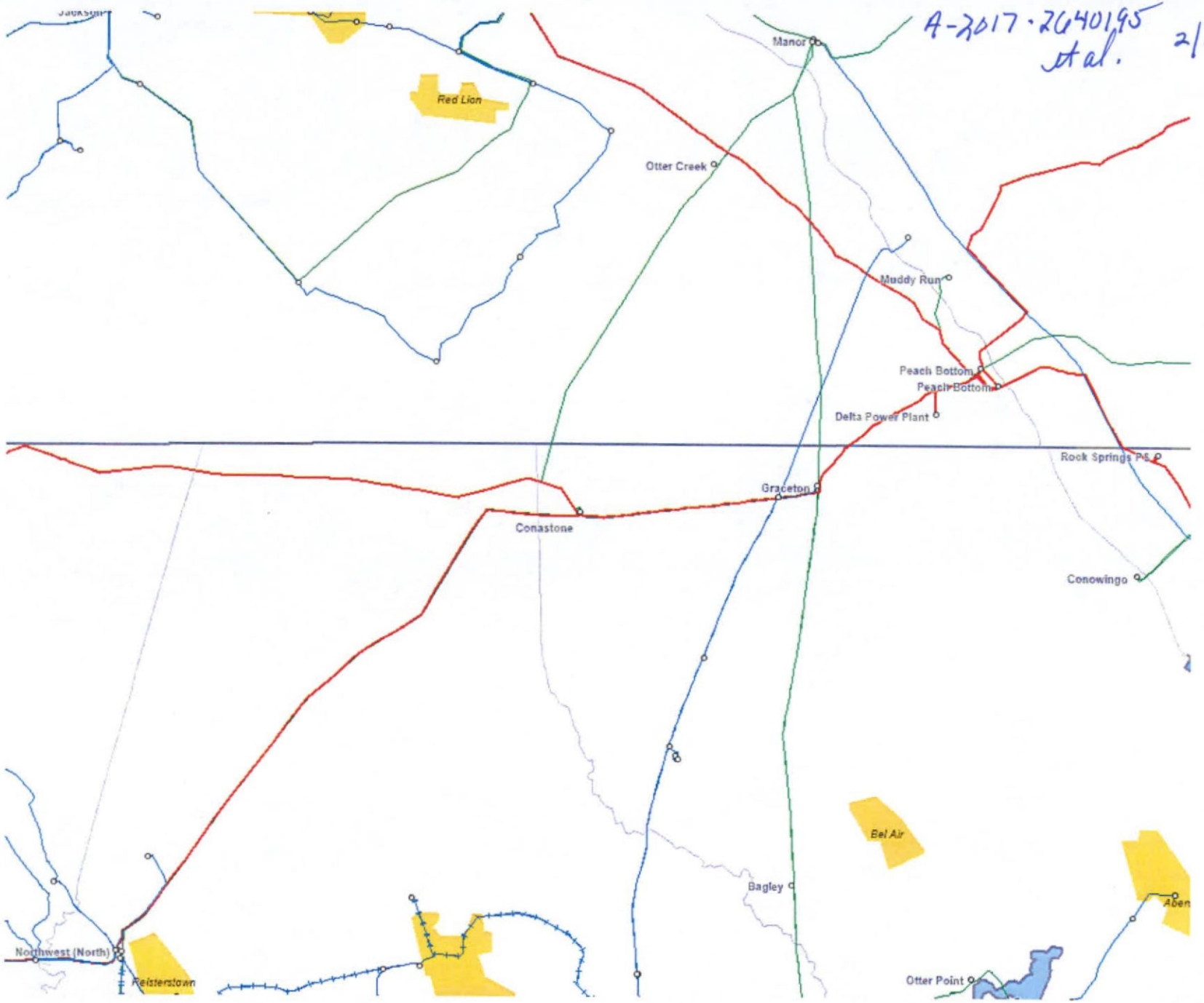
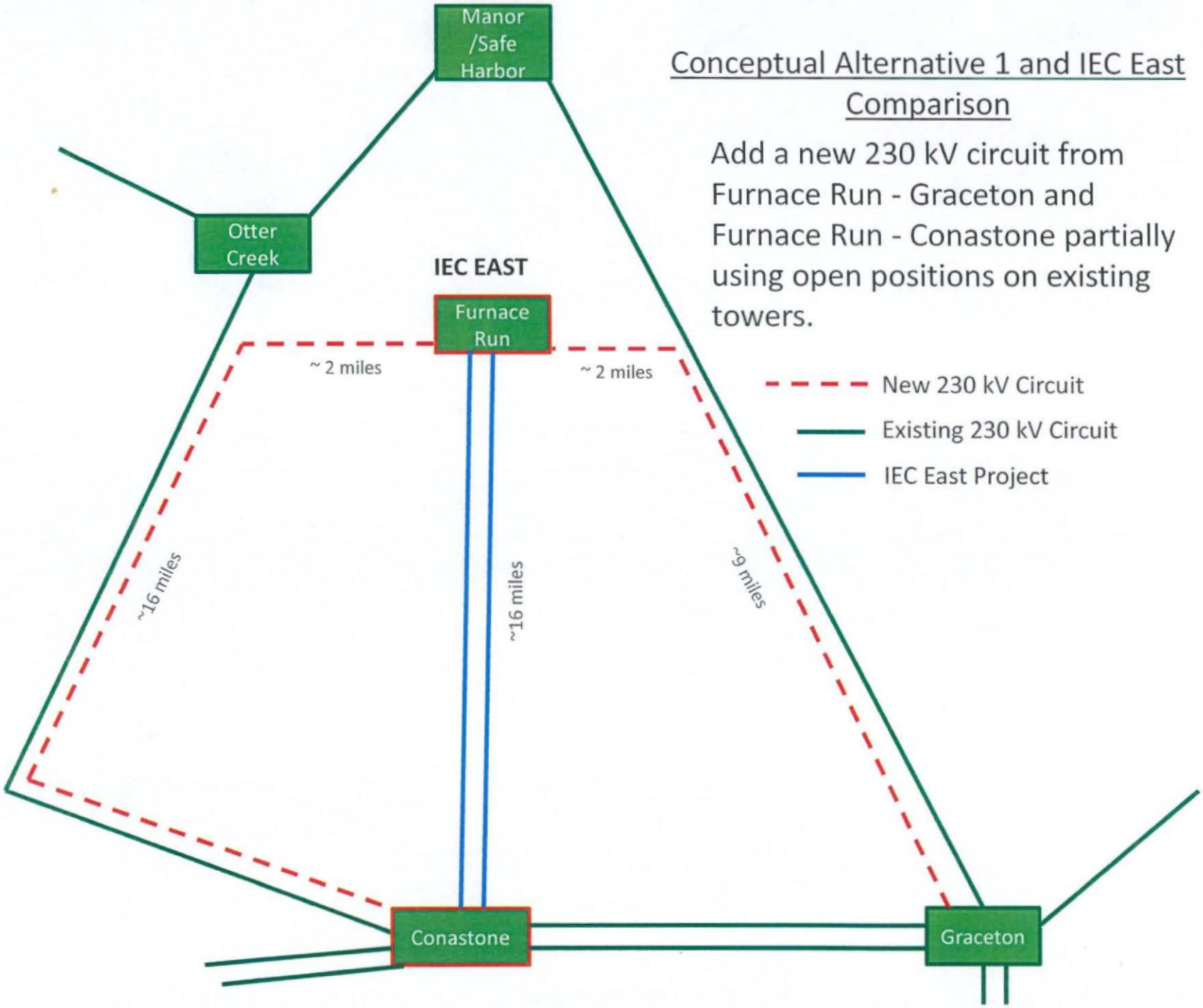
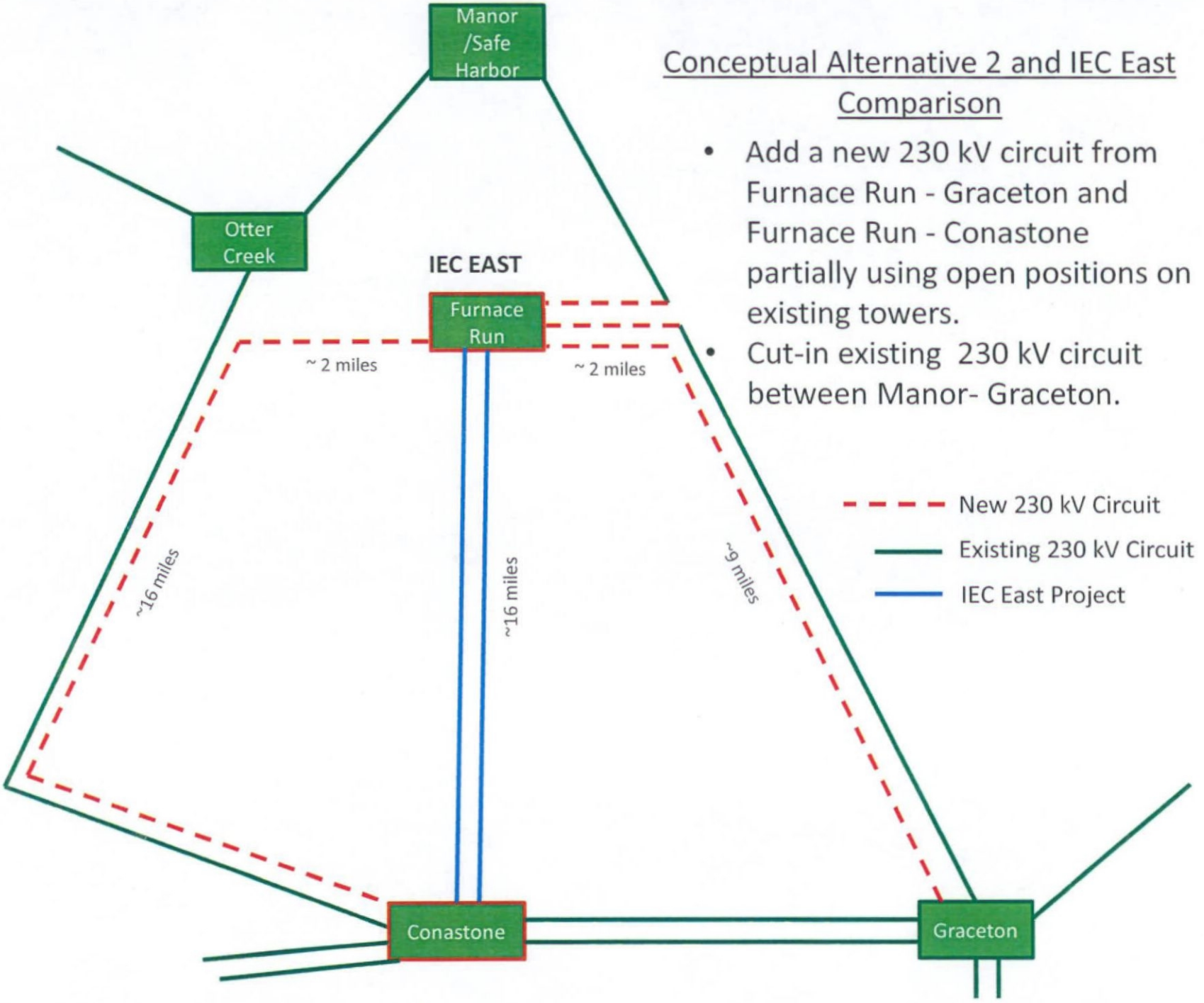
TPA Exhibit No. 5

A-2017-2640195 et al. 2/22/19 lhbg

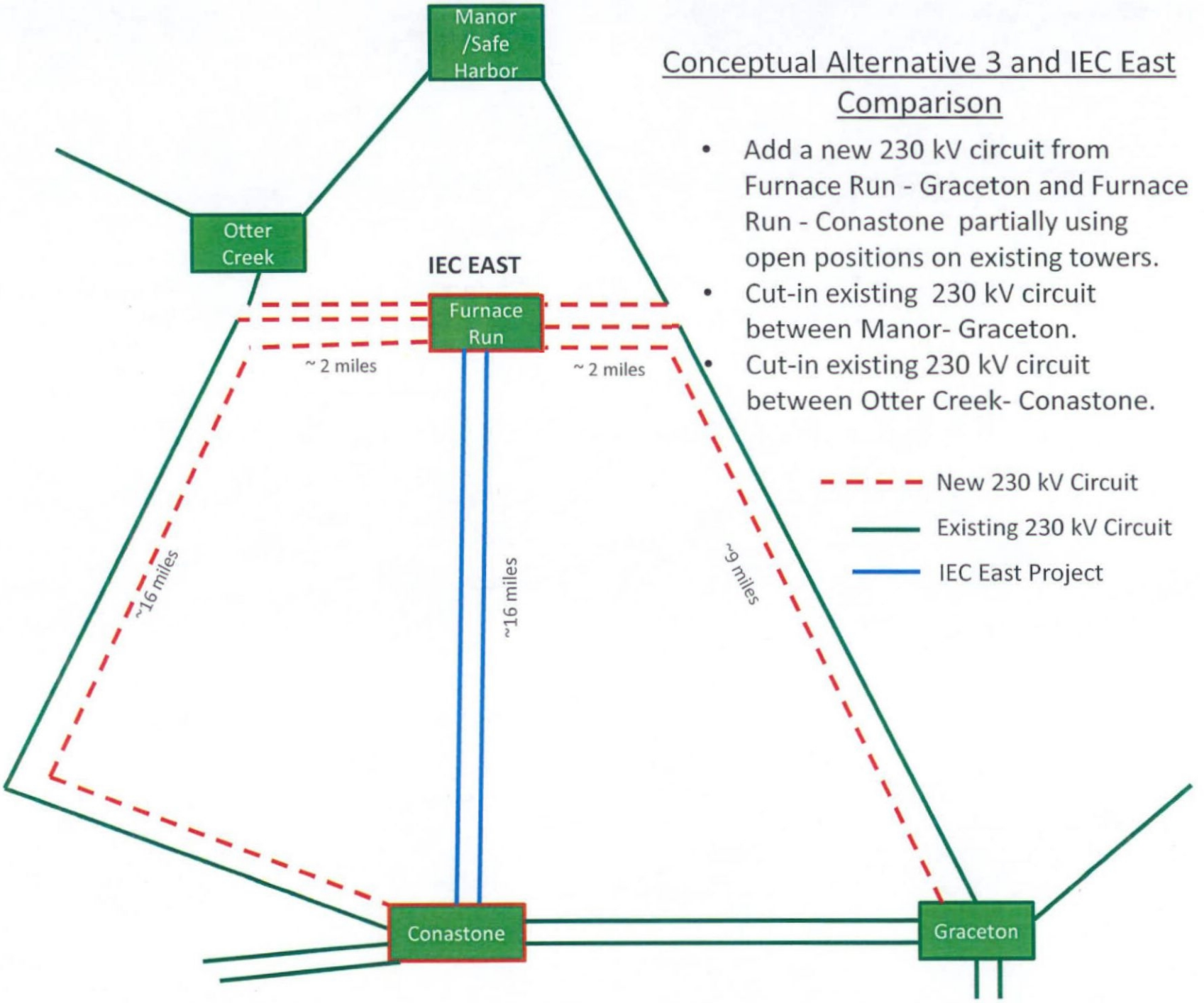


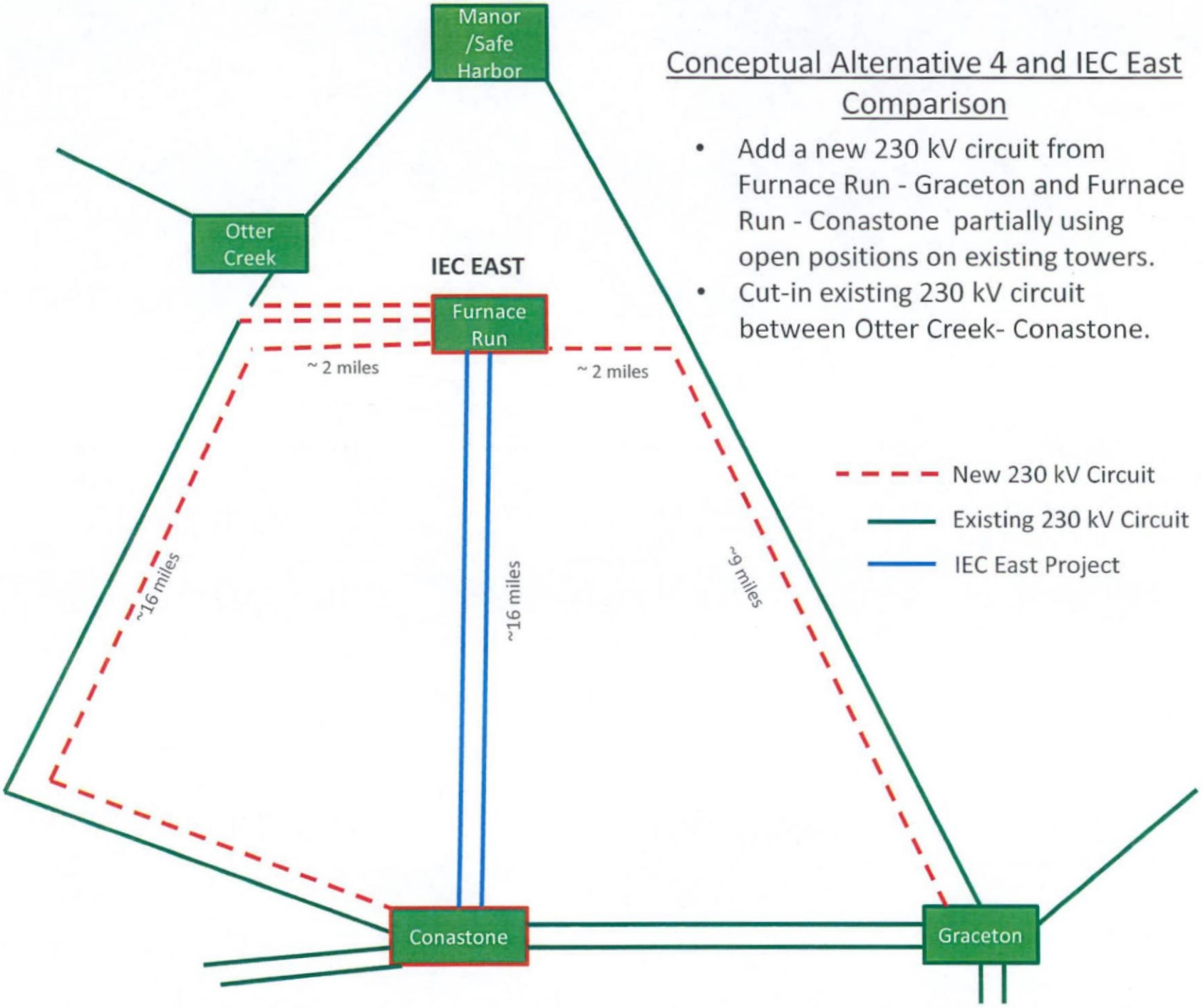

Manor /Safe Harbor
Otter Creek
IEC EAST
Furnace Run
~ 2 miles
~ 2 miles
~16 miles
~16 miles
~9 miles
Conastone
Graceton
Conceptual Alternative 1 and IEC East Comparison
Add a new 230 kV circuit from Furnace Run - Graceton and Furnace Run - Conastone partially using open positions on existing towers.
New 230 kV Circuit
Existing 230 kV Circuit
IEC East Project



Conceptual Alternative 2 and IEC East Comparison

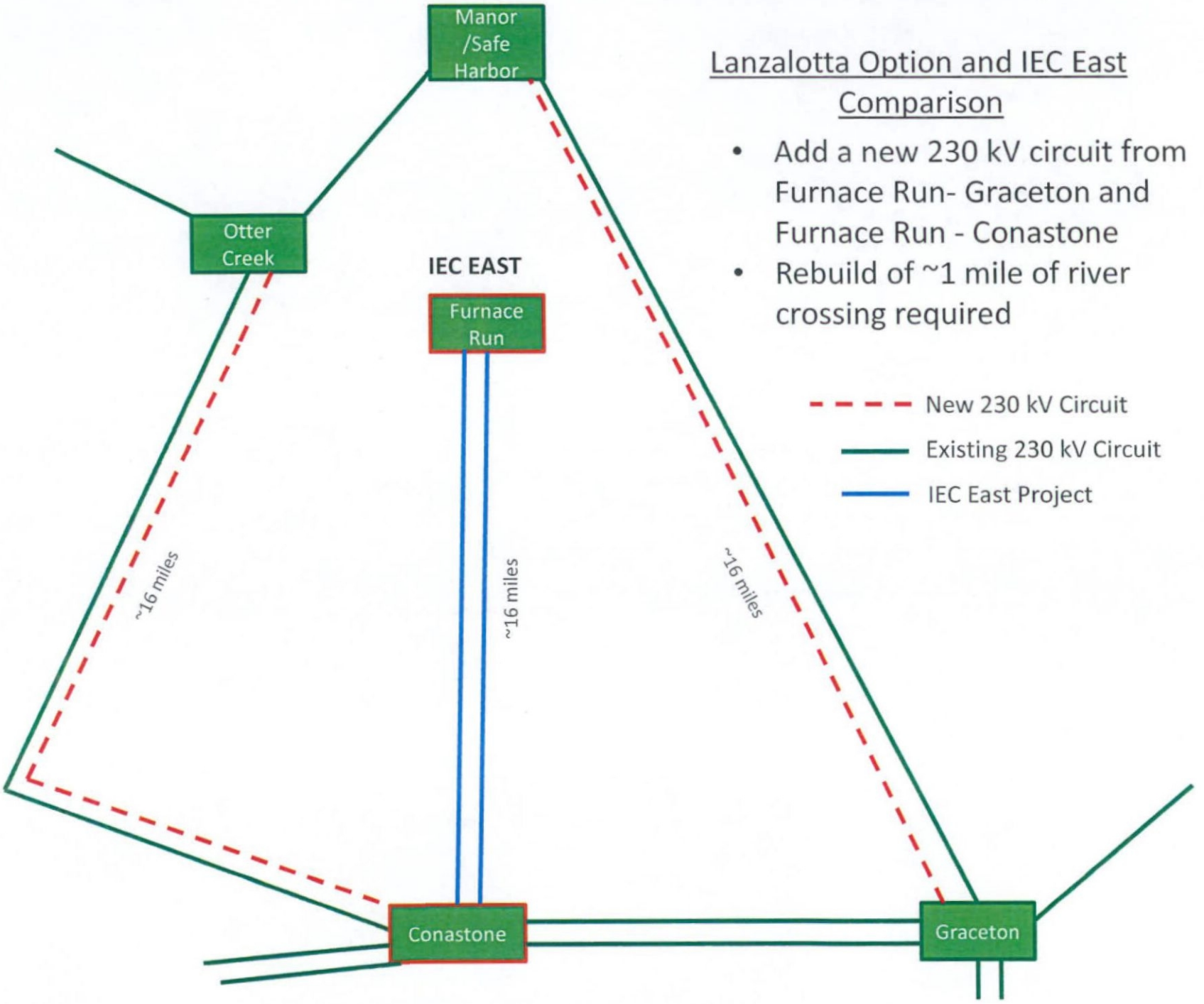
- Add a new 230 kV circuit from Furnace Run - Graceton and Furnace Run - Conastone partially using open positions on existing towers.
- Cut-in existing 230 kV circuit between Manor- Graceton.

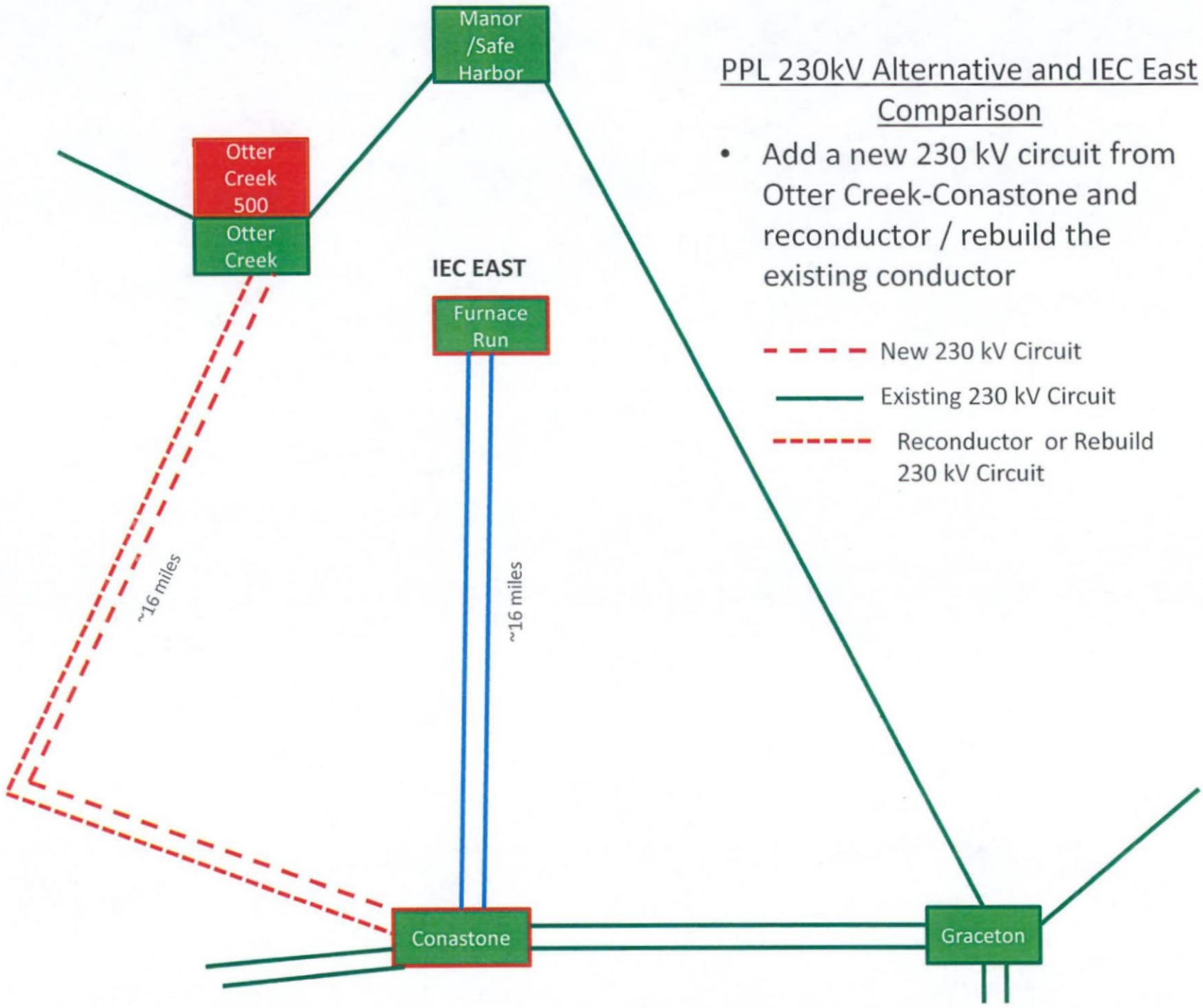

Manor /Safe Harbor
Otter Creek
IEC EAST
Furnace Run
~ 2 miles
~ 2 miles
~16 miles
~16 miles
~9 miles
Conastone
Graceton
Conceptual Alternative 3 and IEC East Comparison
• Add a new 230 kV circuit from Furnace Run - Graceton and Furnace Run - Conastone partially using open positions on existing towers.
• Cut-in existing 230 kV circuit between Manor- Graceton.
• Cut-in existing 230 kV circuit between Otter Creek- Conastone.
New 230 kV Circuit
Existing 230 kV Circuit
IEC East Project



Conceptual Alternative 4 and IEC East Comparison

- Add a new 230 kV circuit from Furnace Run - Graceton and Furnace Run - Conastone partially using open positions on existing towers.
- Cut-in existing 230 kV circuit between Otter Creek- Conastone.


Manor /Safe Harbor
Otter Creek
IEC EAST
Furnace Run
~16 miles
~16 miles
~16 miles
Conastone
Graceton
Lanzalotta Option and IEC East Comparison
• Add a new 230 kV circuit from Furnace Run- Graceton and Furnace Run - Conastone
• Rebuild of ~1 mile of river crossing required
New 230 kV Circuit
Existing 230 kV Circuit
IEC East Project



PPL 230kV Alternative and IEC East Comparison

- Add a new 230 kV circuit from Otter Creek-Conastone and reconductor / rebuild the existing conductor

New 230 kV Circuit

Existing 230 kV Circuit

Reconductor or Rebuild 230 kV Circuit

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TPA Exhibit No. 6

2/22/19 1469 par

This update includes both the FERC accepted rules associated with the exclusions of FSAs and the alignment of the evaluation period with the PJM RTEP planning horizon

New Calcs

Benefits

NPV In RTEP Year	NPV In RTEP Year Beneficiaries Only	Zone	RTEP Year 2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
$35,748,657.10	$0.00	AECO	$ -	$ 3,643,710	$ 3,882,032	$ 4,120,354	$ 4,358,676	$ 4,247,788	$ 4,136,900	$ 4,026,013	$ 4,493,076	$ 4,960,138	$ 5,427,201	$ 5,301,836	$ 5,475,318	$ 5,648,799	$ 5,822,280
($99,080,486.40)	$99,080,486.40	AEP	$ -	$ (7,705,451)	$ (8,705,485)	$ (9,705,520)	$ (10,705,554)	$ (10,120,487)	$ (9,535,419)	$ (8,950,352)	$ (12,521,061)	$ (16,091,770)	$ (19,662,479)	$ (17,857,155)	$ (18,961,712)	$ (20,066,269)	$ (21,170,826)
($60,881,634.50)	$60,881,634.50	APS	$ -	$ (964,308)	$ (3,066,069)	$ (5,167,830)	$ (7,269,592)	$ (6,945,149)	$ (6,620,707)	$ (6,296,265)	$ (8,114,520)	$ (9,932,776)	$ (11,751,031)	$ (12,736,966)	$ (13,900,811)	$ (15,064,656)	$ (16,228,501)
($117,110,616.74)	$117,110,616.74	BGE	$ -	$ (14,687,667)	$ (14,602,178)	$ (14,516,689)	$ (14,431,201)	$ (13,720,710)	$ (13,010,220)	$ (12,299,730)	$ (14,080,510)	$ (15,861,290)	$ (17,642,070)	$ (15,808,022)	$ (15,985,671)	$ (16,163,320)	$ (16,340,970)
($8,127,191.60)	$8,127,191.60	COMED	$ -	$ 1,069,393	$ 127,077	$ (815,239)	$ (1,757,554)	$ (734,087)	$ 289,380	$ 1,312,847	$ (261,285)	$ (1,835,417)	$ (3,409,549)	$ (2,798,697)	$ (3,205,316)	$ (3,611,936)	$ (4,018,555)
($12,455,084.13)	$12,455,084.13	DAY	$ -	$ (844,886)	$ (1,043,912)	$ (1,242,937)	$ (1,441,962)	$ (1,321,763)	$ (1,201,565)	$ (1,081,366)	$ (1,539,610)	$ (1,997,854)	$ (2,456,098)	$ (2,284,904)	$ (2,437,701)	$ (2,590,498)	$ (2,743,295)
$9,077,322.36	$0.00	DEOK	$ -	$ 2,280,834	$ 1,899,617	$ 1,518,401	$ 1,137,185	$ 1,173,731	$ 1,210,277	$ 1,246,824	$ 1,049,447	$ 852,070	$ 654,692	$ 363,878	$ 179,302	$ (5,273)	$ (189,849)
($492,477,844.63)	$492,477,844.63	DOM	$ -	$ (57,880,367)	$ (55,709,007)	$ (53,537,646)	$ (51,366,286)	$ (52,800,188)	$ (54,234,090)	$ (55,667,992)	$ (64,215,010)	$ (72,762,027)	$ (81,309,044)	$ (73,037,680)	$ (74,940,101)	$ (76,842,521)	$ (78,744,941)
$64,796,135.81	$0.00	DPL	$ -	$ 6,655,969	$ 7,077,512	$ 7,499,054	$ 7,920,596	$ 7,558,037	$ 7,195,478	$ 6,832,919	$ 7,985,701	$ 9,138,483	$ 10,291,265	$ 9,732,228	$ 10,064,824	$ 10,397,420	$ 10,730,016
($525,787.25)	$525,787.25	DUQ	$ -	$ 248,012	$ 170,535	$ 93,057	$ 15,579	$ 40,217	$ 64,855	$ 89,493	$ (81,663)	$ (252,819)	$ (423,974)	$ (374,919)	$ (440,409)	$ (505,898)	$ (571,388)
($7,730,393.30)	$7,730,393.30	EKPC	$ -	$ (678,766)	$ (755,637)	$ (832,507)	$ (909,378)	$ (828,477)	$ (747,576)	$ (666,676)	$ (931,847)	$ (1,197,019)	$ (1,462,191)	$ (1,310,741)	$ (1,380,429)	$ (1,450,117)	$ (1,519,805)
$20,919,635.60	$0.00	FE-ATSI	$ -	$ 4,223,197	$ 3,457,087	$ 2,690,977	$ 1,924,866	$ 2,335,854	$ 2,746,843	$ 3,157,831	$ 2,871,587	$ 2,585,344	$ 2,299,101	$ 1,816,432	$ 1,594,460	$ 1,372,487	$ 1,150,514
$102,661,169.80	$0.00	JCPL	$ -	$ 11,292,032	$ 11,509,968	$ 11,727,905	$ 11,945,841	$ 11,816,152	$ 11,686,462	$ 11,556,772	$ 13,013,894	$ 14,471,017	$ 15,928,139	$ 15,021,962	$ 15,438,615	$ 15,855,267	$ 16,271,919
$9,859,634.43	$0.00	LINDVFT	$ -	$ 1,241,986	$ 1,209,524	$ 1,177,062	$ 1,144,600	$ 1,109,238	$ 1,073,877	$ 1,038,515	$ 1,210,983	$ 1,383,452	$ 1,555,921	$ 1,367,470	$ 1,387,313	$ 1,407,157	$ 1,427,000
$82,294,554.52	$0.00	METED	$ -	$ 8,572,947	$ 8,842,501	$ 9,112,054	$ 9,381,608	$ 9,199,685	$ 9,017,762	$ 8,835,838	$ 10,421,066	$ 12,006,294	$ 13,591,522	$ 12,622,430	$ 13,073,619	$ 13,524,808	$ 13,975,998
$17,937,729.48	$0.00	NEPTHVDC	$ -	$ 2,326,630	$ 2,250,618	$ 2,174,606	$ 2,098,593	$ 2,000,591	$ 1,902,589	$ 1,804,587	$ 2,163,378	$ 2,522,169	$ 2,880,960	$ 2,465,307	$ 2,494,631	$ 2,523,954	$ 2,553,278
$9,103,386.81	$0.00	O66HVDC	$ -	$ 1,161,953	$ 1,131,333	$ 1,100,713	$ 1,070,093	$ 1,021,685	$ 973,277	$ 924,869	$ 1,101,021	$ 1,277,172	$ 1,453,324	$ 1,257,170	$ 1,274,032	$ 1,290,894	$ 1,307,756
$166,149,175.63	$0.00	PECO	$ -	$ 16,478,638	$ 17,697,735	$ 18,916,831	$ 20,135,927	$ 19,452,197	$ 18,768,468	$ 18,084,738	$ 20,780,839	$ 23,476,941	$ 26,173,043	$ 25,236,682	$ 26,162,486	$ 27,088,289	$ 28,014,093
$36,109,156.34	$0.00	PENELEC	$ -	$ 4,659,411	$ 4,360,890	$ 4,062,370	$ 3,763,850	$ 4,033,357	$ 4,302,863	$ 4,572,370	$ 4,816,415	$ 5,060,461	$ 5,304,506	$ 4,908,451	$ 4,953,457	$ 4,998,464	$ 5,043,470
($183,684,740.63)	$183,684,740.63	PEPCO	$ -	$ (22,240,154)	$ (21,547,086)	$ (20,854,019)	$ (20,160,951)	$ (20,265,152)	$ (20,369,354)	$ (20,473,556)	$ (23,428,996)	$ (26,384,437)	$ (29,339,877)	$ (26,334,793)	$ (26,875,296)	$ (27,415,799)	$ (27,956,302)
$256,020,365.37	$0.00	PLGRP	$ -	$ 29,809,991	$ 29,681,998	$ 29,554,005	$ 29,426,012	$ 28,785,994	$ 28,145,976	$ 27,505,958	$ 31,990,742	$ 36,475,525	$ 40,960,309	$ 37,076,375	$ 37,966,603	$ 38,856,830	$ 39,747,058
$156,370,587.12	$0.00	PSEG	$ -	$ 16,131,475	$ 16,972,958	$ 17,814,442	$ 18,655,925	$ 18,214,345	$ 17,772,765	$ 17,331,185	$ 19,691,351	$ 22,051,517	$ 24,411,683	$ 23,405,905	$ 24,185,681	$ 24,965,456	$ 25,745,232
$2,465,812.52	$0.00	RECO	$ -	$ 324,276	$ 278,875	$ 233,473	$ 188,072	$ 255,245	$ 322,418	$ 389,591	$ 377,104	$ 364,616	$ 352,129	$ 343,614	$ 346,874	$ 350,135	$ 353,395
$0.00	$0.00	zPJMIMP	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cost	$452.79		$ -	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95	$ 56.95

BC Ratio 2.17

TPA Exhibit No. 7

[Witness: Shadab Ali]

2/22/19

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.1 Admit that at the time of the PJM 2014/15 RTEP Long-Term Proposal Window PPL was aware that PPL had submitted to PJM a proposal to rebuild the Manor-Graceton 230 kV, defined as PJM project S0232.

A.1 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.2 Admit that at the time of the PJM 2014/15 RTEP Long-Term Proposal Window PPL was aware that PPL had submitted to PJM a proposal to rebuild the Otter Creek-Conastone 230 kV line, defined as PJM project S0233.

A.2 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
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Q.3 Admit that PPL did not submit to PJM a proposal to add 500-230kv transformation at the existing Otter Creek substation, add a second high capacity 230kV circuit and replace the current circuit with a higher capacity circuit on the existing Otter Creek-Conastone 230 kV line in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.3 *Admitted.*

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
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Q.4 Admit that PPL had an opportunity to submit to PJM a proposal to add 500-230kv transformation at the existing Otter Creek substation, add a second high capacity 230kV circuit and replace the current circuit with a higher capacity circuit on the existing Otter Creek-Conastone 230 kV line in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.4 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.5 Admit that PPL did not submit to PJM a proposal to add 500-230kv transformation at the existing Otter Creek substation, add a second high capacity 230kV circuit and replace the current circuit with a higher capacity circuit on the existing Otter Creek-Conastone 230 kV line in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.5 Admitted. By way of further response, there were no congestion drivers in the 2016/17 RTEP Long-Term Proposal Window for which the above-referenced proposal would be responsive to.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.6 Admit that PPL had an opportunity to submit to PJM a proposal to add 500-230kv transformation at the existing Otter Creek substation, add a second high capacity 230kV circuit and replace the current circuit *with a higher capacity circuit on the existing Otter Creek-Conastone* 230 kV line in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.6 Denied. By way of further response, there were no congestion drivers in the 2016/17 RTEP Long-Term Proposal Window for which the above-referenced proposal would be responsive to.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.7 Admit that PPL has no plan to submit to PJM a proposal to add 500-230kv transformation at the existing Otter Creek substation, add a second high capacity 230kV circuit and replace the current circuit with a higher capacity circuit on the existing Otter Creek-Conastone 230 kV line in any currently-open or future RTEP proposal window.

