

June 2, 2014

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, Newfoundland & Labrador
A1A 5B2

Attention: Ms. Cheryl Blundon
Director Corporate Services & Board Secretary

Dear Ms. Blundon:

**Re: The Board's Investigation and Hearing into Supply Issues and Power Outages
on the Island Interconnection System**

In accordance with the Board's Interim Report dated May 15, 2014 with respect to the above noted matter please find enclosed the original plus 12 copies of Hydro's:

- Updated Integrated Action Plan;
- June 2 report in relation to the work required to be done in 2014 with regard to terminal station transformers; and
- June 2 report in relation to the work required to be done in 2014 with regard to air blast circuit breakers.

With respect to the updated Integrated Action Plan, Hydro has incorporated the actions recommended by Liberty Consulting. These items have been given appropriate priority ranking and have been scheduled in accordance with the dates set out by the Board in its Interim Report. Hydro will align resources to ensure completion of the various items set out in the updated Integrated Action Plan in accordance with the priority and completion dates scheduled for these items.

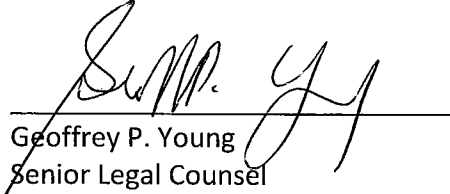
Hydro will continue to update the Integrated Action Plan to reflect any further findings of Hydro's internal investigation and/or further findings arising from the Board's review.

The reports on terminal station transformers and air blast circuit breakers set out in detail the specific information requested by the Board.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO



Geoffrey P. Young
Senior Legal Counsel

GPY/jc

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Sheryl Nisenbaum – Praxair Canada Inc.
Roberta Frampton Benefiel – Grand Riverkeeper Labrador

Thomas Johnson – Consumer Advocate
Thomas O' Reilly – Cox & Palmer
Danny Dumaresque

*Investigation and Hearing into Supply Issues and Power Outages on the
Island Interconnected System*

**REPORT TO THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES
REGARDING WORK TO BE PERFORMED ON TRANSFORMERS**

Newfoundland and Labrador Hydro

June 2, 2014



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1 **1 INTRODUCTION**

2 On May 15, 2014 the Newfoundland and Labrador Board of Commissioners of Public
3 Utilities (“Board”) issued its Interim Report in the matter of an investigation and hearing
4 into supply issues and power outages on the Island Interconnected System (“Interim
5 Report”). Pursuant to the Interim Report, Newfoundland and Labrador Hydro (“Hydro”)
6 was to file by June 2, 2014 a report in relation to the work required to be done in 2014 with
7 regard to transformers, addressing schedule, estimated costs, the resources required, and
8 how these requirements will be met, setting out:

9

- 10 1. A list of critical transformers and an explanation as to how this determination was
11 made;
- 12 2. A list of all transformers showing gas analysis results for the period 1993-2013;
- 13 3. A plan for testing in 2014 for all transformers with questionable levels of
14 combustible gases;
- 15 4. A plan to complete the 2014 and overdue testing and maintenance on critical
16 transformers in 2014; and
- 17 5. A plan to complete the 2014 and overdue testing and maintenance on the remaining
18 transformers.

19

20 This report constitutes Hydro’s response to the foregoing Board direction.

21

22 Hydro’s internal investigation and analysis of the supply issues and power outages which
23 occurred in January, 2014 identified many recommendations for action. The review by
24 Liberty Consulting made further recommendations which incorporated many of Hydro’s
25 recommendations. These have all been consolidated into an integrated action plan which
26 Hydro is managing and tracking to ensure successful completion.

27

28 Hydro’s root cause analysis report, completed as part of its internal investigation and
29 report, investigated the transformer failure at Sunnyside. This report identified actions to

1 be undertaken with respect to the completion of transformer maintenance. Liberty
2 Consulting made additional recommendations related to transformer oil dissolved gas
3 analysis. Hydro has been carrying out a program for many years with respect to dissolved
4 gas analysis and has been monitoring and acting on the results of these tests. In this report
5 Hydro is providing the results of its ongoing DGA program and actions being undertaken to
6 address results which indicate questionable readings.

7

8 Since the end of the 2013/14 peak winter demand season, Hydro has begun executing its
9 annual preventative maintenance program; progress on transformer maintenance is
10 included in this report. The focus for 2014 will be on critical transformers such that critical
11 transformers rescheduled from prior years are completed during the year. The level of
12 maintenance activities on the transformers will be increasing over the summer and into the
13 fall. Hydro will be actively monitoring and tracking compliance to the plan to ensure the
14 power system is ready for sustained reliable performance in the winter of 2014/2015 and
15 beyond.

1 **2 CRITICAL TRANSFORMERS**

2 Appendix A (Sheet A) lists power transformers with a high voltage winding of 66 kV and
3 above on the Island Interconnected System, and their respective criticality ranking. The
4 asset criticality for power transformers was determined using an asset criticality ranking
5 tool¹ which considered 11 different factors as outlined in Appendix B (Sheet B). Each factor
6 was considered separately for each power transformer and a score was applied based upon
7 the factors definitions to arrive at an overall criticality score. The criticality score was then
8 ranked by highest to lowest to determine an overall ranking. A review was then completed
9 on the scores to arrive at criticality groups.

10

11 The highest criticality Group A, is mainly driven by the larger generator step up units
12 (GSU's). Group B, the next highest criticality, is mainly driven by the smaller GSU's and the
13 higher MVA 230 kV terminal station transformers. Group C transformers are mainly some
14 of the smaller MVA 230 kV transformers and the larger lower voltage terminals station
15 units, while Group D are lower voltage units. For the purposes of this report, the critical
16 transformers are defined as transformers in Group A and Group B. Overdue maintenance
17 associated with Group A and Group B transformers are planned in 2014 as a priority and
18 overdue maintenance associated with Group C and Group D transformers will be started in
19 2014 and completed in 2015.

