions that Georgia Power made regarding CCR management that have exacerbated the current situation?

A Yes. According to Quarles' Report, surface impoundments at Plants Bowen, McDonough, Wansley, Scherer, and Yates were all constructed over existing streams, causing groundwater to be very vulnerable to contamination.[22] Quarles notes that "placing CCRs directly into a stream places the wastes in direct contact with surface water and groundwater because shallow water table aquifers flow from topographically high areas (e.g. ridges, hills) towards and into streams."[23] Additionally, Quarles highlights that "Georgia Power also constructed some surface impoundments within or nearby areas designated by the Georgia EPD as Most Significant Groundwater Recharge Areas and also within areas that have the highest susceptibility to groundwater pollution."[24]

[20] *See* Exhibit RW-4 at 7.

[21] *See* Exhibit RW-4 at 8.

[22] *See* Exhibit RW-4 at 12.

[23] *See* Exhibit RW-4 at 11.

[24] *See* Exhibit RW-4 at 15.

Q Why are you recommending a disallowance of cost recovery for future CCR costs?

A I recommend that the Commission disallow recovery for future expenses because the Company failed to present any detailed evidence in this rate case, in the form of a breakdown of costs or line item expenses, on the ways in which it plans to spend money for the closure of its ash basins and landfills at any of its plants. In addition, the EPD has not yet approved Georgia Power's closure plans and issued the needed permits, so EPD has not yet determined if the Company's plans are compliant with state and federal law. These costs are therefore still uncertain and could change depending on the actions taken by the EPD.

Q How do the Company's CCR closure plans fail to comply with state and federal CCR law?

A Mr. Quarles describes the Company's closure plans in detail and concludes that the closure plans for Plants Bowen, Hammond, McDonough, Scherer, Wansley and Yates, at a minimum, do not meet the technical standards for closure-in-place.[25] In addition he concludes that:

> The closure-in-place plans will continue to leave CCRs saturated in groundwater even after closure is complete and without other measures (e.g. slurry walls, groundwater pumping wells) to prevent on-going leaching to groundwater or prevent contaminated groundwater from migrating away from the impoundments.[26]

Q Please explain further how Georgia Power's closure plans will fail to resolve ongoing groundwater contamination.

A According to Mr. Quarles' analysis, CCRs will remain submerged in groundwater after closure-in-place is completed. He finds that:

> Saturated CCRs will continue to exist post-closure for the impoundments that will be closed-in-place. Since Georgia Power does not intend to pump any pore water

[25] *See* Exhibit RW-4 at 2.

[26] *See* Exhibit RW-4 at 2.

from the complete depth of saturated wastes prior to constructing the cap at any point during post-closure, leaching and groundwater contamination will continue in perpetuity for any disposal area that contains submerged wastes. The engineered cap cover systems will not prevent groundwater from up-gradient, topographically higher areas from flowing underneath and into the wastes— thus allowing wastes to become re-saturated and leaching to continue.[27]

Q What consequences could this have on future costs?

A If groundwater contamination remains an issue post-closure, this will require many additional long-term costs. Referencing Quarles' report:

EPRI concluded that groundwater conditions at impoundments that are closed in-place can actually worsen when CCRs remain saturated after construction of a cap over wastes because the CCRs will continue to leach to groundwater. In my experience reviewing closure plans in other states for other utilities, groundwater quality predictive models determined that groundwater quality will not improve within 100 years or more (e.g. Duke Energy, Allen Plant, North Carolina). When groundwater quality does not improve over time, utilities must continue sampling groundwater and incurring the associated long-term costs of labor, laboratory analyses, and well maintenance, as examples, into the distant future.[28]

Q Is Georgia Power aware that its closure plans are not compliant with the State or Federal CCR Rule?

A Yes. As Quarles describes in his report:

Georgia Power completed numeric, predictive models for Plants Scherer and Wansley, and those models determined that CCRs will remain submerged in groundwater even after closure-in-place is completed. Further, Georgia Power did not propose any engineering measures to capture contaminated groundwater or prevent it from continuing to migrate from the disposal areas. As such, these closures do not satisfy the Federal or Georgia CCR Rule closure performance standards.[29]

Namely, Georgia Power's closure plans conclude that Plant Scherer will have approximately 30 to 40 feet of CCRs submerged in a former stream valley after

[27] *See* Exhibit RW-4 at 34.

[28] *See* Exhibit RW-4 at 35.

[29] *See* Exhibit RW-4 at 34.

closure is complete, and at least 75 feet of CCRs will remain submerged at Plant Wansley.[30]

Q Has Georgia Power completed groundwater predictive modeling for all of its Plants?

A No. The Company has not numerically predicted the amounts of saturated CCRs that will remain post-closure at Plants Hammond, McDonough, or Yates.

Q Without this information, are you able to determine if the closure methods for these plants are compliant and eligible for cost recovery?

A No. According to Quarles' report, the estimation of saturated wastes is a "critical factor in determining whether or not leaching will continue and whether or not the closure-in-place method is compliant with the Georgia CCR Rule and the Federal CCR Rule."[31]

Q Are there adverse impacts to human health associated with groundwater contamination from CCR ponds and landfills?

A Yes. A report by the group Physicians for Social Responsibility discusses the range of toxic constituents that are known to leach, leak, or spill out of coal ash disposal sites that adversely affect human and environmental health. The report summarizes the effects on the human body resulting from exposure to nine of the most common toxic contaminants found in coal ash.[32] As an example, arsenic is found in coal ash and is known to produce numerous negative health effects including several types of cancer (skin cancer, bladder cancer, lung cancer, and kidney cancer) due to chronic exposure from contaminated drinking water.[33]

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[30] *See* Exhibit RW-4 at 34.

[31] *See* Exhibit RW-4 at 34.

[32] Gottlieb, Gilbert and Gollin-Evans. 2010. *Coal Ash: The Toxic Threat to Our Health and the Environment*. Available at https://www.psr.org/wp-content/uploads/2018/05/coal-ash.pdf.

[33] *Ibid.*

Q Have there been any studies that calculate the health costs imposed on communities that are exposed to toxic pollution from coal ash?

A Yes. One study measured the damage costs to surrounding communities from the 2014 Dan River coal ash spill in North Carolina. The study found that the combined cost of ecological damage, recreational impacts, effects on human health and consumptive use, and esthetic value losses due to the coal ash spill totaled $295,485,000.[34] The study found that the total six-month damage cost for health and consumptive use to individuals living in the affected communities was $75,565,425.[35] The study author notes that this was a short-term six-month study and the long-term damage costs from the coal ash spill could be much larger.

VII. GEORGIA POWER'S ENVIRONMENTAL COMPLIANCE COST RECOVERY

Q What is Georgia Power seeking in this rate case with respect to Environmental Compliance Cost Recovery (ECCR)?