A.7 Denied. PPL cannot speculate on what proposals it may submit to PJM in the future.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
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Q.8 Admit that PPL did not submit to PJM a proposal to add a second 230 kV circuit from north to south on the Manor-Graceton 230 kV in the area in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.8 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.9 Admit that PPL had an opportunity to submit to PJM a proposal to add a second 230 kV circuit from north to south on the Manor-Graceton 230 kV in the area in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.9 Admitted.

[Witness Shadab Ali:]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.10 Admit that PPL did not submit to PJM a proposal to add a second 230 kV circuit from north to south on the Manor-Graceton 230 kV in the area in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.10 Admitted. By way of further response, there were no congestion drivers in the 2016/17 RTEP Long-Term Proposal Window for which the ~~the~~ above-referenced proposal would be responsive to.

[Witness Shadab Ali:]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.11 Admit that PPL had an opportunity to submit to PJM a proposal to add a second 230 kV circuit from north to south on the Manor-Graceton 230 kV in the area in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.11 Denied. By way of further response, there were no congestion drivers in the 2016/17 RTEP Long-Term Proposal Window for which above-referenced proposal would be responsive to.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.12 Admit that PPL has no plan to submit to PJM a proposal to add a second 230 kV circuit from north to south on the Manor-Graceton 230 kV in the area in any currently-open or future RTEP proposal window.

A.12 Denied. PPL cannot speculate on what proposals it may submit to PJM in the future.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.13 Admit that PPL did not submit to PJM a proposal to add a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.13 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.14 Admit that PPL had an opportunity to submit to PJM a proposal to add a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line in the PJM 2014/15 RTEP Long-Term Proposal Window.

A.14 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.15 Admit that PPL did not submit to PJM a proposal to add a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.15 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.16 Admit that PPL had an opportunity to submit to PJM a proposal to add a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line in the PJM 2016/17 RTEP Long-Term Proposal Window.

A.16 Denied. By way of further response, there were no congestion drivers in the 2016/17 RTEP Long-Term Proposal Window for which the above-referenced proposal would be responsive to.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.17 Admit that PPL has no plan to submit to PJM a proposal to add a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line in any currently-open or future RTEP proposal window.

A.17 Denied. PPL cannot speculate on what proposals it may submit to PJM in the future.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.18 Admit that PPL submitted a proposal in the PJM 2014/15 RTEP Long-Term Proposal Window titled the "Juniata Substation Static VAR Compensator Addition."

A.18 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.19 Admit that the "Juniata Substation Static VAR Compensator Addition" was proposed to address market efficiency constraints in the AP South Reactive Interface.

A.19 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.20 *Admit that PPL submitted upgrade proposals to address congestion* identified in the PJM 2014/15 RTEP Long-Term Proposal Window in the Safe Harbor-Graceton 230 kV and the Brunner Island-Yorkana 230 kV transmission lines.

A.20 Admitted.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Requests for
Admissions by Transource Pennsylvania LLC, Set I
Dated February 15, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.21 Admit that PPL did not submit any proposals in the PJM 2016/17 RTEP Long-Term Proposal Window as alternatives to (in full or in part) Project 9A.

A.21 Admitted. By way of further response, Project 9A and potential alternatives were not at issue in the 2016/17 RTEP Long-Term Proposal Window.

VERIFICATION

I, SHADAB ALI, being a Transmission Planning Supervisor at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 02/15/2019

Shadab Ali

Shadab Ali

TPA Exhibit No. 8
[Witness: Shadab Ali]
2/22/19

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.2 *Regarding Mr. Shadab Ali's Surrebuttal Testimony at page 2, lines 11-15,* has PPL proposed "adding 500-230kv transformation at the existing Otter Creek substation, adding a second high capacity 230kV circuit and replacing the current circuit with a higher capacity circuit on the existing Otter Creek-Conastone 230 kV line" in any PJM open window or otherwise as part of PJM's RTEP process as a method of addressing market efficiency constraints or for any other purpose?

a. If no, please explain why not.

b. If yes, please provide unredacted copies of all such proposals.

c. If yes, please identify the estimated costs, estimated benefits, and benefit-cost ratio for such proposals.

A.2 No. PPL has not proposed the solution described in Interrogatory 2 as part of PJM's RTEP process.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.3 Regarding Mr. Shadab Ali's Surrebuttal Testimony at page 2, lines 21-24, has PPL proposed "adding a new 500 kV circuit from the existing TMI-Peach Bottom 500 kV line (utilizing a new 500 kV substation at Otter Creek) to the 500 kV Conastone substation, utilizing PPL EU owned right of way on the Otter Creek-Conastone 230 kV line" in any PJM open window or otherwise as part of PJM's RTEP process as a method of addressing market efficiency constraints or for any other purpose?

a. If no, please explain why not.
b. If yes, please provide unredacted copies of all such proposals.
c. If yes, please identify the estimated costs, estimated benefits, and benefit-cost ratio for such proposals.

A.3 No. PPL has not proposed the solution described in Interrogatory 3 as part of PJM's RTEP process.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.4 Regarding Mr. Shadab Ali's Surrebuttal Testimony at page 2, lines 15-17, has PPL proposed "add[ing] a second 230 kV circuit from north to south" on the "PPL EU-BGE jointly owned line (Manor-Graceton 230 kV) *in the area*" *in any PJM open window or otherwise as part of* PJM's RTEP process as a method of addressing market efficiency constraints or for any other purpose?

a. If no, please explain why not.

b. If yes, please provide unredacted copies of all such proposals.

c. If yes, please identify the estimated costs, estimated benefits, and benefit-cost ratio for such proposals.

A.4 No. PPL has not proposed the solution described in Interrogatory 4 as part of PJM's RTEP process.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.6 Please state all facts, and produce all documents, that support the statement in Mr. Shadab Ali's Surrebuttal Testimony at page 3, lines 3-4 that the project described by Mr. Ali "will provide more capacity than the total capacity of the proposed Transource Project 9A."

A.6 Mr. Shadab Ali's testimony is based on his knowledge and experience with the PPL transmission grid and the PJM grid. Mr. Ali is a Supervisor – Transmission Planning with PPL Electric Utilities Corporation, and has over 6 years' experience in transmission system planning.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.12 Please provide a comparison outlining the cost, reliability impacts on the PJM system, economic benefit analysis and any benefit/cost metrics of each of the configurations identified in Mr. Shabad Ali's testimony, PPL's responses to previous discovery request from any party, or in the present Transource PA's Interrogatories (including specifically the configurations or projects described in questions 2, 3, 4, 7, 8, 9, 10, 11, 16, and 17) and Requests for Production of Documents to PPL Electric Utilities Corporation – Sett II, including any combination thereof.

a. Please show these as compared to the IEC Project and Project 9A.

A.12 PPL has no documents responsive to Question 12.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.13 Please describe why the configurations identified in Question 14 above are superior to the Conceptual Alternative identified in the Rebuttal Testimony of Witness Herling, including any comparison of the cost, reliability impacts on the PJM system, economic benefit analysis and any benefit/cost metrics of each compared to the IEC project and Project 9A.

A.13 Interrogatory 13 refers to configurations identified in Question 14. Question 14 does not refer to any configurations. PPL is assuming for the purpose of this response that Transource meant Question 12 instead of Question 14. PPL has not performed any analyses of the topics discussed in Interrogatory 13 and expresses no opinion on the relative value of any proposed configurations, including the Conceptual Alternative identified in the Rebuttal Testimony of Witness Herling.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.15 Does PPL agree that the Transource Project 9A produced the highest benefit-cost ratio of all of the projects and configurations that were proposed in the 2014/15 RTEP Long-Term Proposal Window?

a. If no, please explain why not.

A.15 PPL expresses no opinion on the relative merits of the projects and configurations that were proposed in the 2014/15 RTEP Long-Term Proposal Window.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
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Q.18 Regarding the project and configurations identified in Question 12:

a. Please identify any existing lines that would need to be removed and/or rebuilt in connection with this project and configuration.

b. Would the existing right of way need to be expanded to accommodate the proposed project and configurations? If yes, please identify the existing right-of-way width and the portions that would need to be expanded. If no, please state all facts and provide all documents that support that conclusion.

A.18 PPL has not engaged in transmission planning or engineering work related to the projects and configurations identified in Question 12 to a degree sufficient to determine whether any existing lines would need to be removed and/or rebuilt in connection with this project and configuration, or whether the existing right of way need to be expanded to accommodate the proposed project and configurations.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.19 Does PPL contend that the "Conceptual Alternative" described in Mr. Herling's Rebuttal Testimony would not violate NERC Reliability Standards?

a. If yes, please explain and state all facts, and produce all documents, that support your conclusion.

A.19 PPL has no opinion on whether the "Conceptual Alternative" described in Mr. Herling's Rebuttal Testimony would violate NERC Reliability Standardse. By way of further response, it is not uncommon for planning proposals to create reliability issues elsewhere on the grid, which is why the PJM planning process looks at the grid holistically to incorporate any upgrades necessary to remedy reliability violations that may occur.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.20 *Does PPL contend that the project and configuration described in* Question 2 above would not violate NERC Reliability Standards?

a. If yes, please explain and state all facts, and produce all documents, that support your conclusion.

A.20 PPL has no opinion on whether the project and configuration described in Question 2 would violate NERC Reliability Standards. By way of further response, it is not uncommon for planning proposals to create reliability issues elsewhere on the grid, which is why the PJM planning process looks at the grid holistically to incorporate any upgrades necessary to remedy reliability violations that may occur.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.21 Does PPL contend that the project and configuration described in Question 3 above would not violate NERC Reliability Standards?

a. If yes, please explain and state all facts, and produce all documents that support your conclusion.

A.21 PPL has no opinion on whether the project and configuration described in Question 3 would violate NERC Reliability Standards. By way of further response, it is not uncommon for planning proposals to create reliability issues elsewhere on the grid, which is why the PJM planning process looks at the grid holistically to incorporate any upgrades necessary to remedy reliability violations that may occur.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.22 Does PPL contend that the project and configuration described in Question 4 above would not violate NERC Reliability Standards?

a. If yes, please explain and state all facts, and produce all documents, that support your conclusion.

A.22 PPL has no opinion on whether the project and configuration described in Question 4 would violate NERC Reliability Standards. By way of further response, it is not uncommon for planning proposals to create reliability issues elsewhere on the grid, which is why the PJM planning process looks at the grid holistically to incorporate any upgrades necessary to remedy reliability violations that may occur.

[Witness: Shadab Ali]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set II
Dated February 11, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.23 Does PPL contend that any of the remaining projects or configuration described in Question 12 above would not violate NERC Reliability Standards?

a. If yes, please explain and state all facts, and produce all documents that support your conclusion.

A.23 PPL has no opinion on whether any of the project and configurations described in Question 12 would violate NERC Reliability Standards. By way of further response, it is not uncommon for planning proposals to create reliability issues elsewhere on the grid, which is why the PJM planning process looks at the grid holistically to incorporate any upgrades necessary to remedy reliability violations that may occur.

VERIFICATION

I, HORST J. LEHMANN, being a Senior Engineer at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 2/8/19

Horst J. Lehmann

VERIFICATION

I, SHADAB ALI, being a Transmission Planning Supervisor at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 02/08/2019

Shadab Ali

TPA Exhibit No. 9

[Witness: Horst Lehmann]

2/22/19
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PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set III
Dated February 19, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.1 Does PPL Electric use UHS 1949.6 45/7 ACSS TW Athabaska conductor on any of its transmission facilities? If yes, where?

A.1 PPL does not have this conductor on any of its transmission facilities. By way of further response, the above referenced conductor is from a manufacturer PPL is familiar with, and PPL has the technical capability to utilize said conductor type.

[Witness: Horst Lehmann]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set III
Dated February 19, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.2 What experience does PPL Electric have in installing and/or working with UHS 1949.6 45/7 ACSS TW Athabaska conductor on transmission lines within the PJM area?

A.2 PPL has not installed this conductor on any transmission lines. By way of further response, the above referenced conductor is from a manufacturer PPL is familiar with, and PPL has the technical capability to utilize said conductor type.

[Witness: Horst Lehmann]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set III
Dated February 19, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.3 Does PPL Electric use UHS 2153.8 60/19 ACSS TW Powder conductor on any of its transmission facilities? If yes, where?

A.3 PPL does not have this conductor on any of its transmission facilities. By way of further response, the above referenced conductor is from a manufacturer PPL is familiar with, and PPL has the technical capability to utilize said conductor type.

[Witness: Horst Lehmann]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set III
Dated February 19, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.4 What experience does PPL Electric have in installing and/or working with UHS 2153.8 60/19 ACSS TW Powder conductor on transmission lines within the PJM area?

A.4 PPL has not installed this conductor on any transmission lines. By way of further response, the above referenced conductor is from a manufacturer PPL is familiar with, and PPL has the technical capability to utilize said conductor type.

[Witness: Horst Lehmann]

PPL Electric Utilities Corporation
Response to Interrogatories and Requests for
Production of Documents of
Transource Pennsylvania LLC, Set III
Dated February 19, 2019
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.5 Have either Athabaska or Powder conductors been used as part of a reconductor project on PPL Electric facilities?

A.5 PPL has not used Athabaska or Powder conductors on any reconductor projects. By way of further response, the above referenced conductors are from manufacturers PPL is familiar with, and PPL has the technical capability to utilize said conductor types.

VERIFICATION

I, HORST J. LEHMANN, being a Senior Engineer at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 2/19/19

Horst J. Lehmann

TPA Exhibit No. 9 X 10
Witness: Phil O. Penny

2/22/19
IHog
JAR

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.1 Is PPL Electric's position that the proposed Furnace Run-Conastone route for the IEC Project is not reasonable because it can be replaced by a route whereby the Furnace Run-Conastone transmission line structures would be located within PPL Electric's Otter Creek to Conastone existing right-of-way? Please provide all documents and opinions that support or are related to that position (either favorably or unfavorably, or which are neutral).

A.1 PPL Electric has no position on the reasonableness of the IEC project and has no related documents.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.2 Do the existing easements owned by PPL Electric allow for Transource PA to locate any part of the proposed Furnace Run-Conastone portion of the ICE Project in the PPL Electric's Otter Creek to Conastone right of way? If yes, please describe in detail all the requirements and conditions necessary for Transource PA to locate its facilities in PPL Electric's right-of-way, including any need for expanding the existing right-of-way and any new right-of-way that may be necessary.

A. 2 The existing easements owned by PPL Electric do not allow for Transource PA to locate any part of the proposed IEC project in the PPL Electric's Otter Creek to Conastone right of way.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.3 Would PPL Electric allow Transource PA to locate any part of the proposed Furnace Run-Conastone portion of the ICE Project in the PPL Electric's Otter Creek to Conastone right of way? If yes, please describe in detail all the requirements and conditions necessary for Transource PA to locate its facilities in PPL Electric's right-of-way.

A.3 PPL Electric has not studied the feasibility of locating additional facilities in the Otter Creek to Conestone rights-of-way. Should PJM re-evaluate solutions in the Market Efficiency planning process, PPL Electric is open to a request from PJM to consider use of existing PPL Electric facilities as a solution.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.4 Has PPL Electric conducted any analyses, studies, or reviews to determine whether PPL Electric's Otter Creek to Conastone could be modified by adding a second circuit in order to provide the equivalent electrical characteristics (as measured by the performance criteria below) of the proposed Furnace Run-Conastone portion of the IEC Project? Please describe in detail any such modifications, and provide any analyses, reviews, plans, documents, or opinions related to such modifications.

Performance criteria
1800 / 2400 MVA summer normal / emergency rating with the following parameters:
R = 0. 00134928 pu
X = 0. 0146981 pu
B = 0. 0608184 pu

A.4 PPL Electric has not conducted analyses or studies or reviews to determine if adding a second circuit to the Otter Creek to Conestone line would provide equivalent electrical characteristics as measured by the performance criteria cited in the above question # 4.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.5 Is PPL Electric's position that the proposed Furnace Run-Conastone route for the IEC Project is not reasonable because it can be replaced by a route whereby the Furnace Run-Conastone transmission line structures would be located within PPL Electric's Graceton-Manor existing right-of-way? Please provide all documents and opinions that support or are related to that position (either favorably or unfavorably, or which are neutral).

A.5 PPL Electric has no position on the reasonableness of the IEC project and has no related documents.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.6 Do the existing easements owned by PPL Electric allow for Transource PA to locate any part of the proposed Furnace Run-Conastone portion of the ICE Project in PPL Electric's Graceton-Manor right-of-way? If yes, please describe in detail all the requirements and conditions necessary for Transource PA to locate its facilities in PPL Electric's right-of-way, including any need for expanding the existing right-of-way and any new right-of-way that may be necessary.

A.6 The existing easements owned by PPL Electric do not allow for Transource PA to locate any part of the proposed IEC project in the PPL Electric's Graceton-Manor right-of-way.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.7 Would PPL Electric allow Transource PA to locate any part of the proposed Furnace Run-Conastone portion of the ICE Project in PPL Electric's Graceton-Manor right-of-way? If yes, please describe in detail all the requirements and conditions necessary for Transource PA to locate its facilities in PPL Electric's right-of-way.

A.7 PPL Electric has not studied the feasibility of locating additional facilities in the Graceton-Manor right-of-way . Should PJM re-evaluate solutions in the Market Efficiency planning process, PPL Electric is open to a request from PJM to consider use of existing PPL Electric facilities as a solution.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.8 Has PPL Electric conducted any analyses, studies, or reviews to determine whether PPL Electric's Graceton-Manor could be modified by adding a second circuit in order to provide the equivalent electrical characteristics (as measured by the performance criteria below) of the proposed Furnace Run-Conastone portion of the IEC Project? Please describe in detail any such modifications, and provide any analyses, reviews, plans, documents, or opinions related to such modifications.

Performance criteria
1800 / 2400 MVA summer normal / emergency rating with the following parameters:
R = 0. 00134928 pu
X = 0. 0146981 pu
B = 0. 0608184 pu

A.8 PPL Electric has not conducted analyses or studies or reviews to determine if adding a second circuit to the Graceton-Manor line would provide equivalent electrical characteristics as measured by the performance criteria cited in the above question # 8.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.9 Please provide the names and contact information for the individuals who conducted the above-referenced analyses along with their qualifications and any applicable professional certifications that they possess.

A.9 PPL has not performed the above-referenced analyses.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.10 In PPL Electric Utilities Corporation Response to Interrogatories of Office of Consumer Advocate, Set XII, Q.4, it was stated that "there is ability to utilize conductors with a higher capacity rating" for the Otter Creek-Conastone transmission line.

a. Based upon all studies and analyses completed or known at the time of the integratory response, please provide the maximum rating of any conductors studied along with the conductor specifications that can be added to the existing structures without modification to the structures or land rights, and the related summer normal and summer emergency ratings in MVA and the associated R, X and B pu values. Please provide the engineer(s) responsible for any assessment supporting this determination, their contact information and qualifications along with any applicable professional certifications that they possess.

A.10 PPL Electric performed a preliminary review that showed that almost all existing structures could accommodate higher capacity conductors. PPL Electric has not performed the detailed engineering or planning studies required to select a specific higher capacity conductor or determine specific modifications to structures or land rights that may be required. The review was performed by Mr. Horst Lehmann. Mr. Lehmann is employed by PPL Electric Utilities, Two North Ninth Street Allentown, PA 18101. Mr. Lehmann has over ten years of electric utility operating experience including six years in the design of transmission lines. Mr. Lehmann has B.S. degrees in both Electrical Engineering and Economics from Rensselaer Polytechnic Institute and is a licensed Professional Engineer in the Commonwealth of Pennsylvania.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

Q.11 In PPL Electric Utilities Corporation Response to Interrogatories of Office of Consumer Advocate, Set XII, Q.11, it was stated that "there is ability to utilize conductors with a higher capacity rating" for the rebuilt portions of the Graceton-Manor transmission line.

a. Based upon all studies and analyses completed or known at the time of the integratory response, please provide the maximum rating of any conductors studied along with the conductor specifications that can be added to the existing structures without modification to the structures or land rights, and the related summer normal and summer emergency ratings in MVA and the associated R, X and B pu values. Please provide the names of any engineer(s) or other persons responsible for any assessment supporting this determination, their contact information and qualifications along with any applicable professional certifications that they possess.

A.11 PPL Electric performed a preliminary review that showed that almost all existing structures could accommodate higher capacity conductors. PPL Electric has not performed the detailed engineering or planning studies required to select a specific higher capacity conductor or determine specific modifications to structures or land rights that may be required. The review was performed by Mr. Horst Lehmann. Mr. Lehmann is employed by PPL Electric Utilities, Two North Ninth Street Allentown, PA 18101. Mr. Lehmann has over ten years of electric utility operating experience including six years in the design of transmission lines. Mr. Lehmann has B.S. degrees in both Electrical Engineering and Economics from Rensselaer Polytechnic Institute and is a licensed Professional Engineer in the Commonwealth of Pennsylvania.

Witness: Phil O. Penny

PPL Electric Utilities Corporation
Response to Interrogatories of
TRANSOURCE PA, Set I
Dated October 2, 2018
Docket Nos. A-2017-2640195 and A-2017-2640200

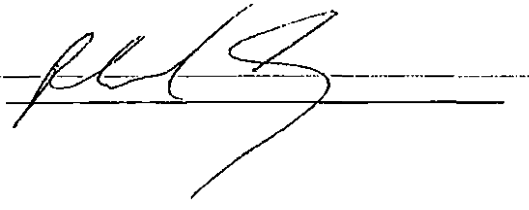
Q.12 In PPL Electric Utilities Corporation Response to Interrogatories of Office of Consumer Advocate, Set XVI, Question 2, it was stated that "future studies may identify a need" for reconductoring. Please identify any such studies planned or conducted by PPL Electric, and described the timeframe and scope for each such study.

A.12 PPL Electric transmission planning practices, including future studies to be performed are publicly available at: https://www.pjm.com/-/media/planning/planning-criteria/ppl-planning-criteria.ashx?la=en

VERIFICATION

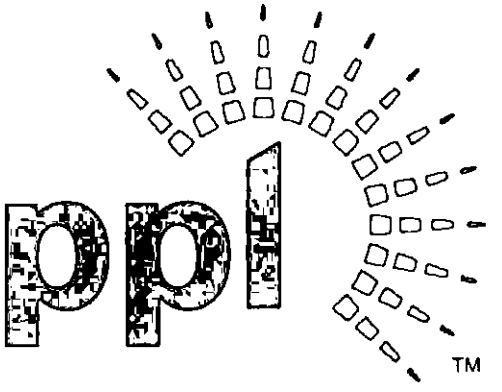
I, PHIL OSEI PENNY, being the Manager- Transmission Planning at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 10/12/16



TPA Exhibit No. 11

A-2017-2640495 et al 2/22/19 Hrg



PPL Electric Utilities

2014-2015 RTEP Long Term Proposal Window

Juniata Substation Static VAR Compensator Addition

Constraint Addressed:

AP South Interface L/O Black Oak-Bedington

Submittal Date February 26, 2015

~~PROPRIETARY AND CONFIDENTIAL~~

Public Version

Primary POC - PPL Electric Utilities:

Matthew B. Green

mbgreen@pplweb.com

610-774-4784

Table of Contents

Executive Summary

A.1 Description of Proposed Solution

This proposal is a submittal by PPL Electric Utilities ("PPL", "PPL EU", "The Company") in response to the 2014-2015 PJM RTEP Long Term Proposal Window. This proposal has three project components as identified below that address market efficiency constraints within the AP South (FirstEnergy) service territory and provide reliability benefits to PPL EU service areas. This project will be further referred to as the "Juniata Substation 500kV Static VAR Compensator ("SVC") Project."

Proposal elements #1 through #3 help resolve significant congestion associated with the AP South interface L/O Black Oak-Bedington Constraint. The violations addressed by these proposal elements are listed in Section A.3.

1. **Juniata Substation SVC Transmission Interconnection:** Install new 300 foot, single span of 500kV transmission between two 500kV deadend structures located at Juniata substation and a new Static VAR Compensator ("SVC") yard.
2. **Juniata Substation North Bus Extension:** Install one new 500kV three insulator Motor Operated Disconnect ("MOD"), one 500kV 3000A circuit breaker, associated relays panels and 3000A 4-inch aluminum bus.
3. **Juniata Substation SVC Yard Addition:** Install new SVC: rated -100/+500MVAR, ancillary equipment and 500kV transmission interconnections to the Juniata Substation 500kV deadend structures.

A.2 Advantages / Alternatives to the Comprehensive Solution

Advantages Analysis

This comprehensive solution is characterized by the following advantages, among others:

Helps Resolve the PJM RTEP Constraint: Research performed by PPL EU indicates that no single physical solution can comprehensively resolve the AP South constraint with a proposal that meets the PJM mandate for a Benefits-to-Cost ("B/C") ratio above 1.25.

[redacted]

Increased Capacity and Efficiency: The Juniata Substation 500kV SVC Project adds robustness to the area surrounding PPL EU's Juniata Substation. The 500kV SVC planned

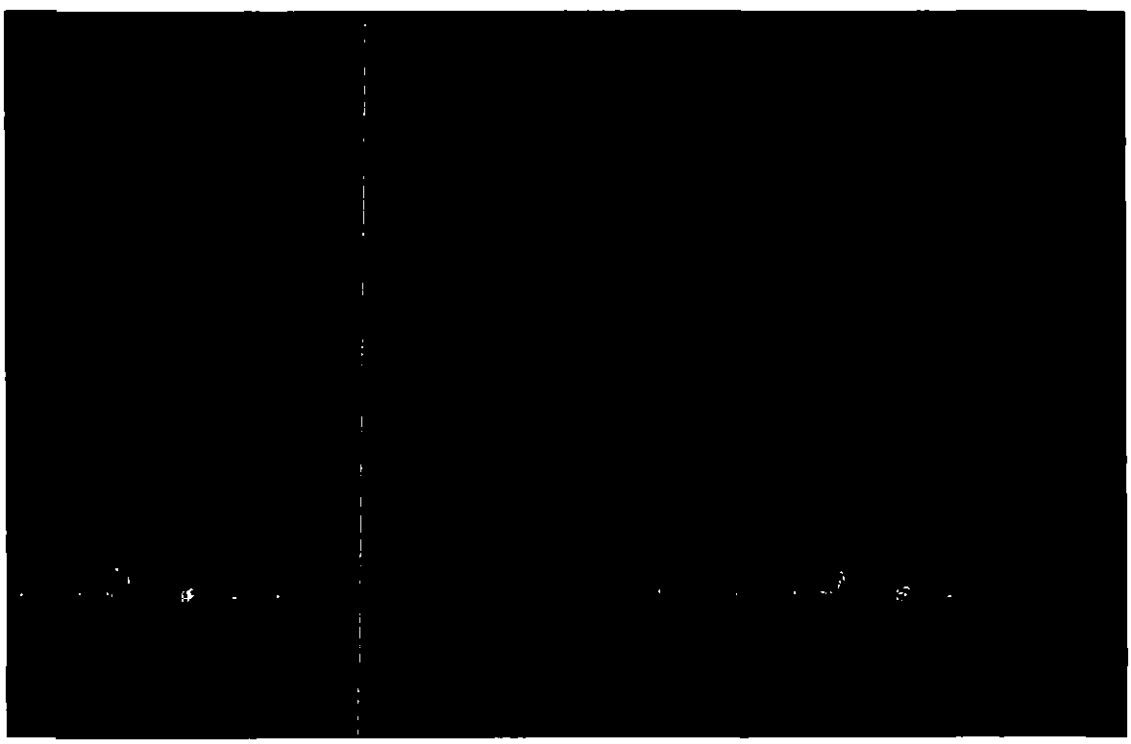
for the Juniata Substation provides tight voltage regulation for improved power quality to the surrounding load pockets, thus improving reliability under various scenarios.

Strengthened Network: The multiple sources into Juniata Substation and new 500kV SVC will create a strong area source. This comes with the added benefit of strengthening the power transfer capability throughout the PJM area.

Cost Conscious Advanced Technology: While solutions proposed within the AP South service territory can resolve the AP South market efficiency constraint, the vast majority of eligible solutions are cost prohibitive for non-incumbent transmission entities. The PPL EU Juniata Substation 500kV SVC Project creatively applies the principles of static VAR compensation to address congestion outside of PPL service territories with a cost competitive solution by allowing the interface limit to be raised when needed. Furthermore, this proposal also makes use of substation facilities that are already in place, thus avoiding the need to purchase new land or undertake significant permitting / siting efforts. In doing so, PPL EU has prepared a solution that employs advanced technology at a low capital cost.

Alternatives Analysis

As part of the analysis, PPL EU evaluated other solutions to resolve the AP South L/O Black Oak-Bedington constraints affecting this area. The additional solutions PPL EU identified are as follows:



[redacted]

Due to the competitive bidding processes set forth in FERC Order No. 1000, a solution which maximizes long term market efficiency benefits to consumers at a low cost is objectively superior to competing solutions. The proposed Juniata Substation 500kV SVC Project is significantly less costly than any option PPL EU investigated during the proposal window.

The remainder of this proposal focuses exclusively on the market efficiency solution developed by PPL EU.

A.3 Violations Resolved

As mentioned above, PPL EU's proposed solution provides long-term relief to a major portion of the market efficiency constraints reported in the RTEP Long Term Proposal Window briefing with the Transmission Expansion Advisory Committee ("TEAC").

The Juniata Substation 500kV SVC Project specifically addresses market efficiency constraints associated with the following interface points:

			2015 Input / 2015 Topology		2015 Input / 2019 Topology	
Facility Name	Area	Type	Frequency (Hours)	Market Congestion ($M)	Frequency (Hours)	Market Congestion ($M)
AP South L/O BED-BLA	PJM	Interface	1627	$103.6	1448	$79.4

Table 1: Congestion Interface Points from the PJM 2014-2015 Long Term Window Study

A.4 Additional Violations Analysis

PPL EU performed both an internal desktop review and enlisted external parties to analyze the impact of the proposed Juniata Substation upgrades. These studies confirmed that none of the project components associated with this proposal create additional thermal or voltage violations given the current system topography and infrastructure ratings.

It should be noted that these results are based on the current 2015 system configuration, and changes could occur that require additional violation analyses before the project in-service date of Q2-2018.

A.5 Network Impact Analysis

PPL EU performed contingency analysis on the proposed topology with the addition of the new Juniata Substation SVC. Based upon that review PPL EU has determined that there

are no adverse impacts resulting from the addition of the project components associated with this proposal.

A.6 Total Proposed Project Cost

The total cost of the proposed Juniata Substation 500kV SVC Project is approximately $33.95million. The expected project duration is 34 months from receipt of approval from PJM.

Description	Total Cost ($M)
REDACTED	
Total Project Cost	**$33.95**

Table 2: Estimated Costs for the Juniata Substation 500kV SVC Project

A.7 *Project Execution*

Listed below is the timeline for construction of the Juniata Substation 500kV SVC Project. The estimated project timeline is 34 months.

Project Component	Activity	Start	Finish
REDACTED			

Table 3: Anticipated Timeline for the Juniata Substation 500kV SVC Project

B Company Evaluation Information

B.1 PPL EU Company Evaluation

PPL Electric Utilities Corporation

2 North Ninth Street, GENN5

Allentown, PA 18101

PPL EU engages in the regulated transmission and distribution of electricity, providing high-quality, safe and reliable service to customers across central and eastern Pennsylvania. With the support of its parent company, PPL Corporation, PPL EU has access to the best practices and leading capabilities of one of the largest investor-owned companies in the U.S. utility sector.

PPL EU's pre-qualification information on record with PJM and as posted on PJM's website, submitted on June 28, 2013 through the Office of the Interconnection prior to the opening of the Market Efficiency project proposal window, reflects the company's current qualifications to be eligible for Designated Entity status as defined in the PJM Amended and Restated Operating Agreement ("PJM OA") in Section 1.5.8(a) (PJM Designation 13-12).

PPL EU hereby submits by reference as to the specific section in its original pre-qualification documentation (dated June 28, 2013 and subsequently accepted by PJM) as evidence of the following:

- PPL EU's technical and engineering qualifications (Prequalification Section 5.3);
- PPL EU's experience in:
    - developing, operating and maintaining transmission facilities (Prequalification Sections 4.0 through 4.3);
    - adherence to standardized construction, maintenance and operating practices (Prequalification Section 5.12 and 5.13), and including the ability for emergency response and system restoration (Prequalification Section 5.16);
    - working in the geographic region in which the proposed project is located (Prequalification Section 2.3);
    - ability to acquire rights of way within the proposed projects geographic region (Prequalification Section 5.8);
- PPL EU has adequate financial resources available to construct, operate and maintain the proposed project (Prequalification Section 2.5);

- PPL EU has demonstrated its managerial ability to contain costs and adhere to construction schedules for numerous transmission projects executed across its nearly 100-year history serving this territory;
- PPL EU will not be offering any construction cost caps or commitments for the proposed project;
- PPL EU is amply qualified to construct, operate, and maintain the proposed project (Prequalification Section 3.0 through 3.6).

PPL EU hereby indicates its intent to be designated to construct, own, operate, maintain and finance the three components of the proposed Juniata Substation 500kV SVC Project listed below.

- Juniata Substation SVC Transmission Interconnection
- Juniata Substation North Bus Extension
- Juniata Substation SVC Yard Addition

In doing so, PPL EU has made clear its intent to be considered the Designated Entity for these project components.

C Proposed Solution Constructability Information

C.1 Solution Scope

PPL EU proposes to implement a three-component solution in order to alleviate AP South market efficiency constraints under loss of the Black Oak-Bedington circuit. PPL EU's proposal consists of one transmission component and two substation components. The sections that follow provide additional constructability information about each component.

Section	Component Name	Type	Notes
C.1.1	Juniata Substation SVC Transmission Interconnection	Transmission	Greenfield
C.1.2	Juniata Substation North Bus Extension	Substation	Upgrade
C.1.3	Juniata Substation SVC Yard Addition	Substation	Greenfield

Table 4: Juniata Substation 500kV SVC Project Component List

C.1.1 Juniata Substation SVC Transmission Interconnection

General

PPL EU proposes to build a new span of 500kV transmission line with an approximate distance of 300 feet from its Juniata Substation to a new SVC yard located north of Juniata on land already owned by PPL EU. This work will require a single-span of 500kV transmission across Pennsylvania State Highway 34 and two 500kV deadend structures, the first located at the Juniata Substation and the second located in the new SVC yard.

Electrical & Physical Characteristics

[redacted]

In summary, the proposed transmission line has the following specifications:

Parameter	Value
REDACTED	

Table 5: Transmission Line Specifications

Additional detail, including aerial maps of the proposed siting, line routing, and electrical one-line diagrams can be found in the accompanying Appendix A.

C.1.2 Juniata Substation North Bus Extension

General Description

PPL EU proposes to modify its Juniata Substation to support the addition of a -100/+500 MVAR SVC located across Pennsylvania Highway 34 on land PPL EU currently owns. To accommodate this addition and interconnection, PPL EU will need to add one 500kV disconnect switch with Motor Operated Disconnect ("MOD"), one 500kV breaker, associated relays & controls and 4-inch aluminum bus-work to the existing Juniata Substation yard.

Additional detail, including PPL EU aerial maps of the proposed modifications, general arrangements and electrical one-line diagrams can be found in the accompanying Appendix B.

Electrical Design

Relay Communications Plan

Transmission Line Protection: PPL EU's 69kV – 500kV transmission lines are protected with primary and backup relays. Further details on PPL EU's Transmission Line Protection Standards are included in the accompanying Appendix C.

Circuit Breaker Protection: Circuit Breaker ("CB") failure protection clears the fault when protective relaying trips a CB and the CB fails to interrupt the current. Protection schemes consist of several elements including relays, voltage and current transformers, control power supply (DC batteries, fusing), control cables and CBs. CB failure schemes are specifically employed to provide backup protection in the event a CB fails to operate properly during fault clearing. The operation of a CB failure scheme trips all local and remote CBs associated with power system sources feeding the fault. Further details on PPL EU's Circuit Breaker Protection Standards are included in the accompanying Appendix C.

C.1.3 Juniata Substation SVC Yard Addition

General Description

PPL EU proposes to connect the Juniata Substation to a new yard across Pennsylvania State Highway 34 that will accommodate a 500kV SVC. The scope of work included as part of the SVC yard includes supply and installation of the SVC equipment plus relaying & controls and interconnections that will connect the SVC to the 500kV deadend structure described in Section C.1.1.

Additional detail, including PPL EU aerial maps of the proposed modifications, general arrangements and electrical one-line diagrams can be found in the accompanying Appendix B.

Electrical Design

Relay Communications Plan

Please refer to the Relay Communications Plan details in Section C.1.2, above, and the more detailed discussion of PPL EU's Protection Standards included in Appendices B and C.

C.1.4 Transmission Facilities Constructed by Others

Transmission line Relocation

As part of this project proposal, no transmission line relocations will be constructed by others.

Substation Expansion or Modification

As part of this project proposal, no substation expansions or modifications will be constructed by others.

C.2 Environmental, Permitting and Land Acquisition

C.2.1 Environmental Impact Review Methodology and Preliminary Results

PPL EU will coordinate the environmental studies required for state and federal permits potentially necessary for completing the project. These environmental studies generally involve wetland delineations, assessments for Threatened & Endangered ("T&E") species or their habitats, and evaluation of the cultural resources that may be within or in the vicinity of the Right of Way ("ROW"). Once these existing environmental conditions are identified and documented, they will be incorporated into the project drawings for the civil and environmental permitting submittals.

C.2.2 Right-of-Way and Land Acquisition Plan

PPL EU plans to build the aforementioned SVC yard beyond the fence area of the existing substation but within the boundaries of neighboring property currently owned by PPL EU. The company does not anticipate the need to acquire any additional land.

C.2.3 Permitting Plan and Approach

A Letter of Notification ("LON") to the Pennsylvania Public Utility Commission ("PUC") is required for project components outside of the current Juniata Substation fenceline. The work scope within the substation is typically not deemed transmission line and is not covered by siting regulations. If a LON is needed, siting would take 5-7 months in total to prepare and receive approval from the PUC. This has been factored into PPL EU's proposed project execution schedule, and execution will be completed more quickly if an LON is not required.

In accordance with the aforementioned scope of work, PPL EU will also conduct environmental permitting for the project based on the following:

- Desktop Permitting Assessment
- Engineering and Environmental Site Review
- Wetland Delineation
- PADEP Chapter 102 Design and Permitting
- PADEP Chapter 105 Permitting

C.3 Solution Cost Estimate

The estimated project cost is $33.95 and should be interpreted as a budget estimate. The bottom up development and top down verification provides an 80% confidence level in the project estimate, based on the baseline scope of work and assumptions. A more detailed breakdown of PPL EU's costs can be found in the accompanying Appendix D.

C.4 Solution Schedule

A 34 month project schedule is required to complete the scope of the Juniata Substation 500kV SVC Project. Successful completion of the project will require coordination between engineering, ROW / land acquisition, long-lead time equipment procurement, CPCN / permitting, operations and construction activities. A preliminary estimate of the integrated project schedule is provided below. These activities will be finalized in greater detail upon selection of PPL EU as the Designated Entity for this project.