20

21 These criticality groupings were developed by an internal Hydro team with representatives
22 from Long-term Asset Planning², Work Execution³ and System Operations⁴ and will be
23 reviewed and updated on an ongoing basis.

¹ The asset criticality ranking tool was developed internally and leverages internal knowledge and experience, as well as externally validated practices and support.

² This role leads long-term asset planning and critical spares management activities. It is accountable for developing and refreshing the 20+ year asset plan addressing asset rehabilitation/overhaul, renewal and replacement. It drives the development of annual asset work plan and provides oversight and input into effectiveness of asset maintenance activities including preventative and predictive maintenance.

³ This role leads the planning and execution of maintenance work in the annual work plan in a safe, environmentally friendly and effective manner.

⁴ This is the power system operations group which is responsible for the safe, reliable, environmentally responsible and effective operation of the Island Interconnected System.

1 **3 TRANSFORMER GAS ANALYSIS FOR THE PERIOD 1993-2013**

2 Hydro has an extensive transformer oil dissolved gas analysis (“DGA”) program, the purpose
3 of which is to help identify faults that may be developing inside the transformer. This
4 program has routine annual samplings completed which are reviewed by an equipment
5 engineer who determines the appropriate action to take when questionable gas levels are
6 obtained. This includes resampling at a more frequent rate and at times utilizes Hydro’s
7 portable DGA analyzer to expedite a sample if a significant concern is flagged. Further to
8 this, Hydro is also planning enhancements in monitoring with installation of on-line gas in oil
9 monitoring for seven of its generator step up transformers starting in 2015. The on-line gas
10 in oil monitoring capital program will be submitted to the Board as a part of Hydro’s 2015
11 Capital Budget Application.

12
13 Attached in Appendix B are the DGA analysis results for all of Hydro’s large power
14 transformers, as requested by the Board. Those with recent elevated combustible gas levels
15 are indicated in Section 4 of this report, along with Hydro’s resampling plan for these
16 transformers.

17
18 Besides oil analysis from sampling, transformers are equipped with gas relays, which also
19 provide indications of gas accumulation and, as well, are designed to trip the unit offline in
20 the event of a sudden buildup of gas inside the unit.

1 **4 PLAN FOR TESTING IN 2014 OF TRANSFORMERS WITH ELEVATED**
2 **LEVELS OF COMBUSTIBLE GASES**

3 Hydro's DGA program involves a review of gas analysis and then recommendations for
4 further action to prevent transformer failures. As part of that, Hydro adjusts oil sample
5 frequency based on gassing level trends to determine whether additional action is required.

6 Recent examples of increased monitoring include:

7

8 1. Three transformers are being sampled quarterly due to a combination of their
9 criticality and gas levels. These transformers are BDE T3, BDE T7, and USL T1 and
10 they have been sampled at this increased frequency since 2013;

11 2. Three transformers are being closely monitored by additional sampling due to
12 increases in gas levels observed in their routine 2014 sample. These transformers
13 are OPD T1, OPD T3, and WAV T1. For all three of these transformers, two follow-up
14 samples have been obtained to date and a third follow-up sample is planned; and

15 3. The DGA results of the routine 2014 oil sample for MDR T3, SSD T4 and WAV T2 have
16 raised concern, but the results of the follow-up sampling have eliminated this
17 concern.

18

19 The following table lists power transformers with combustible gas levels that warrant
20 further investigation. Follow-up (i.e., non-routine) sampling is planned for each of these
21 transformers. The gas(es) and resampling deadlines are shown in the table below. The
22 results of these follow-up samples will be reviewed by a Hydro professional engineer who
23 will recommend a course of action in accordance with IEEE Std. C57.104, IEEE Guide for the
24 Interpretation of Gases Generated in Oil Immersed Transformers and recommendations will
25 be reviewed by another Hydro professional engineer. As well, all future results will be
26 reviewed by Hydro's insurer FM Global.

Table 4.1 - Transformers with Combustion Gas Levels warranting Further Investigation

Transformer	Questionable Gas(es)	Resampling Deadline
BBK T1	Acetylene	June 30 th
BDE T2	Ethylene	August 31 st
BDE T3	Ethylene	August 31 st
BDE T5	Ethylene	August 31 st
BDE T7	Ethylene	August 31 st
BDE T10	Acetylene	June 30 th
BUC T1	Acetylene	June 30 th
DLK T2	Acetylene	June 30 th
HLK T1	Ethylene, Hydrogen	August 31 st
HRD T5	Acetylene, Ethylene, Ethane , Methane	June 30 th
HRD T6	Acetylene	July 31 st
HRD T7	Acetylene	July 31 st
HWD T2	Acetylene	June 30 th
OPD GT1	Ethylene, Hydrogen	August 31 st
OPD T1	Acetylene	June 30 th
OPD T2	Ethylene, Ethane, Methane	August 31 st
OPD T3	Acetylene	June 30 th
RHR T1	Acetylene	June 30 th
STB T2	Acetylene	July 31 st
SVL T3	Acetylene	July 31 st
USL T1	Ethylene	August 31 st
WAV T1	Acetylene, Ethylene	July 31 st
WAV T3	Acetylene	June 30 th
WAV T4	Acetylene	July 31 st

- 1 Furthermore, the Stony Brook transformer (STB T2), which is a sister unit to the Sunnyside
2 transformer (SSD T1), is schedules for a tap changer leak test. The two reasons for the leak
3 test are:
- 4 1. To determine if the tap changer is the source of the acetylene present in the
5 transformer oil samples; and
 - 6 2. To assess the suitability of performing such a test on other power transformers
7 suspected to have acetylene leaking from the tap changer.