A The Company is seeking cost recovery for $165 million in Environmental Compliance Cost Recovery for 2020.[36]

Q Does the Company describe the ways in which this money will be spent?

A Not as fully as I would like. The Company has provided the *Environmental Compliance Strategy*, which was attached to its 2019 IRP, as well as the STF-L&A-3-6 TS Attachment, which provides ********REDACTED********** **********. In its response to STF-L&A-3-6, Georgia Power also provides a *Basis for the Assertion that the Information Submitted is Trade Secret*, in which the Company states that the Attachment "contains insight on expenditures related to specific controls and timing of when the controls will be

[34] Lemly, A.D. 2014. "Damage cost of the Dan River coal ash spill." *Environmental Pollution*: 197 (2015) 55e61. Available at http://ecojusticecollaborative.org/wp-content/uploads/2017/10/Lemly-Damage-Cost-of-Dan-River-Coal-Ash-Spill.pdf.

[35] *Ibid.*

[36] *See* Direct Testimony of Poroch, Adams and Robinson at 9.

placed in service." In my review of the STF-L&A-3-6 Attachment, however, I do not note any expenditure amounts that I can tie to any specific controls.

Q What sort of information should Georgia Power have provided with respect to ECCR?

A At a minimum, Georgia Power should have provided Direct Testimony from Company witnesses describing the ways in which the Environmental Compliance Strategy is tied to the $165 million in ECCR being requested. Like the CCR costs, without documentation of ECCR spending in Georgia Power's supporting testimony, the Commission is unable to determine if these costs are both reasonable and prudently incurred. In the examples that I give in Section IV, above, Ms. Jessica Bednarcik from Duke Energy provides descriptive testimony of the utility's costs and closure plans related to its ash ponds tied to the numbers presented in her both her testimony and supporting exhibits. Similarly, Mr. Paul of Detroit Edison provides direct testimony supporting his numbers for projected capital expenditures at the utility's steam plants.

The Company also should have indeed included cost information related to specific environmental controls, and the timing of those controls, in its related supporting documentation.

Q Why is it important that Georgia Power provide this additional information?

A My testimony on Georgia Power's 2019 Integrated Resource Plan in Docket No. 42310 presents capacity expansion modeling results demonstrating that the retirement of Plant Bowen prior to 2024 is more cost effective for ratepayers than continuing to operate the plant.[37] Continued operation would require capital spending for Effluent Limitation Guidelines (ELG) compliance and should not be given cost recovery. In the IRP docket, the Commission ordered that capital spending at Bowen be limited. During testimony at the rebuttal hearing, the Company confirmed that it did not intend to spend any money on ELG

[37] Direct Testimony of Rachel S. Wilson before the Georgia Public Service Commission. Docket No. 42310. April 25, 2019. Available at: https://psc.ga.gov/search/facts-document/?documentId=176702

compliance at Bowen. Without information related to specific environmental controls, by plant, the Commission is unable to determine if the Company is complying with that order. At the very least, Georgia Power's ELG line item budget should have indicated the spending being proposed for Bowen and confirm that it is below the cap set in the IRP docket.

Q What is your recommendation with respect to cost recovery for ELG spending?

A I would recommend that the Commission request that that Georgia Power confirm that it is not seeking cost recovery for any ELG expenses at Bowen, and disallow cost recovery on any spending that is above the cap set in the IRP docket, to the extent that there is any.

VIII. CONCLUSIONS AND RECOMMENDATIONS

Q Please summarize your conclusions.

A Georgia Power has failed to show the money it has spent on past, incurred costs associated with CCRs were reasonable and prudent, as the Company did not provide a cost breakdown or line item expenses for any of its coal plants, ash basins, or landfills that would allow review of these expenses. This includes the $241 million CCR ARO regulatory balance that Georgia Power projects to be under-collected as of December 31, 2019 for which the Company is currently requesting cost-recovery.[38]

Similarly, Georgia Power provided no such itemized breakdown for future ash management costs, despite the fact it is requesting to recover $158 million in 2020, $140 million in 2021, and $227 million in 2022 from its customers. As I show in Section IV, reasonable utilities provide detailed cost breakdowns to demonstrate that their spending is prudent. The examples I give are information that utilities have made publicly available, and there are many more examples in

[38] *See* Direct Testimony of Poroch, Adams, Robinson at 26.

which cost information is confidential, but nonetheless available to utility regulators and intervenors. Georgia Power failed to provide justification for its past and future CCR costs, either publicly or as trade secret information. It is thus impossible to make a determination as to the reasonableness or prudency of its estimates. This also applies to the Company's ECCR request for $165 million, which requires additional support in the form of descriptive testimony and greater cost detail.

Lastly, the Company bases its closure plans on permit applications rather than actual permits, meaning that these costs can be expected to change if the Georgia EPD does not approve the plans or alters them. Customers may then have to pay even more money if Georgia Power must undo parts of its closure plans.

Q Please summarize your recommendations.

Q First, I recommend that the Commission should disallow the costs that have already been incurred by Georgia Power because the Company has not presented any detailed evidence, in the form of a breakdown of costs or line item expenses, on how this money was spent in order to determine if the expenses were reasonable and prudent. Cost recovery should also not be allowed to the extent that the historical CCR storage and disposal did not comply with state and federal regulations.

Second, the Commission disallow recovery for future expenses for the same lack of detailed information as with past expenditures. The EPD has not yet approved Georgia Power's closure plans and issued the necessary permits, so it is not yet known if the Company's proposed plans follow state and federal law. The Commission may also want to withhold cost recovery on these future CCR costs until permits are issued. With respect to any future spending on ELG compliance at the Bowen plant, I would recommend that the Commission disallow cost recovery on any spending that is above the cap set in the IRP docket, to the extent that Georgia Power is seeking recovery of these costs.

Third, I recommend that the Commission order Georgia Power to issue a Request for Proposal (RFP) on the beneficial uses of coal ash before estimated costs are accepted for rate recovery, similar to what was done by the Virginia General Assembly in the case of Dominion. This has the potential to result in substantial cost savings to ratepayers.

Finally, I recommend that the Commission initiate a separate hearing specifically to address the Company's CCR Asset Recovery Obligation (ARO) compliance costs, both historical and forward-going since the closure of these ash basins and landfills are a multi-billion-dollar expense spanning fifty or more years.

Q Does this conclude your direct testimony?

A Yes, it does.

Date: October 17, 2019

Rachel Wilson
Principal Associate
Synapse Energy Economics, Inc.

EXHIBIT RW-1	Resume of Rachel S. Wilson

Rachel Wilson, Principal Associate

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rwilson@synapse-energy.com

PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Principal Associate*, April 2019 – present*, Senior Associate*, 2013 – 2019, *Associate*, 2010 – 2013, *Research Associate*, 2008 – 2010.