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Project Component	Activity	Start	Finish
REDACTED			

Table 6: Anticipated Timeline for Juniata Substation 500kV SVC Project Components

C.5 Ongoing Transmission Facility Items

C.5.1 Operations Plan

Operations Plan Overview

These facilities will be operated by PPL EU at the direction of PJM and controlled and maintained by PPL EU consistent with the current operations and maintenance practices used by PPL EU. PPL EU's Transmission Control Center ("TCC") is tasked with the responsibility of monitoring and operating a reliable transmission grid as defined by PJM, RFC and NERC. The TCC operates 24 hours a day, 365 days a year in a NERC/R-certified state-of-the-art, secure facility with both primary and disaster recovery sites. All TCC employees are trained by NERC certified trainers and receive NERC, PJM Transmission Operator, PJM Generation, and PPL EU training certifications.

C.5.2 Maintenance Plan

Maintenance Plan Overview

PPL EU will integrate these facilities into its existing transmission maintenance program. PPL EU currently groups equipment into functional groups allowing optimum scheduling of equipment maintenance under a single outage window. Inspection activities are timed to maintain the desired performance levels defined for each individual asset.

PPL EU owns and maintains a fleet of spare substation equipment to include at least one of each major piece of equipment, such as power transformers, CB's, CCVT's, etc. Items such as spare transformers are kept at strategically located substations based on the location of in-service units. PPL EU will ensure equipment is on hand that matches elements included as part of this physical solution so that spares on-hand are compatible. PPL EU has included spare parts for the SVC component of this proposal.

C.6 Assumptions

[redacted]

Financial / Estimating

- [redacted]
- [redacted]
- [redacted]
- [redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Permitting

- [redacted]
- [redacted]

Schedule

- [redacted]
- [redacted]

Appendices

Reference	Description
Appendix A	Transmission Component Details
Appendix B	Substation Component Details
Appendix C	Line Protection and Breaker Failure Protection Philosophy
Appendix D	Detailed Cost Estimate
Appendix E	List of Attachments

TPA Exhibit No. 12

A-2017-2640145 et al.

2/22/19 jar

2016/17 PJM RTEP Long Term Proposal Window

Conastone-Graceton-Bagley Congestion Relief – Project 1

Submitted by:

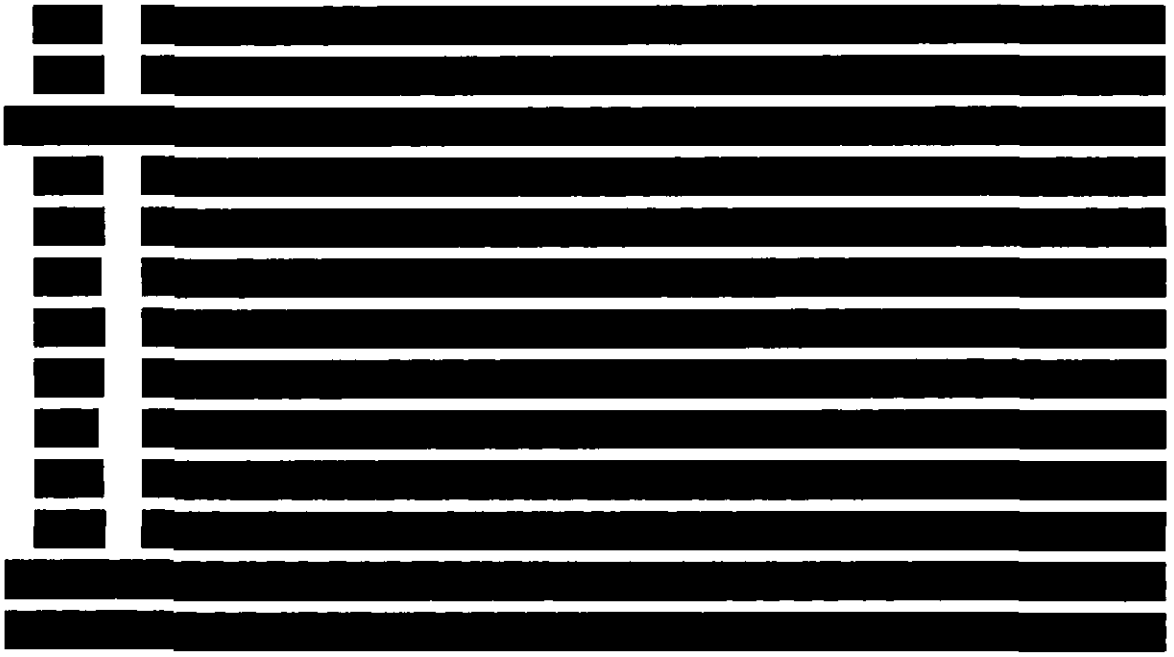
PPL Electric Utilities Corporation ("PPL EU") and

ATX East, LLC

REDACTED Version for Public Release

PPL Electric Utilities

Ameren TRANSMISSION



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A. Executive Summary

A.1. Introduction

[redacted]

[redacted]

A.2. Name of proposing entity

This is a joint proposal submitted by the following Proposing Entities:

PPL Electric Utilities Corporation ("PPL EU")
2 North 9th Street
Allentown, PA 18101

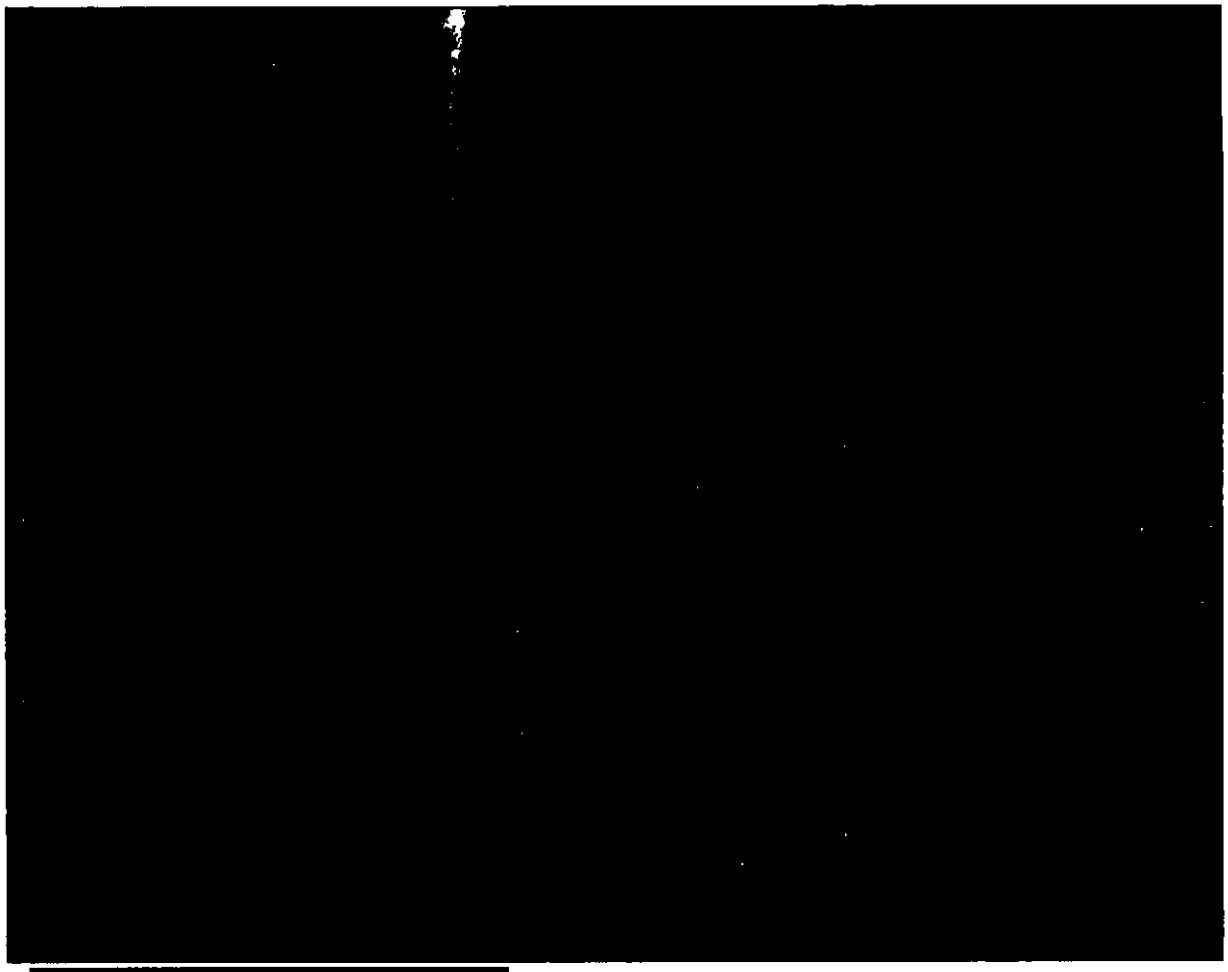
ATX East, LLC (ATX East)
1901 Chouteau Avenue, MC 635
St. Louis, MO 63166-6149

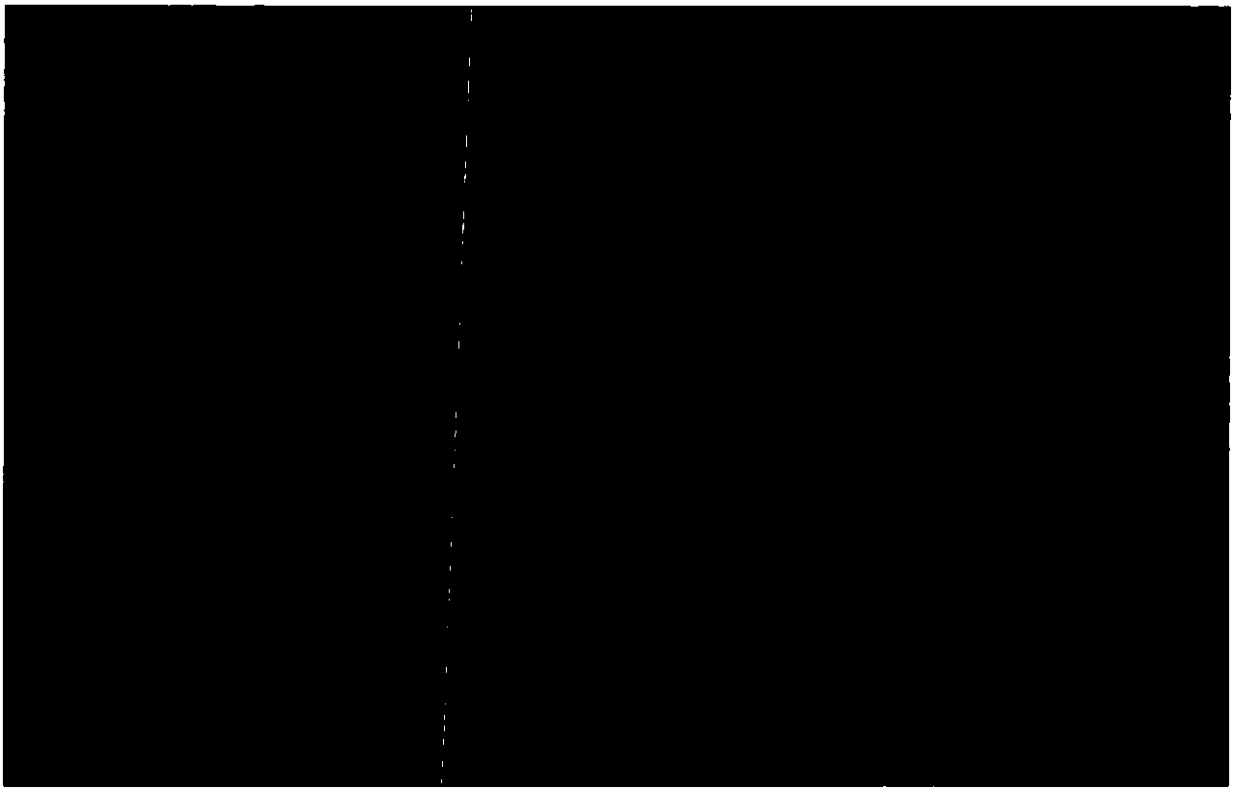
A.3. Proposed Congestion Driver(s) Being Addressed

PPL EU and ATX East propose a project to:

- Completely resolve the congestion on ME-1; the Graceton to Conastone 230kV line;
- Completely resolve the congestion on ME-2; the Graceton to Bagley 230kV line; and
- Partially resolve the congestion on the AP South Interface for the loss of the Bedington - Black Oak 500 kV line.

These flowgates were identified in the problem statement of the 2016/17 RTEP Long Term Proposal Window. Chart A.3.1, Flowgate Congestion Totals below shows the congestion for the base case ("BC") and project case ("PC") on the Graceton – Bagley 230kV line, Conastone - Graceton 230kV line and AP South Interface for the loss of Beddington - Black Oak 500 kV line.





A.4. Additional Violations Caused/Not Addressed

The proposed project does not cause any reliability violations.

A.5. PJM Zones or Neighboring Balancing Authority

The proposed project is located entirely within the Baltimore Gas & Electric zone.

A.6. Project Responsibility

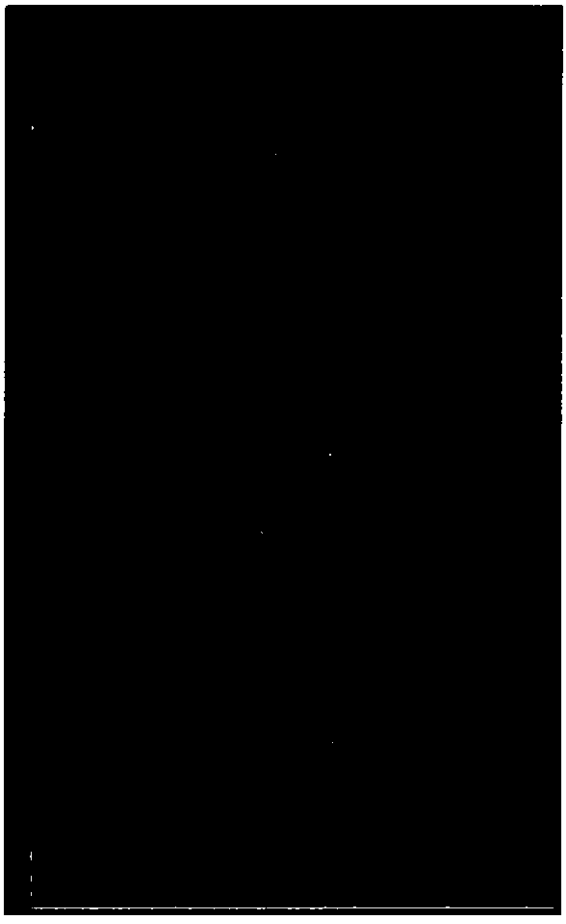
The Proposing Entities (PPL EU and ATX East) intend to jointly construct, operate and maintain the project. If PJM awards the project to PPL EU and ATX East, the ownership of the Project will be divided as follows:

[redacted]

As further discussed in Section G of this proposal, each proposing entity will maintain legal responsibility for the operation and maintenance of their transmission facilities [redacted]

A.7. Description of Proposed Solution

PPL EU and ATX East propose a project to completely resolve the congestion on the Graceton to Conastone 230kV line and the Graceton to Bagley 230kV line as identified in the problem statement of the 2016/17 PJM RTEP Long Term Proposal Window. The Proposing Entities propose to construct the following greenfield components and propose and propose that the following brownfield components be constructed by the incumbent (Baltimore Gas & Electric). Reference Figure A.7 below for the proposed location of each component:



- **Component 1 (Greenfield):** Build a new 230/115 kV substation called Baldwin. The substation will consist of two 230/115 kV transformers. It will be arranged as a breaker and a half on the 230 kV and 115 kV sides with the transformers connecting to the main buses at both the 230 kV and 115 kV voltage level.
- **Component 2 (Greenfield; blue line):** Build a new double circuit 230 kV line between Conastone and Baldwin.
- **Component 3 (Greenfield; yellow line):** Build a new double circuit 230 kV line between Baldwin and Raphael Road.
- **Component 4 (Brownfield; red line):** Rebuild the sections of 115 kV lines 110512 and 110511 between Windy Edge and Baldwin
- **Component 5 (Brownfield; red line):** Reconductor the sections of existing double circuit 230 kV line (2315 and 2337) between Raphael Road and Northeast.
- **Component 6 (Brownfield):** Add two new positions at 230 kV Conastone substation.
- **Component 7 (Brownfield):** Add two new positions at 230 kV Raphael Road substation.

A.8. Description of Project Consideration

This project should be considered by PJM only as a whole.

A.9. Overview of Cost and Cost Commitment

PPL EU and ATX East have endeavored to develop a cost-effective solution that resolves the congestion drivers on the Conastone-Graceton-Bagley 230 kV line, while providing additional value to the ultimate customers using the transmission system. The parties have estimated the cost to develop, design, construct and commission the proposed transmission project at $138.5 million in-service (nominal) dollars. This includes a fully developed cost estimate for all of the proposed upgrades to be constructed by the incumbent TO(s).

[redacted]

A.10. Additional Benefits

In developing the proposed project, PPL EU and ATX East recognized that a project that simply upgrades or parallels the existing, congested transmission lines is not adequate for the following reasons:

- It will push congestion to the next line segments that are electrically downstream, which PJM is not monitoring in PROMOD; and
- The affected lines are presently being upgraded by the incumbent (anticipated in-service date of June 1, 2017) and any new project that involves a further, additional rebuild or reconductor of these lines will result in the current upgrade investment becoming a stranded asset for the incumbent utility;
- A solution that parallels the existing line will require new right-of-way to be acquired by the incumbent utility.

PPL EU and ATX East **strongly encourage PJM to perform an analysis that monitors the additional flowgates which are identified in Section D of this proposal.** By including these additional flowgates in the analysis, the additional congestion created in the 230 kV and 115 kV systems will become apparent. In contrast, this analysis will highlight the more comprehensive solution proposed by PPL EU and ATX East not only mitigates the current congestion drivers but also will alleviate any future congestion in the lower voltage systems and creates a much more robust solution.

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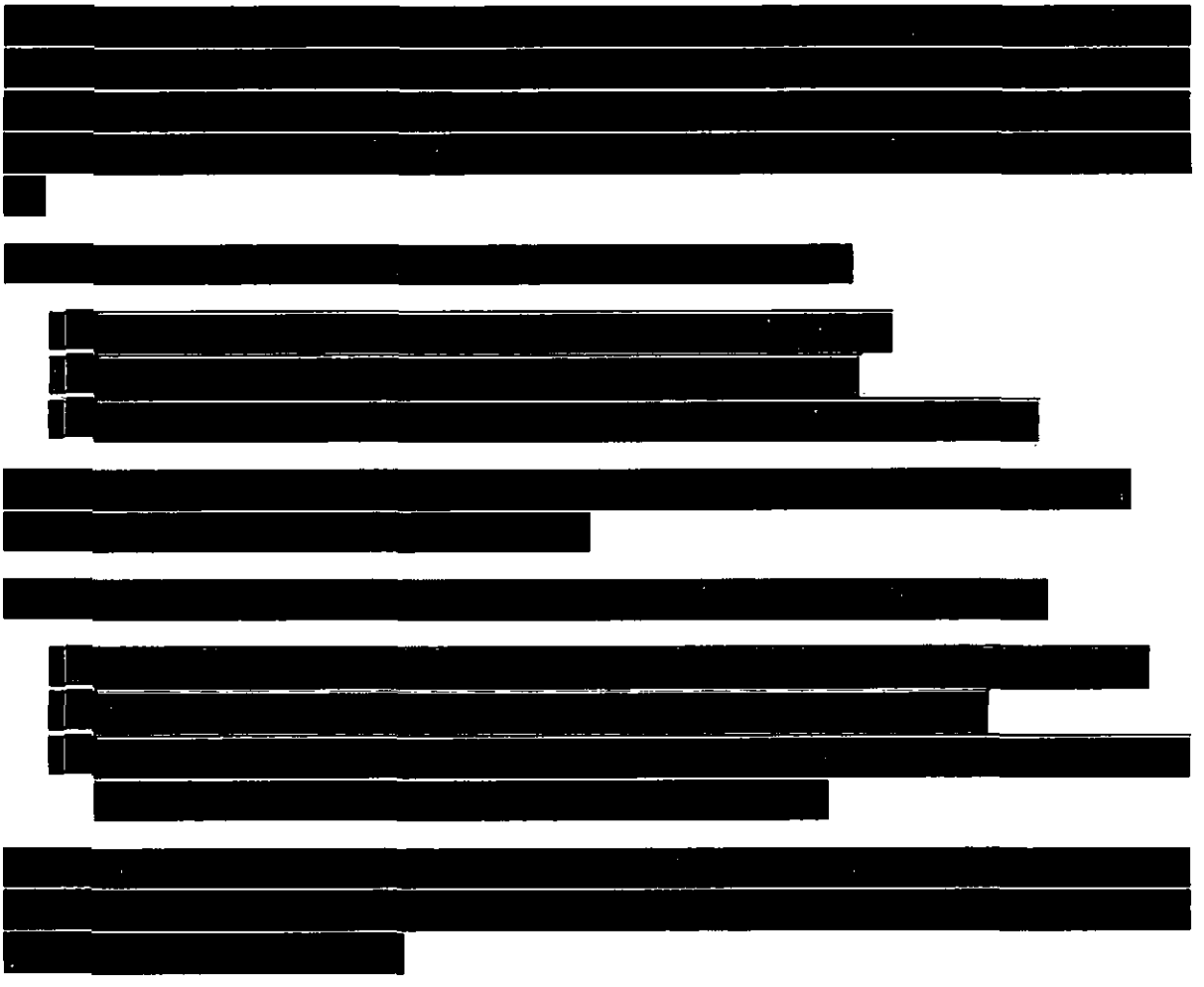

B. Company Evaluation Information

This section is required to be completed by those proposing entities who are seeking Designated Entity status.

B.1. Name and Address of Entity

PPL Electric Utilities Corporation ("PPL EU")
2 North 9th Street
Allentown, PA 18101

Primary Contact:	Stephanie Raymond - Vice President
Telephone:	610-774-2146
E-Mail:	SRaymond@pplweb.com
Secondary Contact:	Joshua Trott
Telephone:	610-774-4506
E-Mail:	JTrott@pplweb.com

ATX East, LLC (ATX East)
1901 Chouteau Avenue, MC 635
St. Louis, MO 63166-6149

Primary Contact:	Sean Black – Director, Transmission Business Development
Telephone:	314-554-3844
E-Mail:	sblack2@ameren.com
Secondary Contact:	Kathy Thole – Manager, Transmission SBC and Development Support
Telephone:	314-554-2947
E-Mail:	KThole@ameren.com

B.2. Pre-qualification submittal identification number

PPL EU (13-12):

PPL EU has been pre-qualified as a Designated Entity for transmission projects in PJM under section 1.5.8 (a) of the PJM Amended and Restated Operating Agreement. The pre-qualification information is contained in the document originally submitted to PJM dated December 22, 2016 entitled "PJM Developer Qualification Application". This document is on file with PJM and is posted on PJM's website, with a PJM pre-qualification ID of 13-12. The

latest update of this document was submitted to PJM on December 22, 2016. PJM confirmed the pre-qualified status in a letter dated January 11, 2017.

ATX East (14-01):

Ameren Corporation and its Affiliate ATX East have been pre-qualified as a Designated Entity for transmission projects in PJM under section 1.5.8 (a) of the PJM Amended and Restated Operating Agreement. The pre-qualification information is contained in the document originally submitted to PJM dated March 5, 2014 entitled "Designated Entity Pre-Qualification Filing by Ameren". This document is on file with PJM and is posted on PJM's website, with a PJM pre-qualification ID of 14-01. The latest update of this document was submitted to PJM in September, 2016. PJM confirmed the pre-qualified status in a letter dated October 27, 2016.

B.3. Additional Company Information

B.3.a. PPL EU

Refer to PPL EU's Qualified Transmission Developer Application. A copy of the PPL financial statements can be accessed through the following link: PPL 2016 10K

B.3.b. ATX East

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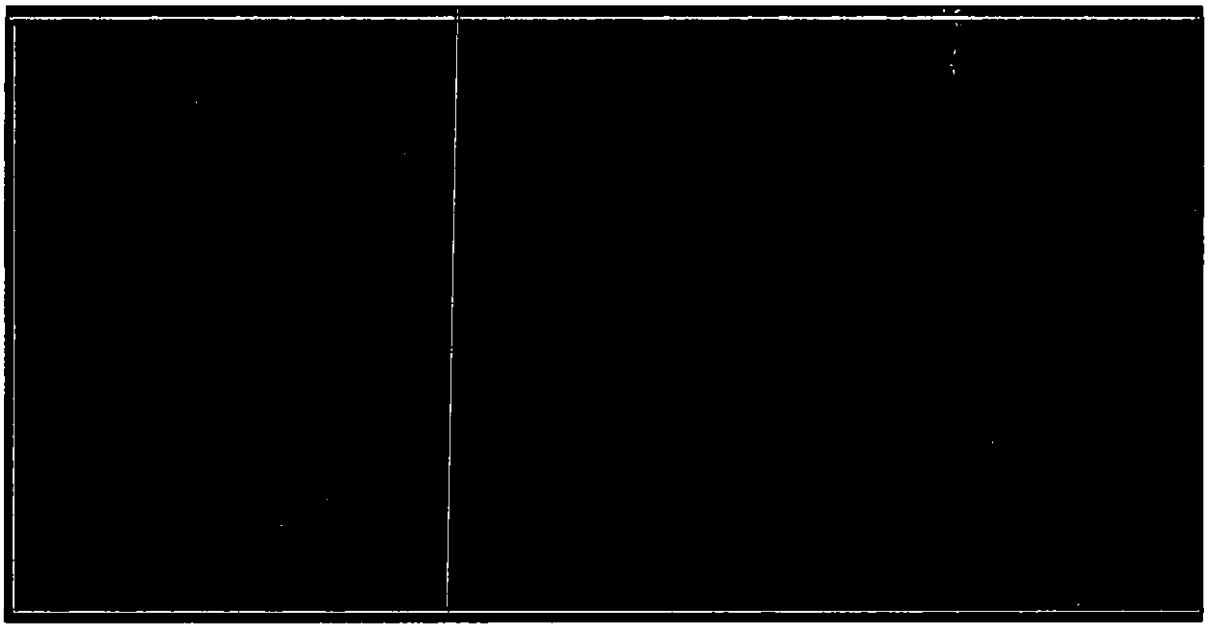

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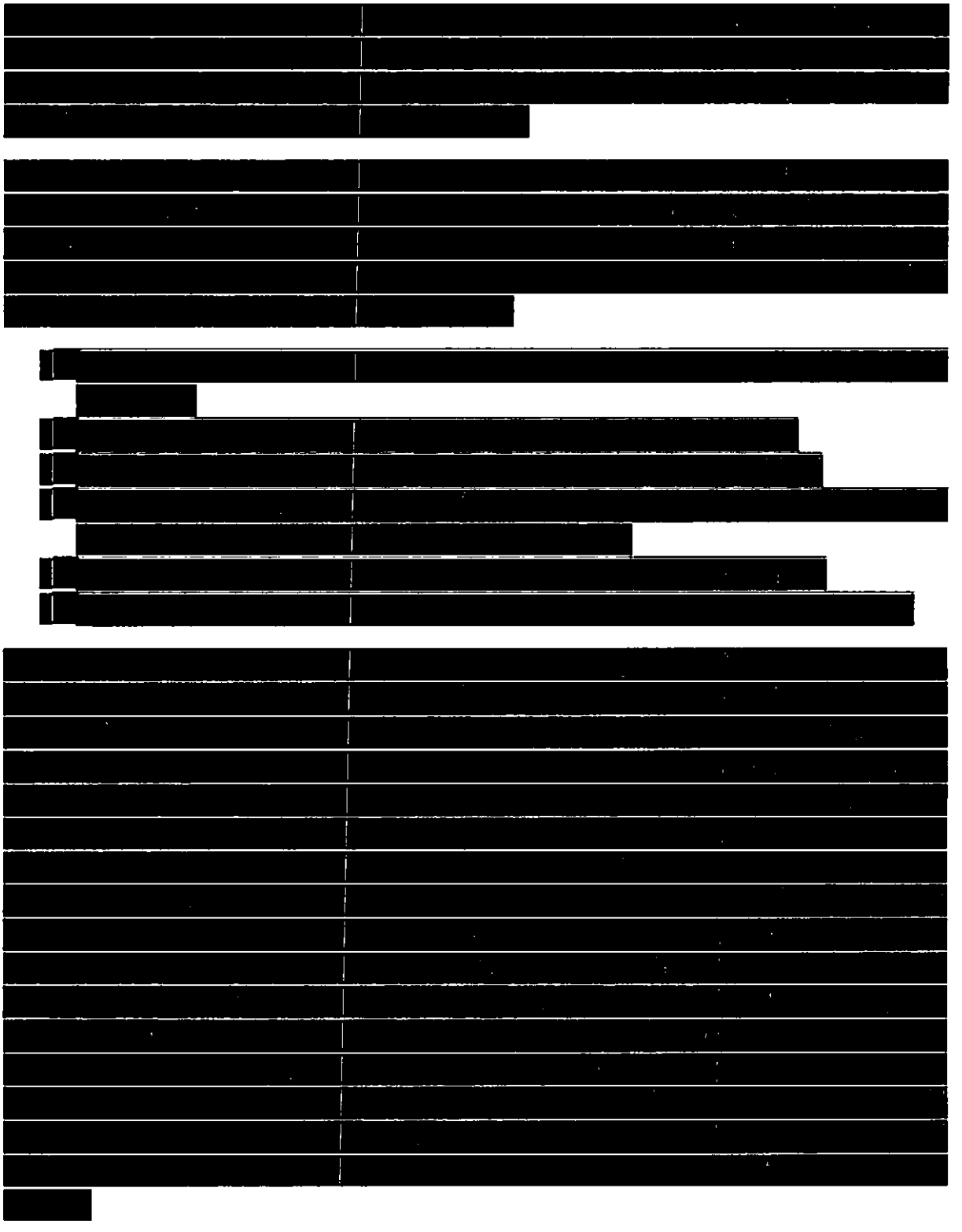

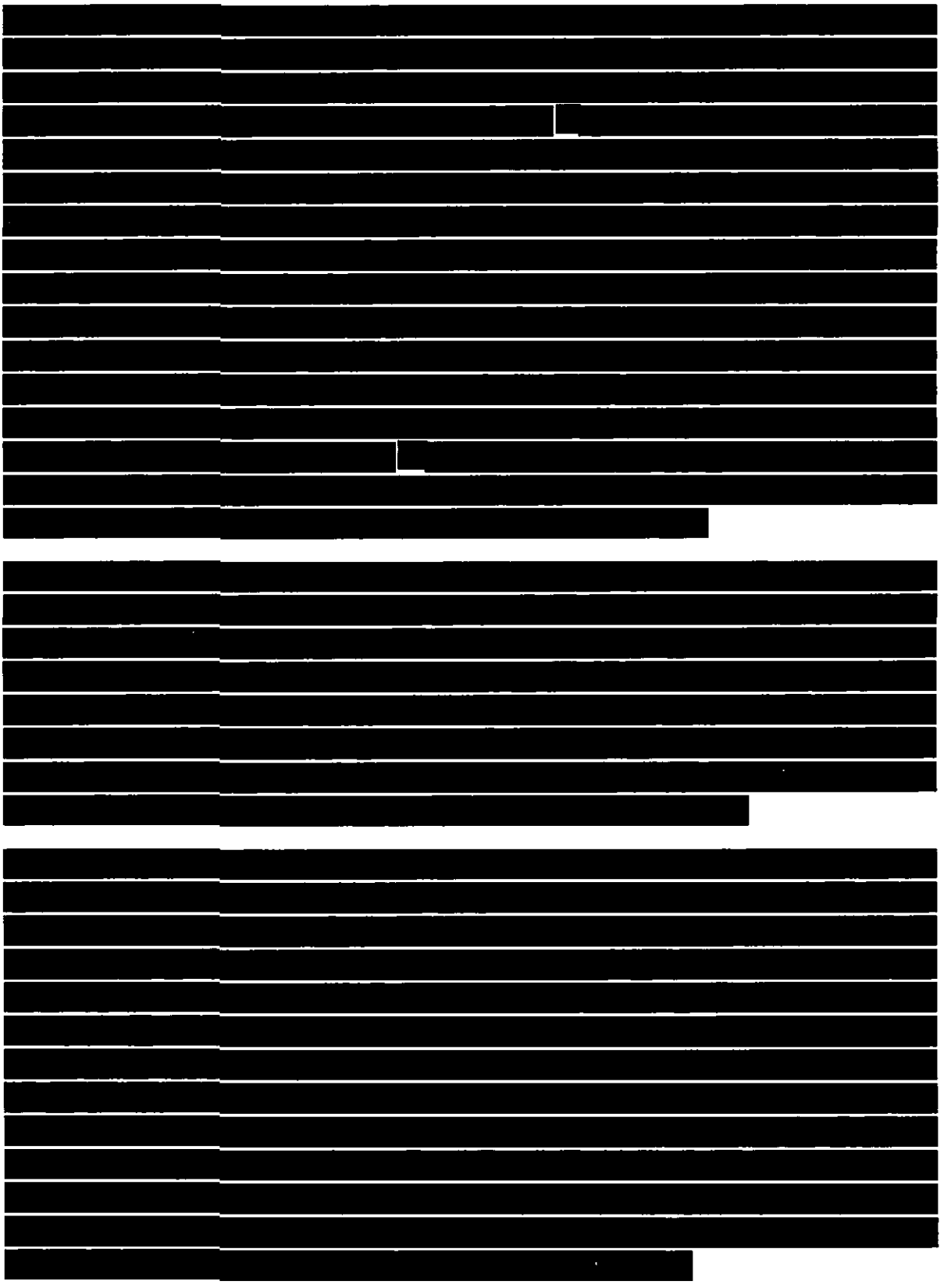

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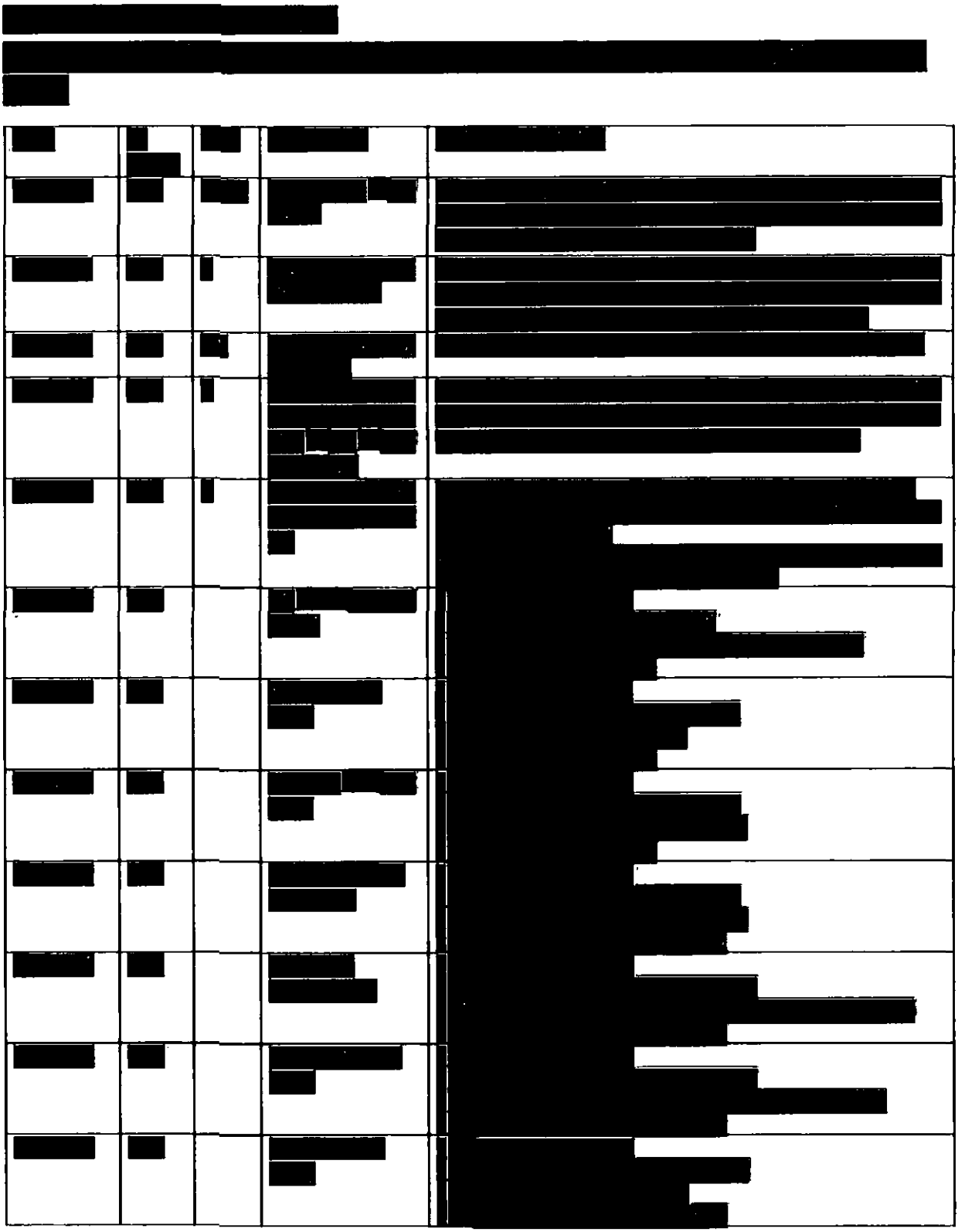