1 **5 PLAN FOR TESTING OF CRITICAL AND REMAINING TRANSFORMERS**

2 Hydro has 105 preventative maintenance (“PM”) items to complete on power transformers
3 with a high voltage winding rating of 66 kV and above on a six-year frequency. In 2010,
4 Hydro recognized it was tracking behind the desired six-year cycle of completing the PMs
5 and established a plan to have on all PMs back on the six-year cycle by the end of 2015. Up
6 to the beginning of 2014 (four years into the six-year cycle), Hydro has completed 54 PMs
7 on these transformers.

8

9 Hydro plans to accelerate its transformer PM plan to ensure that overdue testing and
10 maintenance on all power transformers is completed by the end of 2015. There are 51 PMs
11 scheduled to be completed by the end of 2015, 16 of which are overdue. In 2014, 28 power
12 transformer PMs will be completed (20 planned, eight overdue). The remaining 23 power
13 transformer PMs will be completed in 2015 (15 planned, eight overdue). In 2016 and
14 beyond, the annual number of power transformer PMs will return to 17 or 18 per year. The
15 2014 plan focuses on completing the most overdue PMs with the priority being critical
16 transformers as shown in Section 2. The remaining transformer PMs will be completed in
17 2015. During PM work outages, corrective maintenance (“CM”) work will be performed
18 before equipment is returned to service.

19

20 With the additional PM and CM work to be completed by December 1, 2014, additional
21 resources will be required. The resources will be a combination of temporary employees
22 and external contractors to supplement the existing resource levels in Transmission and
23 Rural Operations (“TRO”).

24

25 As of May 30, 2014, Hydro has completed one critical power transformer PM and one other
26 power transformer PM.

27

28 A schedule to execute this additional PM and CM work is shown in Appendix C.

- 1 The incremental cost beyond base budgets for 2014 associated with these additional PMs is
- 2 found in Section 6. The cost shown in the table includes all transformers.
- 3
- 4 Incremental administrative and supervisory resource requirement for this PM is found in
- 5 Section 7.

1 **6 ESTIMATED COSTS**2 **Table 6.1 – Power Transformer Additional 2014 and 2015 Work Cost Summary**

Estimated Total Cost to Execute Additional Work for Power Transformers	
Estimate Additional PMs for 2014 (Critical Overdue)	\$220,815
Estimate Additional CMs for 2014 (Critical Overdue)	\$155,416
Estimate Additional PMs for 2015 (Remaining Overdue)	\$220,815
Estimate Additional CMs for 2015 (Remaining Overdue)	\$155,416
TOTAL ESTIMATE	\$752,461

3

4

Table 6.2 Transformer Additional PM 2014 Estimate

Estimated Costs to Execute Additional PMs for Transformers in 2014		
Number of Additional Transformer PMs	8	
TOTAL LABOR ESTIMATE		\$108,319
Internal Labour Execution (Regular Schedule)	2	\$23,746
Internal Labour Execution (O/T Schedule)	3	\$41,453
Internal Labour & Contractor Execution	3	\$43,119
RENTALS		\$80,000
Bucket Truck (six months)		\$30,000
Material Handler (six months)		\$30,000
Light Vehicles (Vans/Truck)		\$20,000
ADMINISTRATION & DELAYS		\$32,496
Delays/Re-schedule (weather and system conditions) (20% Labour)		\$21,664
Administration (10% Labour)		\$10,832
TOTAL ESTIMATE		\$220,815

5

1

Table 6.3 - Transformer Additional CM 2014 Estimate

Estimated Costs to Execute Additional CMs for Transformers in 2014		
Number of overdue PMs to Complete	8	
TOTAL LABOR ESTIMATE		\$58,012
Internal Labour Execution (Regular Schedule)	2	\$12,023
Internal Labour Execution (O/T Schedule)	3	\$20,116
Internal Labour & Contractor Execution	3	\$25,873
RENTALS		\$80,000
Bucket Truck (six months)		\$30,000
Material Handler (six months)		\$30,000
Light Vehicles (Vans/Truck)		\$20,000
ADMINISTRATION & DELAYS		\$17,404
Delays/Re-schedule (weather and system conditions) (20% Labour)		\$11,602
Administration (10% Labour)		\$5,801
TOTAL ESTIMATE		\$155,416

1

Table 6.4 - Transformer Additional PM 2015 Estimate

Estimated Costs to Execute Additional PMs for Transformers in 2015		
Number of Additional Transformer PMs	8	
TOTAL LABOR ESTIMATE		\$108,319
Internal Labour Execution (Regular Schedule)	2	\$23,746
Internal Labour Execution (O/T Schedule)	3	\$41,453
Internal Labour & Contractor Execution	3	\$43,119
RENTALS		\$80,000
Bucket Truck (six months)		\$30,000
Material Handler (six months)		\$30,000
Light Vehicles (Vans/Truck)		\$20,000
ADMINISTRATION & DELAYS		\$32,496
Delays/Re-schedule (weather and system conditions) (20% Labour)		\$21,664
Administration (10% Labour)		\$10,832
TOTAL ESTIMATE		\$220,815

1

Table 6.5 - Transformer Additional CM 2015 Estimate

Estimated Costs to Execute Additional CMs for Transformers in 2015		
Number of overdue PMs to Complete	8	
TOTAL LABOR ESTIMATE		\$58,012
Internal Labour Execution (Regular Schedule)	2	\$12,023
Internal Labour Execution (O/T Schedule)	3	\$20,116
Internal Labour & Contractor Execution	3	\$25,873
RENTALS		\$80,000
Bucket Truck (six months)		\$30,000
Material Handler (six months)		\$30,000
Light Vehicles (Vans/Truck)		\$20,000
ADMINISTRATION & DELAYS		\$17,404
Delays/Re-schedule (weather and system conditions) (20% Labour)		\$11,602
Administration (10% Labour)		\$5,801
TOTAL ESTIMATE		\$155,416

1 **7 RESOURCE REQUIREMENT**

2 The incremental administrative and supervisory resource requirements for the transformer
 3 and breaker PM and CM completions are shown in the table below. These are in addition to
 4 the contractor and trades workers shown in Section 6.