Provides consulting services and expert analysis on a wide range of issues relating to the electricity and natural gas sectors including: integrated resource planning; federal and state clean air policies; emissions from electricity generation; electric system dispatch; and environmental compliance technologies, strategies, and costs. Uses optimization and electricity dispatch models, including Strategist, PLEXOS, EnCompass, PROMOD, and PROSYM/Market Analytics to conduct analyses of utility service territories and regional energy markets.

Analysis Group, Inc., Boston, MA.

Associate, 2007 – 2008, *Senior Analyst Intern*, 2006 – 2007.

Provided litigation support and performed data analysis on various topics in the electric sector, including tradeable emissions permitting, coal production and contractual royalties, and utility financing and rate structures. Contributed to policy research, reports, and presentations relating to domestic and international cap-and-trade systems and linkage of international tradeable permit systems. Managed analysts' work processes and evaluated work products.

Yale Center for Environmental Law and Policy, New Haven, CT. *Research Assistant*, 2005 – 2007.

Gathered and managed data for the Environmental Performance Index, presented at the 2006 World Economic Forum. Interpreted statistical output, wrote critical analyses of results, and edited report drafts. Member of the team that produced *Green to Gold*, an award-winning book on corporate environmental management and strategy. Managed data, conducted research, and implemented marketing strategy.

Marsh Risk and Insurance Services, Inc., Los Angeles, CA. *Risk Analyst*, Casualty Department, 2003 – 2005.

Evaluated Fortune 500 clients' risk management programs/requirements and formulated strategic plans and recommendations for customized risk solutions. Supported the placement of $2 million in insurance premiums in the first year and $3 million in the second year. Utilized quantitative models to create loss forecasts, cash flow analyses and benchmarking reports. Completed a year-long Graduate Training Program in risk management; ranked #1 in the western region of the US and shared #1 national ranking in a class of 200 young professionals.

EDUCATION

Yale School of Forestry & Environmental Studies, New Haven, CT
Masters of Environmental Management, concentration in Law, Economics, and Policy with a focus on energy issues and markets, 2007

Claremont McKenna College, Claremont, California
Bachelor of Arts in Environment, Economics, Politics (EEP), 2003. *Cum laude* and EEP departmental honors.

School for International Training, Quito, Ecuador
Semester abroad studying Comparative Ecology. Microfinance Intern – Viviendas del Hogar de Cristo in Guayaquil, Ecuador, Spring 2002.

ADDITIONAL SKILLS AND ACCOMPLISHMENTS

- Microsoft Office Suite, Lexis-Nexis, Platts Energy Database, Strategist, PROMOD, PROSYM/Market Analytics, EnCompass, and PLEXOS, some SAS and STATA.
- Competent in oral and written Spanish.
- Hold the Associate in Risk Management (ARM) professional designation.

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Fisher, J., C. James, L. Johnston, D. Schlissel, R. Wilson. 2009. *Energy Future: A Green Alternative for Michigan*. Synapse Energy Economics for Natural Resources Defense Council (NRDC) and Energy Foundation.

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Texas Public Utilities Commission (SOAH Docket No. 473-17-1764, PUC Docket No. 46449): Direct testimony evaluating Southwestern Electric Power Company's application for authority to change rates to recover the costs of investments in pollution control equipment. On behalf of Sierra Club and Dr. Lawrence Brough. April 25, 2017.

Virginia State Corporation Commission (Case No. PUE-2015-00075): Direct testimony evaluating the petition for a Certificate of Public Convenience and Necessity filed by Virginia Electric and Power Company to construct and operate the Greensville County Power Station and to increase electric rates to recover the cost of the project. On behalf of Environmental Respondents. November 5, 2015.

Missouri Public Service Commission (Case No. ER-2014-0370): Direct and surrebuttal testimony evaluating the prudence of environmental retrofits at Kansas City Power & Light Company's La Cygne Generating Station. On behalf of Sierra Club. April 2, 2015 and June 5, 2015.

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Indiana Utility Regulatory Commission (Cause No. 44217): Direct testimony before the Commission discussing PROSYM/Market Analytics modeling relating to the application of Duke Energy Indiana for Certificates of Public Convenience and Necessity. On behalf of Citizens Action Coalition, Sierra Club, Save the Valley, and Valley Watch. November 29, 2012.

Kentucky Public Service Commission (Case No. 2012-00063): Direct testimony before the Commission discussing upcoming environmental regulations and electric system modeling relating to the application of Big Rivers Electric Corporation for a Certificate of Public Convenience and Necessity and for approval of its 2012 environmental compliance plan. On behalf of Sierra Club. July 23, 2012.

Kentucky Public Service Commission (Case No. 2011-00401): Direct testimony before the Commission discussing STRATEGIST modeling relating to the application of Kentucky Power Company for a Certificate of Public Convenience and Necessity, and for approval of its 2011 environmental compliance plan and amended environmental cost recovery surcharge. On behalf of Sierra Club. March 12, 2012.

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Minnesota Public Utilities Commission (OAH Docket No. 8-2500-22094-2 and MPUC Docket No. E-017/M-10-1082): Rebuttal testimony before the Commission describing STRATEGIST modeling performed in the docket considering Otter Tail Power's application for an Advanced Determination of Prudence for BART retrofits at its Big Stone plant**.** On behalf of Izaak Walton League of America, Fresh Energy, Sierra Club, and Minnesota Center for Environmental Advocacy. September 7, 2011.

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Wilson, R. 2015. "Best Practices in Clean Power Plan Planning." NASEO/ACEEE Webinar. June 29, 2015.

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Resume dated April 2019

EXHIBIT RW-2	Company response to STF-L&A 5-13 Amended **TRADE SECRET**

EXHIBIT RW-3	Company response to STF-L&A 10-1 **TRADE SECRET**

EXHIBIT RW-4	Expert report of Global Environmental, LLC/Mark Quarles

EXHIBIT RW-5	Excerpt of Bednarcik Exhibit 4 from the Direct Testimony of Jessica L. Bednarcik Before the North Carolina Utilities Commission

EXHIBIT RW-6	Paul Exhibit A-12 Schedule B5.1, from the Direct Testimony of Matthew Paul Before the Michigan Public Service Commission

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Steam, Hydraulic and
Other Power Generation
($000)