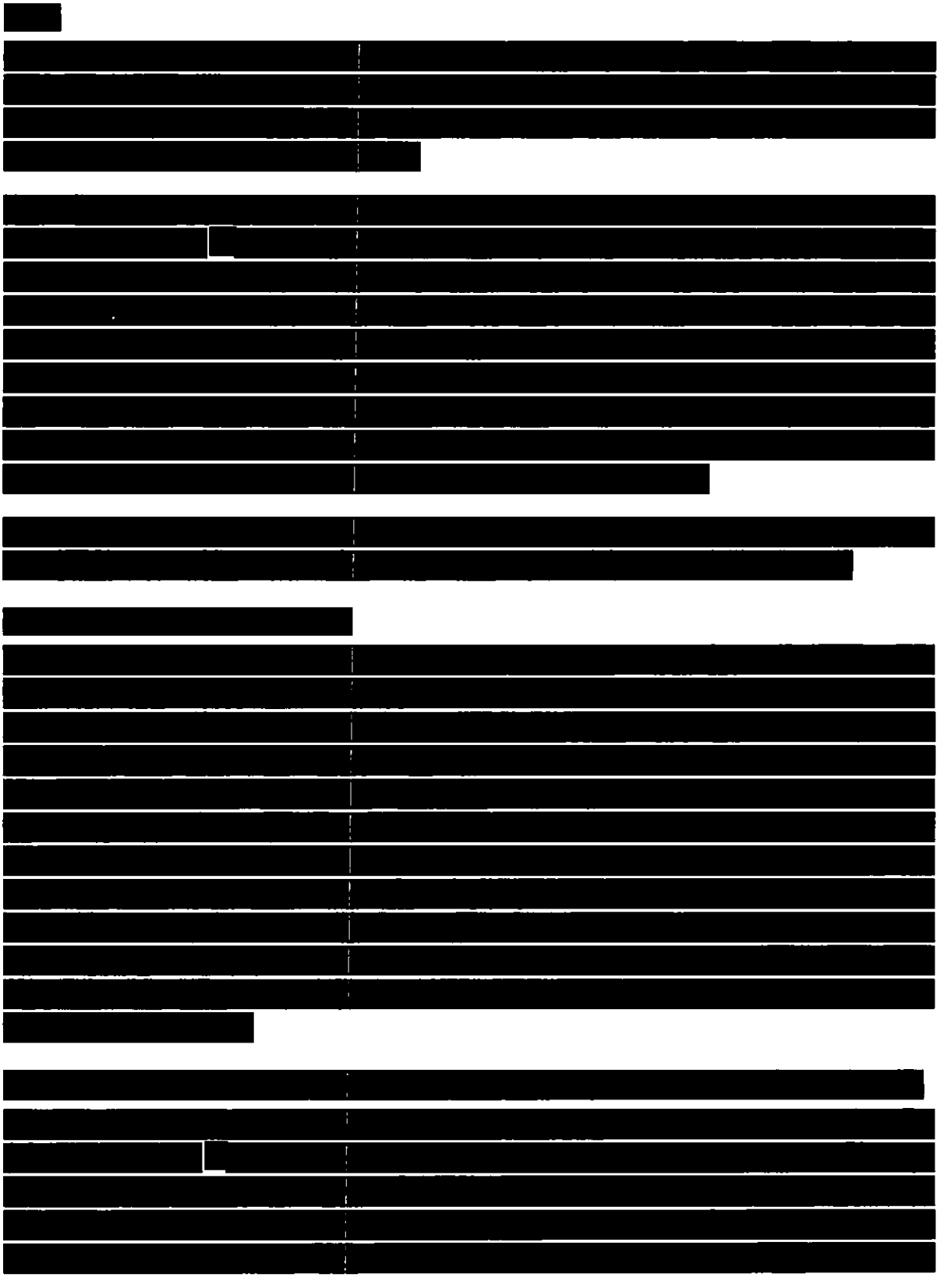

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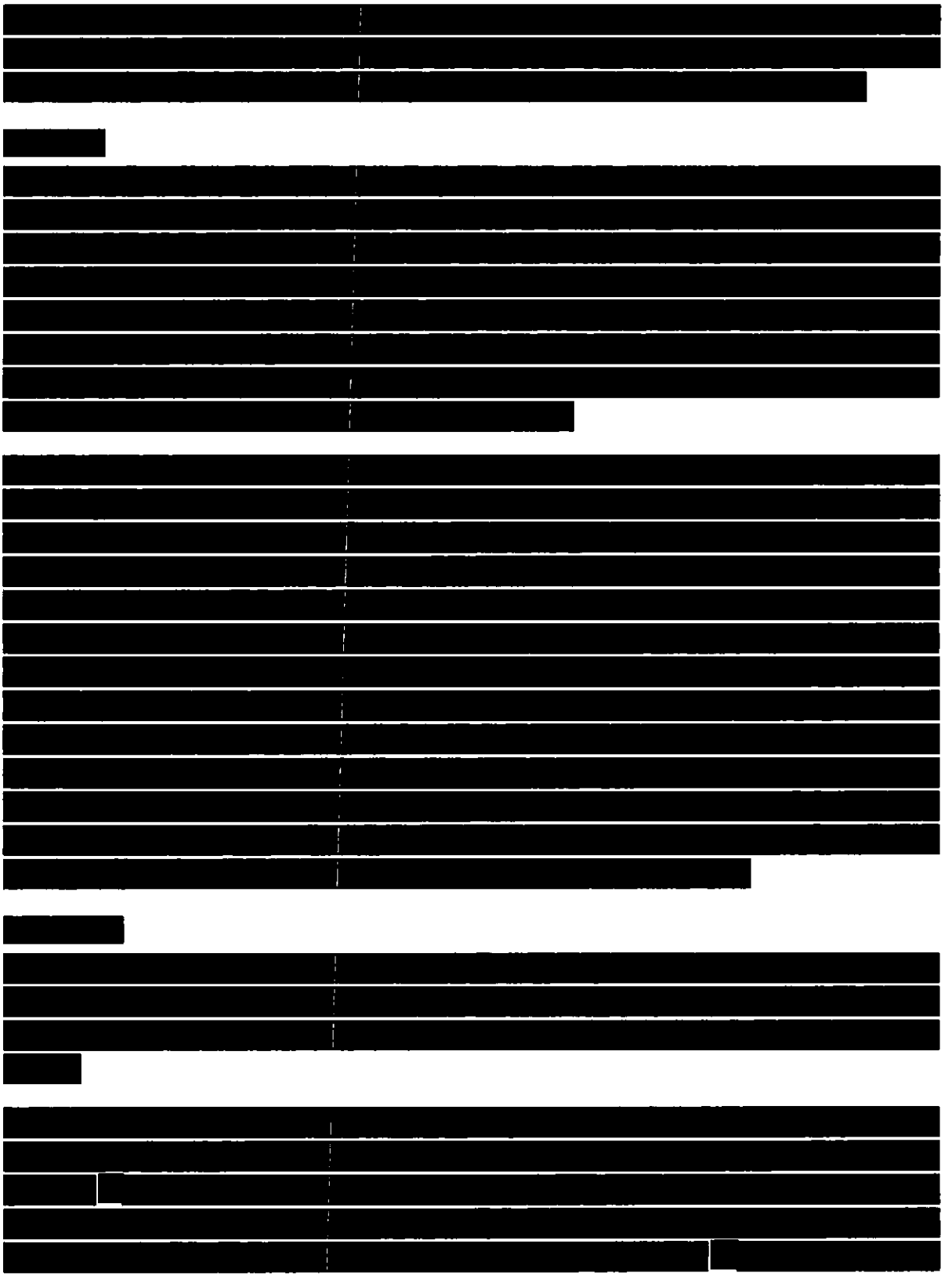

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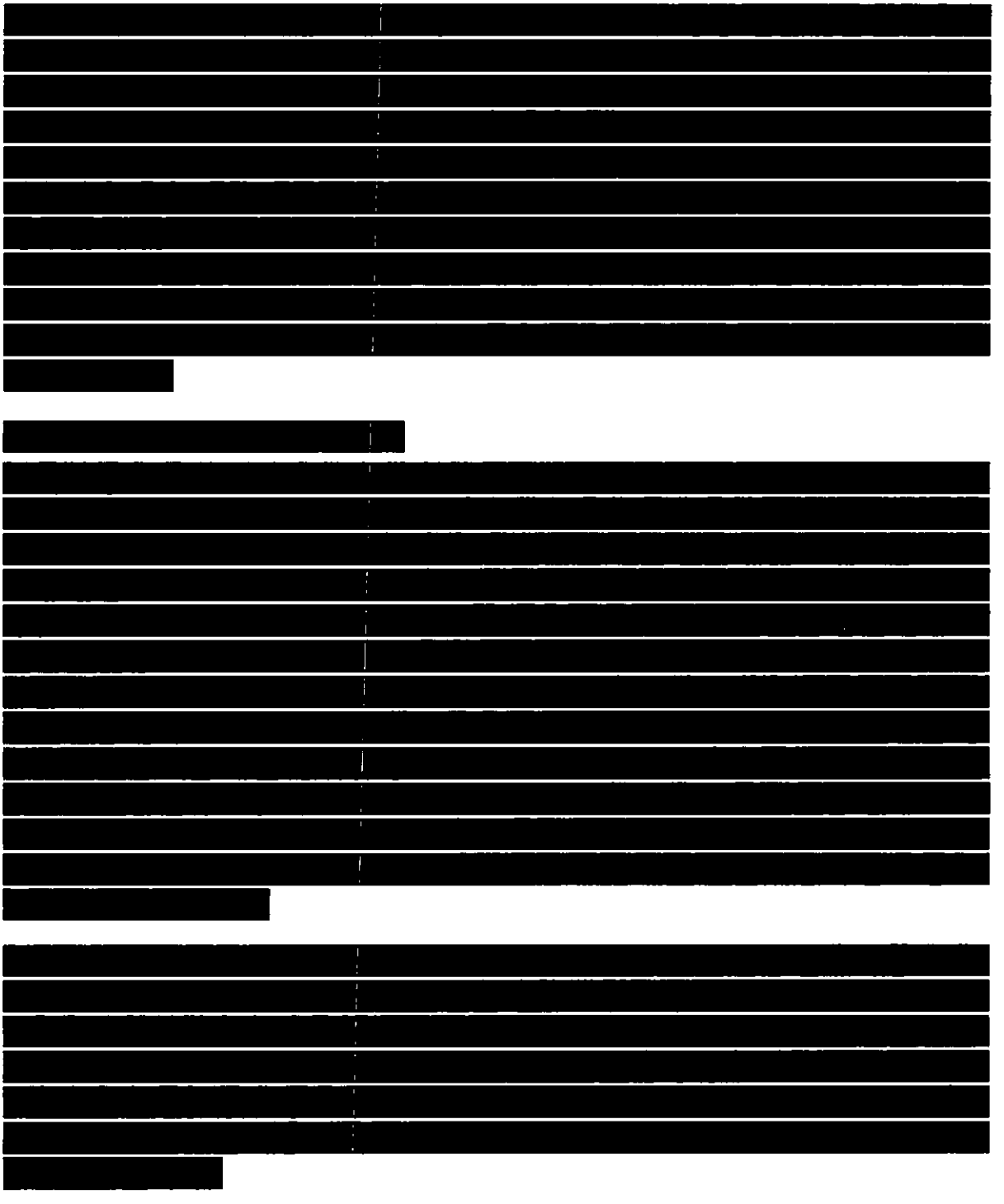

C. Proposed Project Constructability Information

C.1. Component Scope

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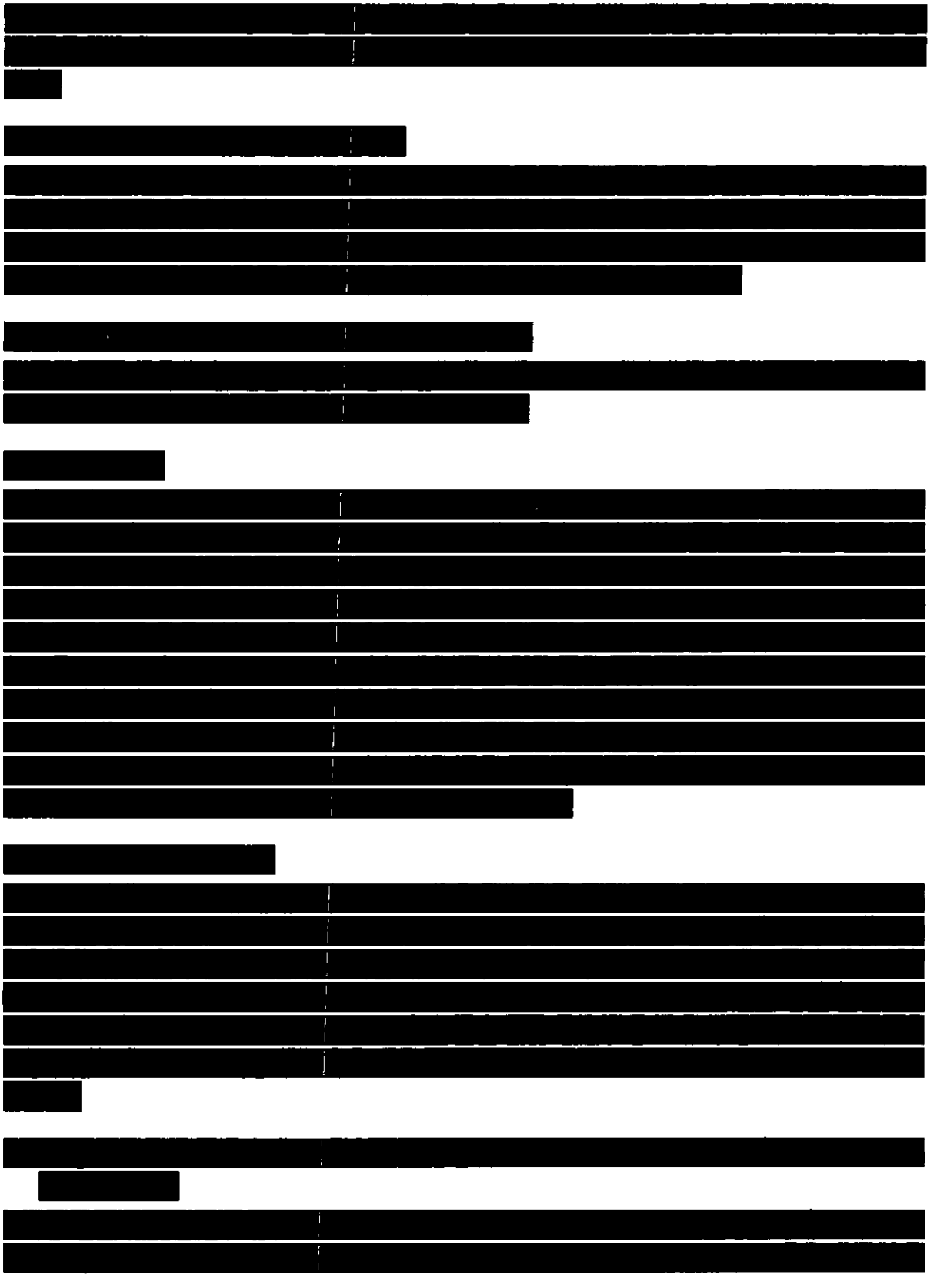

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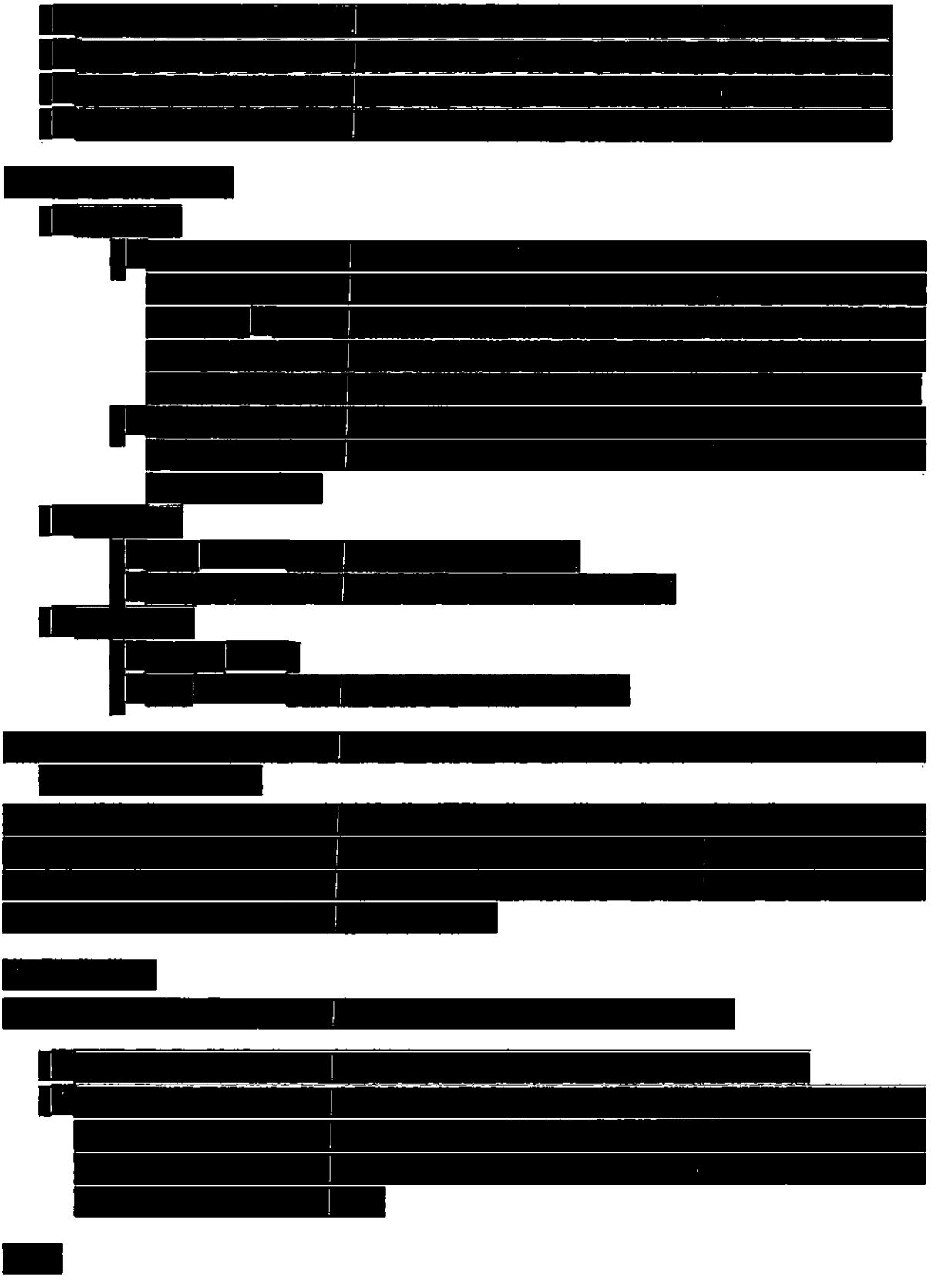

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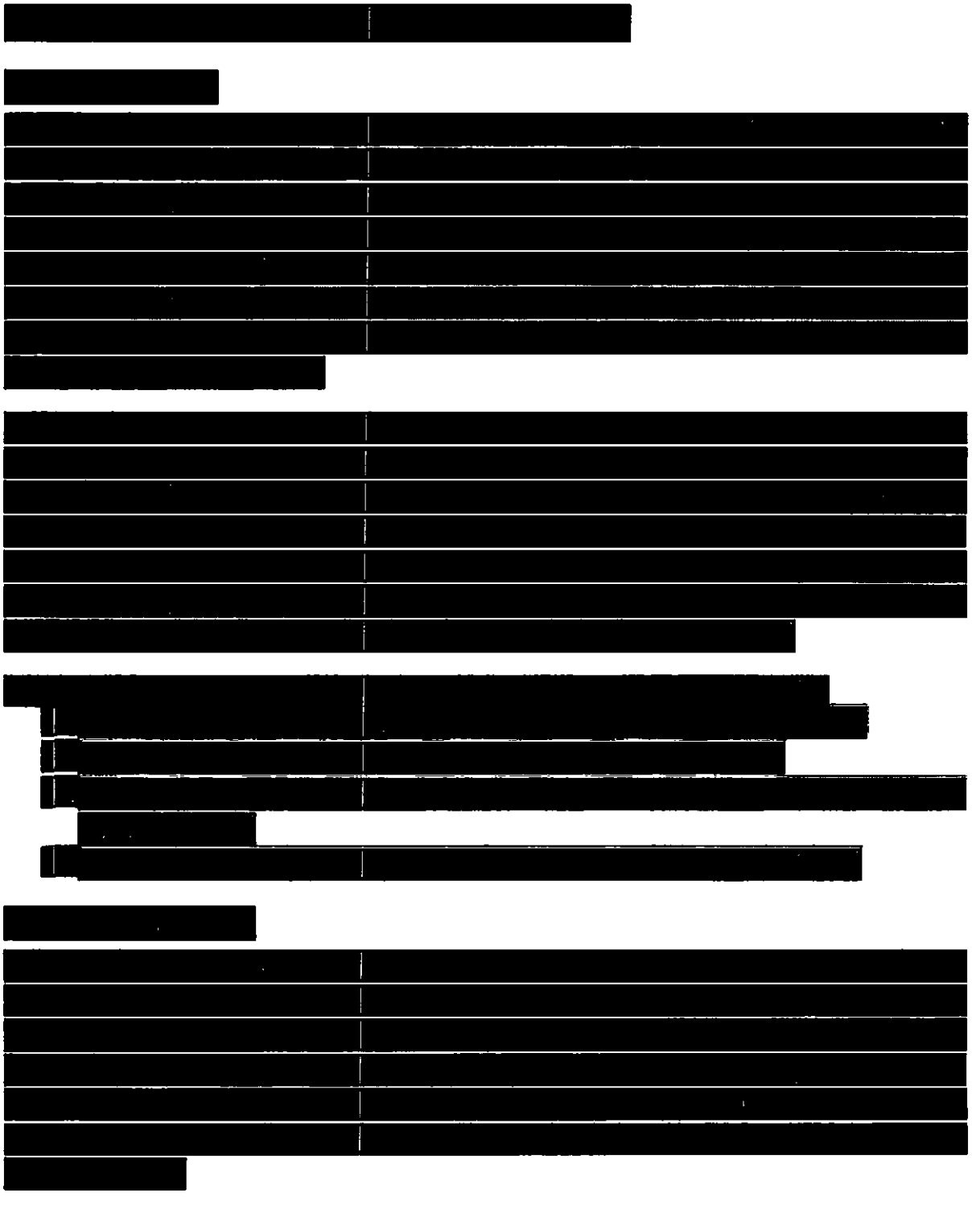

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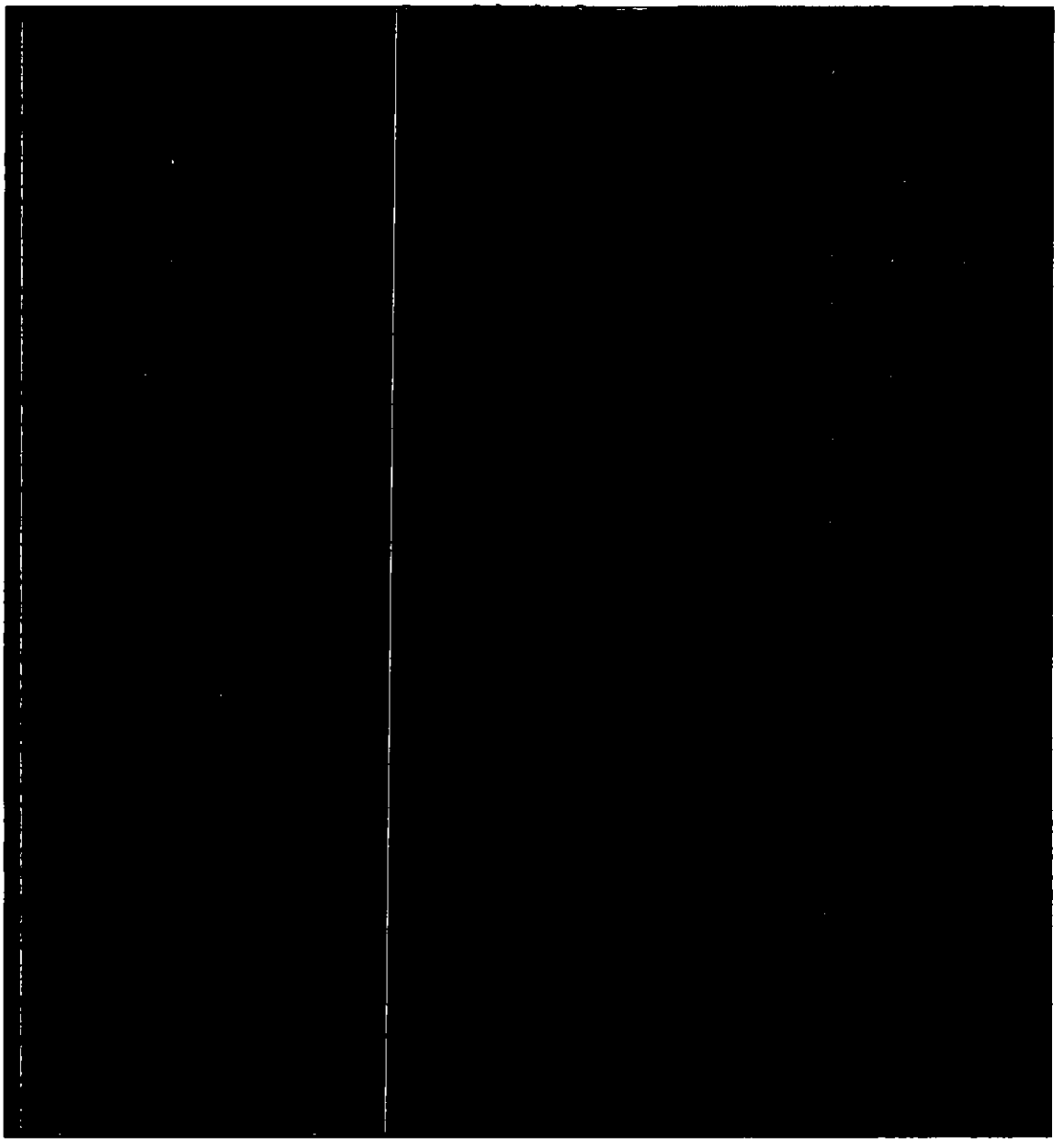

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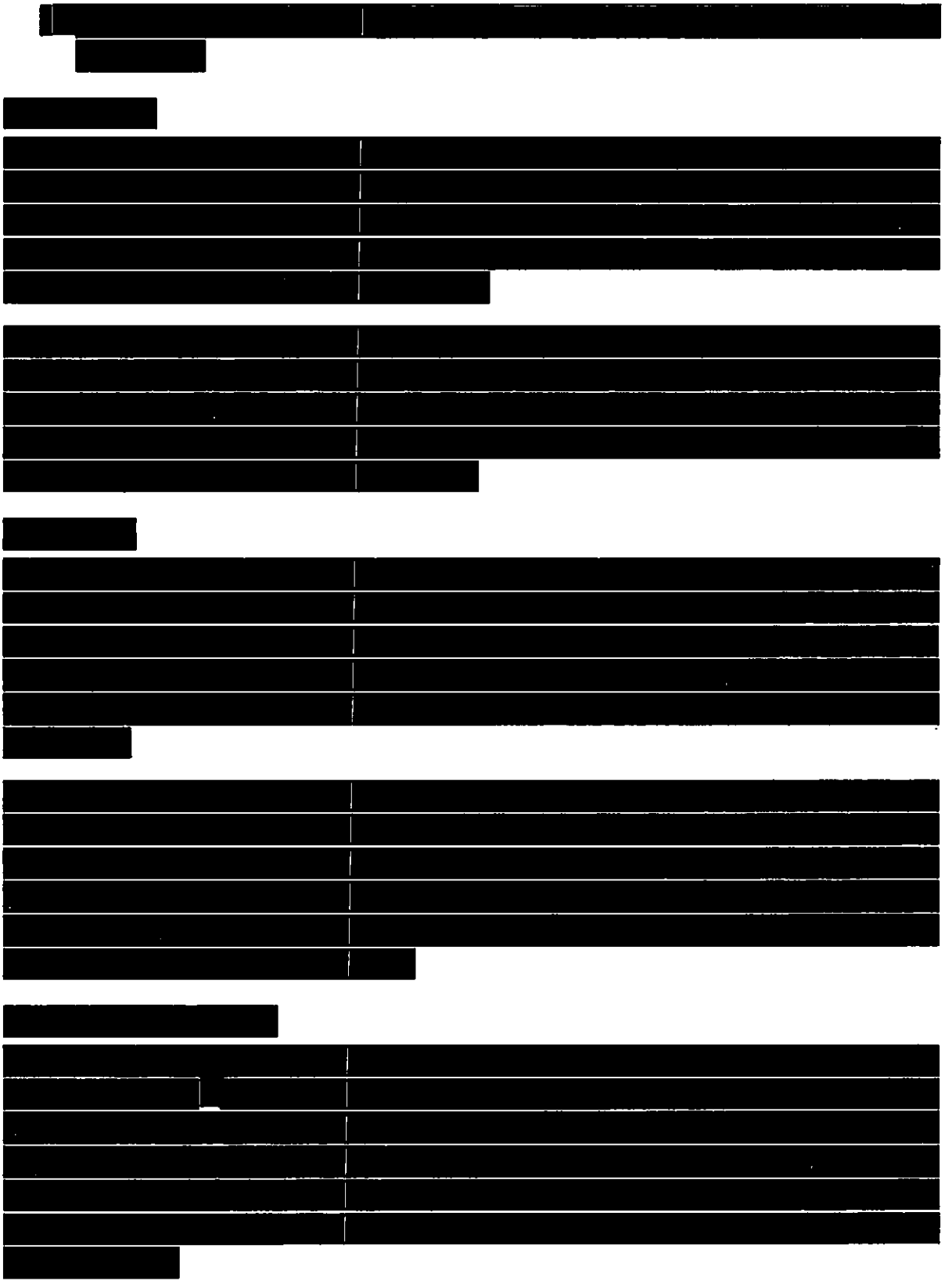

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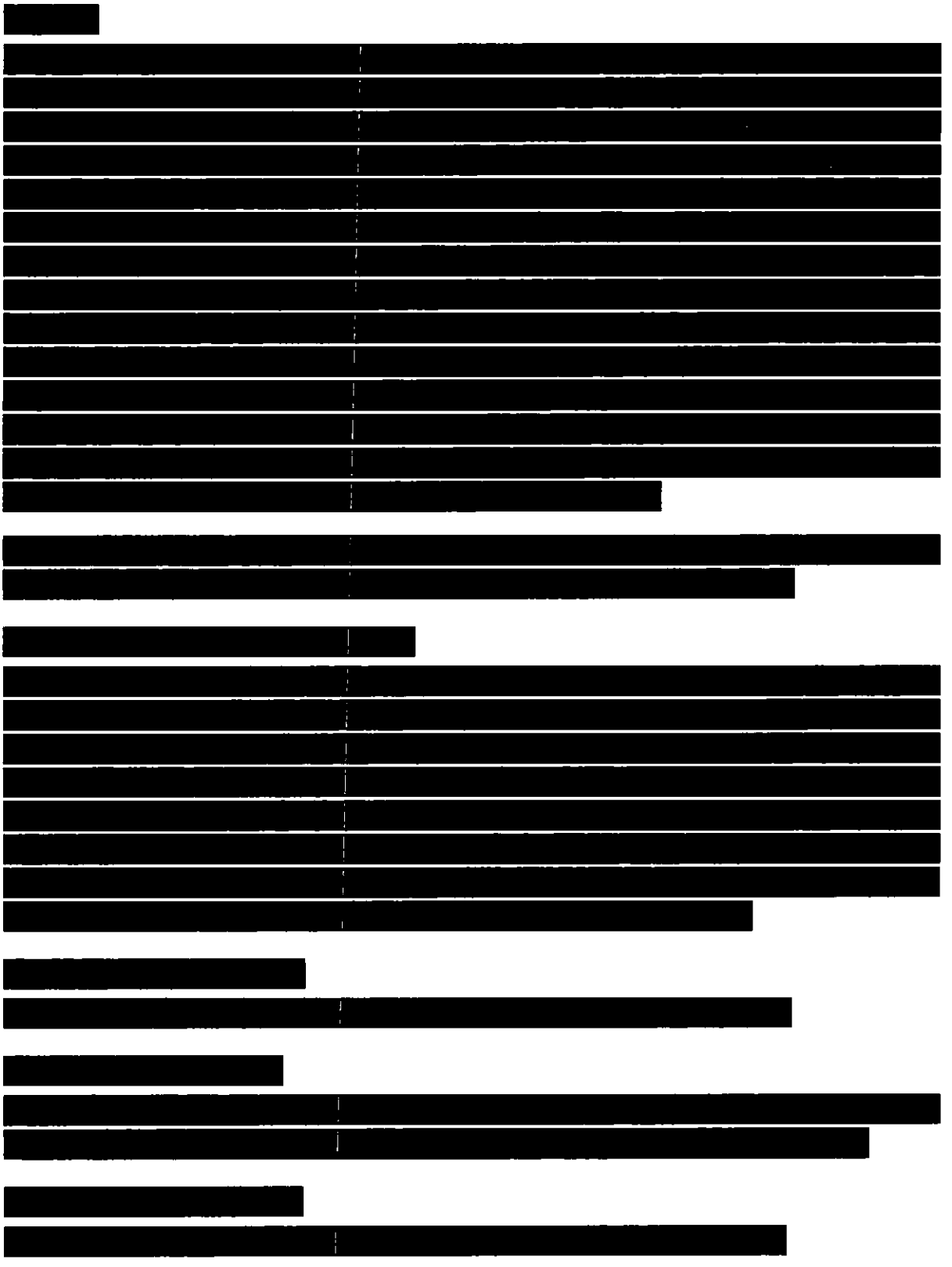

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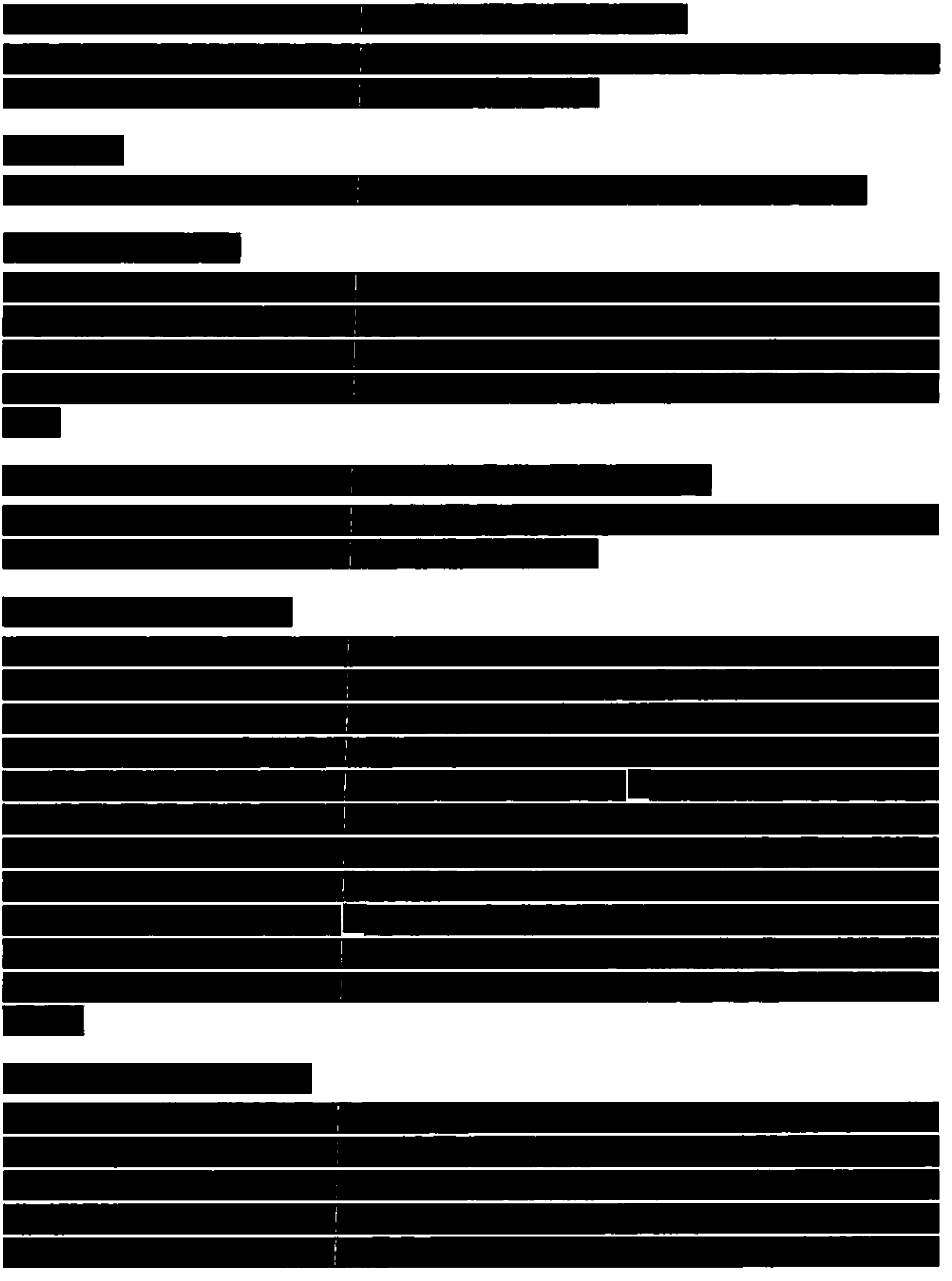

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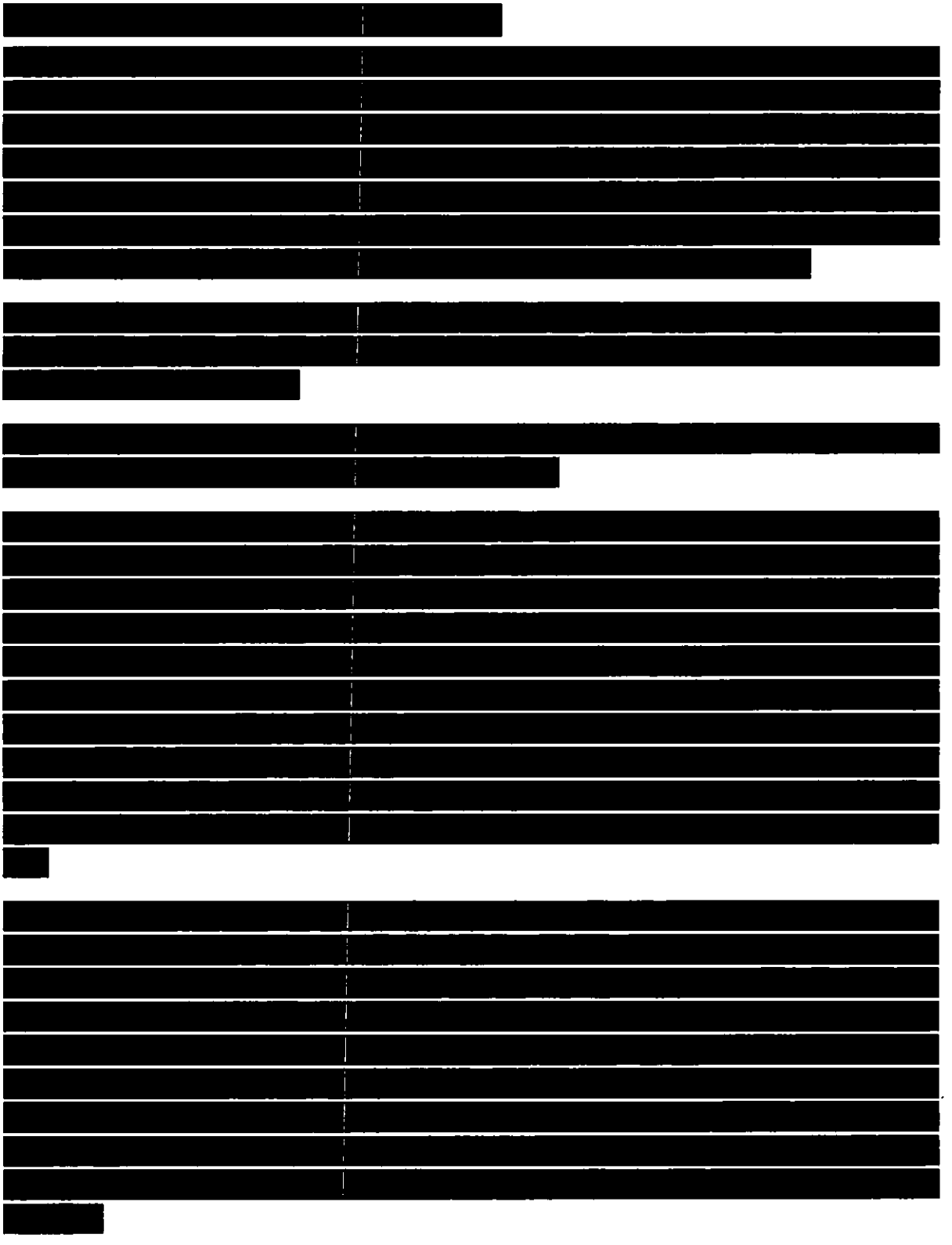