5
 6 Some resources listed here will be shared between the air blast circuit breaker PM
 7 execution and the critical transformer PM execution. Resources shown in this report
 8 coincide with resources shown in the air blast circuit breaker PM report, however costs will
 9 not be duplicated.

10
 11 **Table 7.1 - Additional Resources - PM and CM Recovery Plan**

2014			
Classification	FTE	Total	Dates
Maintenance Planner	0.5	\$33,525	July-Dec
Equipment Engineer LTAP	0.5	\$40,000	July-Dec
Electrical/Mechanical Supervisor	0.5	\$33,525	July-Dec
Superintendent G&T	0.5	\$50,125	July-Dec
Asset Specialists	0.5	\$50,125	July-Dec
Total FTE	2.5	\$207,300	
2015			
Classification	FTE	Total	Dates
Maintenance Planner	1.0	\$67,050	Jan-Dec
Equipment Engineer LTAP	1.0	\$80,000	Jan-Dec
Electrical/Mechanical Supervisor	0.5	\$33,525	Jan-Dec
Superintendent G&T	1.0	\$100,250	Jan-Dec
Asset Specialists	0.5	\$50,125	Jan-Dec
Total FTE	4.0	\$330,950	

12
 13 Field Resource estimates are shown in the estimates to complete the PMs and CMs in
 14 Section 6 of this report. These resources include such trades as Electrical Maintenance A,
 15 Mechanical Maintenance A and Protection and Control Technicians.

APPENDIX A

**SHEET A: ISLAND INTERCONNECTED TRANSFORMER ASSET CRITICALITY – MAY 27,
2014**

Location	Type	Criticality Score/ 10,000	Criticality Category
BAY D'ESPOIR	T7	960.0	A
HOLYROOD	T1	512.0	A
HOLYROOD	T2	512.0	A
HOLYROOD	T3	512.0	A
BAY D'ESPOIR	T1	384.0	A
BAY D'ESPOIR	T2	384.0	A
BAY D'ESPOIR	T3	384.0	A
BAY D'ESPOIR	T4	384.0	A
BAY D'ESPOIR	T5	384.0	A
BAY D'ESPOIR	T6	384.0	A
CAT ARM	T1	384.0	A
CAT ARM	T2	384.0	A
UPPER SALMON	T1	384.0	A
GRANITE CANAL	T1	345.6	A
HARDWOODS	T5	192.0	B
STEPHENVILLE	T1	144.0	B
STAR LAKE	T1	115.2	B
CORNER BROOK	T1	86.4	B
CORNER BROOK	T2	86.4	B
HINDS LAKE	T1	86.4	B
HINDS LAKE	T2	86.4	B
VOISEY'S BAY NICKEL	T1	43.2	B
VOISEY'S BAY NICKEL	T2	43.2	B
BUCHANS	T1	25.9	B
GRAND FALLS	T1	25.9	B
GRAND FALLS	T2	25.9	B
BUCHANS	GT1	24.2	B
COME-BY-CHANCE	T1	21.6	B
COME-BY-CHANCE	T2	21.6	B
HOLYROOD	T8	17.3	B
MASSEY DRIVE	T1	17.3	B

Location	Type	Criticality Score/ 10,000	Criticality Category
MASSEY DRIVE	T3	17.3	B
OXEN POND	T2	17.3	B
OXEN POND	T3	17.3	B
STONY BROOK	T1	17.3	B
STONY BROOK	T2	17.3	B
SUNNYSIDE	T1	17.3	B
SUNNYSIDE	T4	17.3	B
WESTERN AVALON	T5	17.3	B
DEER LAKE	T2	14.4	B
HARDWOODS	GT1	12.1	B
MASSEY DRIVE	GT1	12.1	B
OXEN POND	GT1	12.1	B
STEPHENVILLE	GT1	12.1	B
WESTERN AVALON	GT1	12.1	B
BOTTOM BROOK	T1	8.6	C
BOTTOM BROOK	T3	8.6	C
HARDWOODS	T1	8.6	C
HARDWOODS	T2	8.6	C
HARDWOODS	T3	8.6	C
HOLYROOD	T6	8.6	C
HOLYROOD	T7	8.6	C
MASSEY DRIVE	T2	8.6	C
OXEN POND	T1	8.6	C
WESTERN AVALON	T3	8.6	C
WESTERN AVALON	T4	8.6	C
HARDWOODS	T4	8.6	C
BISHOP'S FALLS	PORT	7.8	C
HOWLEY	T2	7.8	C
DEER LAKE	T1	6.5	C
DOYLES	T1	5.8	C
BAY D'ESPOIR	T10	5.8	C
BAY D'ESPOIR	T12	5.8	C
HOLYROOD	T10	5.8	C
HOLYROOD	T5	5.8	C
WESTERN AVALON	T1	5.8	C