Case No.: U-20162
Exhibit: A-12
Schedule: B5.1
Witness: M. T. Paul
Page: 1 of 9

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
			Capital Expenditures				
		Historical	Projected Bridge Period			Projected Test Year	
Line No.	Description	12 mos. ended 12/31/2017	12 mos. ending 12/31/2018	4 mos. ending 4/30/2019	16 mos. ending 4/30/2019	12 mos. ending 4/30/2020	Reference
					col. (c)+(d)		
1	**Steam Power Generation**						
2	Routine	216,167	152,894	50,445	203,339	148,436	Exh A-12, B5.1 page 4
3	Non-Routine	31,994	35,318	28,627	63,945	75,572	Exh A-12, B5.1 page 2
4	Total Steam Power Generation	248,162	188,212	79,072	267,284	224,008	
5	**Hydraulic Power Generation**						
6	Routine	2,529	3,242	2,257	5,499	5,397	Exh A-12, B5.1 page 4
7	Non-Routine	58,591	43,980	13,029	57,009	35,579	Exh A-12, B5.1 page 2
8	Total Hydraulic Power Generation	61,120	47,222	15,286	62,508	40,976	
9	**Other Power Generation**						
10	Routine	26,456	28,123	4,275	32,398	20,008	Exh A-12, B5.1 page 4
11	Non-Routine	32,497	130,237	273,612	403,849	275,564	Exh A-12, B5.1 page 2
12	Total Other Power Generation	58,953	158,359	277,887	436,246	295,572	
13	Grand Total	368,234	393,793	372,245	766,038	560,556	

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Steam, Hydraulic, and
Other Power Generation -- Non-Routine
($000)

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Line No.	(a) Description	(b) Historical 12 mos. ended 12/31/2017	(c) Projected Bridge Period 12 mos. ending 12/31/2018	(d) Projected Bridge Period 4 mos. ending 4/30/2019	(e) Projected Bridge Period 16 mos. ending 4/30/2019	(f) Projected Test Year 12 mos. ending 4/30/2020
					col. (c)+(d)	
1	**Steam Power Generation - Non-Routine Additions:**					
2	Monroe Dry Fly Ash Basin	3,301	124	-	124	-
3	Monroe Fly Ash Basin Vertical Extension	4,232	115	-	115	-
4	Monroe Coal Combustible Residuals Transfer Pad	3,377	428	-	428	-
5	Monroe ELG Fly Ash Dry Conversion	2,419	11,250	8,927	20,177	21,437
6	Monroe Dry Fly Ash Processing	-	1,100	8,333	9,433	24,667
7	Monroe Site Security	7,539	3,644	1,333	4,978	2,667
8	DSI/ACI Control Projects	1,129	285	-	285	-
9	316b	1,225	1,000	118	1,118	160
10	St Clair Fire Restoration	24,786	-	-	-	-
11	St Clair Fire Insurance Recovery	(23,850)	(14,850)	-	(14,850)	-
12	Trenton Channel Aux Boiler & Main Steam Reducing Station	817	(18)		(18)	-
13	Trenton Channel Ash Handling & Sibley Quarry Landfill	788	1,011	-	1,011	-
14	Total Steam Power Generation - Non-Routine	25,762	4,088	18,711	22,799	48,930
15	Steam Power Generation - Non-Routine Removals:					
16	River Rouge Bottom Ash Remediation	282	2,728	-	2,728	-
17	St. Clair Scrubber Basin Remediation	398	3,841	-	3,841	-
18	Monroe Inactive Impoundment Remediation	841	2,220	7,595	9,815	5,405
19	Harbor Beach Decommissioning	2,111	9,480	-	9,480	-
20	Conners Creek Decommissioning	601	11,050	1,973	13,023	18,332
21	River Rouge Decommissioning	998	1,000	191	1,191	1,942
22	Trenton Channel Decommissioning	1,001	910	157	1,067	963
23	Steam Power Generation - Non-Routine Removals - TOTALS	6,232	31,229	9,916	41,146	26,642
24	Steam Power Generation - Non-Routine - TOTALS	31,994	35,318	28,627	63,945	75,572
25	**Hydraulic Power Generation - Non-Routine:**					
26	Ludington Upgrades	50,831	36,980	12,959	49,939	27,189
27	Ludington Transformers	7,759	7,000	70	7,070	8,390
28	Hydraulic Power Generation - Non-Routine - TOTALS	58,591	43,980	13,029	57,009	35,579
29	**Other Power Generation - Non-Routine:**					
30	Combined Cycle - 2022	31,871	92,425	271,191	363,616	252,414
31	Peaker Site Security & Blackstart	626	83	333	416	667
32	Ford CHP Unit	-	37,729	2,088	39,817	22,483
33	Other Power Generation - Non-Routine - TOTALS	32,497	130,237	273,612	403,849	275,564
34	TOTAL NON-ROUTINE	123,082	209,534	315,269	524,803	386,715

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Steam, Hydraulic, Environmental
and Other Power Generation - St. Clair Outage Event
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Line No.	(a) Description	Unit	(b) Capital Expenditures Historical 12 mos. ended 12/31/2017
1	Boiler House Window Replacement	Common	2,719
2	Bridge Crane Restoration	Common	-
3	Turbine Area Lead and Asbestos Abatement	Common	-
4	Turbine Deck Lighting Replacement	Common	-
5	Turbine Vent Fans Replacement	Common	-
6	Turbine Window Replacement	Common	-
7	Turbine Roof Replacement	Common	-
8	Unit 1 to 3 Power Batteries (North and South) Replacement	Common	4
9	Misc Electrical Panels, Breakers and Transformers Replacement	Common	289
10	Asbestos and Lead Abatement/Removal	Common	3,360
11	Computer Equipment Replacement	Common	25
12	Plant Radio System Replacement	Common	184
13	Central Control Room Annunciator Replacement	Common	40
14	Sub Total	Common	6,621
15	Unit 1 LP Generator Brush Holder Assembly Replacement	Unit 1	-
16	Unit 1 HP and LP Exciter Cables Replacement	Unit 1	-
17	Unit 1 Generators Neutral Bus Cable Replacement	Unit 1	-
18	Unit 5 Asbestos Removal	Unit 5	-
19	Unit 6 Uninterruptible Power Supply (UPS) Replacement	Unit 6	-
20	Unit 6 Control Battery Chargers Replacement	Unit 6	-
21	Unit 6 Control Battery DC Distribution System Replacement	Unit 6	152
22	Unit 6 Replace #1 Boiler Water Circulating Pump	Unit 6	-
23	Unit 6 Replace #1 Boiler Water Circulating Pump	Unit 6	409
24	Unit 6 Replace #2 Boiler Water Circulating Pump	Unit 6	-
25	Unit 6 Replace #3 Boiler Water Circulating Pump	Unit 6	9
26	Unit 6 Replace #4 Boiler Water Circulating Pump	Unit 6	(5)
27	Unit 7 turbine dissembly, reassembly and inspection	Unit 7	10,708
28	Unit 7 Replace #2 Boiler Water Circulating Pump	Unit 7	425
29	Unit 7 Condenser Expansion Joints	Unit 7	67
30	Unit 7 MTG Front Standard Control & Monitoring System	Unit 7	6,073
31	Unit 7 MTG Restoration (other than LP1)	Unit 7	328
32	Sub Total	Units	18,165
33	Total		24,786