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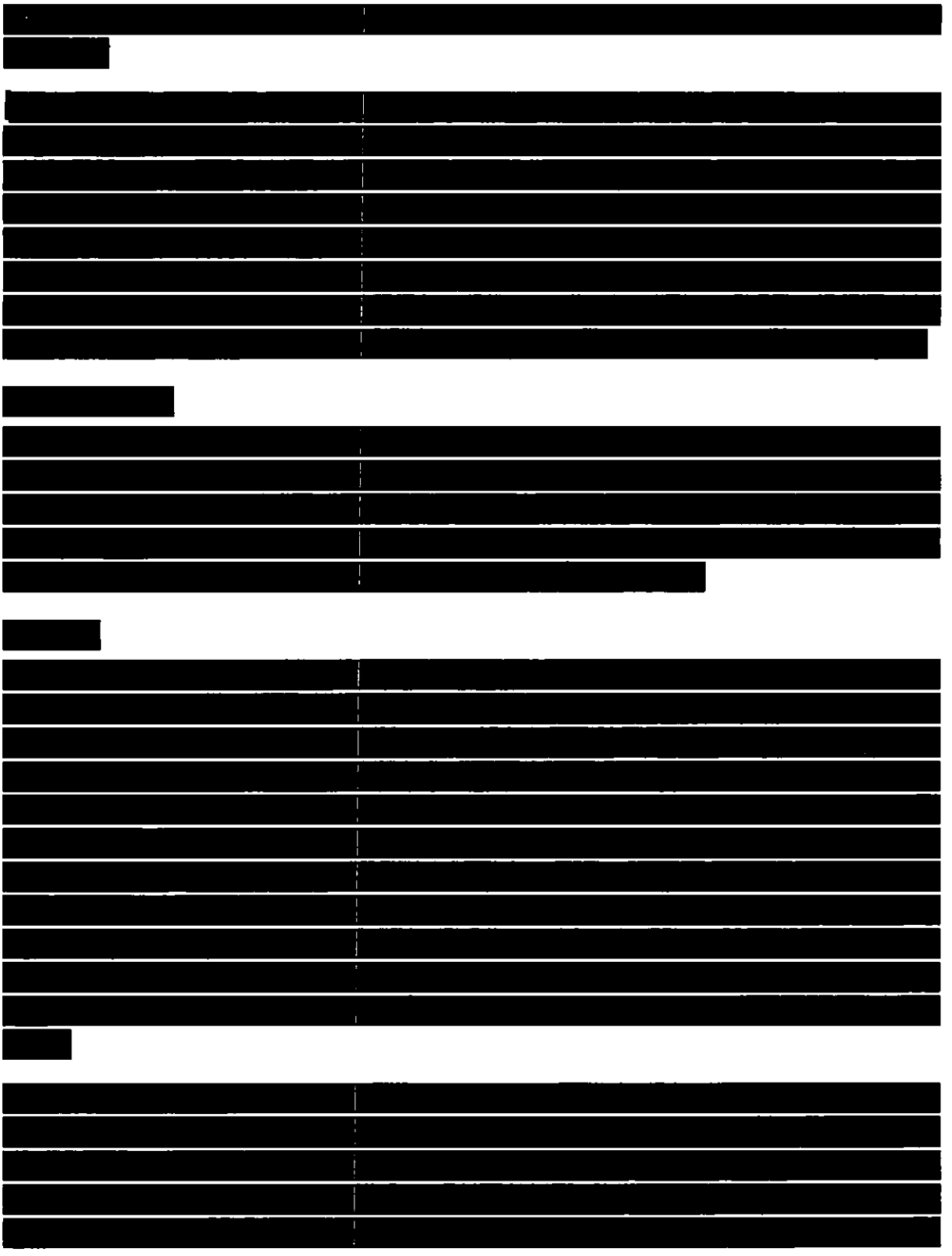

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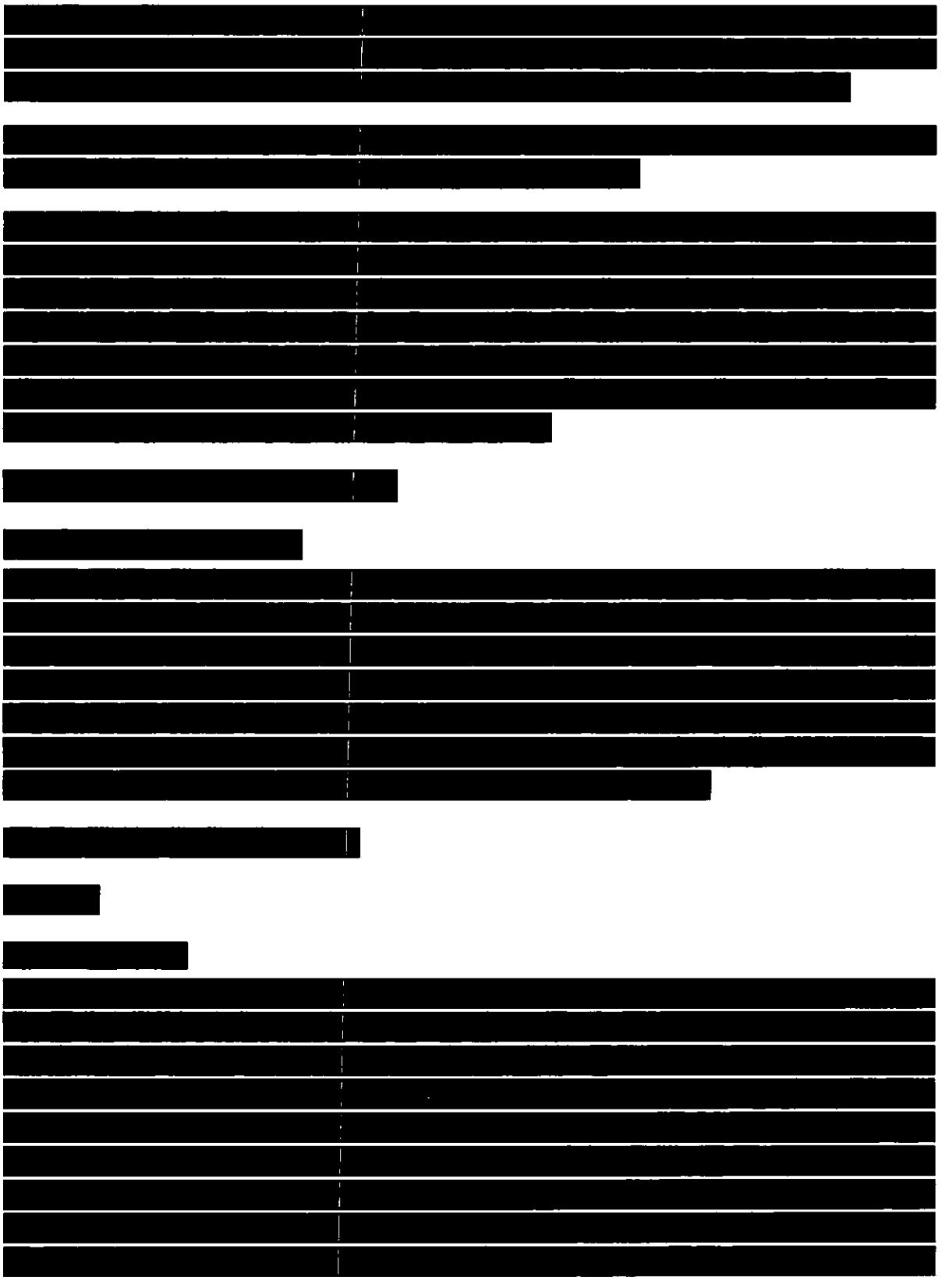

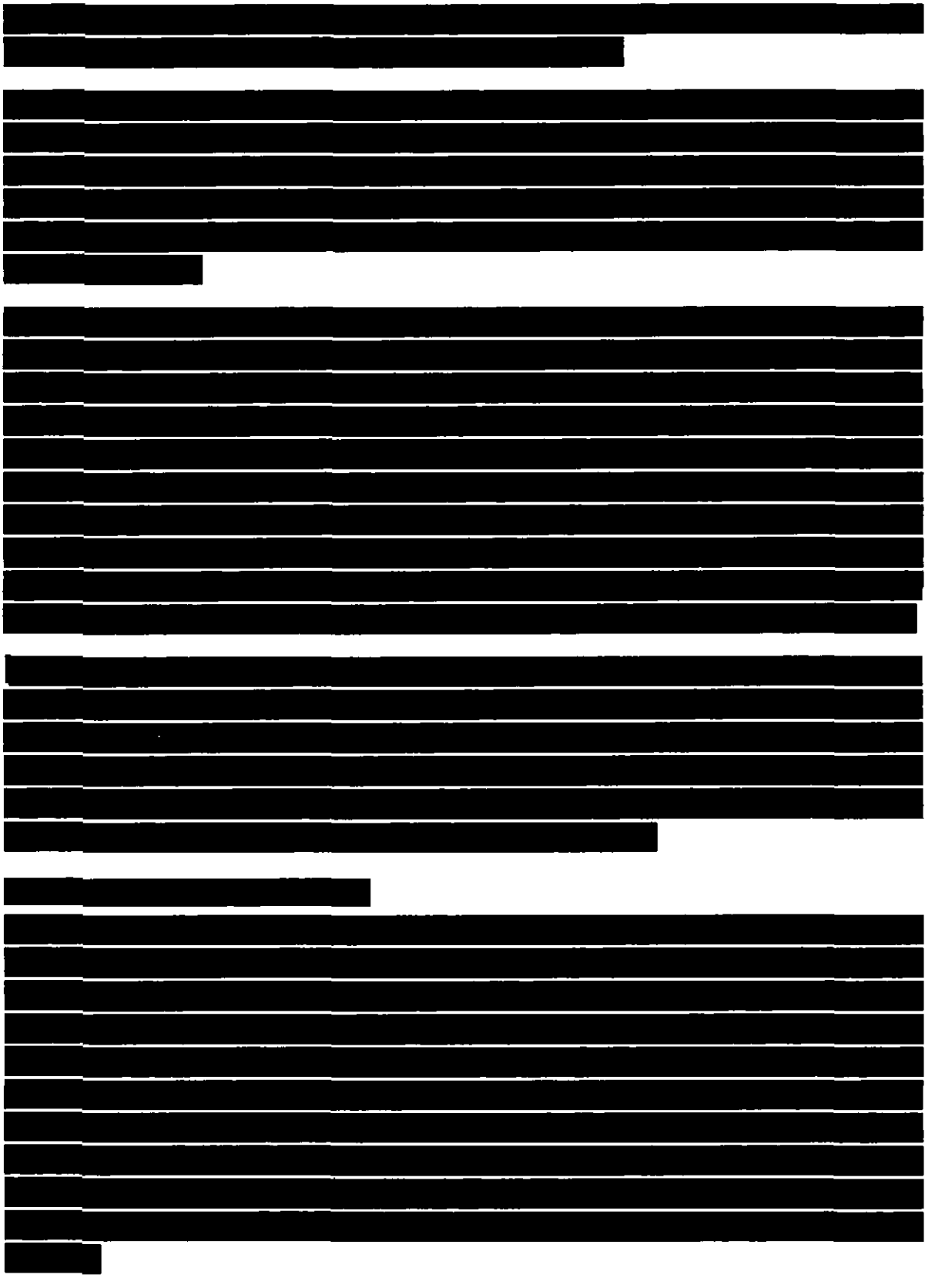

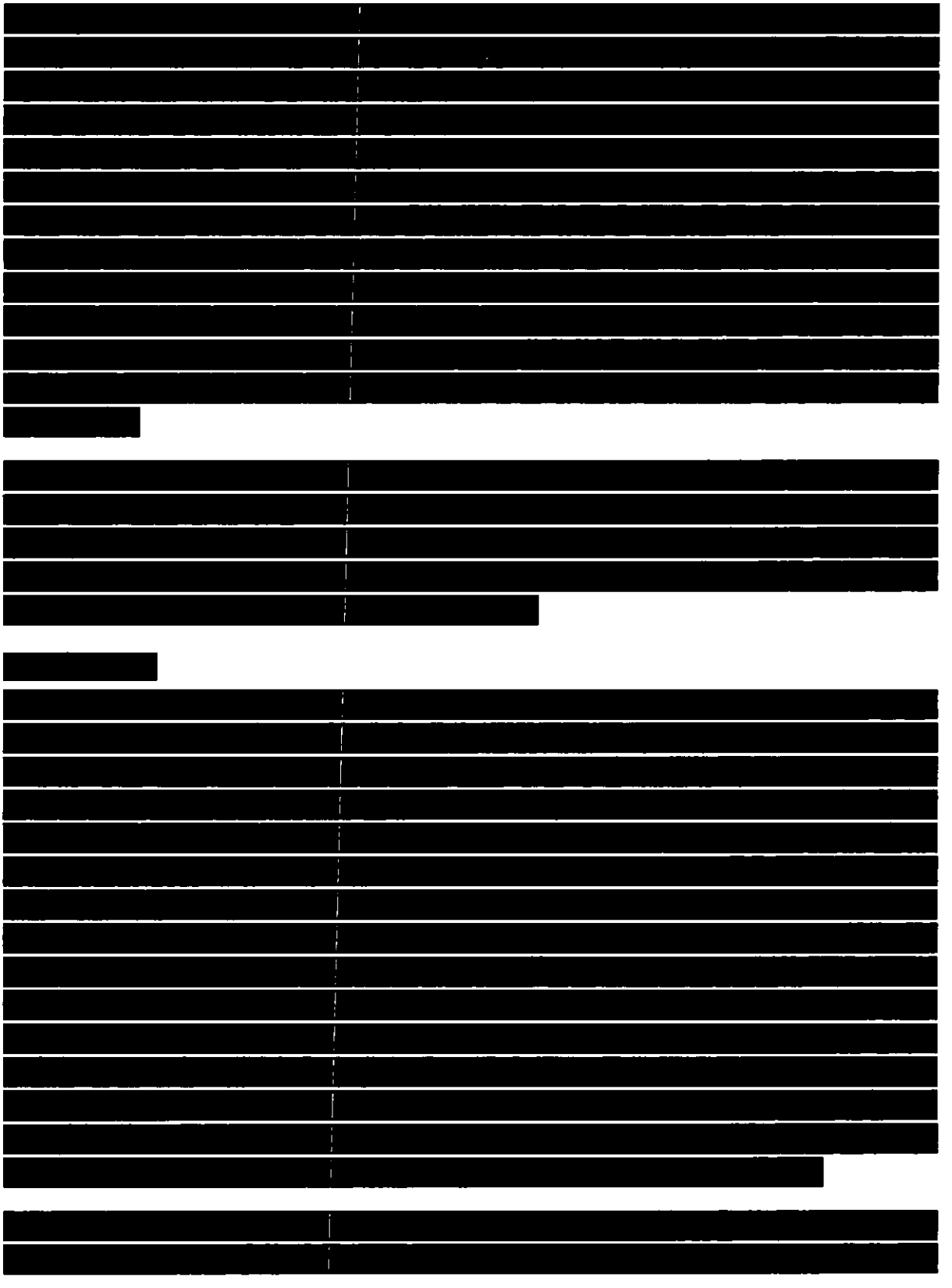

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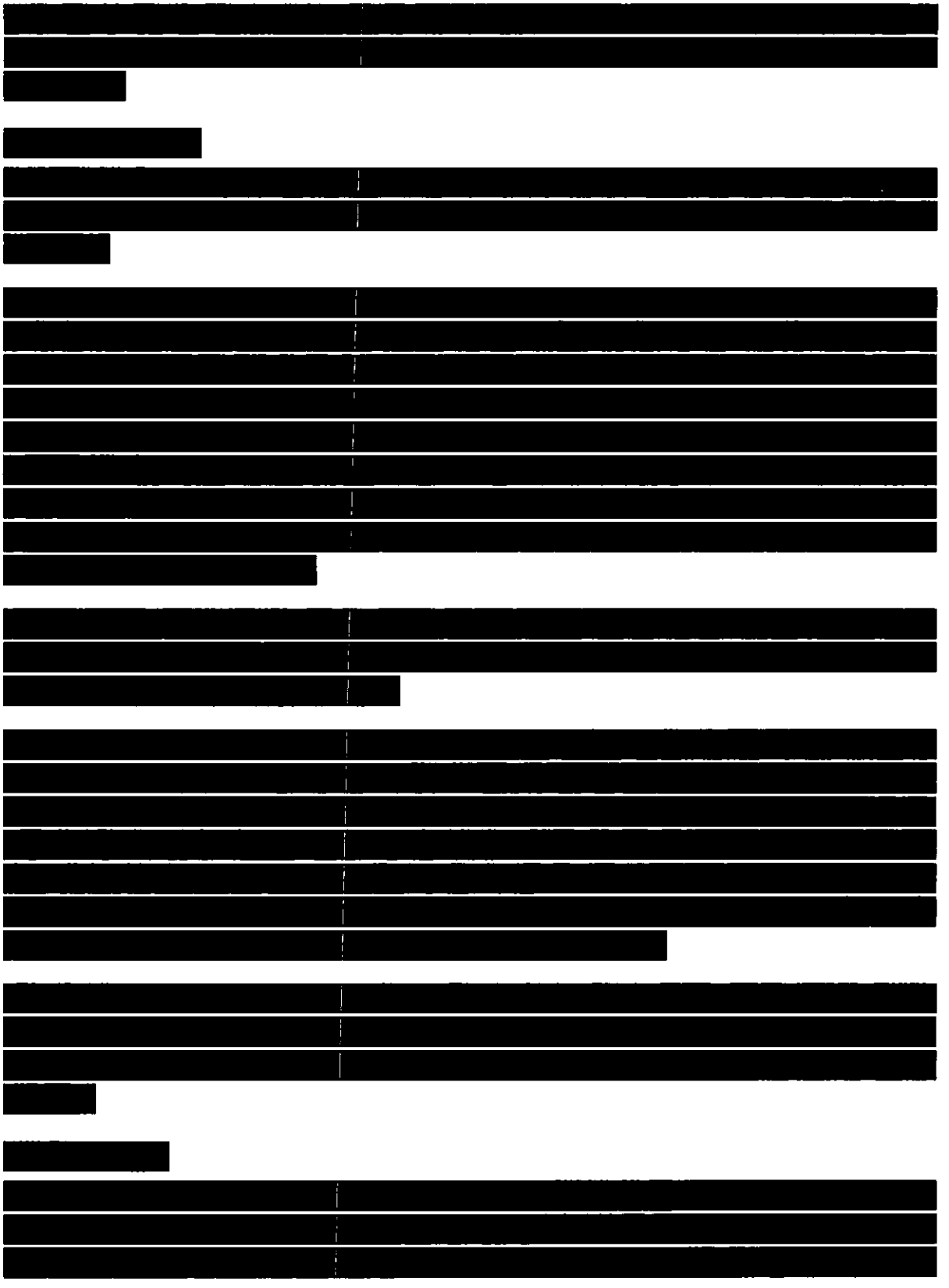

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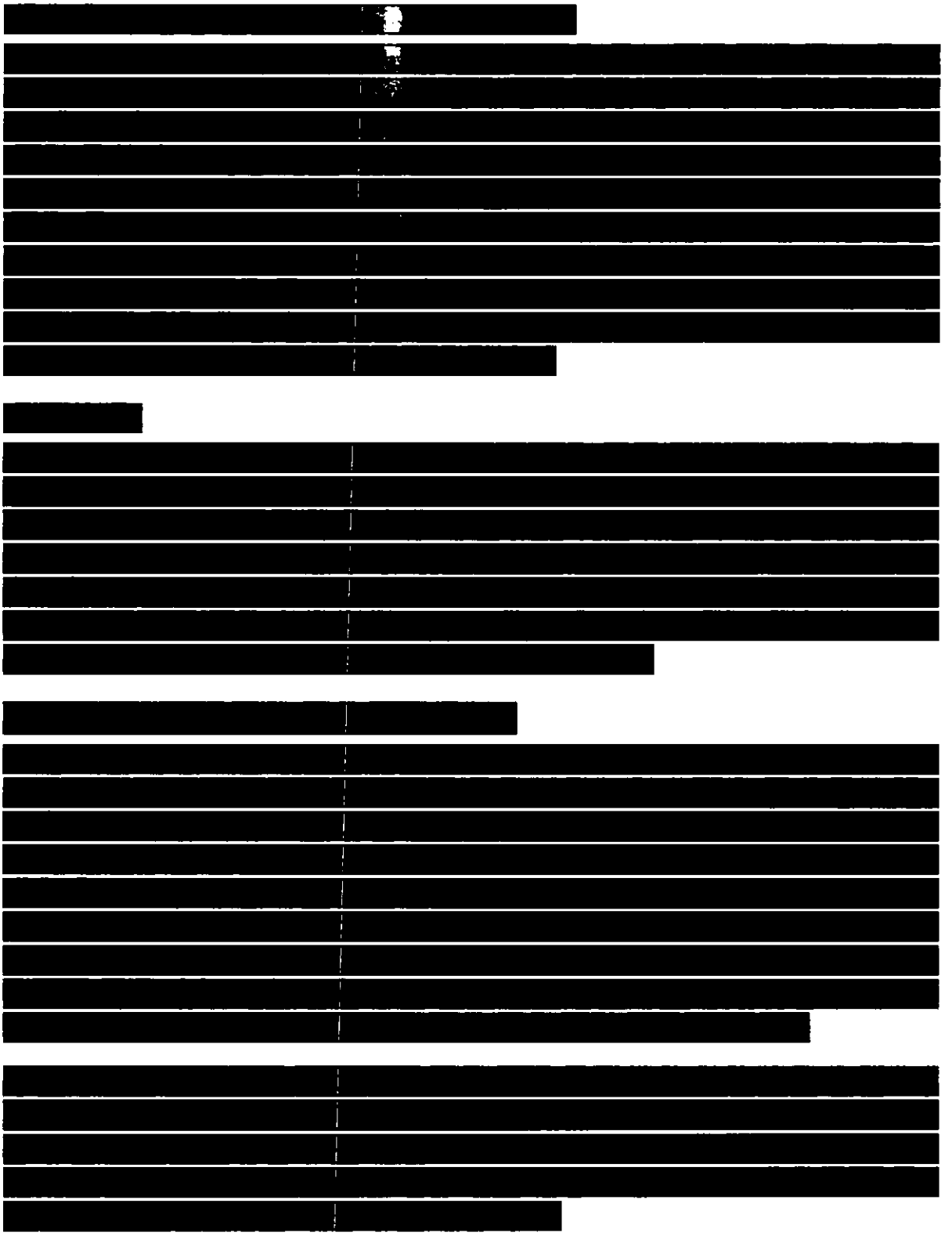

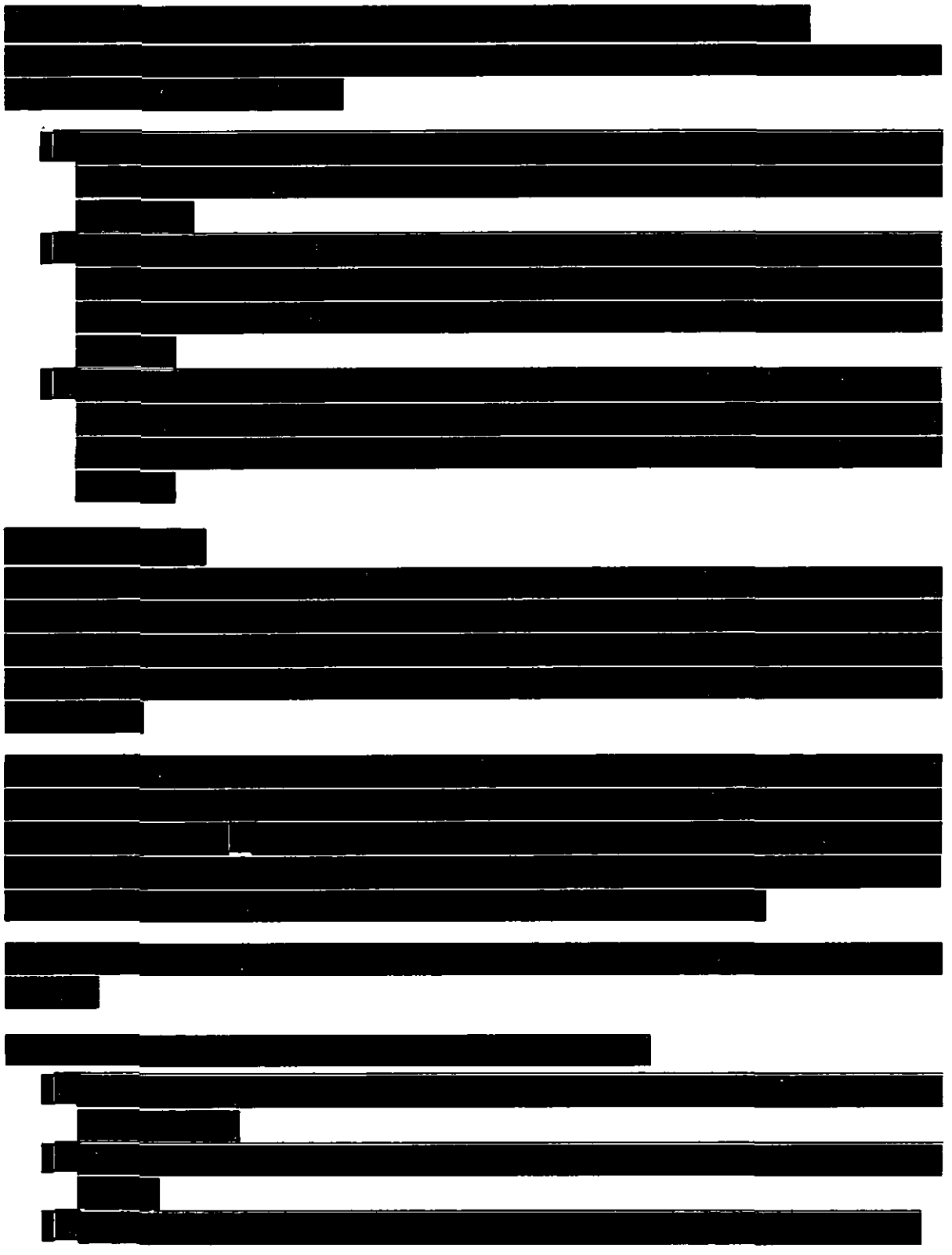

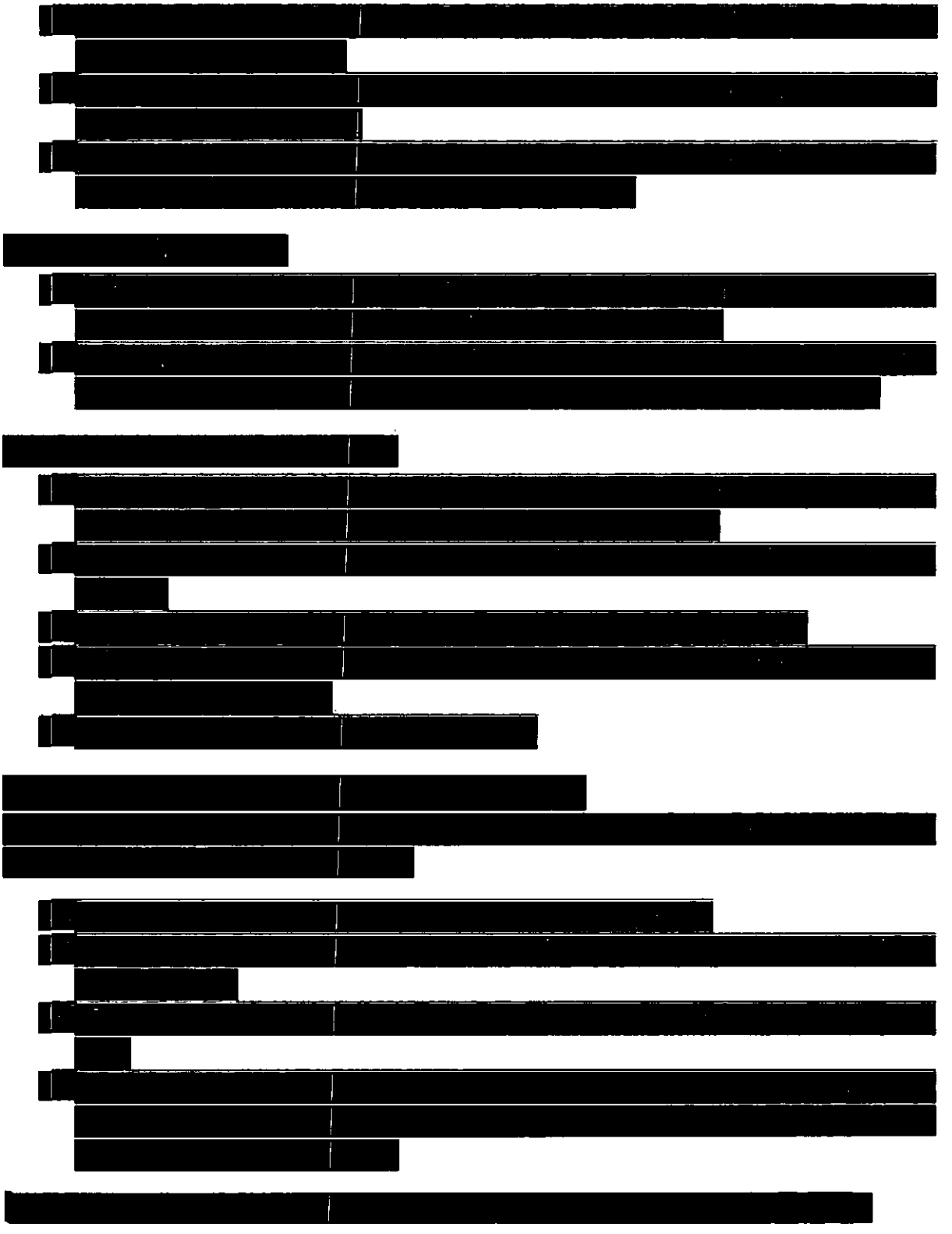

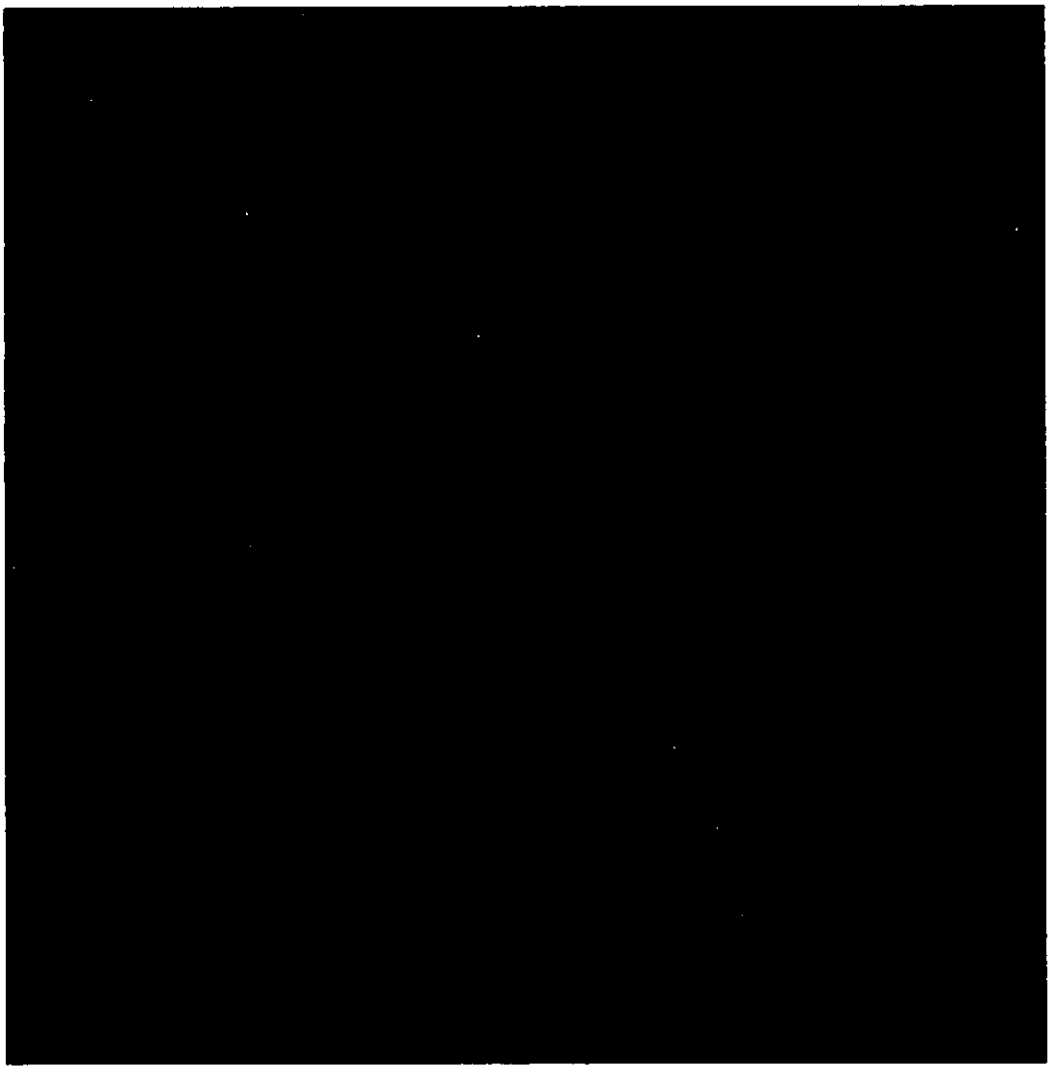

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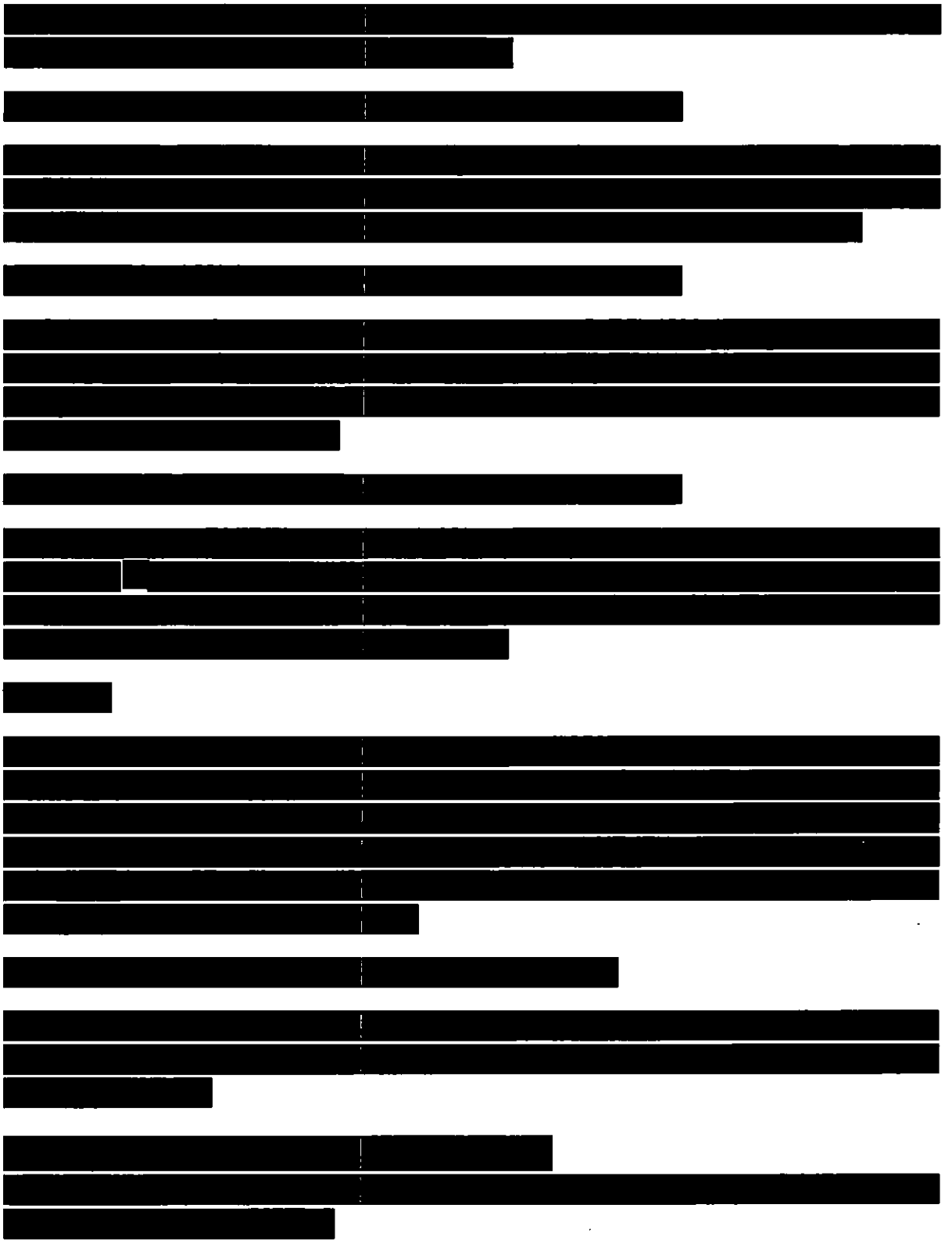