Location	Type	Criticality Score/ 10,000	Criticality Category
WESTERN AVALON	T2	5.8	C
STEPHENVILLE	T3	5.8	C
BEAR COVE	T1	3.9	C
BERRY HILL	T1	3.9	C
BOTTOM WATERS	T1	3.9	C
GRANDY BROOK	T1	3.9	C
PLUM POINT	T1	3.9	C
ST. ANTHONY AIRPORT	T1	3.9	C
DUCK POND	T1	3.5	C
BUCHANS	T2	2.9	C
HOLYROOD	SST1,2	2.9	C
HOLYROOD	SST3,4	2.9	C
BOTTOM BROOK	T2	2.6	C
PETER'S BARREN	T1	2.6	C
SOUTH BROOK	T1	1.9	D
HOLYROOD (69 kV YARD)	T1	1.7	D
BARACHIOX	T1	1.7	D
BAY D'ESPOIR	T11	1.7	D
FAREWELL HEAD	T1	1.7	D
PETER'S BARREN	SST	1.2	D
SALLY'S COVE	T1	1.2	D
ST. ANTHONY AIRPORT	SST	1.2	D
WILTONDALE	T1	1.2	D
ST. ANTHONY DIESEL PLANT	T1	1.2	D
CONNE RIVER	T1	0.9	D
COW HEAD	T1	0.9	D
ENGLISH HARBOUR WEST	T1	0.9	D
GLENBURNIE	T1	0.9	D
HAMPDEN	T1	0.9	D
JACKSON'S ARM	T1	0.9	D
MAIN BROOK	T1	0.9	D
PARSON'S POND	T1	0.9	D
ROCKY HARBOUR	T1	0.9	D
RODDICKTON WOODCHIP	T2	0.9	D
CONEY ARM	T1	0.6	D

Location	Type	Criticality Score/ 10,000	Criticality Category
DANIEL'S HARBOUR	T1	0.6	D
DANIEL'S HARBOUR	T2	0.6	D
HAWKE'S BAY	T1	0.6	D
HAWKE'S BAY	T2	0.6	D

SHEET B: CRITICALITY ANALYSIS FACTORS – TRANSFORMERS – MAY 27, 2014

Equipment Factors		
FACTOR 1 - Health and Safety		
Level	Definition	Score
1	Minor	1
2	A medical treatment	2
3	A lost time incident	4
4	A disability	6
5	Loss of life	10
Explanation: Judge based upon asset risk to both people and plant.		

FACTOR 2 - Output (Capacity Derating/Outage Time to Repair)- System		
Level	Definition	Score
1	No effect	1
2	Reduced rate minor effect	2
3	Reduced rate serious effect	3
4	Off two hours to eight hours	4
5	Off for more than eight hours	8
Explanation: Estimated time to repair.		

FACTOR 3 - Quality Of Desired Output (Voltage/Frequency)		
Level	Definition	Score
1	No effect	1
2	Minor effect without downgrade	2
3	Downgrade or block	3
4	Dump (Under frequency Load Shed)	4
Explanation: Do not choose the worst case but one that is reasonably foreseeable.		

FACTOR 4 - Utilization		
Level	Definition	Score
1	Used less than 33% of the time	1
2	Used between 33% and 66% of the time	2
3	Used more than 66% of the time	3
4	Used 100% of time	5
Explanation: Estimate percentage of scheduled production hours.		

FACTOR 5 - Alternatives		
Level	Definition	Score
1	Redundant with a transformer/line/generation and a spare is available	1
2	Redundant with another transformer but no spare is available	2
3	A mobile spare is available	3
4	A full-rated non-mobile spare is available	4
5	A lower rated non-mobile spare is available	5
6	No redundancy or spare	6

FACTOR 6 - Environment		
Level	Definition	Score
1	No effect	1
2	Minor local effect - can be contained on site, e.g. noise/smell	2
3	More serious local / minor off-plant - liable to result in discharge to atmosphere or water course, e.g. ammonia/fumes/oil	4
4	Reportable or exceeds consents - has potential for prosecution	6
5	More serious off-plant or off-site effect which involves outside services	10
Explanation: Consider oil in Transformers.		

FACTOR 7 - Time to Affect (Time of failure to take affect)		
Level	Definition	Score
1	Negligible effect	1
2	More than 24 hours	2
3	Between two hours and 24 hours	3
4	Between 30 mins and two hours	4
5	Immediate	5
Explanation: Judgment on time failure will take affect to system.		

FACTOR 8 - Customer Impacts		
Level	Definition	Score
1	Distribution \leq 25 kV	25
2	Sub Transmission 46-69 kV	69
3	Transmission 138 kV	138
4	Transmission 230 kV	230
Explanation: This will depend upon the voltage class of system impacted.		

FACTOR 9 - Loss Type		
Level	Definition	Score
1	Equipment	1
2	Facility (Station or Line)	3
3	Production (Affect generation output)	5
Explanation: Need to select the most probable loss type for the equipment failure.		

Transformer Additional Factors		
FACTOR 10 - Transformer Size		
Level	Definition	Score
1	<5 MVA	1
2	≥5 MVA	2
3	≥ 40 MVA	3
4	≥ 70 MVA	5
5	≥ 125 MVA	6
6	≥ 150 MVA	10
Explanation: Impact of transformer size.		

FACTOR 11 - System Purpose		
Level	Definition	Score
1	25 kV or less	1
2	69 kV Station	2
3	138 kV Station	3
4	230 kV Station	5
5	For Protection Reasons	7
6	Generator Step Up (GSU)	10
Explanation: Failure of equipment type could impact system.		