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Steam, Hydraulic, and
Other Power Generation -- Routine
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	(a)	(b)	(c)	(d)	(e)	(f)
			Capital Expenditures			
		Historical	Projected Bridge Period			Projected Test Year
Line No.	Total Capital - Routine	12 mos. ended 12/31/2017	12 mos. ending 12/31/2018	4 mos. ending 4/30/2019	16 mos. ending 4/30/2019	12 mos. ending 4/30/2020
	DATA BY SITE				*col. (c)+(d)*	
1	Fleet Support Services	3,156	2,832	257	3,088	770
2	Greenwood	6,956	1,826	600	2,426	2,500
3	Belle River/Range Road	29,945	11,571	8,747	20,317	27,983
4	St. Clair	32,446	15,626	4,259	19,885	11,373
5	River Rouge	5,371	3,076	467	3,543	1,400
6	Trenton Channel/Sibley Quarry	7,917	6,027	1,700	7,727	4,200
7	Monroe	130,376	111,936	34,416	146,352	100,210
8	Subtotal Steam Power Generation	216,167	152,894	50,445	203,339	148,436
9	Hydraulic Power Generation	2,529	3,242	2,257	5,499	5,397
10	Other Power Generation	26,456	28,123	4,275	32,398	20,008
11	Total by Site	245,152	184,259	56,976	241,235	173,841
	DATA BY MAJOR CATEGORY					
12	Reliability Tier 1 Units	132,466	92,744	33,824	126,568	103,289
13	Reliability Tier 2 Units	40,298	20,136	4,759	24,895	13,640
14	Fleet Support Services	3,156	2,832	257	3,088	770
15	Safety/Combustible Dust	25,029	25,493	7,812	33,306	20,021
16	Minor Environmental	15,219	11,689	3,793	15,482	10,717
17	Hydraulic Power Generation - Ludington	2,529	3,242	2,257	5,499	5,397
18	Other Power Generation - Peakers	26,456	28,123	4,275	32,398	20,008
19	Total by Major Category	245,152	184,259	56,976	241,235	173,841

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Years 2017 to 2020
Routine Maintenance Projects greater than $1M

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Line No.	(a) Facility	(b) Calendar Year	(c) Unit	(d) High Level Breakdown	(e) Lower Level Breakdown	(f) Description	(g) Key Concept	(h) Amount
1	Belle River/Range Road	2017	2	Reliability	Reliability Boiler	Unit 2 Expansion Joints	Flue Gas	1,284,449
2	Belle River/Range Road	2017	2	Combustible Dust	Common System	Fuel Supply Unit 2 Coal Silo and Conveyor Belt Dust Collecter	Fuel System	1,391,299
3	Belle River/Range Road	2017	2	Safety	Reliability Turbine	Unit 2 HP & IP Turbine Valves	Turbine	2,268,501
4	Belle River/Range Road	2017	2	Reliability	Reliability Turbine	Unit 2 HP Turbine	Turbine	4,357,466
5	Belle River/Range Road	2017	2	Reliability	Reliability Boiler	Unit 2 Waterwall and Lower Slope Tubes	WW Tubes	7,448,930
6	Belle River/Range Road	2017	Common	Minor Environmental	Common System	Range Road Landfill Capping	Land	1,352,322
7	Belle River/Range Road	2017	Common	Reliability	Common System	Fuel Supply Coal Crusher 1	Fuel System	2,057,959
8	Greenwood	2017	1	Safety	Reliability Turbine	Unit 1 Turbine Valves	Turbine	2,268,048
9	Monroe without Large Enviro.	2017	1	Reliability	Reliability Boiler	Unit 1 Waterwall Tubes	WW Tubes	1,023,415
10	Monroe without Large Enviro.	2017	1	Reliability	Reliability Turbine	Unit 1 South Boiler Feed Pump Turbine Blades	Turbine	1,355,185
11	Monroe without Large Enviro.	2017	1	Minor Environmental	Air Quality	Unit 1 SCR Catalyst Layers 2 & 4	Boiler Emissions	1,376,299
12	Monroe without Large Enviro.	2017	1	Reliability	Reliability Turbine	Unit 1 North Boiler Feed Pump Turbine Blades	Turbine	1,385,904
13	Monroe without Large Enviro.	2017	1	Reliability	Reliability Boiler	Unit 1 Secondary Superheat Inlet Pendants	SH/RH Tubes	1,988,287
14	Monroe without Large Enviro.	2017	1	Reliability	Common System	Unit 1 Coal Mill 1-2, 1-4 and 1-5 Silos	Fuel System	2,458,553
15	Monroe without Large Enviro.	2017	2	Reliability	Reliability Boiler	Unit 2 Economizer Tubes	Econ Tubes	1,768,425
16	Monroe without Large Enviro.	2017	2	Reliability	Reliability Boiler	Unit 2 Reheat Outlet Pendant Dutchmen	SH/RH Tubes	2,100,366
17	Monroe without Large Enviro.	2017	2	Minor Environmental	Air Quality	Unit 2 SCR Catalyst Layers 2 & 4	Boiler Emissions	2,557,554
18	Monroe without Large Enviro.	2017	2	Reliability	Reliability Boiler	Unit 2 Horizontal Reheater Tubes	SH/RH Tubes	2,661,027