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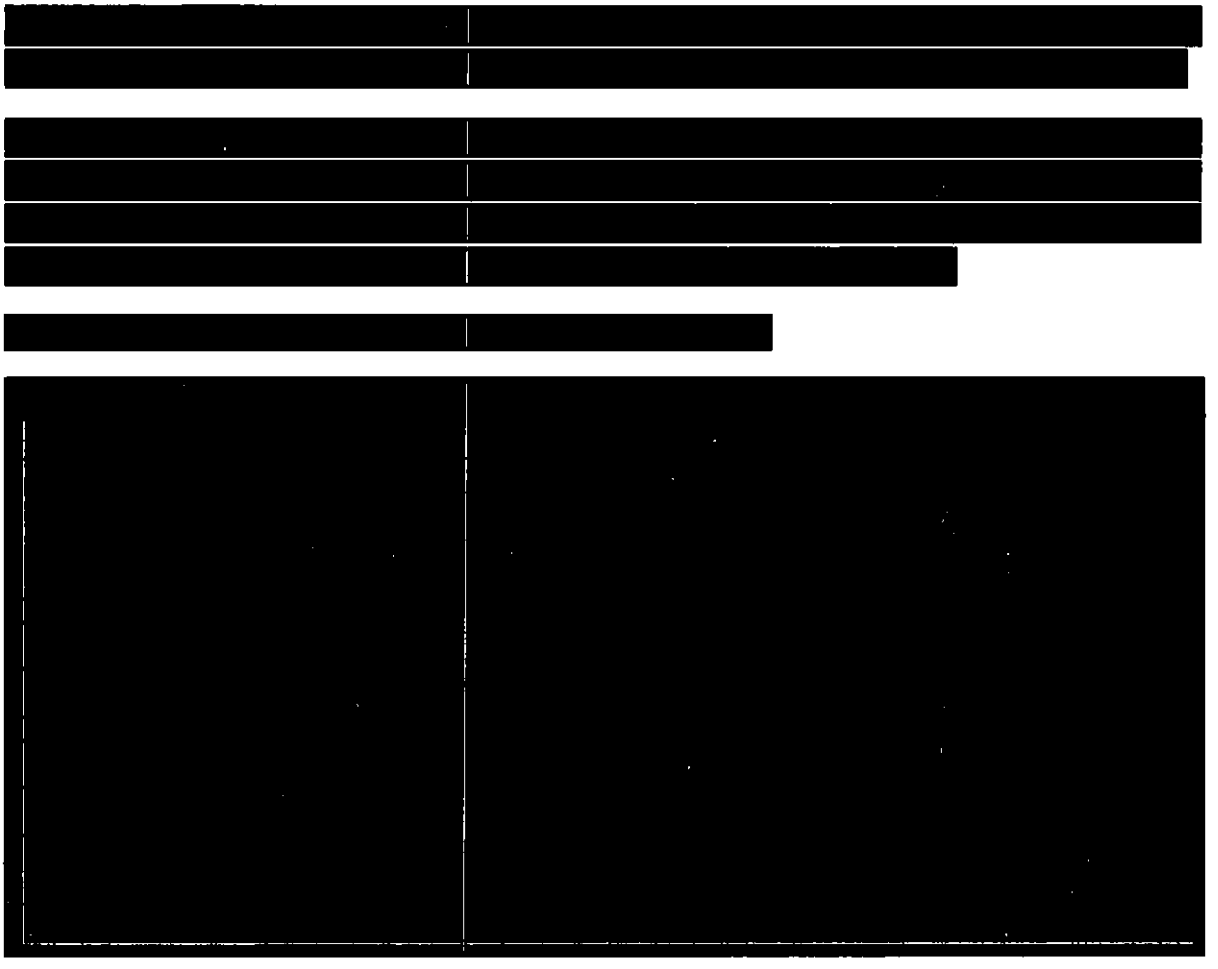

D. Analytical Assessment

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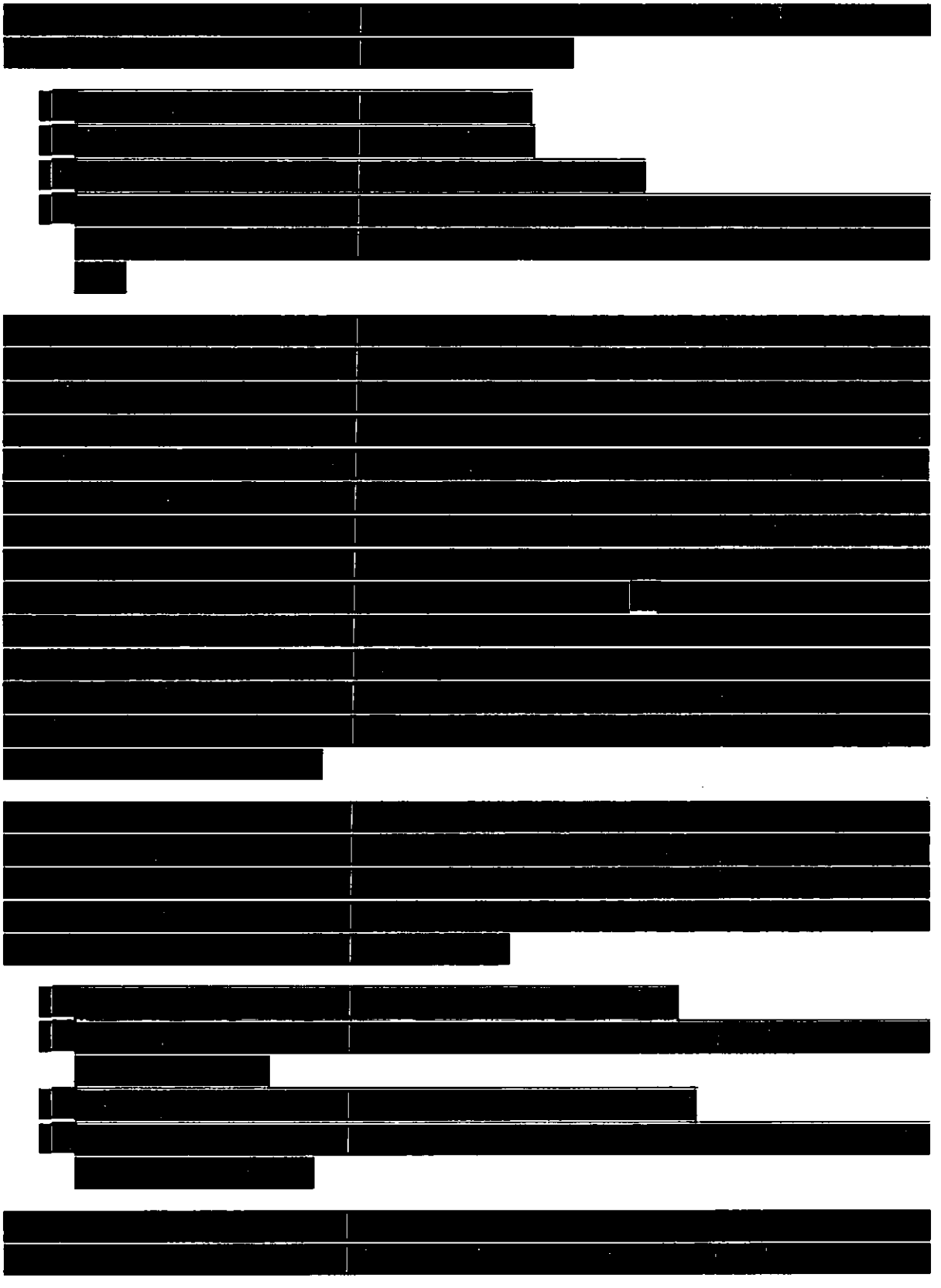

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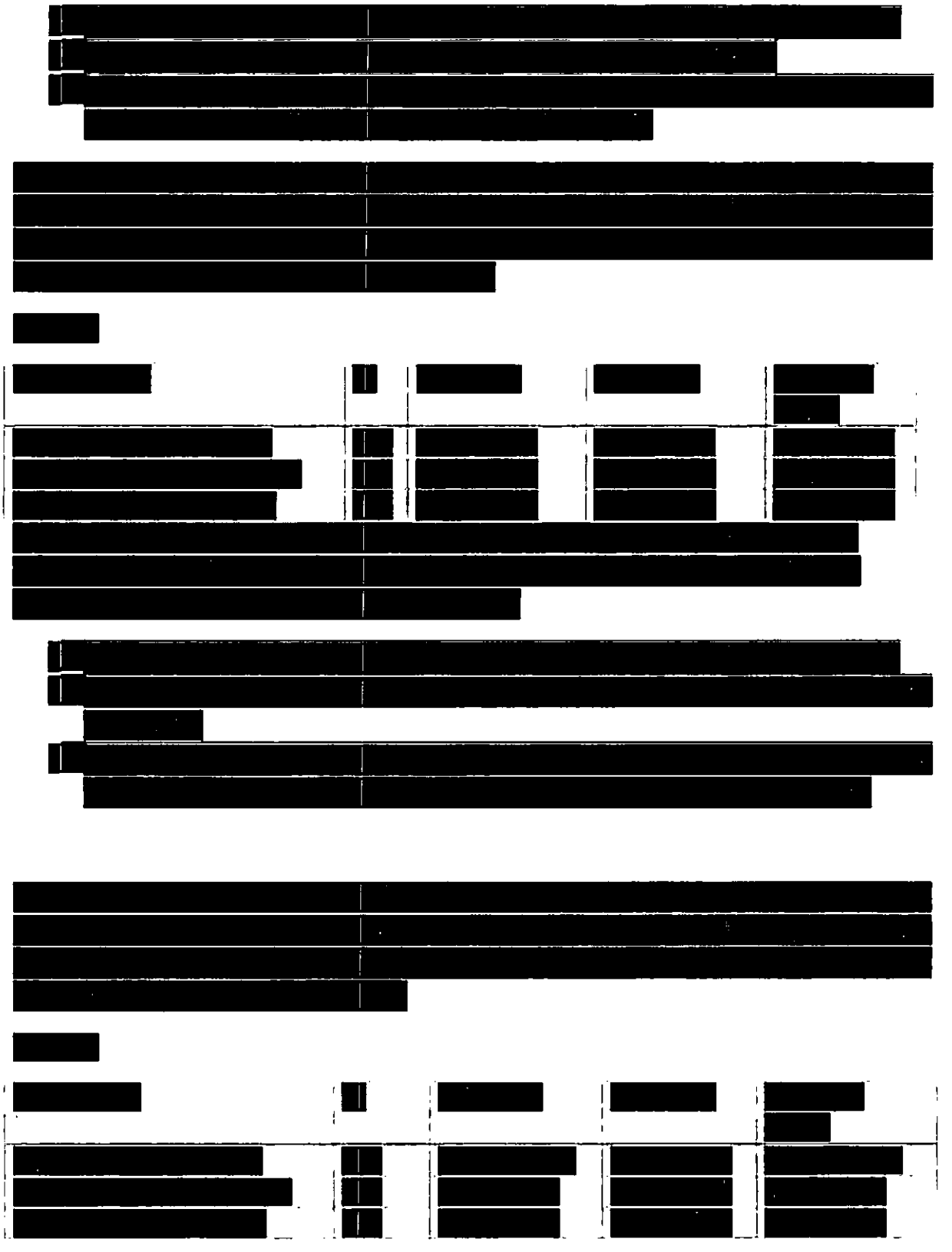

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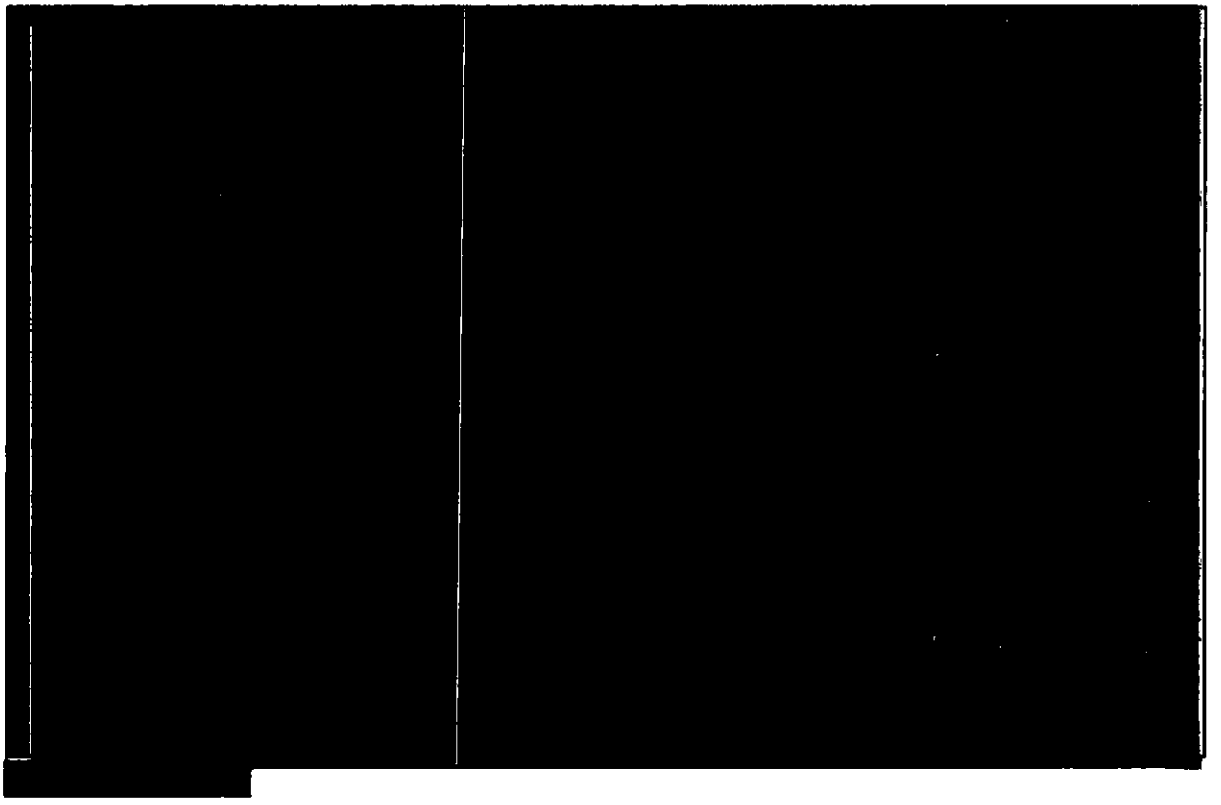

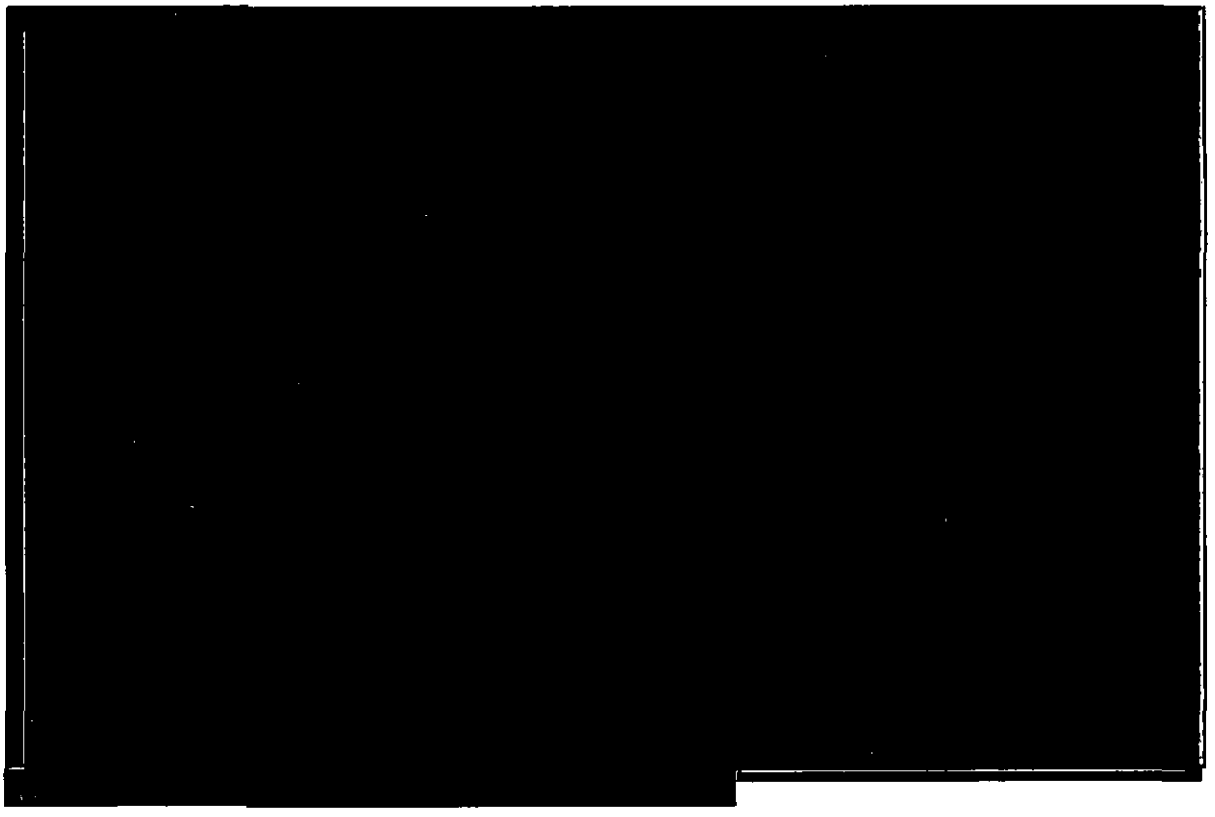

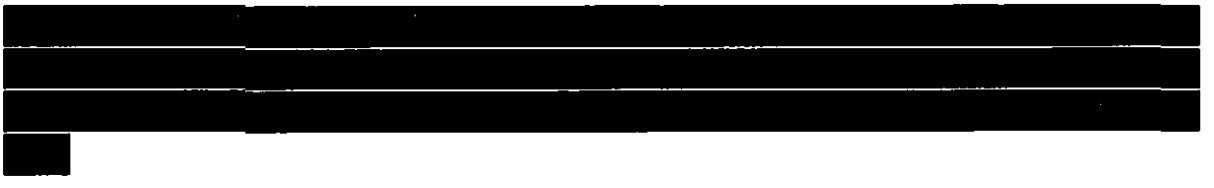

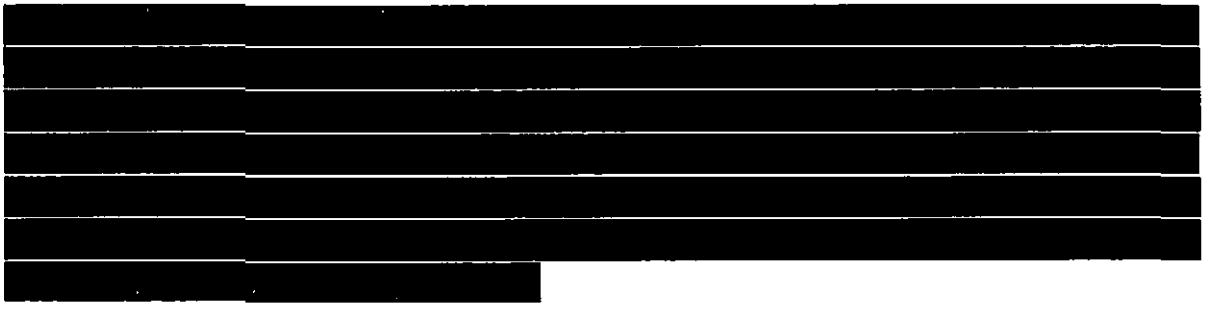

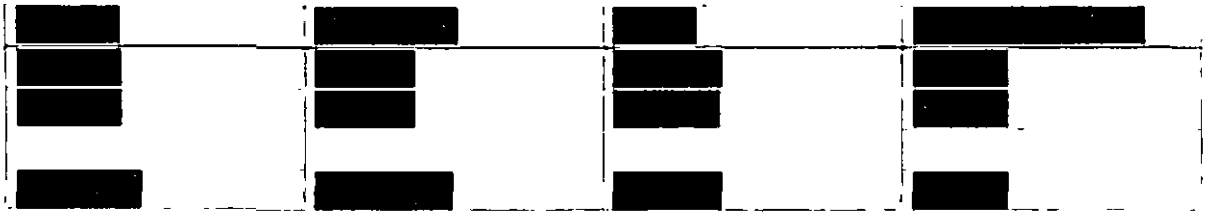

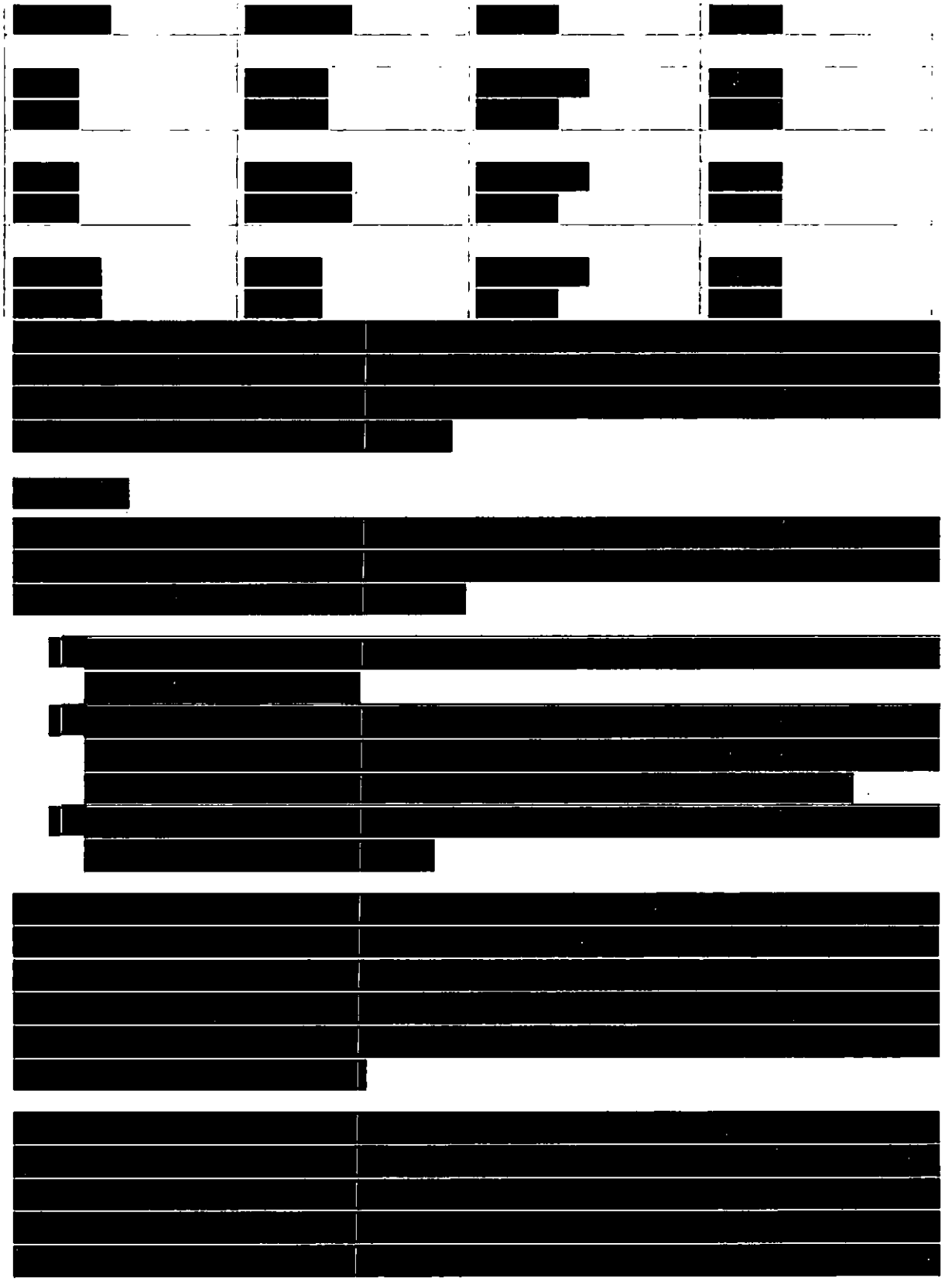

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E. Cost

E.1. Estimated Project Costs and Cash Flows

The overall project cost estimate and annual cash-flow developed by PPL EU and ATX East is summarized below in the format requested by PJM. The total project cost estimate is $118 million in 2017 dollars[1] and $138.5 million in nominal (in-service) dollars [redacted]

[1] The estimated 2017 cost excludes AFUDC and Escalation but includes estimated project contingency.

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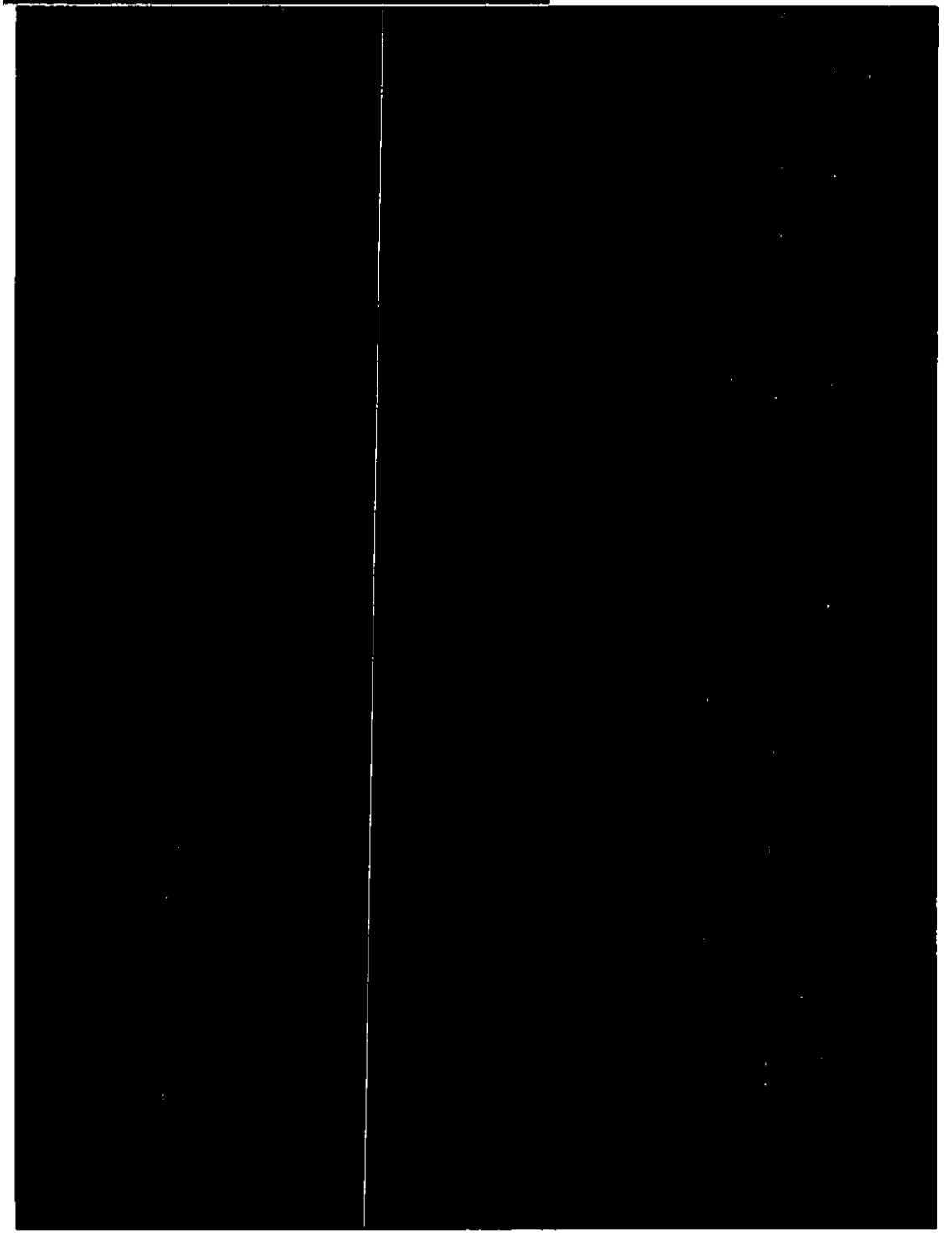

E.2. Proposed Capital Structure and Requested Return on Equity

[redacted]

E.3. Estimated AFUDC

[redacted]

[redacted]

[redacted]

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F. Project Schedule

A Level 1 project schedule is attached as Appendix I. [redacted]

[redacted]

The proposed project in-service date is May 31, 2022. [redacted]

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G. Operations/Maintenance

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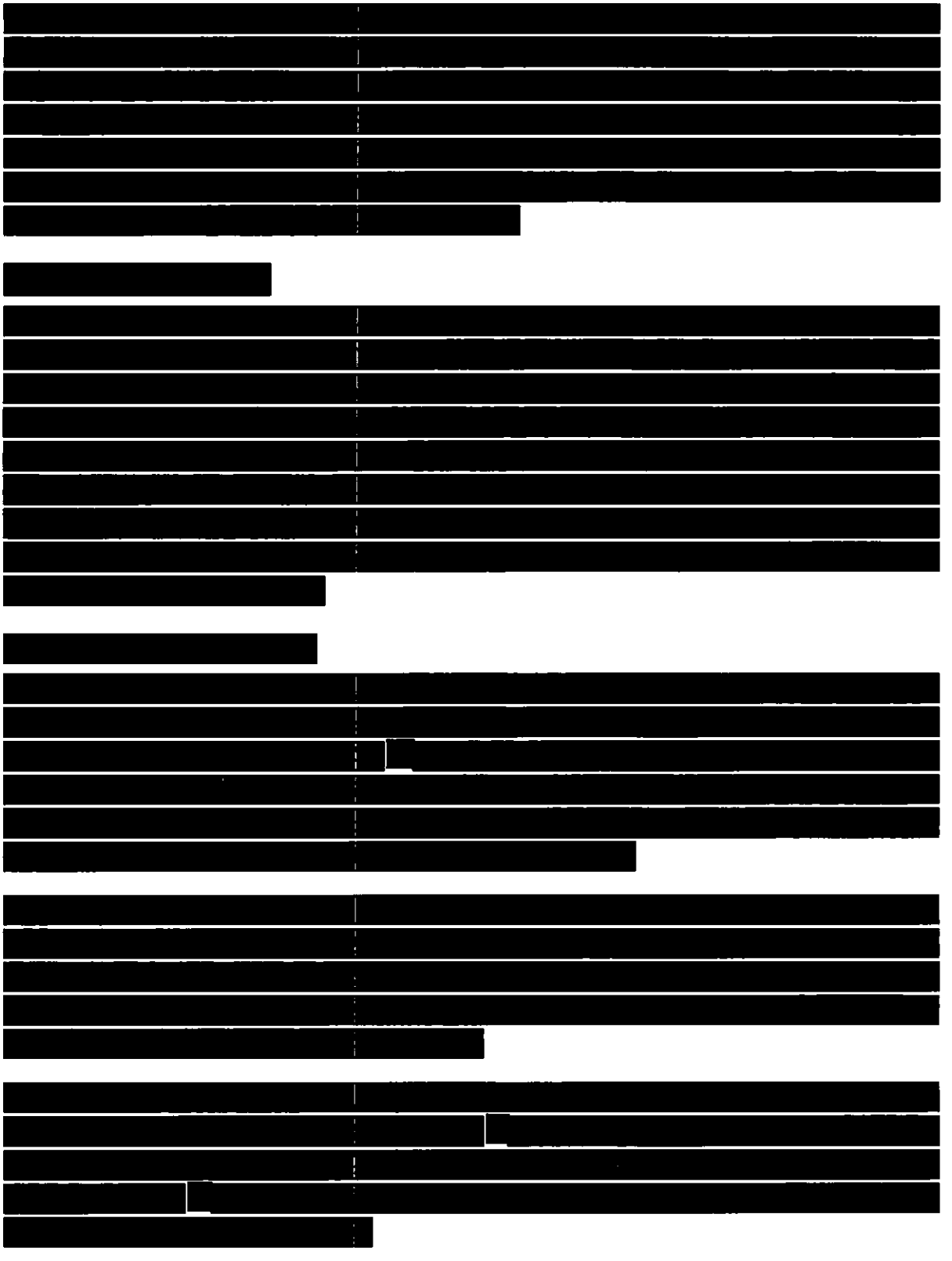

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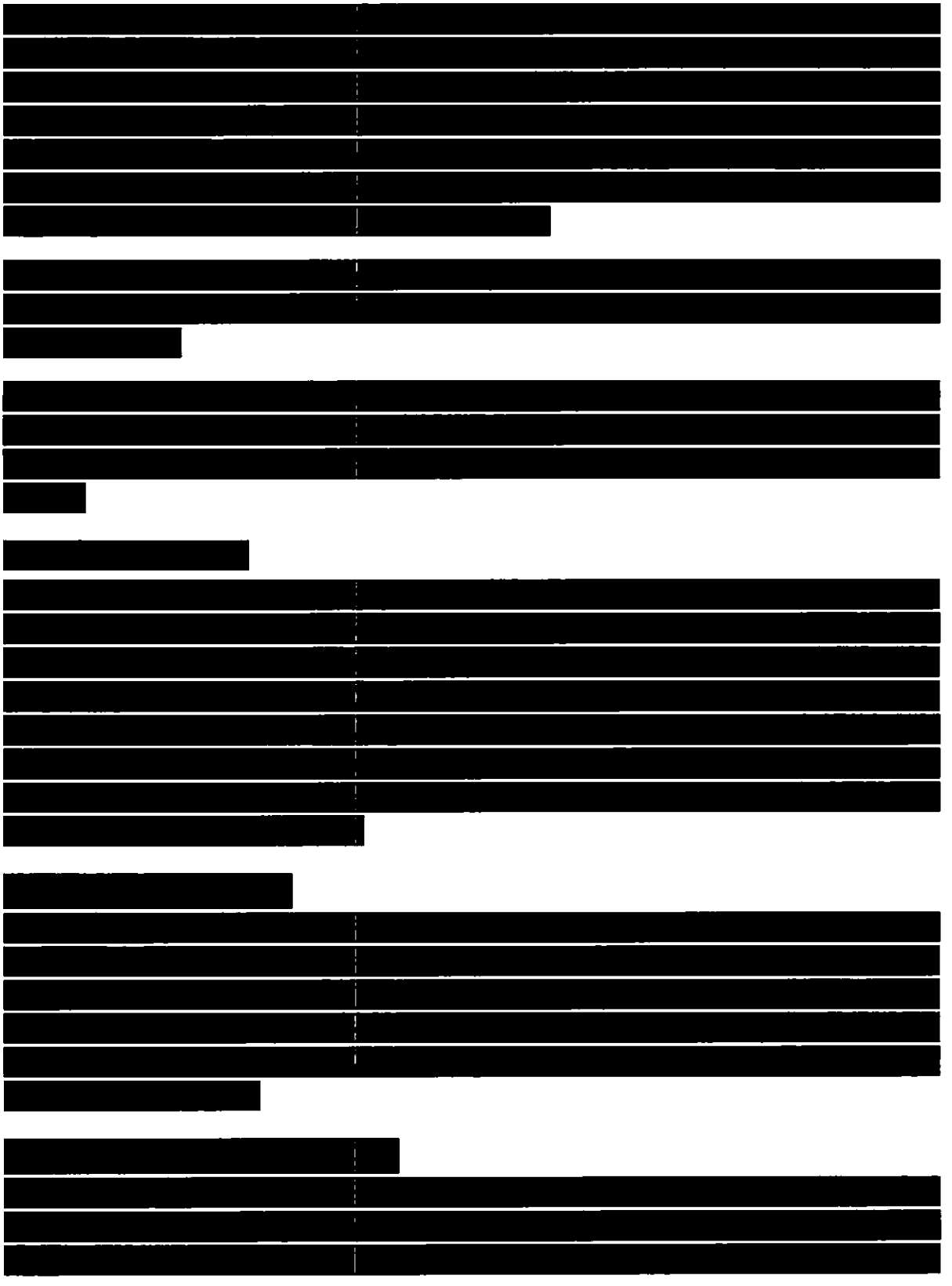

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TPA Exhibit No. 13

A-2017-2640195 et al.

2/23/19 NLS

2016/17 PJM RTEP Long Term Proposal Window

Conastone-Graceton-Bagley Congestion Relief – Project 2

Submitted by:

PPL Electric Utilities Corporation ("PPL EU") and

ATX East LLC

REDACTED Version for Public Release

PPL Electric Utilities

Ameren TRANSMISSION

A. Executive Summary

A.1. Introduction

[redacted]

[redacted]

A.2. Name of proposing entity

This is a joint proposal submitted by the following Proposing Entities:

PPL Electric Utilities Corporation ("PPL EU")
2 North 9th Street
Allentown, PA 18101

ATX East, LLC (ATX East)
1901 Chouteau Avenue, MC 635
St. Louis, MO 63166-6149

PPL EU and ATX East worked with Stantec Engineering, Contract Land Staff (CLS) and Jingoli Power to form an integrated team of subject matter experts ("Project Team") to develop this proposal for PJM's consideration.

A.3. Proposed Congestion Driver(s) Being Addressed

PPL EU and ATX East propose a project to:

- Completely resolve the congestion on ME-2; the Graceton to Bagley 230kV line;
- Resolves over 99.99% of the congestion on ME-1; the Graceton to Conastone 230kV line;
- Partially resolve the congestion on the Conastone – Peach Bottom 500 kV line;
- Partially resolve the congestion on the 5004/5005 Interface for the loss of the Hoptacong – Lackawanna 500 kV line and
- Partially resolve the congestion on the AP South Interface for the loss of the Bedington - Black Oak 500 kV line.

These flowgates were identified in the problem statement of the 2016/17 RTEP Long Term Proposal Window. Chart A.3.1, Flowgate Congestion Totals below shows the congestion for the base case ("BC") and project case ("PC") on the Graceton – Bagley 230kV line, Conastone - Graceton 230kV line, Conastone – Peach Bottom 500 kV line, 5004/5005 Interface for the loss of Hoptacong – Lackawanna 500 kV line, and the AP South Interface for the loss of Beddington - Black Oak 500 kV line.

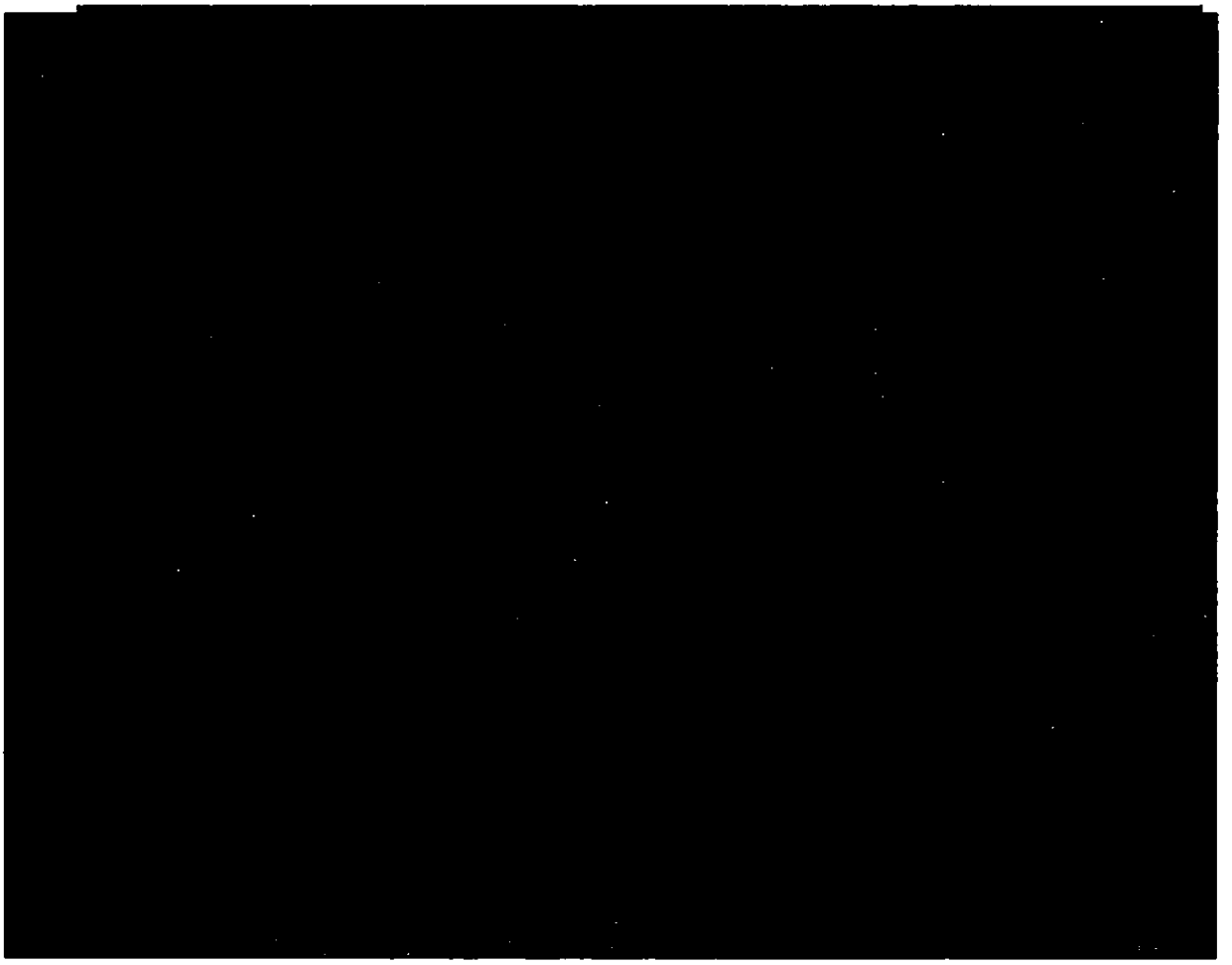

Chart A.3.1 – PJM Congestion Totals

A.4. Additional Violations Caused/Not Addressed

The proposed project does not cause any reliability violations.