APPENDIX B

DGA RESULTS – ISLAND INTERCONNECTED 1993 – 2014

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BBK T1										
BBK T1	1993-09-14	15	30800	74100	5	475	2440	56.0	5.0	92.0
BBK T1	1994-09-26	15	28200	65600	5	447	2360	55.0	3.0	89.0
BBK T1	2001-01-16	5	33623	77561	0	433	2111	52.0	1.0	45.0
BBK T1	2002-04-09	20	34538	83778	9	470	2388	57.0	6.0	46.0
BBK T1	2003-03-26	12	36043	81762	4	463	2276	58.0	2.0	51.0
BBK T1	2004-04-20	7	41357	106442	2	465	2240	50.0	1.0	31.0
BBK T1	2006-04-05	10	29200	66800	5	427	2190	48.0	2.0	25.0
BBK T1	2007-04-04	10	29700	69200	5	405	2150	53.0	2.0	27.0
BBK T1	2008-03-05	10	28200	65000	5	372	2020	52.0	2.0	28.0
BBK T1	2009-03-30 10:11:00	0	27700	63600	0	354	2040	50.0	0.0	20.0
BBK T1	2010-03-15 14:35:00	0	30400	67900	0	401	2370	55.0	0.0	18.0
BBK T1	2011-03-24 15:33:00	0	30500	70100	0	409	2140	54.0	0.0	13.0
BBK T1	2012-02-16 00:00:00	0	30100	67300	0	389	2320	53.0	0.0	17.0
BBK T1	2013-03-04 00:00:00	0	28500	64300	0	346	2110	55.0	0.0	18.0
BBK T1	2014-04-01 00:00:00	20	29600	65600	0	336	2250	58.0	0.0	23.0
BBK T2										
BBK T2	1993-09-14	10	32600	78700	5	446	2700	70.0	3.0	2.0
BBK T2	1994-09-26	15	29000	65600	5	434	2730	68.0	2.0	2.0
BBK T2	2001-01-16	8	33642	76540	1	421	2528	76.0	1.0	0.0
BBK T2	2002-04-09	20	33495	83371	6	474	3221	81.0	3.0	0.0
BBK T2	2003-03-26	6	36362	81080	4	444	2684	87.0	3.0	0.0
BBK T2	2004-04-20	6	40679	96932	3	431	2842	87.0	1.0	0.0
BBK T2	2006-04-05	10	29300	66000	5	441	2800	85.0	2.0	2.0
BBK T2	2007-04-04	10	29300	65800	5	423	2920	94.0	2.0	2.0
BBK T2	2008-03-05	10	30200	67200	5	398	2830	95.0	3.0	2.0
BBK T2	2009-03-30 10:09:00	0	29100	66000	0	390	2950	95.0	0.0	0.0
BBK T2	2010-03-15 14:25:00	0	30700	66600	0	409	3340	103.0	2.0	0.0
BBK T2	2011-03-24 15:34:00	0	29900	67700	0	443	3300	112.0	3.0	0.0
BBK T2	2012-02-16 00:00:00	0	29800	66500	0	407	3370	93.0	0.0	0.0
BBK T2	2013-03-04 00:00:00	0	29300	65500	0	385	3170	94.0	2.0	0.0
BBK T2	2014-04-01 00:00:00	0	31900	71000	0	392	3300	77.0	0.0	0.0
BBK T3										
BBK T3	1993-09-13	20	27700	75500	5	173	880	28.0	6.0	30.0
BBK T3	1994-09-26	30	26800	59100	5	227	1040	26.0	5.0	25.0
BBK T3	1995-03-30	515	38400	103000	105	78	753	125.0	2.0	1470.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BBK T3	2000-10-13	11	33633	80151	2	322	1645	18.0	2.0	7.0
BBK T3	2002-04-09	29	33473	85244	7	425	1865	22.0	3.0	8.0
BBK T3	2003-03-26	19	32470	89768	2	438	1605	21.0	2.0	2.0
BBK T3	2004-04-20	12	32840	89393	2	580	2096	34.0	3.0	2.0
BBK T3	2006-04-05	10	26000	65200	5	511	1930	36.0	2.0	2.0
BBK T3	2008-03-04	10	27100	65400	5	449	1750	40.0	3.0	2.0
BBK T3	2009-03-30 10:13:00	0	23700	63100	0	448	1770	37.0	0.0	0.0
BBK T3	2010-03-15 14:33:00	0	27200	67800	0	476	1940	38.0	0.0	2.0
BBK T3	2011-03-24 15:36:00	0	27600	71100	0	540	1740	39.0	0.0	0.0
BBK T3	2012-02-16 00:00:00	0	26800	65300	0	444	1720	33.0	0.0	0.0
BBK T3	2013-03-04 00:00:00	0	24800	61300	0	421	1580	31.0	0.0	0.0
BBK T3	2014-04-01 00:00:00	0	27300	65000	0	442	1600	24.0	0.0	0.0
BBK T3	2014-05-02 00:00:00	0	28300	67700	0	419	1610	19.0	0.0	0.0
BCV T1										
BCV T1	1997-09-05	10	29100	58400	25	55	441	2.0	2.0	2.0
BCV T1	2002-05-01	4	35788	75197	3	64	709	1.0	0.0	0.0
BCV T1	2003-03-10	5	38960	79405	0	73	801	0.0	0.0	0.0
BCV T1	2004-04-15	2	37754	76684	1	73	835	0.0	0.0	0.0
BCV T1	2006-04-12	10	31800	60400	5	54	881	2.0	2.0	2.0
BCV T1	2007-07-17	10	31700	60100	5	56	975	2.0	2.0	2.0
BCV T1	2008-04-23	10	31600	59900	5	58	972	2.0	2.0	2.0
BCV T1	2009-05-13 14:45:00	0	33400	62000	0	57	1050	0.0	0.0	0.0
BCV T1	2010-02-11 13:10:55	0	30900	58900	0	57	1010	0.0	0.0	0.0
BCV T1	2011-03-29 14:14:00	0	32600	61100	0	59	1130	0.0	0.0	0.0
BCV T1	2013-06-06 00:00:00	0	31400	59100	0	53	1070	0.0	0.0	0.0