19	Monroe without Large Enviro.	2017	2	Reliability	Reliability Turbine	Unit 2 Generator	Generator	3,994,771
20	Monroe without Large Enviro.	2017	2	Reliability	Common System	Unit 2 Dynamic Classifiers for Coal Mills 1-7	Fuel System	6,773,278
21	Monroe without Large Enviro.	2017	2	Reliability	Reliability Boiler	Unit 2 Secondary Superheat Inlet Pendants	SH/RH Tubes	11,169,618
22	Monroe without Large Enviro.	2017	2	Reliability	Reliability Boiler	Unit 2 Waterwall Tubes	WW Tubes	15,470,599
23	Monroe without Large Enviro.	2017	3	Reliability	Common System	Unit 3 Coal Mill 3-4	Fuel System	1,188,738
24	Monroe without Large Enviro.	2017	3	Reliability	Reliability Boiler Feedwater System	Unit 3 Main Unit Condenser	Condenser	1,805,902
25	Monroe without Large Enviro.	2017	4	Minor Environmental	Air Quality	Unit 4 SCR Catalyst Layer 2	Boiler Emissions	1,201,747
26	Monroe without Large Enviro.	2017	4	Reliability	Reliability Turbine	Unit 4 North Boiler Feed Pump Turbine Blades	Turbine	1,202,189
27	Monroe without Large Enviro.	2017	Common	Safety	Common System	Fuel Supply Street Lighting	Lighting	1,175,053
28	Monroe without Large Enviro.	2017	Common	Reliability	Common System	Fuel Supply Caterpillar D10 Dozer	Fuel System	1,398,009
29	Monroe without Large Enviro.	2017	Common	Reliability	Common System	Fuel Supply Caterpillar D10 Dozer	Fuel System	1,408,953
30	Monroe without Large Enviro.	2017	Common	Combustible Dust	Common System	Fuel Supply Coal Crusher Sizing Grid & Bypass Chute	Fuel System	1,452,340
31	Monroe without Large Enviro.	2017	Common	Combustible Dust	Common System	Fuel Supply Unit 1 & 2 Cascade Counterweight Room	Fuel System	1,637,279
32	Monroe without Large Enviro.	2017	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 1	Fuel System	3,317,392
33	Monroe without Large Enviro.	2017	Common	Reliability	Capacity Electrical	Fuel Supply Control System	Fuel System	3,609,547
34	Monroe without Large Enviro.	2017	Common	Reliability	Common System	Outlet Canal Gates	Water	1,229,027
35	Monroe without Large Enviro.	2017	Common	Reliability	Common System	Make-Up Water System	Water	1,784,890
36	Monroe without Large Enviro.	2017	Common	Reliability	Common System	#8 Sootblowing Air Compressor	Plant Air	4,185,225
37	Peakers	2017	Belle River	Reliability	Capacity Electrical	Belle River 12-1, 12-2 & 13-1 Peakers Control System	Peakers	1,805,737
38	Peakers	2017	Delray	Reliability	Reliability Turbine	Delray 12-1 Peaker Generator Field	Peakers	1,711,751
39	Peakers	2017	Delray	Reliability	Reliability Turbine	Delray 11-1 Peaker Turbine Hot Gas Path	Peakers	3,955,931
40	Peakers	2017	Delray	Reliability	Reliability Turbine	Delray 12-1 Peaker Turbine Hot Gas Path	Peakers	4,046,178
41	Peakers	2017	Northeast	Reliability	Reliability Turbine	Northeast 12-1 Peaker Turbine Combustion Cans & Hot Gas Path	Peakers	3,597,118
42	Peakers	2017	Renaissance	Reliability	Reliability Turbine	Renaissance Unit 2 Peaker Combustion Cans	Peakers	2,417,370
43	Peakers	2017	Superior	Reliability	Reliability Turbine	Superior 11-4 Peaker Turbine Combustion Cans & Hot Gas Path	Peakers	2,884,787
44	St. Clair	2017	6	Reliability	Reliability Turbine	Unit 6 LP1 & LP2 Turbine L-0 Blades	Turbine	2,344,827
45	St. Clair	2017	7	Reliability	Common System	Unit 7 Coal Mill D	Fuel System	1,025,211
46	St. Clair	2017	7	Reliability	Common System	Unit 7 Coal Bunker Walls	Fuel System	1,082,849
47	St. Clair	2017	7	Reliability	Reliability Boiler	Unit 7 North & South Air Preheater Baskets (Cold End)	Air Heater	1,119,316
48	St. Clair	2017	7	Safety	Air Quality	Unit 7 Stack Liner Insulation	Boiler Emissions	1,120,690
49	St. Clair	2017	7	Reliability	Reliability Turbine	Unit 7 MTG Low Pressure Turbine LP1 Blades	Turbine	1,278,107
50	St. Clair	2017	7	Reliability	Reliability Boiler	Unit 7 Front & Rear Reheat Pendants	SH/RH Tubes	2,886,668
51	St. Clair	2017	7	Reliability	Reliability Boiler	Unit 7 Waterwall Tubes	WW Tubes	3,387,643
52	St. Clair	2017	7	Reliability	Reliability Turbine	Unit 7 MTG Low Pressure Turbine LP2 Blades	Turbine	3,985,782
53	St. Clair	2017	Common	Reliability	Common System	Fuel Supply Caterpillar D10 Dozer	Fuel System	1,487,172
54	**Total 2017 Projects**							**145,245,684**