A.5. PJM Zones or Neighboring Balancing Authority

The proposed project is located within the Baltimore Gas and Electric ("BG&E") zone in MD and the Philadelphia Electric Company ("PECO") zone in PA. The vast majority of the project is located within the BGE zone in Maryland.

A.6. Project Responsibility

The Proposing Entities (PPL EU and ATX East) intend to jointly construct, operate and maintain the project. If PJM awards the project to PPL EU and ATX East, the ownership of the Project will be divided as follows:

[redacted]

As further discussed in Section G of this proposal, each proposing entity will maintain legal responsibility for the operation and maintenance of their transmission facilities. However, ATX East will contract with PPL EU to coordinate and perform all operations and maintenance activities for all greenfield transmission components to be constructed on the proposed project on behalf of ATX East.

A.7. Description of Proposed Solution

PPL EU and ATX East propose a project to completely resolve the congestion on the Graceton to Bagley 230kV kV line as identified in the problem statement of the 2016/17 PJM RTEP Long Term Proposal Window. The Proposing Entities propose to construct the following greenfield components and propose that the following brownfield components be constructed by the incumbents (Baltimore Gas & Electric and Philadelphia Electric Company). Reference Figure A.7 below for the proposed location of each component:

- **Component 1 (Greenfield):** Build a new 230/115 kV substation called Baldwin. The substation will have two 230/115 kV transformers. The transformers will connect to the 115 kV main busses of a 4 position breaker and a half 115 bus arrangement. The 115 kV breaker and a half arrangement will serve to loop in both Windy Edge – Five Fork 115 kV lines. The 230/115 kV transformers will be directly tied into the Baldwin – Raphael Road 230 kV lines.
- **Component 2 (Greenfield; purple line):** A new double circuit 230 kV line from Peach Bottom to Otter Point.
- **Component 3 (Greenfield; yellow line):** A new double circuit 230 kV line from Raphael Road to Baldwin.
- **Component 4 (Brownfield; red line):** Rebuild the sections of 115 kV lines 110512 and 110511 between Windy Edge and Baldwin

[redacted]

- **Component 5 (Brownfield; red line):** Reconductor the sections of existing double circuit 230 kV line (2315 and 2337) between Raphael Road and Northeast.
- **Component 6 (Brownfield; orange line):** Reconductor the sections of existing double circuit 230 kV line (2360 and 2361) between Raphael Road and Otter Point.
- **Component 7 (Brownfield):** Add two new positions at the 230 kV Otter Point substation.
- **Component 8 (Brownfield):** Add two new positions at the 230 kV Raphael Road Substation.
- **Component 9 (Brownfield):** Add two new positions at the 230 kV Peach Bottom substation.

A.8. Description of Project Consideration

This project should be considered by PJM only as a whole.

A.9. Overview of Cost and Cost Commitment

PPL EU and ATX East have endeavored to develop a cost-effective solution that resolves the congestion drivers on the Conastone-Graceton-Bagley 230 kV line, while providing additional value to the ultimate customers using the transmission system. The parties have estimated the cost to develop, design, construct and commission the proposed transmission project at approximately $178.3 million nominal (in-service) dollars. This includes the estimated cost of all the proposed upgrades by the incumbent TO(s).

[redacted]

A.10. Additional Benefits

In developing the proposed project, PPL EU and ATX East recognized that a project that simply upgrades or parallels the existing, congested transmission lines is not adequate for the following reasons:

- It will push congestion to the next line segments that are electrically downstream, which PJM is not monitoring in PROMOD; and
- The affected lines are presently being upgraded by the incumbent (anticipated in-service date of June 1, 2017) and any new project that involves a further additional rebuild or reconductor of these lines will result in the current upgrade investment becoming a stranded asset for the incumbent utility;
- A solution that parallels the existing line will require new right-of-way to be acquired by the incumbent utility and will create

PPL EU and ATX East **strongly encourage PJM to perform an analysis that monitors the additional flowgates which are identified in Section D of this proposal.** By including these additional flowgates in the analysis, the additional congestion created in the 230 kV and 115 kV systems will become apparent. In contrast, this analysis will highlight the more comprehensive solution proposed by PPL EU and ATX East not only mitigates the current congestion drivers but also will reduce any future congestion in the 230 kV or 115 kV voltage systems and creates a much more robust solution.

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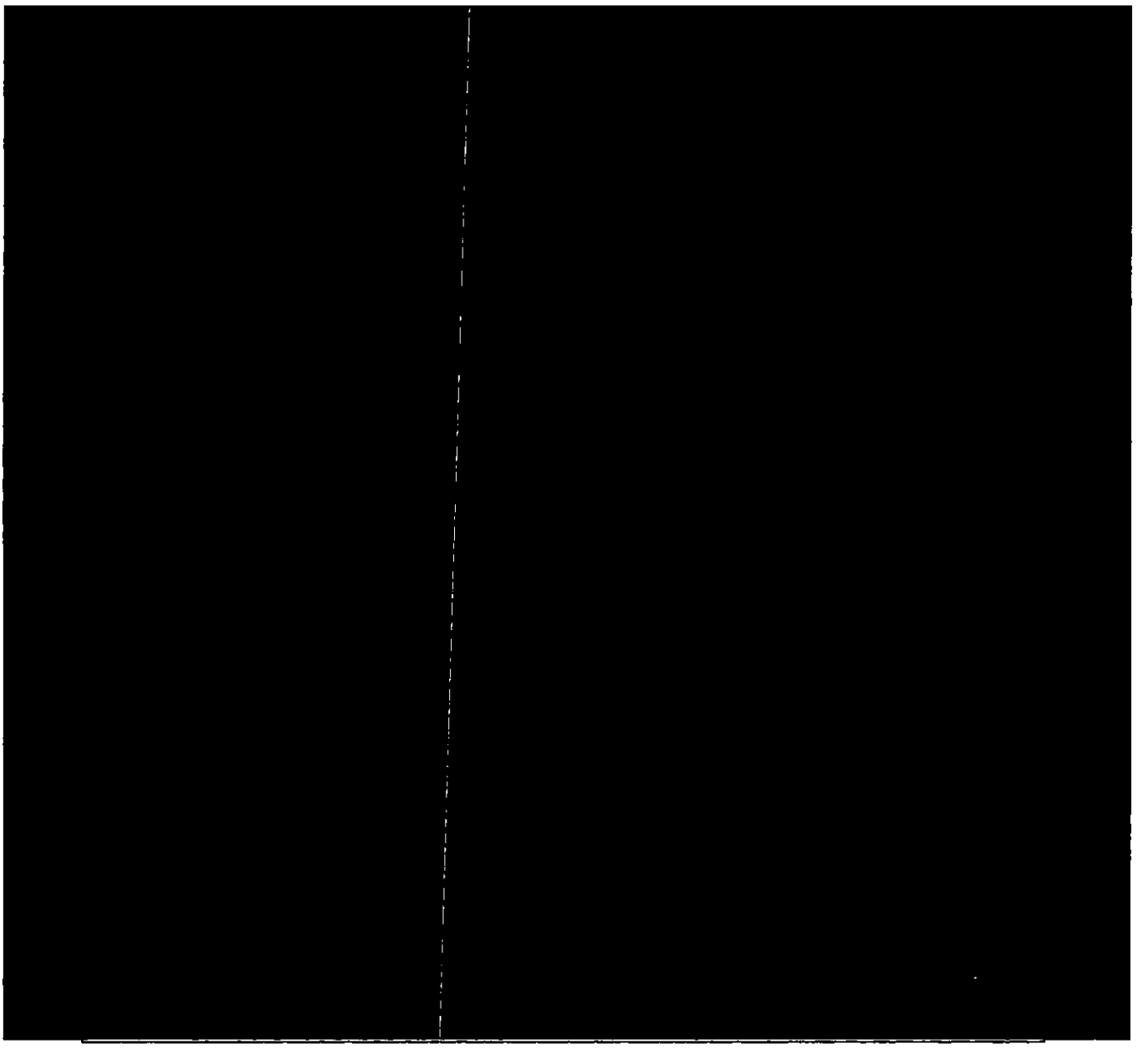

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B. Company Evaluation Information

This section is required to be completed by those proposing entities who are seeking Designated Entity status.

B.1. Name and Address of Entity

PPL Electric Utilities Corporation ("PPL EU")
2 North 9th Street
Allentown, PA 18101

Primary Contact:	Stephanie Raymond - Vice President
Telephone:	610-774-2146
E-Mail:	SRaymond@pplweb.com
Secondary Contact:	Joshua Trott
Telephone:	610-774-4506
E-Mail:	JTrott@pplweb.com

ATX East, LLC (ATX East)
1901 Chouteau Avenue, MC 635
St. Louis, MO 63166-6149

Primary Contact:	Sean Black – Director, Transmission Business Development
Telephone:	314-554-3844
E-Mail:	sblack2@ameren.com
Secondary Contact:	Kathy Thole – Manager, Transmission SBC and Development Support
Telephone:	314-554-2947
E-Mail:	KThole@ameren.com

B.2. Pre-qualification submittal identification number

PPL EU (13-12):

PPL EU has been pre-qualified as a Designated Entity for transmission projects in PJM under section 1.5.8 (a) of the PJM Amended and Restated Operating Agreement. The pre-qualification information is contained in the document originally submitted to PJM dated December 22, 2016 entitled "PJM Developer Qualification Application". This document is on file with PJM and is posted on PJM's website, with a PJM pre-qualification ID of 13-12. The latest update of this document was submitted to PJM on December 22, 2016. PJM confirmed the pre-qualified status in a letter dated January 11, 2017.

ATX East (14-01):

Ameren Corporation and its Affiliate ATX East have been pre-qualified as a Designated Entity for transmission projects in PJM under section 1.5.8 (a) of the PJM Amended and Restated Operating Agreement. The pre-qualification information is contained in the document originally submitted to PJM dated March 5, 2014 entitled "Designated Entity Pre-Qualification Filing by Ameren". This document is on file with PJM and is posted on PJM's website, with a PJM pre-qualification ID of 14-01. The latest update of this document was submitted to PJM in September, 2016. PJM confirmed the pre-qualified status in a letter dated October 27, 2016.

B.3. Additional Company Information

B.3.a. PPL EU

Refer to PPL EU Qualified Transmission Developer Application. A copy of PPL financial statements can be accessed through the following link: PPL 2016 10K

B.3.b. ATX East

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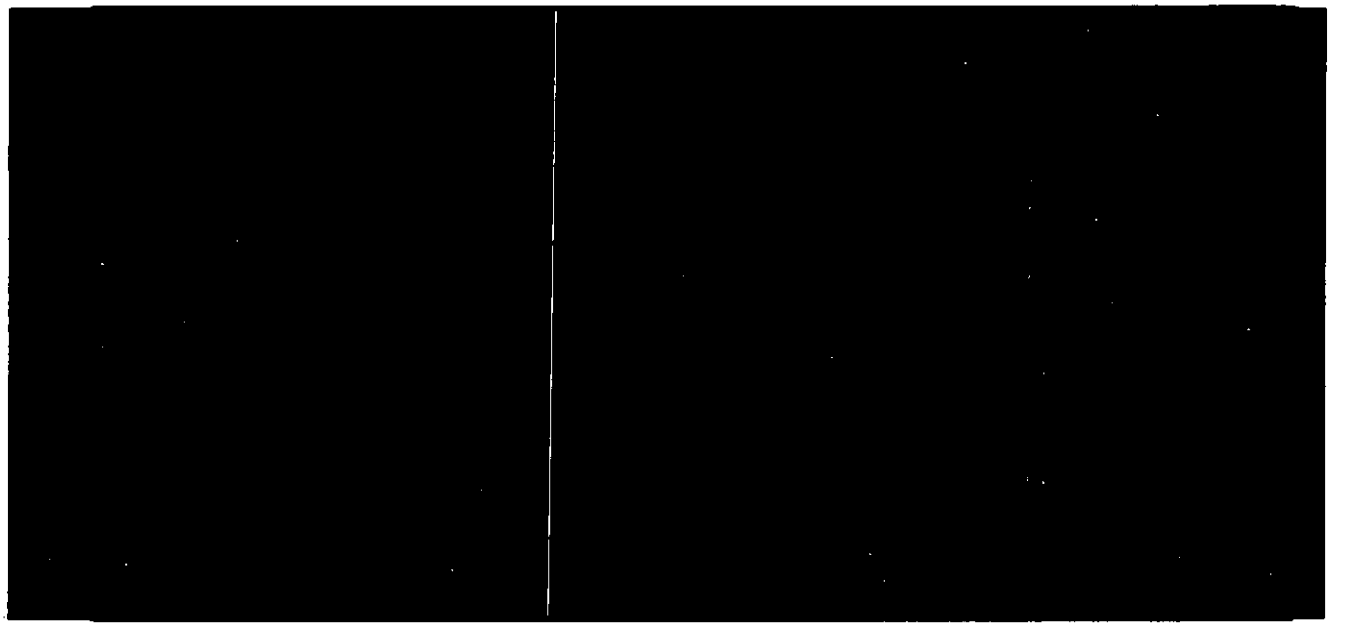

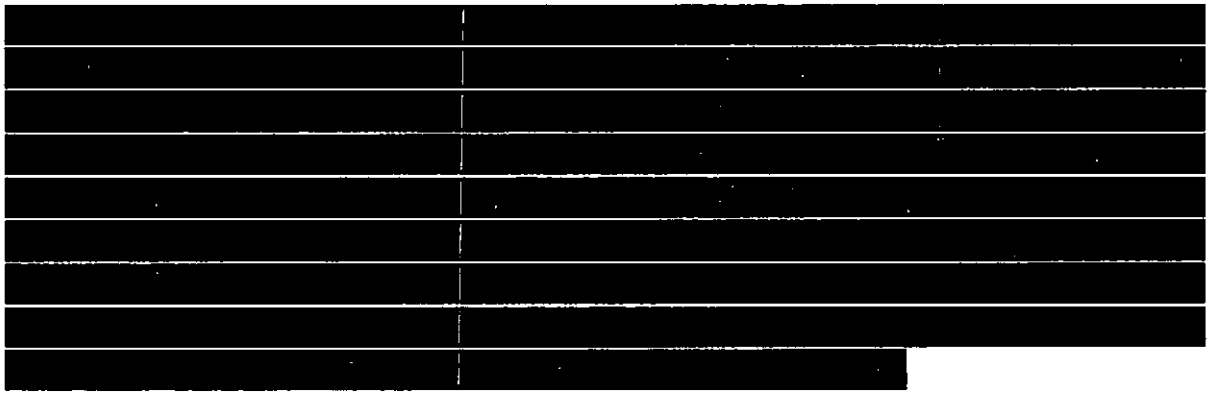

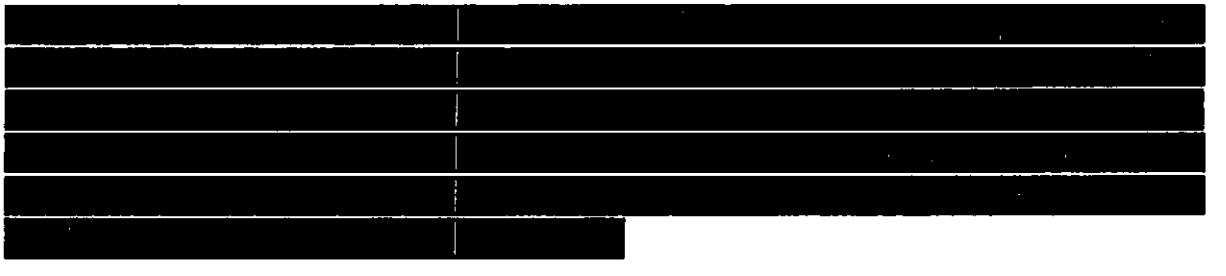

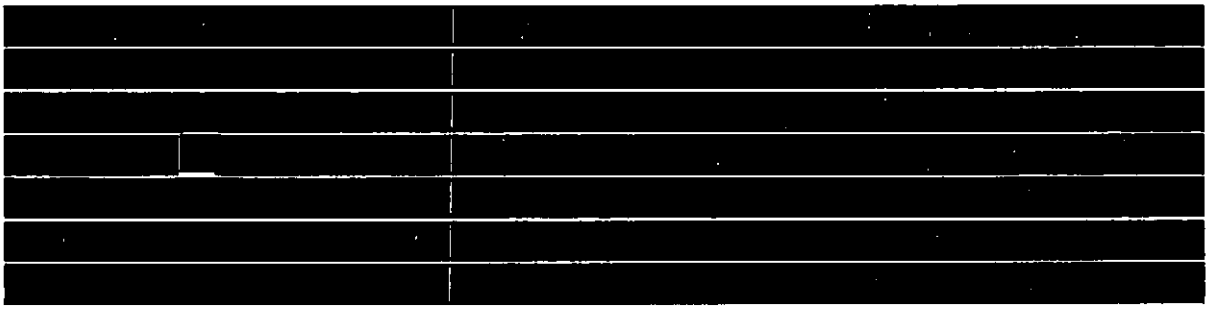

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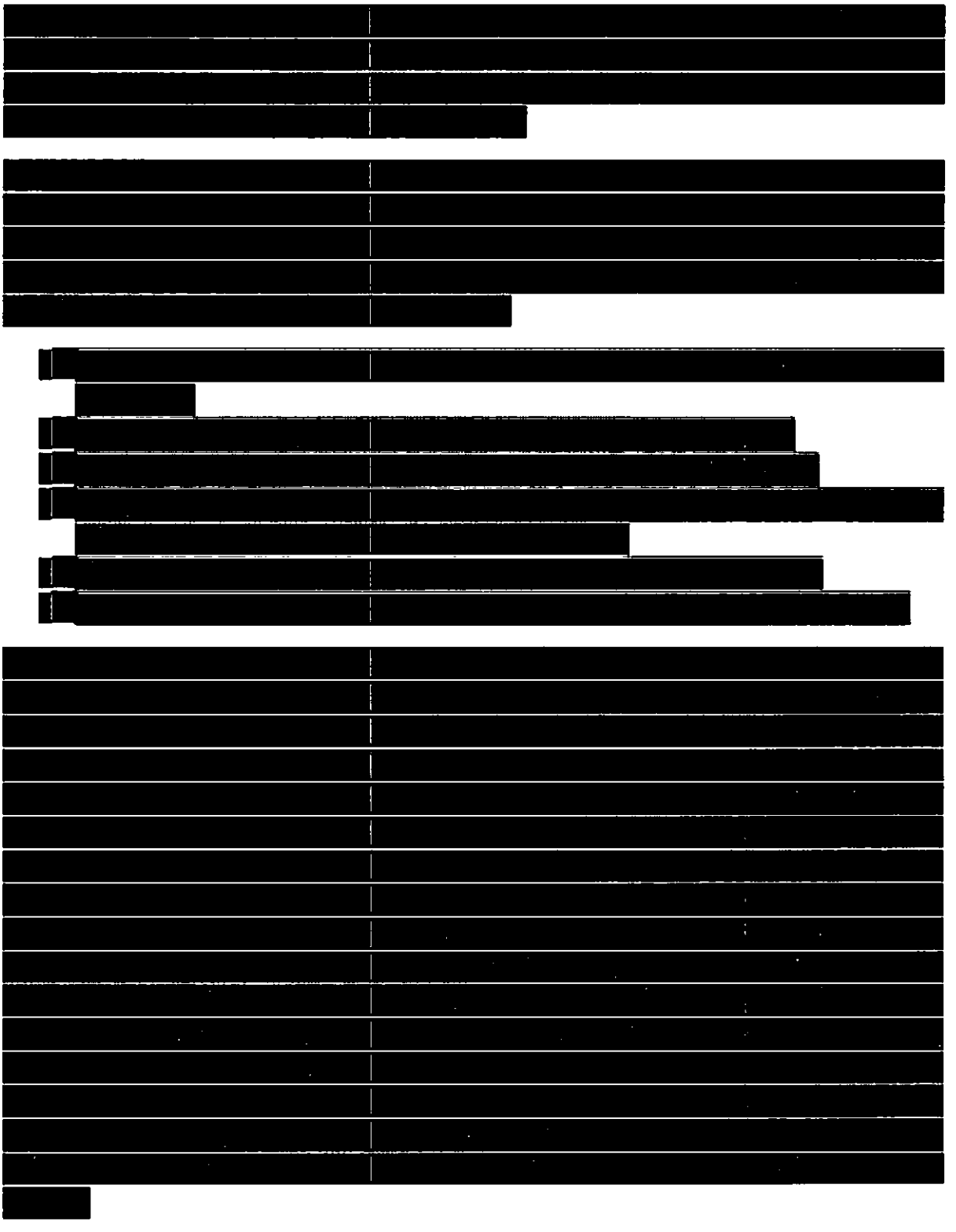

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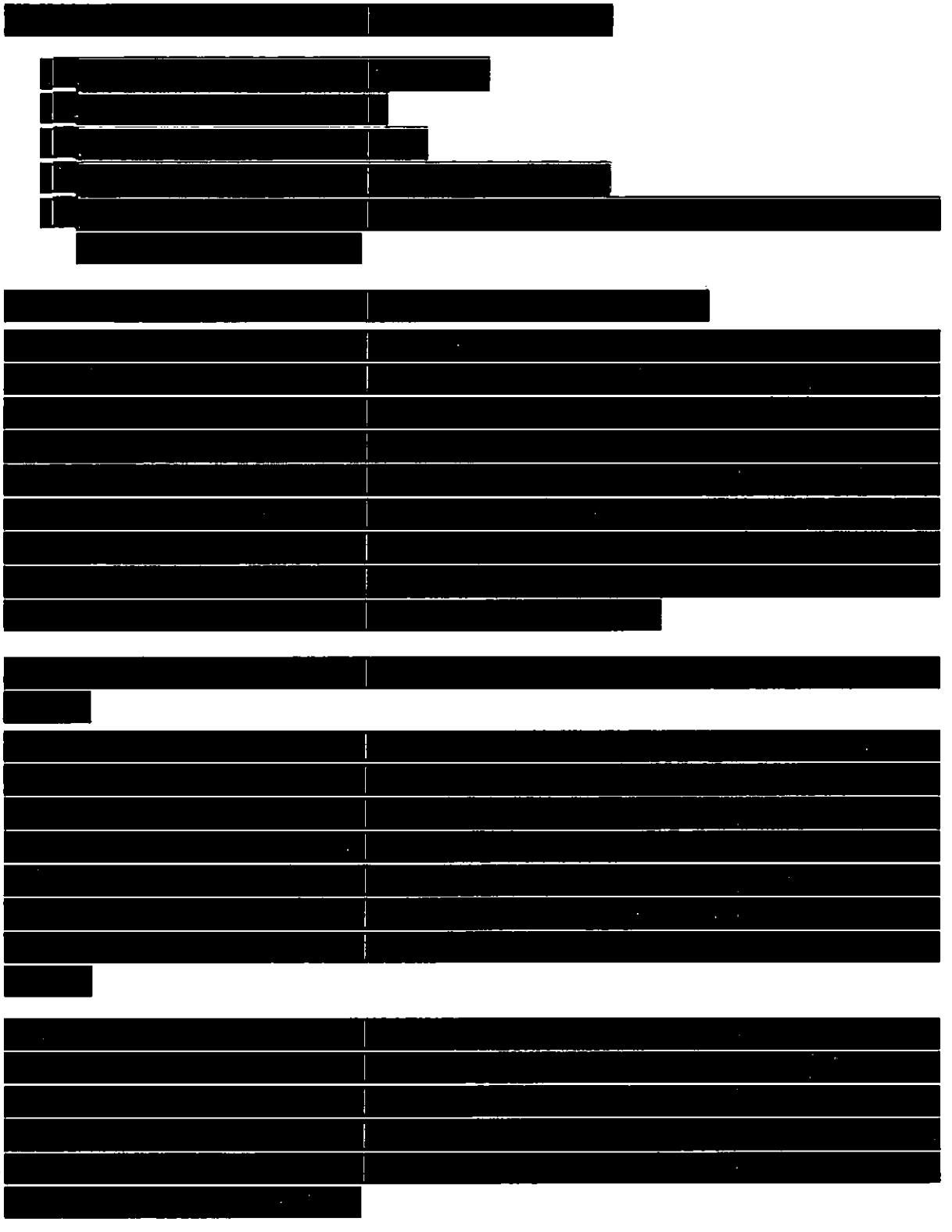

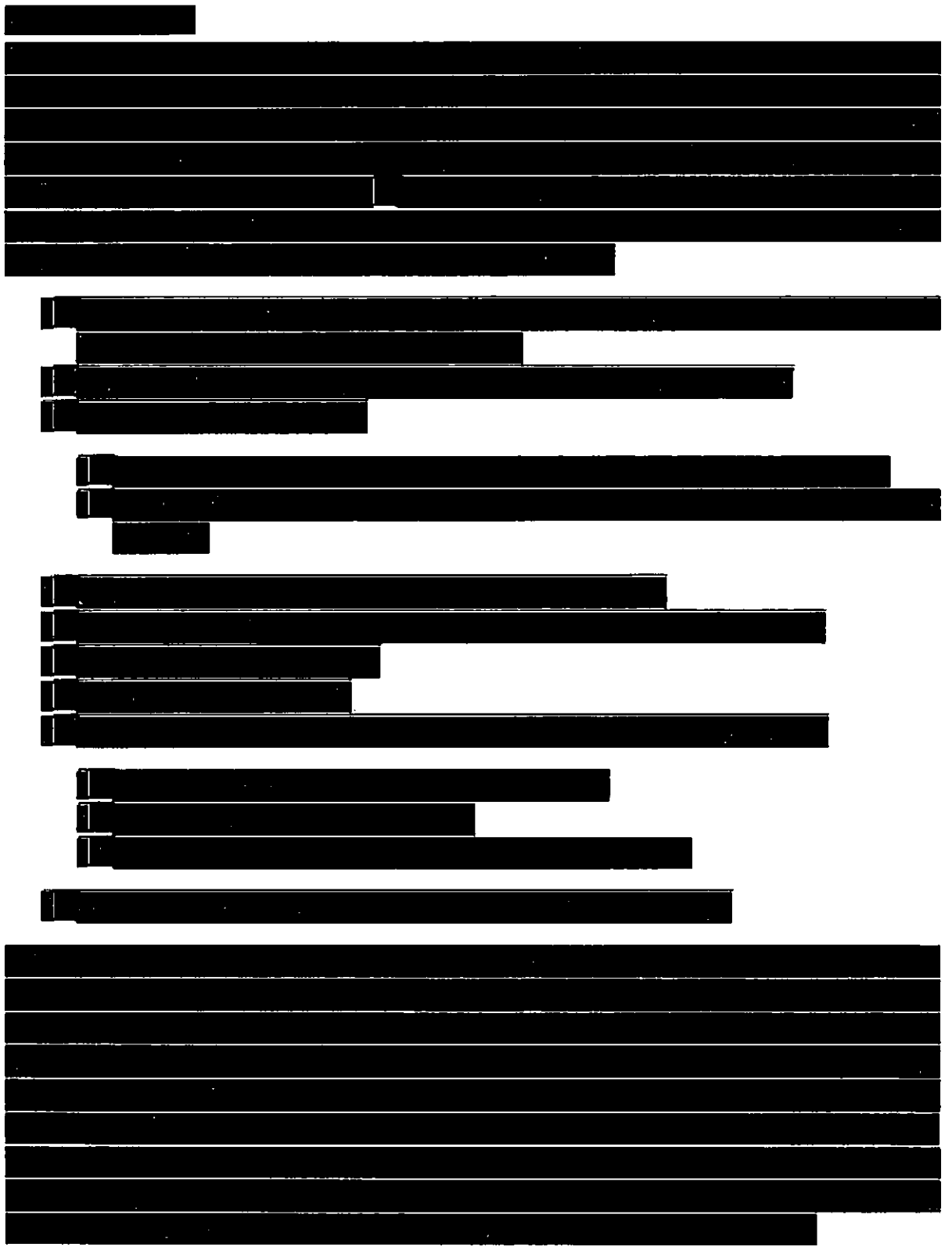

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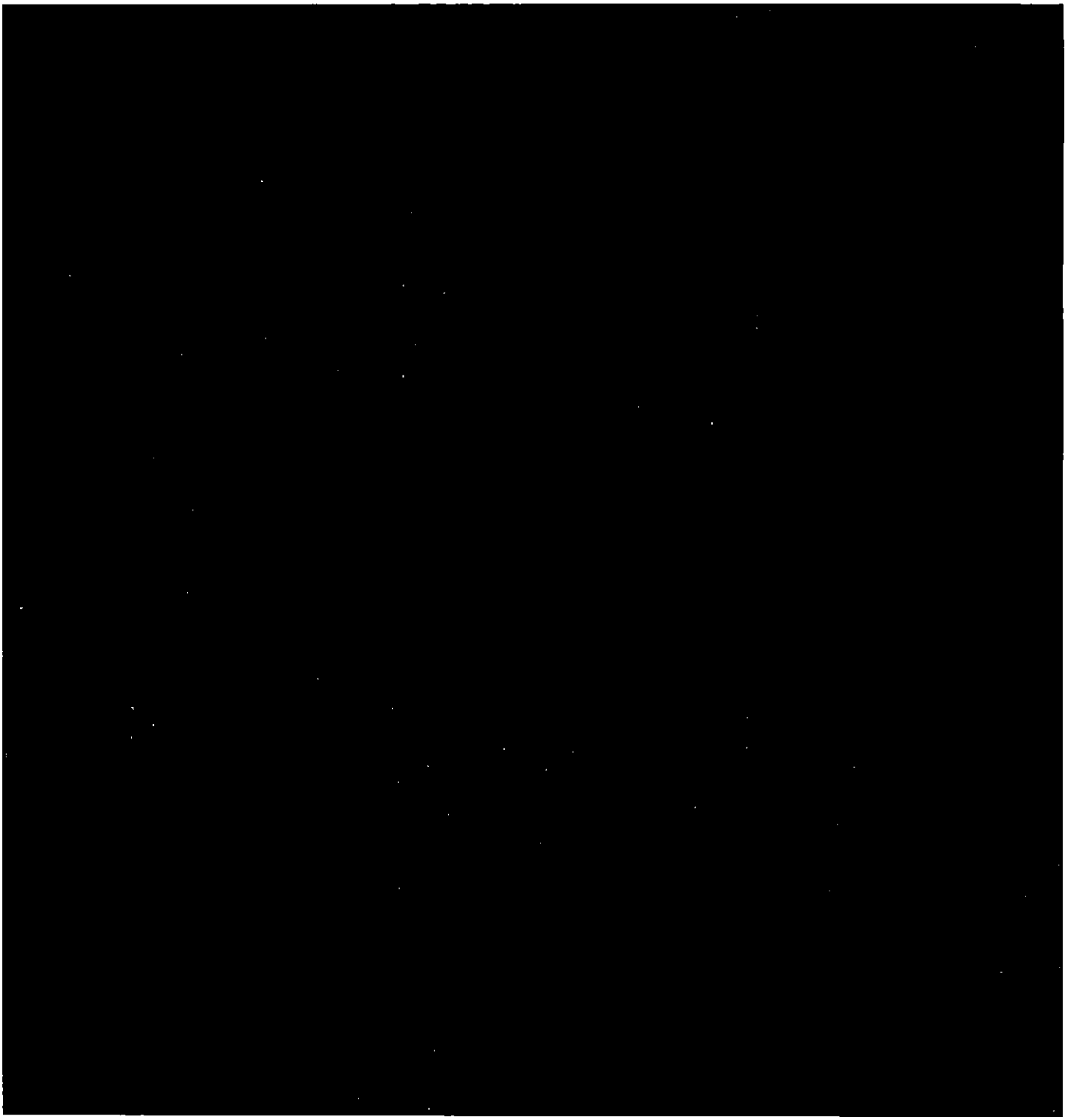

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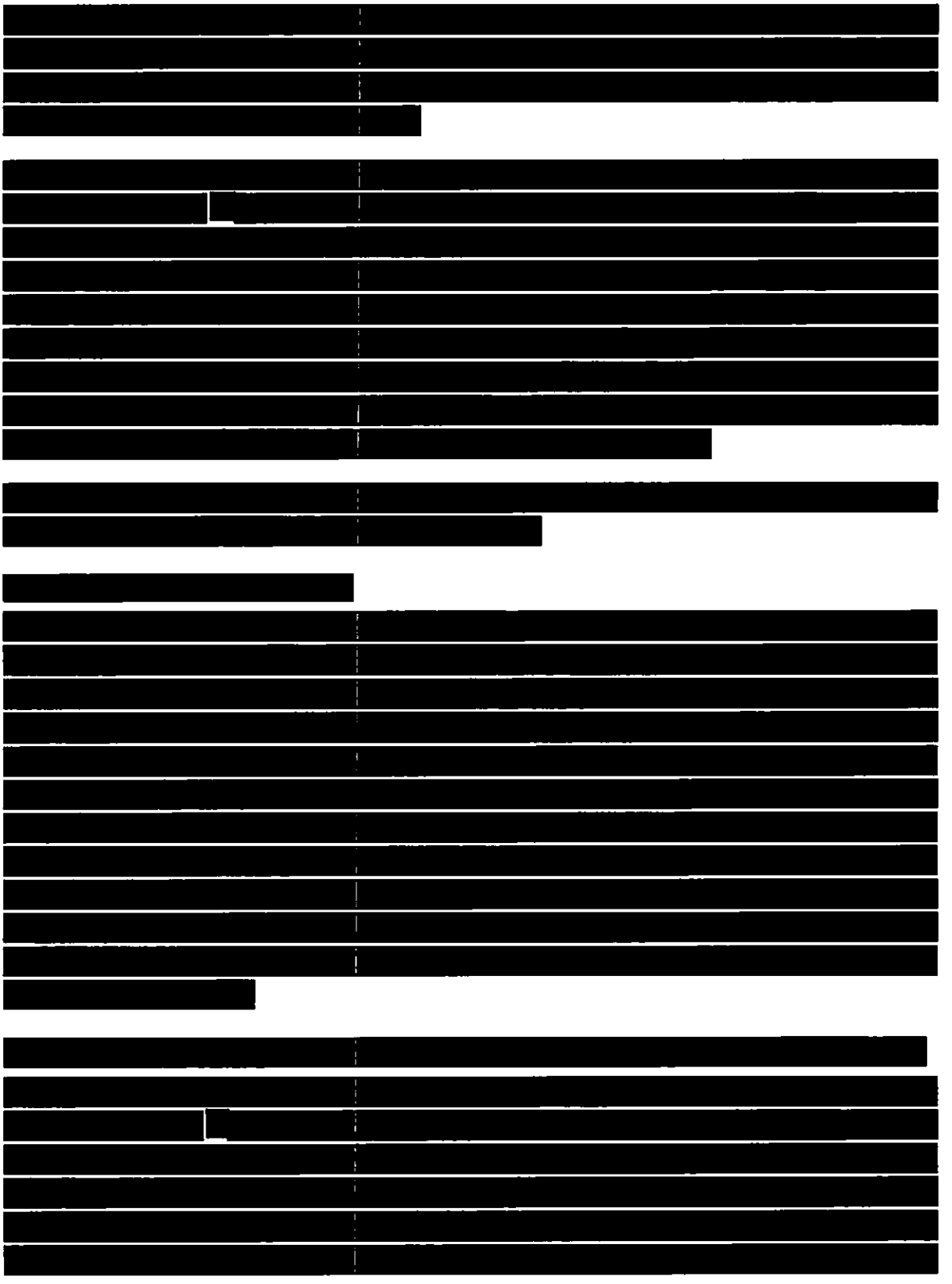

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C. Proposed Project Constructability Information

C.1. Component Scope

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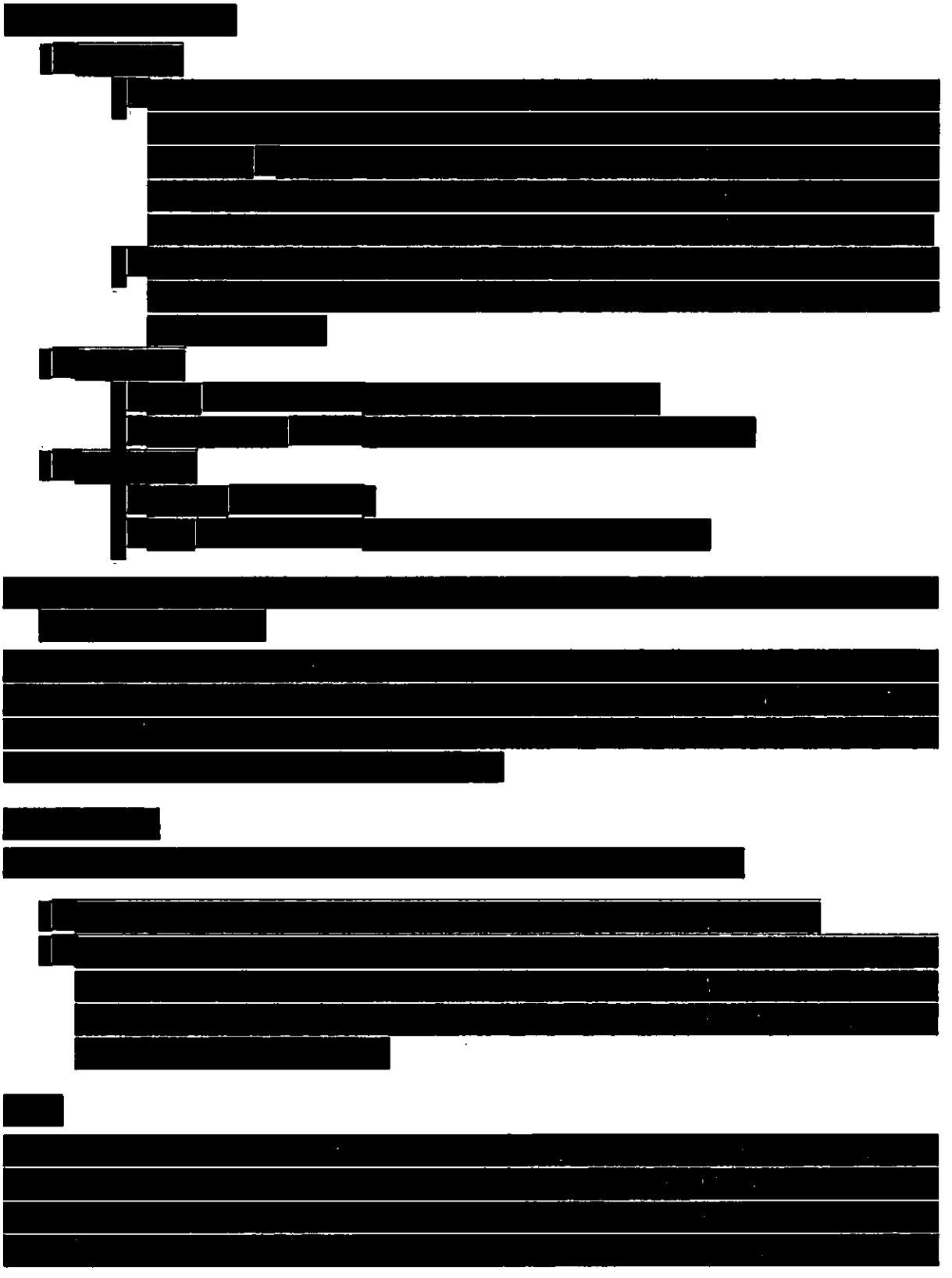