BCV T1	5/27/2014 0:00	0	31200	58200	0	44	1120	0	0	0.0
BCX T1										
BCX T1	1994-02-22	30	29700	66600	5	86	623	2.0	3.0	2.0
BCX T1	1994-10-07	105	30200	78500	5	162	768	2.0	4.0	2.0
BCX T1	1995-05-02	90	24000	67900	5	163	604	2.0	3.0	2.0
BCX T1	1996-02-13	100	26500	67700	5	235	828	2.0	3.0	2.0
BCX T1	1997-03-25	110	21800	67000	5	287	914	2.0	4.0	2.0
BCX T1	1998-04-01	115	23300	67100	5	315	1030	2.0	4.0	2.0
BCX T1	1999-03-04	120	24700	83500	10	409	1220	2.0	4.0	2.0
BCX T1	2000-09-11	191	21244	93996	3	582	1612	1.0	2.0	0.0
BCX T1	2002-07-22	107	18564	93057	4	665	1787	3.0	3.0	2.0
BCX T1	2014-05-25	20	6320	72100	15	1040	2660	7.0	6.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T1										
BDE T1	1993-02-22	10	16200	65300	5	667	3350	114.0	3.0	2.0
BDE T1	1994-02-16	10	22400	90700	5	715	3260	97.0	3.0	2.0
BDE T1	1995-05-03	10	19100	65700	5	581	2600	81.0	2.0	2.0
BDE T1	1996-02-15	10	22600	75500	5	550	2510	71.0	2.0	2.0
BDE T1	1997-03-27	10	12700	60600	5	649	2660	61.0	2.0	2.0
BDE T1	1998-04-01	10	5480	63100	5	878	3890	68.0	3.0	2.0
BDE T1	1999-03-05	10	7040	75900	20	988	4110	65.0	3.0	2.0
BDE T1	2000-09-13	8	5772	86909	47	1377	4368	48.0	6.0	0.0
BDE T1	2001-05-02	13	1031	59959	0	1257	3701	29.0	8.0	0.0
BDE T1	2002-02-20	14	8235	106630	53	1616	5011	46.0	17.0	2.0
BDE T1	2002-10-08	0	7790	26896	1	24	236	0.0	0.0	0.0
BDE T1	2003-04-08	7	26258	74565	3	275	1040	37.0	2.0	0.0
BDE T1	2003-09-30	22	17095	68016	7	817	3991	96.0	1.0	0.0
BDE T1	2003-10-04	11	4451	47767	10	299	1546	13.0	8.0	0.0
BDE T1	2004-04-30	6	23883	73141	9	311	1933	39.0	4.0	0.0
BDE T1	2006-04-04	15	24600	62800	10	459	2660	61.0	6.0	2.0
BDE T1	2007-03-14	10	25900	63400	5	451	2720	54.0	4.0	2.0
BDE T1	2008-02-13	10	27000	65900	5	386	2760	56.0	4.0	2.0
BDE T1	2009-02-24 13:39:00	0	28000	72600	7	521	3340	68.0	7.0	0.0
BDE T1	2010-03-29 14:48:00	0	24200	62500	7	433	2540	49.0	3.0	0.0
BDE T1	2011-03-02 13:58:00	0	25700	63200	6	489	3070	52.0	3.0	0.0
BDE T1	2012-02-16 00:00:00	0	30000	87500	0	554	3050	58.0	3.0	0.0
BDE T1	2013-02-19 00:00:00	0	18400	63800	6	676	4520	84.0	3.0	0.0
BDE T1	2014-02-26 00:00:00	0	23500	61300	0	525	4110	65.0	0.0	0.0
BDE T2										
BDE T2	1993-02-22	10	22900	63100	5	369	1550	32.0	2.0	2.0
BDE T2	1994-02-16	10	31800	110000	5	564	1810	34.0	2.0	2.0
BDE T2	1995-05-03	10	17700	61700	5	595	2410	57.0	2.0	2.0
BDE T2	1996-02-15	10	21200	71500	5	579	2530	61.0	2.0	2.0
BDE T2	1997-03-27	10	18100	59900	5	500	2210	54.0	2.0	2.0
BDE T2	1998-04-01	10	19600	65800	5	568	2660	50.0	2.0	2.0
BDE T2	1999-03-05	10	19200	74300	5	635	2800	56.0	2.0	2.0
BDE T2	2000-09-13	11	8193	76080	4	938	2887	48.0	1.0	0.0
BDE T2	2001-05-02	10	11360	57442	0	577	2086	25.0	0.0	0.0
BDE T2	2002-02-20	15	20055	95169	6	712	2305	28.0	7.0	2.0
BDE T2	2003-04-08	12	22134	94212	8	732	2704	35.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T2	2004-07-04	16	3656	81525	13	1160	3024	19.0	2.0	0.0
BDE T2	2006-04-04	10	28300	59800	5	164	1110	52.0	2.0	2.0
BDE T2	2007-03-14	10	29500	61900	5	207	1450	71.0	2.0	2.0
BDE T2	2008-02-13	10	28200	63400	5	245	1720	64.0	2.0	2.0
BDE T2	2009-02-24 13:30:00	0	31700	66400	0	243	1690	49.0	0.0	0.0
BDE T2	2010-03-29 14:51:00	0	27300	59200	0	215	1320	30.0	0.0	0.0
BDE T2	2011-03-02 14:00:00	0	29800	61200	0	195	1350	24.0	0.0	0.0
BDE T2	2012-02-16 00:00:00	0	29800	62500	0	221	1460	23.0	0.0	0.0
BDE T2	2013-02-19 00:00:00	0	29600	61500	0	230	1580	20.0	0.0	0.0
BDE T2	2014-02-26 00:00:00	0	25800	60100	0	342	2090	33.0	0.0	0.0
BDE T3										
BDE T3	1993-02-22	15	4230	73300	55	1130	3640	27.0	32.0	2.0
BDE T3	1994-02-16	15	3010	69900	65	1260	4460	29.0	38.0	2.0
BDE T3	1995-05-03	15	3860	63700	70	1180	3710	26.0	42.0	2.0
BDE T3	1996-02-15	15	3860	66200	85	1280	4480	35.0	53.0	2.0