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Years 2017 to 2020
Routine Maintenance Projects greater than $1M

Case No.: U-20162
Exhibit: A-12
Schedule: B5.1
Witness: M. T. Paul

Line No.	(a) Facility	(b) Calendar Year	(c) Unit	(d) High Level Breakdown	(e) Lower Level Breakdown	(f) Description	(g) Key Concept	(h) Amount
55	Belle River/Range Road	2018	1	Reliability	Reliability Turbine	Unit 1 HP Turbine	Turbine	3,700,067
56	Monroe without Large Enviro.	2018	1	Reliability	Reliability Turbine	Unit 1 North Boiler Feed Pump Turbine Condenser	Condenser	1,008,659
57	Monroe without Large Enviro.	2018	1	Safety	Reliability Turbine	Unit 1 Turbine Valves	Turbine	1,200,000
58	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler Feedwater System	Unit 1 Feedwater Heater 3	Feedwater Heater	2,148,382
59	Monroe without Large Enviro.	2018	1	Safety	Common System	Unit 1 ID Fan Discharge Dampers	Fans	2,617,601
60	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler	Unit 1 Economizer Tubes	Econ Tubes	2,900,000
61	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler	Unit 1 Horizontal Reheat Tubes	SH/RH Tubes	2,900,000
62	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler	Unit 1 Expansion Joints	Flue Gas	3,296,966
63	Monroe without Large Enviro.	2018	1	Reliability	Common System	Unit 1 Coal Mill 1-2, 1-4 and 1-5 Silos	Fuel System	3,328,991
64	Monroe without Large Enviro.	2018	1	Minor Environmental	Air Quality	Unit 1 SCR Catalyst Layers 2 & 4	Boiler Emissions	3,777,281
65	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler	Unit 1 Secondary Superheat Inlet Pendants	SH/RH Tubes	11,853,710
66	Monroe without Large Enviro.	2018	1	Reliability	Reliability Boiler	Unit 1 Waterwall Tubes	WW Tubes	11,928,188
67	Monroe without Large Enviro.	2018	3	Reliability	Reliability Turbine	Unit 3 South Boiler Feed Pump Turbine Blades	Turbine	1,329,391
68	Monroe without Large Enviro.	2018	3	Reliability	Reliability Boiler	Unit 3 Secondary Superheat Inlet Pendants	SH/RH Tubes	1,752,145
69	Monroe without Large Enviro.	2018	3	Reliability	Common System	Unit 3 Coal Mill 3-3 & 3-4 Silos	Fuel System	2,213,505
70	Monroe without Large Enviro.	2018	3	Minor Environmental	Air Quality	Unit 3 SCR Catalyst Layers 1 & 3	Boiler Emissions	2,244,606
71	Monroe without Large Enviro.	2018	4	Reliability	Reliability Boiler	Unit 4 Secondary Superheat Inlet Pendants	SH/RH Tubes	1,100,000
72	Monroe without Large Enviro.	2018	4	Reliability	Common System	Unit 4 Coal Mill 4-5 Silo	Fuel System	1,800,000
73	Monroe without Large Enviro.	2018	4	Minor Environmental	Air Quality	Unit 4 SCR Catalyst Layer 2	Boiler Emissions	2,342,869
74	Monroe without Large Enviro.	2018	Common	Combustible Dust	Common System	Fuel Supply Coal Crusher Sizing Grid & Bypass Chute	Fuel System	1,715,128
75	Monroe without Large Enviro.	2018	Common	Safety	Capacity Electrical	Fuel Supply 480V Breakers	Fuel System	2,121,390
76	Monroe without Large Enviro.	2018	Common	Combustible Dust	Common System	Fuel Supply Train Unloading Tripper Car Chute	Fuel System	2,200,000
77	Monroe without Large Enviro.	2018	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 2	Fuel System	2,638,854
78	Monroe without Large Enviro.	2018	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 3	Fuel System	2,682,819
79	Monroe without Large Enviro.	2018	Common	Reliability	Capacity Electrical	Fuel Supply Control System	Fuel System	8,321,538
80	Monroe without Large Enviro.	2018	Common	Safety	Common System	Unit 1 & 2 Precipitator SIR Lifting Rails & Trollies	Flue Gas	1,024,486
81	Monroe without Large Enviro.	2018	Common	Reliability	Common System	Make-Up Water System	Water	1,356,873
82	Monroe without Large Enviro.	2018	Common	Reliability	Common System	#8 SBAC Compressor	Plant Air	1,490,264
83	Monroe without Large Enviro.	2018	Common	Reliability	Common System	Station Air Compressors	Plant Air	2,629,558
84	Peakers	2018	Belle River	Minor Environmental	Air Quality	Belle River Peakers CEMS	Peakers	1,000,000
85	Peakers	2018	Dean	Reliability	Capacity Electrical	Dean 11-1, 11-2, 12-1 & 12-2 Peakers Control System	Peakers	2,352,762
86	Peakers	2018	Delray	Reliability	Reliability Turbine	Delray 12-1 Peaker Turbine Hot Gas Path	Peakers	2,430,034
87	Peakers	2018	Greenwood	Reliability	Reliability Turbine	Greenwood 11-1 Peaker Combustion Cans	Peakers	1,800,000
88	Peakers	2018	Greenwood	Reliability	Capacity Electrical	Greenwood 11-1, 11-2 & 12-1 Peakers Control System	Peakers	1,933,456
89	Peakers	2018	Hancock	Reliability	Reliability Turbine	Hancock 11-3 Peaker Generator Field	Peakers	1,000,000
90	Peakers	2018	Hancock	Reliability	Capacity Electrical	Hancock 12-1 & 12-2 Peakers Control System	Peakers	1,144,708
91	Peakers	2018	Northeast	Reliability	Capacity Electrical	Northeast 11-1, 11-2, 11-3, 11-4, & 12-1 Peakers Control System	Peakers	4,000,000
92	Peakers	2018	Renaissance	Minor Environmental	Air Quality	Renaissance Peakers CEMS Monitoring	Peakers	1,000,000
93	Peakers	2018	Renaissance	Reliability	Reliability Turbine	Renaissance Unit 4 Peaker Turbine Combustion Cans	Peakers	2,594,642
94	Peakers	2018	Renaissance	Reliability	Capacity Electrical	Renaissance Units 1-4 Peakers Main Unit Transformer Insulators	Peakers	3,110,608
95	River Rouge	2018	3	Safety	Reliability Turbine	Unit 3 Reheat Stop and Intercept Turbine Valves	Turbine	1,614,358
96	St. Clair	2018	6	Safety	Reliability Turbine	Unit 6 Turbine Valves	Turbine	1,500,000
97	St. Clair	2018	6	Reliability	Reliability Turbine	Unit 6 LP1 & LP2 Turbine L-0 Blades	Turbine	4,065,268
98	Trenton Channel	2018	9	Reliability	Reliability Boiler	Unit 9 Main Steam Piping Tee	Boiler Piping	1,571,493
99	Trenton Channel	2018	9	Reliability	Reliability Turbine	Unit 9 South Boiler Feed Pump Turbine Blades	Turbine	1,696,073
100	**Total 2018 Projects**							**122,436,673**

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Routine Maintenance Projects greater than $1M