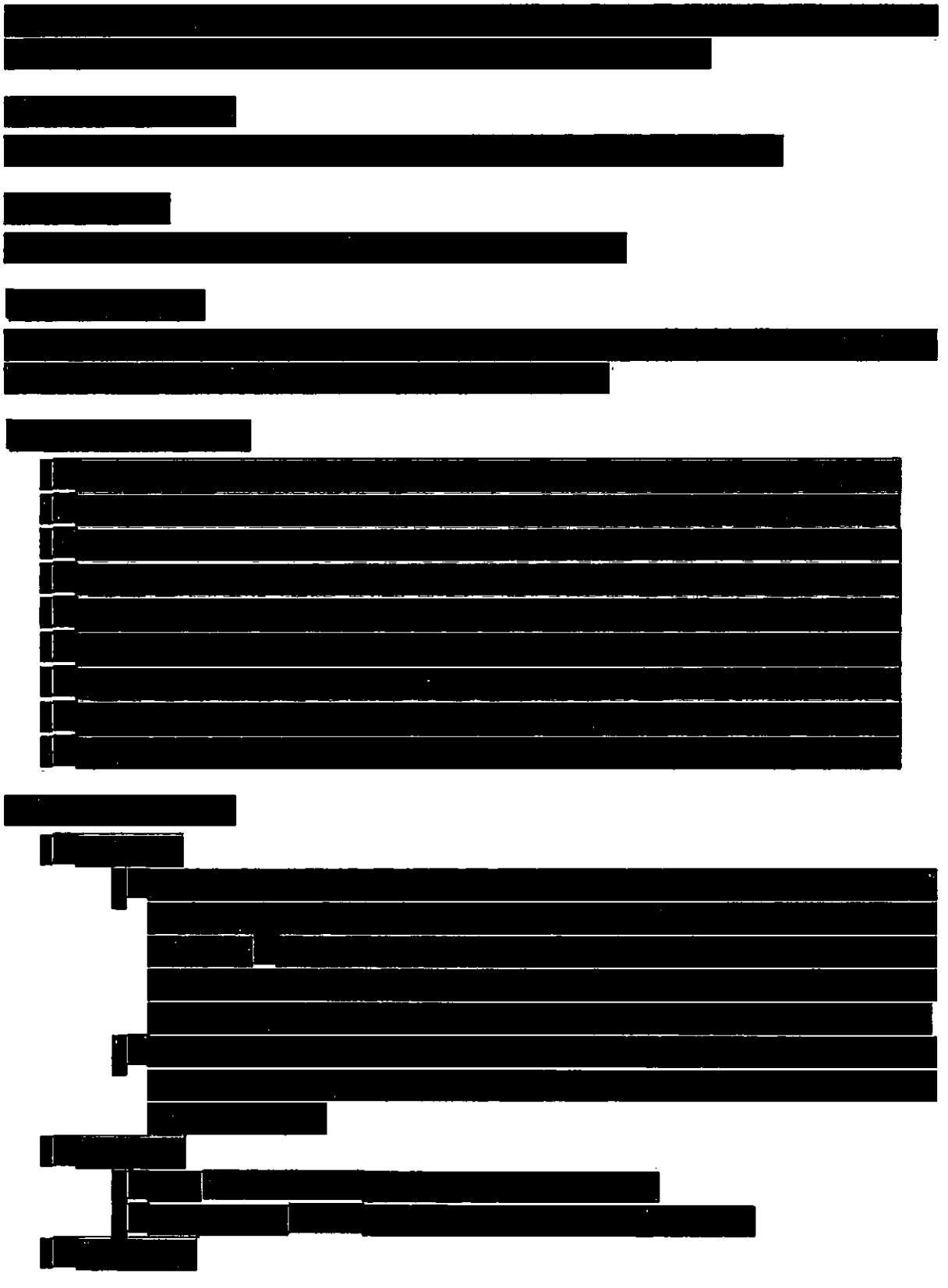

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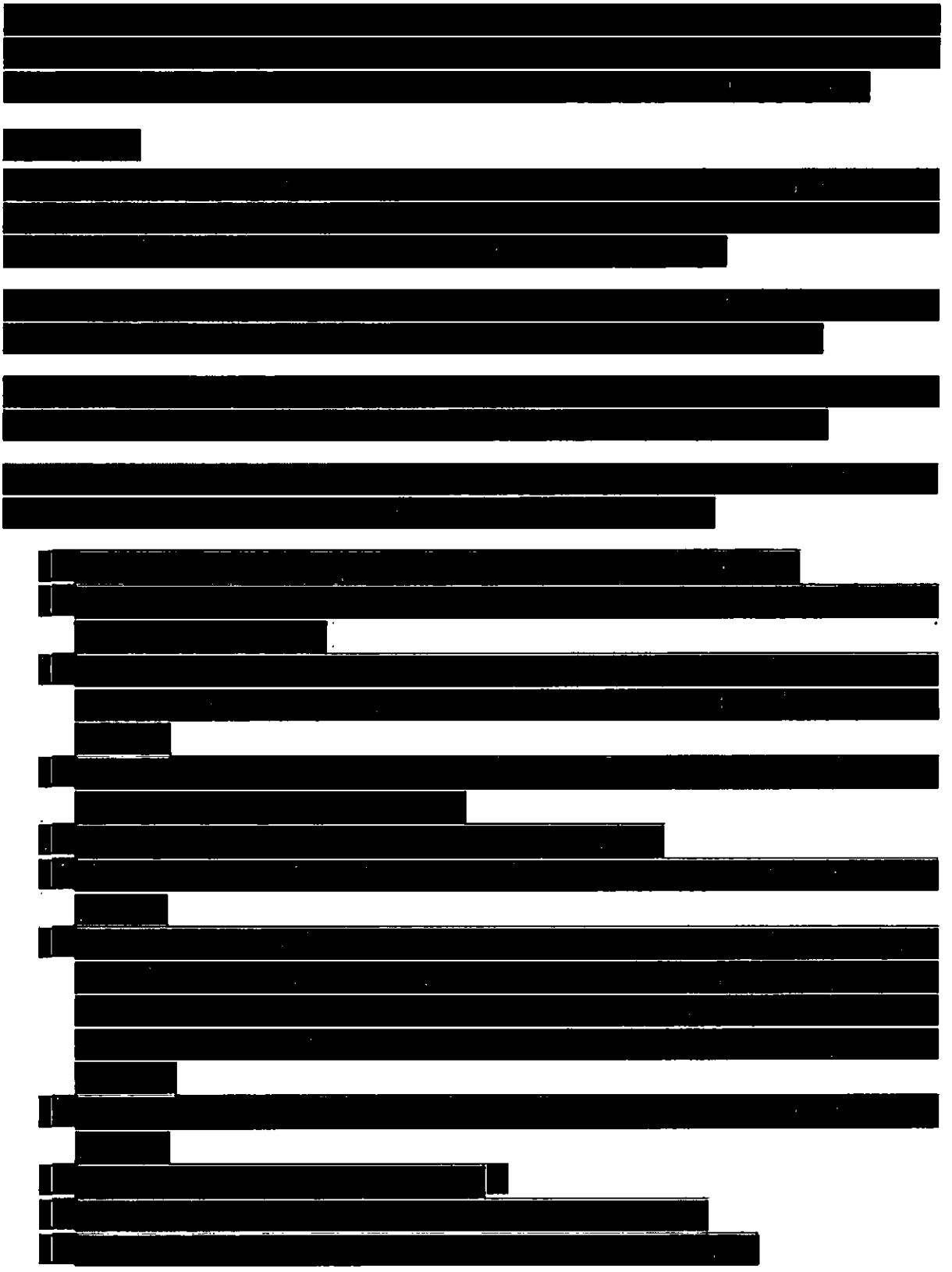

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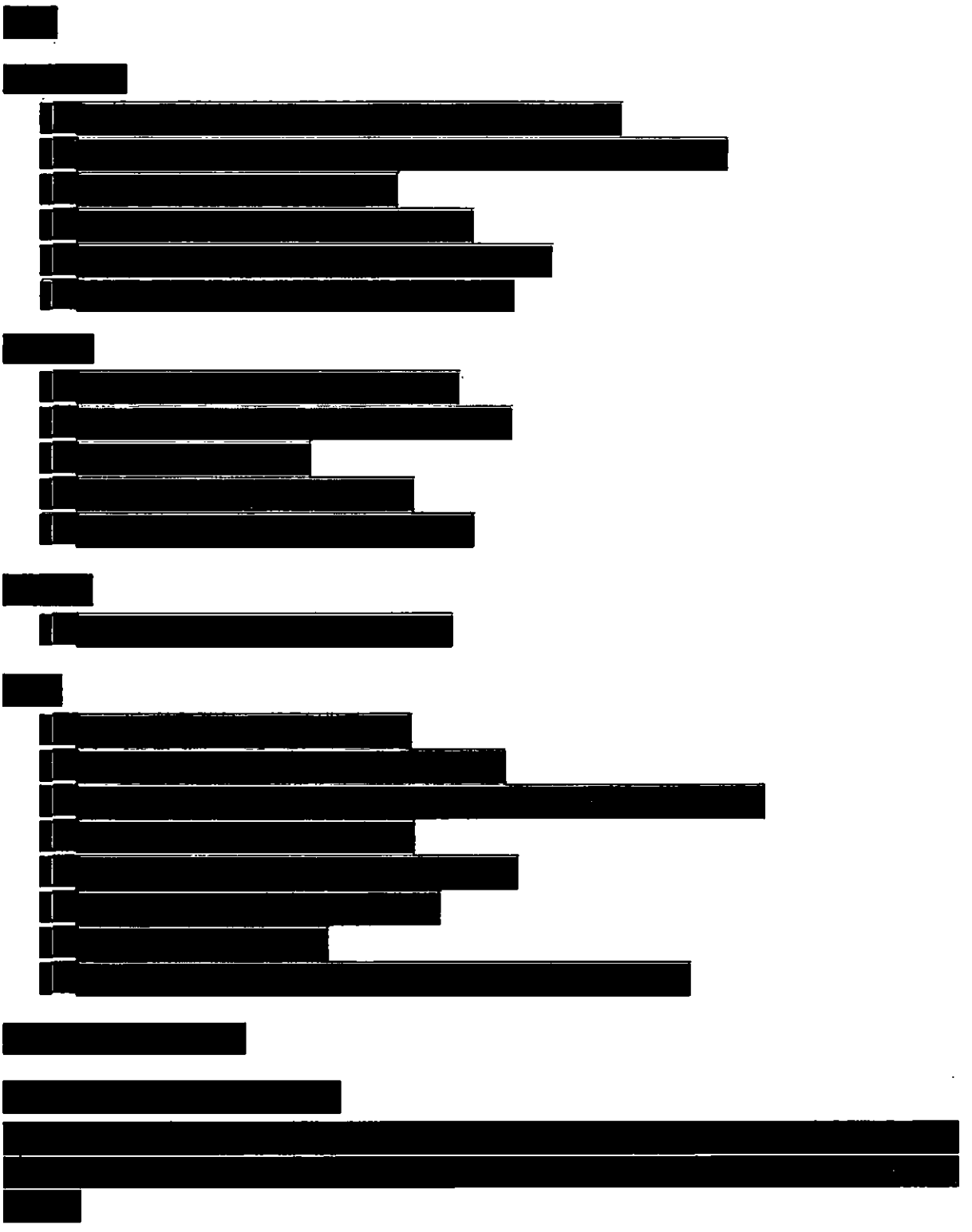

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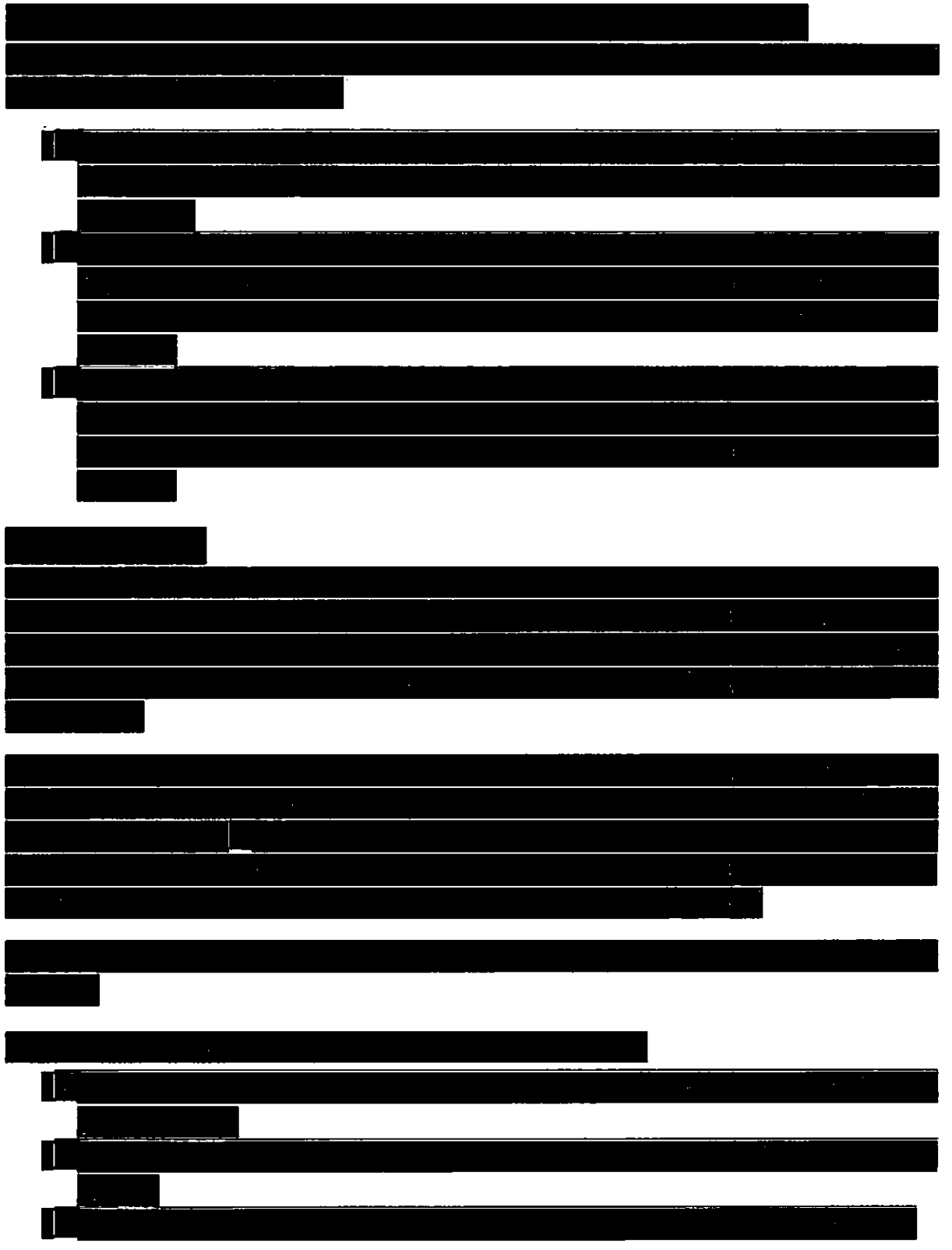

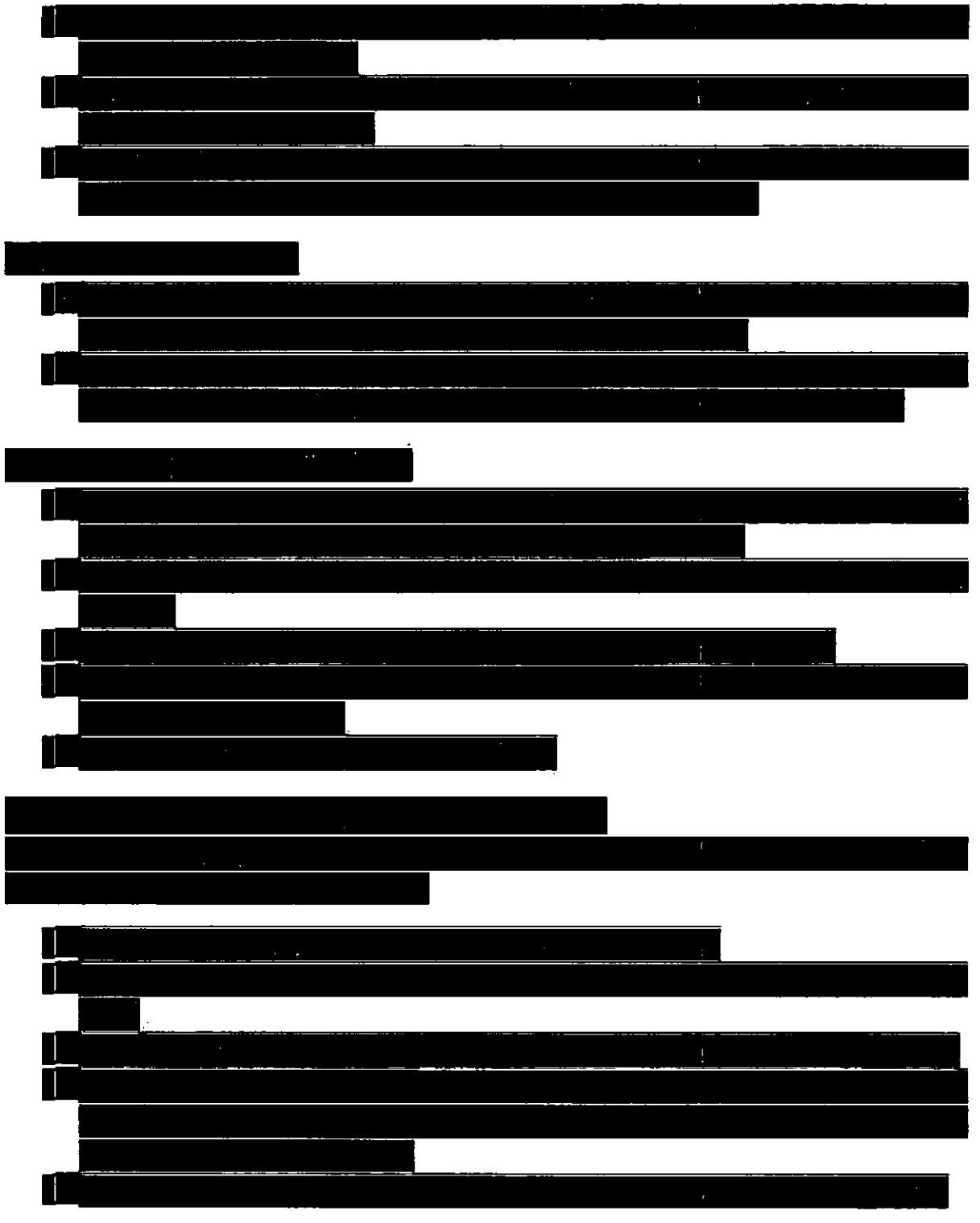

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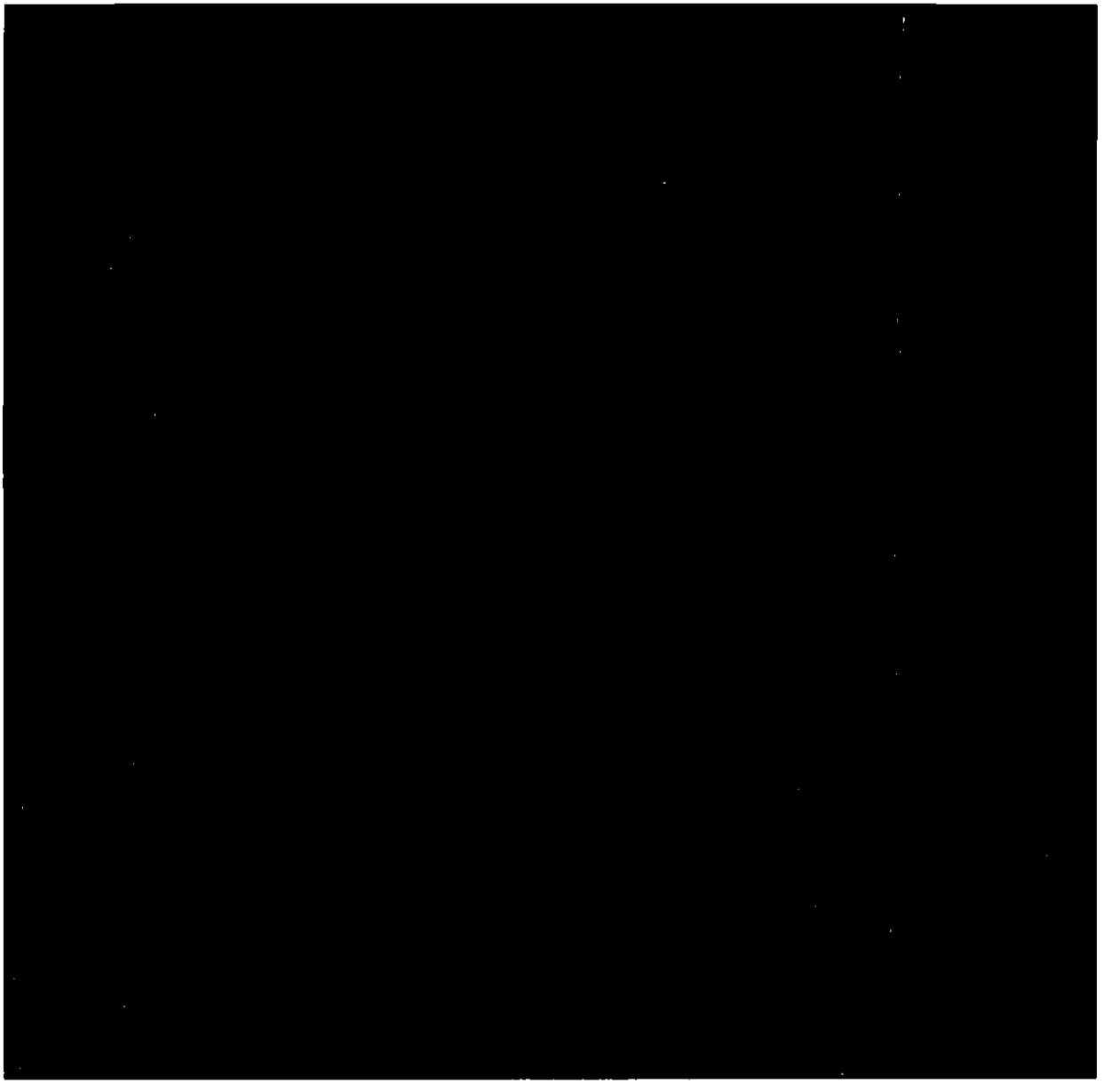

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C.6. Proposed Project Division of Responsibility

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C.7. Total Estimated Cost of Project

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D. Analytical Assessment

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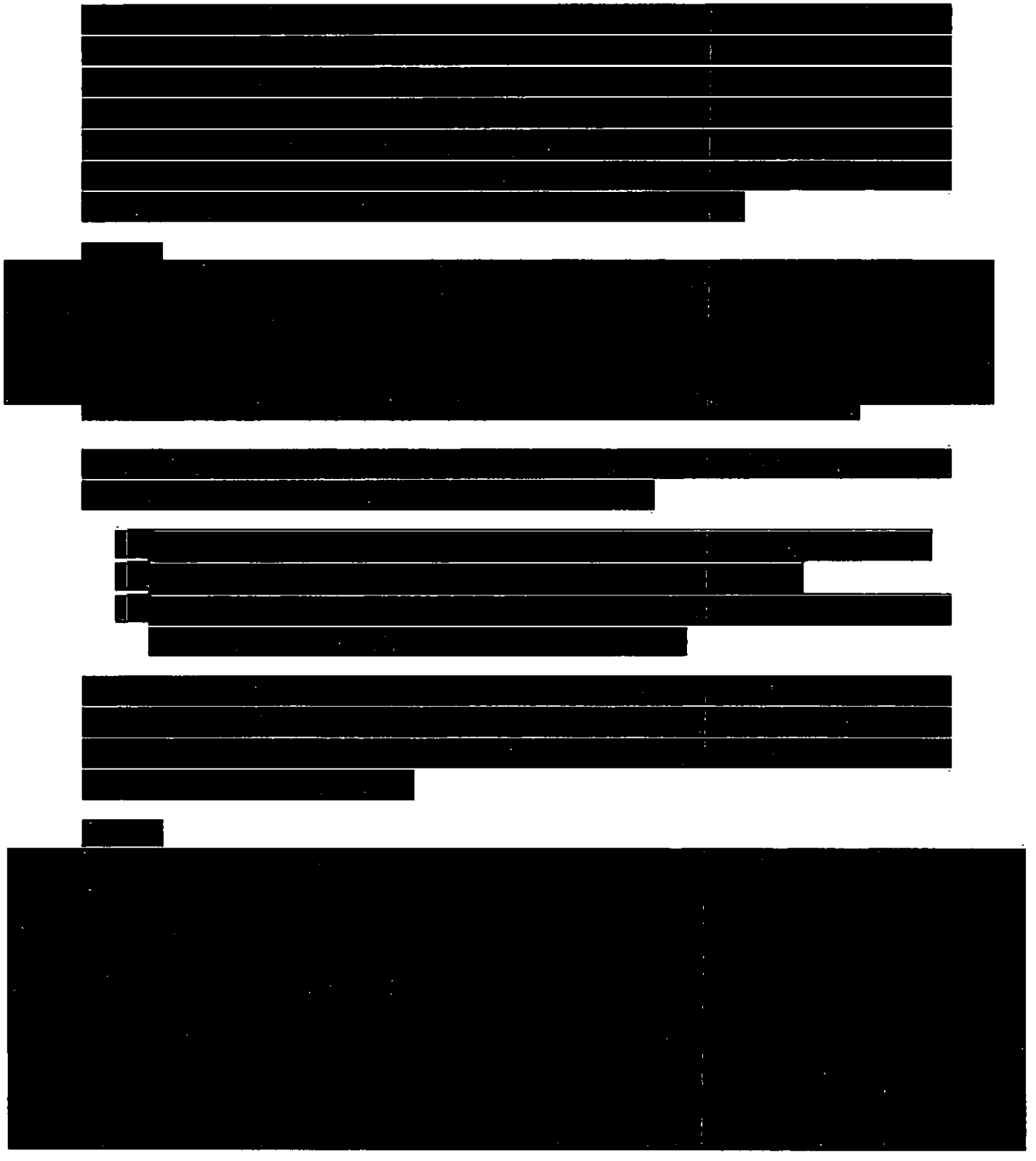

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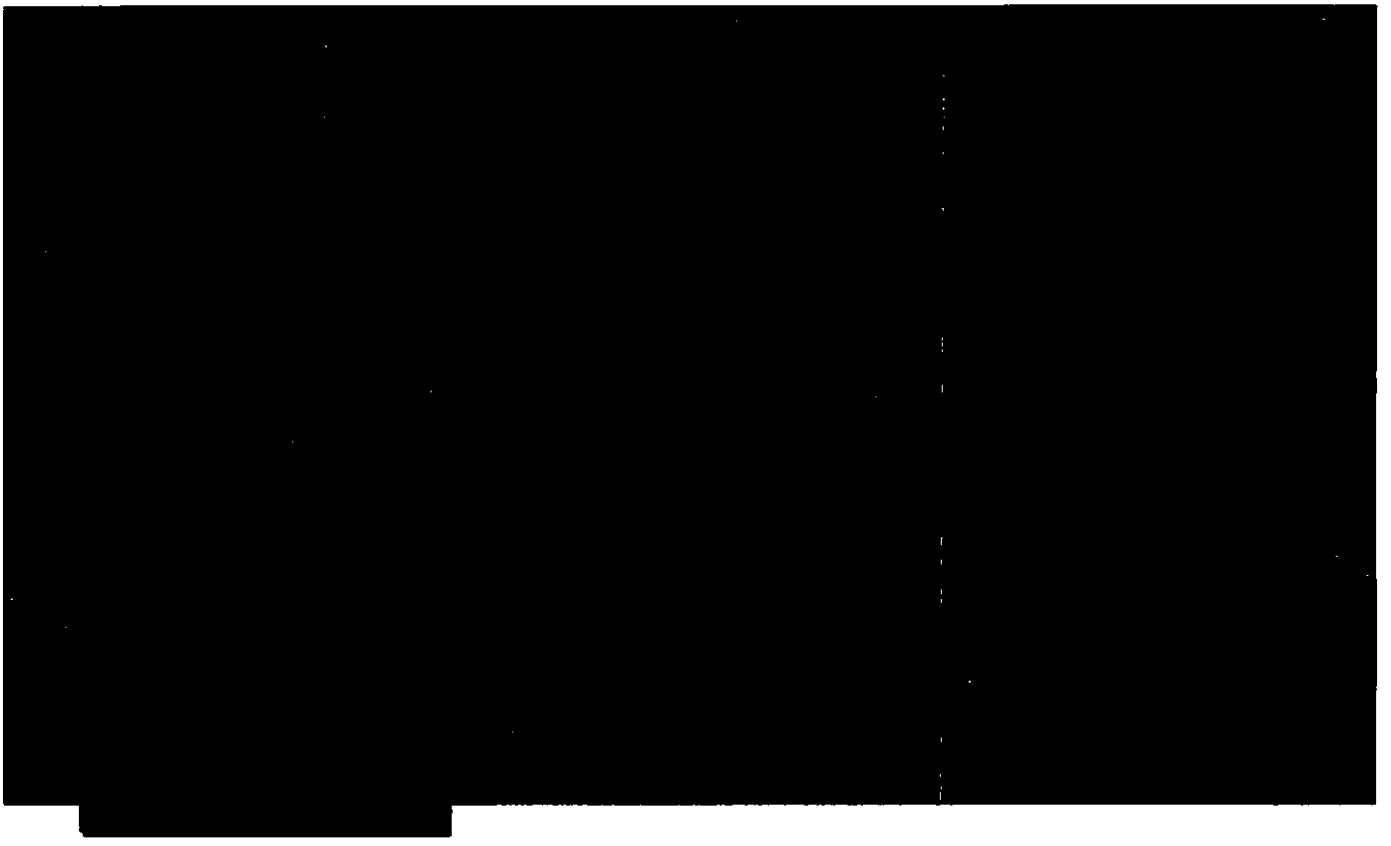

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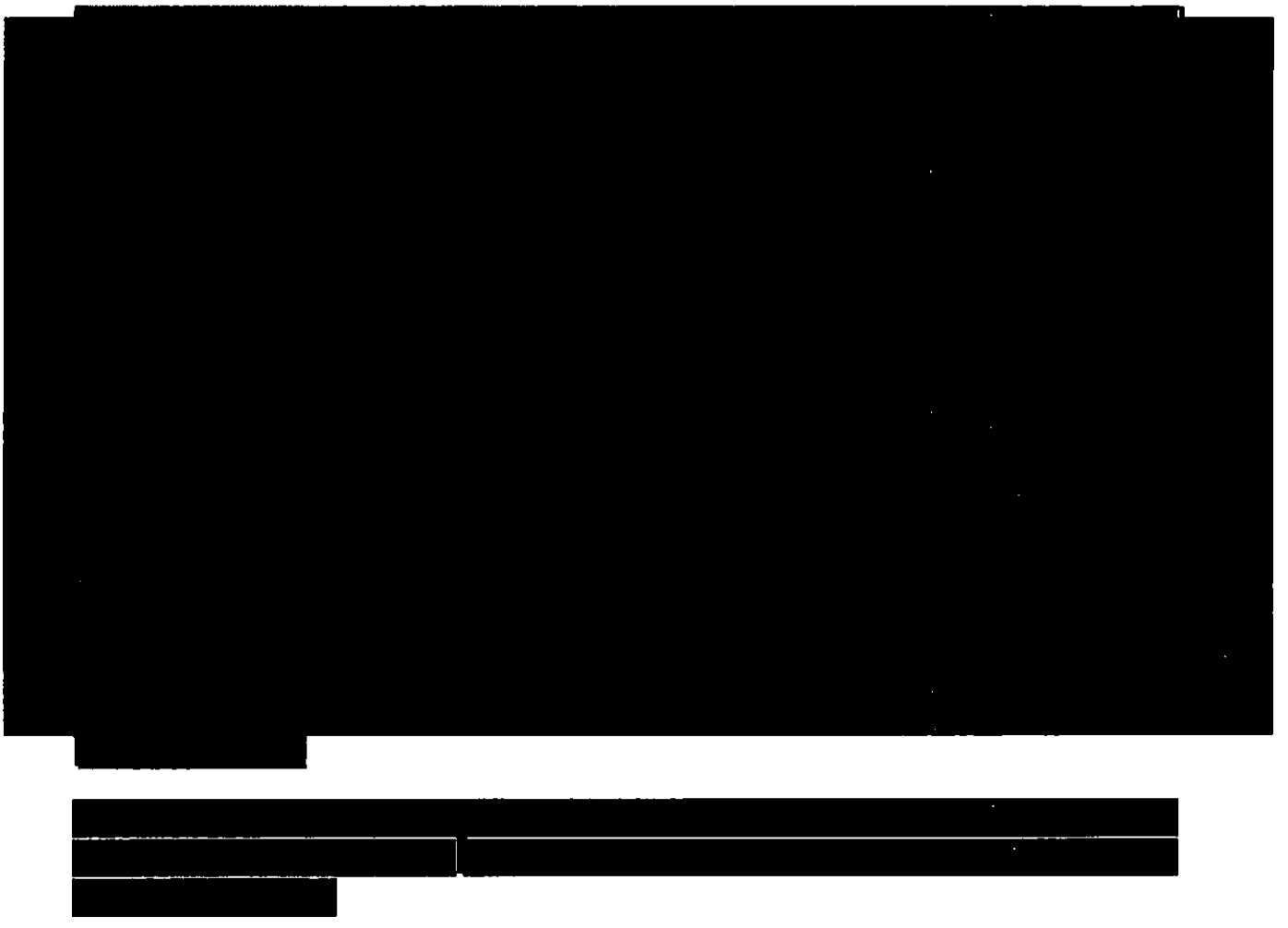

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E. Cost

E.1. Estimated Project Costs and Cash Flows

The overall project cost estimate and annual cash-flow developed by PPL EU and ATX East is summarized below in the format requested by PJM. The total project cost estimate is $150.3 million in 2017 dollars[1] and $178.3 million in nominal (in-service) dollars. [redacted]

[1] The estimated 2017 cost excludes AFUDC and Escalation but includes estimated project contingency.

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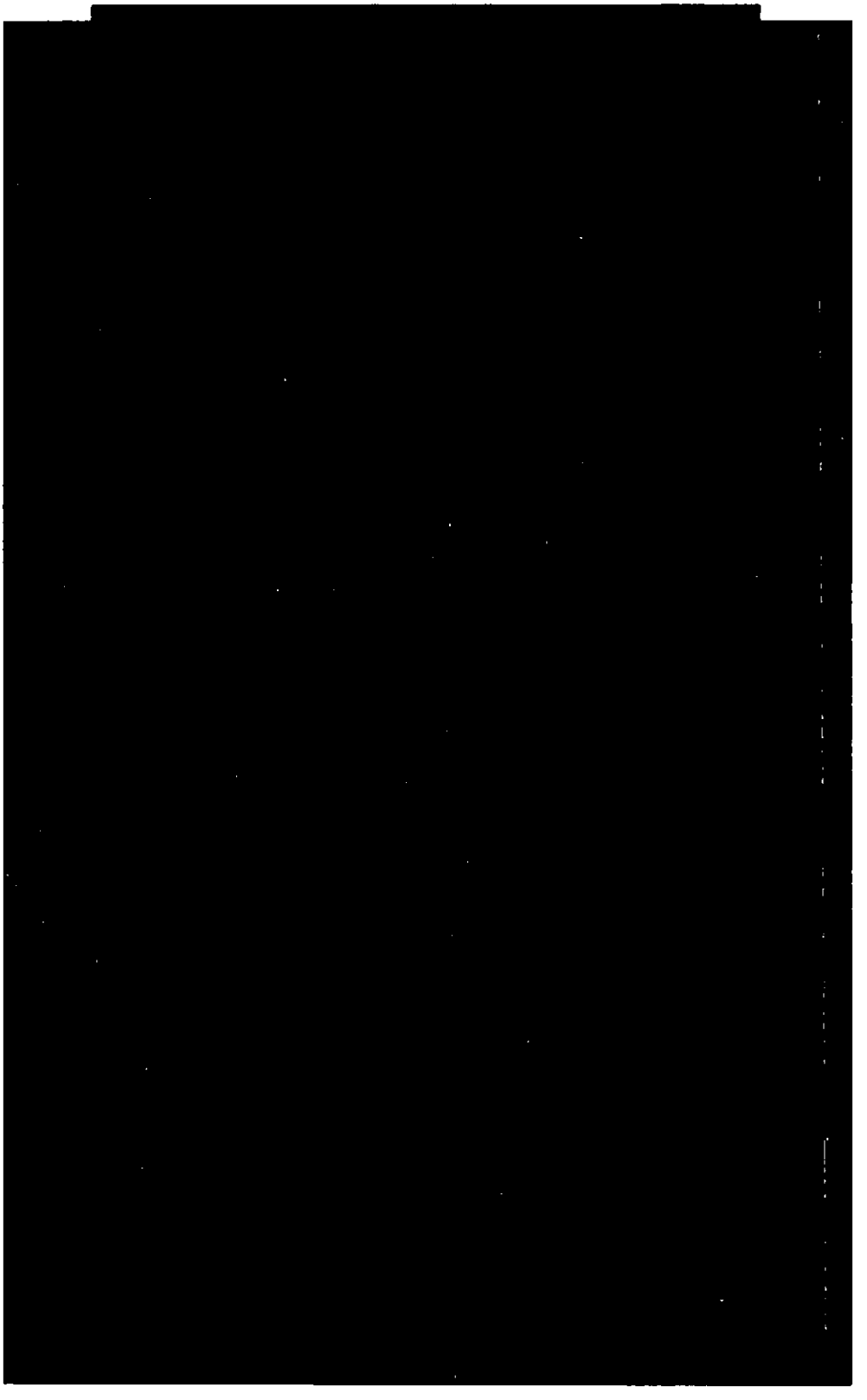

E.2. Proposed Capital Structure and Requested Return on Equity

[redacted]

E.3. Estimated AFUDC

[redacted]

E.4. Estimated Annual Operation and Maintenance (O&M) Costs

[redacted]

F. Project Schedule

A Level 1 project schedule is attached as Appendix [redacted]

The proposed project in-service date is May 31, 2022. [redacted]

[redacted]

G. Operations/Maintenance

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H. List of Appendices