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Line No.	(a) Facility	(b) Calendar Year	(c) Unit	(d) High Level Breakdown	(e) Lower Level Breakdown	(f) Description	(g) Key Concept	(h) Amount
101	Belle River/Range Road	2019	1	Reliability	Reliability Boiler	Unit 1 Expansion Joints	Flue Gas	2,235,912
102	Belle River/Range Road	2019	1	Safety	Reliability Turbine	Unit 1 IP Turbine Valves	Turbine	3,046,298
103	Belle River/Range Road	2019	1	Reliability	Reliability Boiler	Unit 1 Waterwall Tubes	WW Tubes	5,668,759
104	Belle River/Range Road	2019	1	Reliability	Reliability Turbine	Unit 1 HP Turbine	Turbine	8,777,202
105	Belle River/Range Road	2019	2	Reliability	Reliability Turbine	Unit 2 LP Turbine Blades	Turbine	1,000,000
106	Belle River/Range Road	2019	2	Reliability	Reliability Boiler	Unit 2 Waterwall Tubes	WW Tubes	1,100,000
107	Belle River/Range Road	2019	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 109/110	Fuel System	1,500,000
108	Monroe without Large Enviro.	2019	2	Reliability	Common System	Unit 2 Coal Mill 2-6 Silo	Fuel System	1,441,213
109	Monroe without Large Enviro.	2019	2	Minor Environmental	Air Quality	Unit 2 SCR Catalyst Layer 3	Boiler Emissions	2,000,000
110	Monroe without Large Enviro.	2019	3	Reliability	Common System	Unit 3 Coal Mill Silo (1 silo)	Fuel System	1,000,000
111	Monroe without Large Enviro.	2019	3	Safety	Reliability Turbine	Unit 3 Turbine Valves	Turbine	1,200,000
112	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 Reheat Stop Valve	Turbine	1,250,000
113	Monroe without Large Enviro.	2019	3	Reliability	Common System	FGD Unit 3 North & South Booster Fan Hubs & Blades	Fans	1,350,000
114	Monroe without Large Enviro.	2019	3	Minor Environmental	Common System	Unit 3 ID Fan Guillotine Dampers	Fans	1,500,000
115	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 LPA & LPB Crossover Expansion Joints	Flue Gas	2,000,000
116	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler Feedwater System	Unit 3 Main Unit Condenser	Condenser	2,000,000
117	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 Horizontal Reheat Tubes	SH/RH Tubes	2,900,000
118	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 Expansion Joints	Flue Gas	3,500,000
119	Monroe without Large Enviro.	2019	3	Minor Environmental	Air Quality	Unit 3 SCR Catalyst Layer 2, 3, & 4	Boiler Emissions	5,500,000
120	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 Secondary Superheat Inlet Pendants	SH/RH Tubes	10,900,000
121	Monroe without Large Enviro.	2019	3	Reliability	Reliability Boiler	Unit 3 Waterwall Tubes	WW Tubes	14,000,000
122	Monroe without Large Enviro.	2019	4	Reliability	Reliability Boiler	Unit 4 Air Heater Hot End Baskets	Air Heater	1,000,000
123	Monroe without Large Enviro.	2019	4	Reliability	Reliability Boiler Feedwater System	Unit 4 Main Unit Condenser	Condenser	1,000,000
124	Monroe without Large Enviro.	2019	4	Reliability	Reliability Boiler	Unit 4 Secondary Superheat Inlet Pendants	SH/RH Tubes	1,100,000
125	Monroe without Large Enviro.	2019	4	Reliability	Reliability Boiler	Unit 4 Waterwall Tubes	WW Tubes	1,500,000
126	Monroe without Large Enviro.	2019	4	Reliability	Reliability Turbine	Unit 4 Generator Stator	Turbine	2,900,000
127	Monroe without Large Enviro.	2019	Common	Combustible Dust	Common System	Fuel Supply Transfer Chute CVC-6 to CVC-7 & 8	Fuel System	1,500,000
128	Monroe without Large Enviro.	2019	Common	Combustible Dust	Common System	Fuel Supply Unit 3 & 4 Cascade Counterweight Room	Fuel System	1,800,000
129	Monroe without Large Enviro.	2019	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 4	Fuel System	3,490,000
130	Monroe without Large Enviro.	2019	Common	Combustible Dust	Common System	Fuel Supply Dust Collector 5	Fuel System	3,490,000
131	Monroe without Large Enviro.	2019	Common	Reliability	Capacity Electrical	Fuel Supply Control System	Fuel System	7,920,000
132	Monroe without Large Enviro.	2019	Common	Reliability	Capacity Electrical	NERC CIP Med to Low Impact Migration	Misc	1,000,000
133	Peakers	2019	Belle River	Minor Environmental	Air Quality	Belle River Peakers CEMS	Peakers	1,300,000
134	Peakers	2019	Fermi	Reliability	Reliability Turbine	Fermi 11-1 Peaker Turbine Hot Gas Path	Peakers	1,000,000
135	Peakers	2019	Fermi	Reliability	Reliability Turbine	Fermi 11-3 Peaker Turbine Hot Gas Path	Peakers	1,550,000
136	Peakers	2019	Renaissance	Reliability	Capacity Electrical	Renaissance Unit 4 Peaker Main Unit Transformer	Peakers	2,500,000
137	Peakers	2019	Renaissance	Reliability	Reliability Turbine	Renaissance Unit 3 Peaker Turbine Combustion Cans	Peakers	3,100,000
138	St. Clair	2019	7	Safety	Reliability Turbine	Unit 7 Turbine Valves	Turbine	1,500,000
139	St. Clair	2019	Common	Combustible Dust	Common System	Fuel Supply 3TH3 Dust Collector	Fuel System	2,000,000
140	Trenton Channel	2019	9	Reliability	Reliability Turbine	Unit 9 North Boiler Feed Pump Turbine Blades	Turbine	1,500,000
141	Trenton Channel	2019	9	Safety	Reliability Turbine	Unit 9 Turbine Valves	Turbine	1,500,000
142	**Total 2019 Projects**							**116,519,384**

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Years 2017 to 2020
Routine Maintenance Projects greater than $1M

Case No.: U-20162
Exhibit: A-12
Schedule: B5.1
Witness: M. T. Paul

Line No.	(a) Facility	(b) Test Year	(c) Unit	(d) High Level Breakdown	(e) Lower Level Breakdown	(f) Description	(g) Key Concept	(h) Amount
143	Belle River/Range Road	2020 (4 mo)	2	Reliability	Reliability Boiler	Unit 2 Waterwall Tubes	WW Tubes	2,000,000
144	Belle River/Range Road	2020 (4 mo)	2	Reliability	Reliability Turbine	Unit 2 LP Turbine Blades	Turbine	3,000,000
145	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Reliability Boiler	Unit 4 Air Heater Hot End Baskets	Air Heater	1,000,000
146	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Reliability Boiler	Unit 4 Expansion Joints	Flue Gas	1,166,667
147	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Common System	Unit 4 Coal Mill 4-1 Silo	Fuel System	1,400,000
148	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Reliability Turbine	Unit 4 Generator Stator	Turbine	3,666,667
149	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Reliability Boiler	Unit 4 Waterwall Tubes	WW Tubes	4,000,000
150	Monroe without Large Enviro.	2020 (4 mo)	4	Reliability	Reliability Boiler	Unit 4 Secondary Superheat Inlet Pendants	SH/RH Tubes	4,666,667
151	Monroe without Large Enviro.	2020 (4 mo)	Common	Reliability	Common System	Coal Mill Silos (3 silos)	Fuel System	1,400,000
152	Peakers	2020 (4 mo)	Fermi	Reliability	Capacity Electrical	Fermi 11-1 Peaker Control System & MCCs	Peakers	1,166,667
153	Peakers	2020 (4 mo)	Fermi	Reliability	Reliability Turbine	Fermi 11-1 Peaker Turbine Hot Gas Path	Peakers	1,166,667
154	Peakers	2020 (4 mo)	Renaissance	Reliability	Reliability Turbine	Renaissance Unit 3 Peaker Turbine Combustion Cans	Peakers	1,036,667
155	**Total 2020 Projects**							**25,670,000**

Michigan Public Service Commission
DTE Electric Company
Projected Capital Expenditures
Allowance for Funds Used During Construction (AFUDC)
Fossil Generation
($000)

Case No.: U-20162
Exhibit: A-12
Schedule: B5.1
Witness: M. T. Paul
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Line No.	(a) Description		(b) Adjusted Historical 12 mos. ended 12/31/2017	(c) Projected 12 mos. ending 4/30/2020
1	**Fossil Generation - Routine Expenditures**	**1/**	**2,756**	**1,879**
2	**Fossil Generation - Project Specific:**			
3	Ludington		6,432	2,176
4	Combined Cycle		654	-
5	Other Small Projects		-	-
6	**Subtotal Project Specific**		**7,086**	**2,176**
7	**Total AFUDC - Fossil Generation**	**2/**	**9,842**	**4,055**

1/ AFUDC estimates for routine projects are developed at a high level based on historical trend
2/ The projected AFUDC amounts are based on the authorized U-18255 rate of 5.34%