BDE T3	1997-03-27	15	2260	59900	65	1150	4060	28.0	52.0	2.0
BDE T3	1998-04-01	10	3310	57400	70	1100	3620	23.0	48.0	2.0
BDE T3	1999-03-05	15	5950	79600	90	1390	4860	32.0	58.0	2.0
BDE T3	2000-09-13	25	5203	90675	109	1705	5670	35.0	62.0	0.0
BDE T3	2001-05-02	17	443	54371	55	1269	4280	23.0	42.0	0.0
BDE T3	2002-02-20	30	6011	103795	127	1831	6507	44.0	86.0	2.0
BDE T3	2002-10-04	1	9488	34379	1	38	385	1.0	1.0	0.0
BDE T3	2003-04-08	8	24573	76033	3	306	1242	21.0	1.0	0.0
BDE T3	2003-09-23	22	6317	77112	7	1115	5052	89.0	2.0	0.0
BDE T3	2003-09-29	6	4056	23828	5	114	626	6.0	3.0	0.0
BDE T3	2004-04-30	12	17141	57743	3	343	1599	56.0	2.0	0.0
BDE T3	2006-04-04	10	19200	66900	5	677	4110	113.0	3.0	2.0
BDE T3	2007-03-14	10	18300	66000	5	723	4670	108.0	2.0	2.0
BDE T3	2008-02-13	10	17600	65700	5	790	6280	135.0	3.0	2.0
BDE T3	2008-03-06	10	17800	66400	5	770	6100	136.0	3.0	2.0
BDE T3	2009-02-26 13:35:00	0	16100	63400	6	856	6790	139.0	2.0	0.0
BDE T3	2010-03-29 14:53:00	0	12200	63900	6	848	6310	116.0	3.0	0.0
BDE T3	2011-03-02 14:02:00	0	17500	64000	0	787	6690	113.0	0.0	0.0
BDE T3	2012-02-16 00:00:00	0	17600	66400	6	893	7550	137.0	0.0	0.0
BDE T3	2013-02-19 00:00:00	0	15900	62700	0	927	7930	144.0	0.0	0.0
BDE T3	2013-06-12 00:00:00	0	18200	67700	0	954	7740	141.0	0.0	0.0
BDE T3	2013-07-26 00:00:00	0	15900	66100	0	984	8120	123.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T3	2013-09-19 00:00:00	0	15400	66500	0	1030	8200	131.0	0.0	0.0
BDE T3	2014-01-14 00:00:00	0	16900	63100	6	934	7570	130.0	0.0	0.0
BDE T3	2014-05-21 00:00:00	10	14200	63700	0	928	7190	121.0	0.0	0.0
BDE T4										
BDE T4	1993-02-22	10	22200	69800	5	475	2620	86.0	2.0	2.0
BDE T4	1994-02-16	10	25300	77700	5	561	2690	78.0	2.0	2.0
BDE T4	1995-05-03	10	22500	61400	5	465	2800	90.0	2.0	2.0
BDE T4	1996-02-15	10	24200	65900	5	517	2740	88.0	2.0	2.0
BDE T4	1997-03-27	10	23000	61400	5	435	2250	65.0	2.0	2.0
BDE T4	1998-04-01	10	19100	54800	5	502	2400	65.0	2.0	2.0
BDE T4	1999-03-05	10	22100	66900	5	678	3610	3.0	2.0	2.0
BDE T4	2000-09-13	22	12616	77384	3	1430	6262	121.0	1.0	0.0
BDE T4	2001-05-02	0	16922	55432	0	631	3783	227.0	0.0	0.0
BDE T4	2002-02-20	6	31808	88076	3	627	3704	101.0	2.0	0.0
BDE T4	2003-04-08	8	28936	76457	3	456	2646	66.0	2.0	0.0
BDE T4	2006-04-04	10	20500	63300	5	661	2780	43.0	2.0	2.0
BDE T4	2007-03-14	10	25100	71800	5	569	2620	37.0	2.0	2.0
BDE T4	2008-02-13	10	23900	66200	5	532	2970	44.0	2.0	2.0
BDE T4	2009-02-26 13:37:00	0	26300	92500	0	717	3620	45.0	0.0	0.0
BDE T4	2010-03-29 14:55:00	0	19200	62300	0	605	3680	51.0	0.0	0.0
BDE T4	2011-03-02 14:03:00	0	14000	65800	0	891	4370	44.0	0.0	0.0
BDE T4	2012-02-16 00:00:00	0	13700	66300	0	948	3530	26.0	0.0	0.0
BDE T4	2012-08-14 00:00:00	0	10900	35000	0	0	74	0.0	0.0	0.0
BDE T4	2012-08-21 00:00:00	0	5490	24600	0	11	148	0.0	0.0	0.0
BDE T4	2013-02-19 00:00:00	0	23500	48000	0	98	1110	0.0	0.0	0.0
BDE T4	2014-02-26 00:00:00	0	28000	62600	0	249	1650	4.0	0.0	0.0
BDE T5										
BDE T5	1993-02-22	10	31900	76200	5	214	1350	24.0	2.0	2.0
BDE T5	1994-02-16	10	29200	67200	5	364	1820	34.0	2.0	2.0
BDE T5	1995-05-03	10	32400	78700	5	333	1760	36.0	2.0	2.0
BDE T5	1996-02-15	10	31000	70800	5	297	1730	33.0	2.0	2.0
BDE T5	1997-03-27	10	28600	66400	5	328	2010	40.0	2.0	2.0
BDE T5	1998-04-01	10	30100	68800	5	349	1850	37.0	2.0	2.0
BDE T5	1999-03-05	10	29200	68700	5	416	2640	50.0	2.0	2.0
BDE T5	2000-09-13	11	30624	79384	2	447	2008	36.0	1.0	0.0
BDE T5	2001-05-02	0	28484	68022	0	350	2102	36.0	0.0	0.0
BDE T5	2002-02-20	5	37505	84504	3	355	1909	46.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T5	2003-04-08	4	36711	79337	4	279	1773	42.0	3.0	0.0
BDE T5	2006-04-04	10	32100	73900	5	315	1710	32.0	2.0	2.0
BDE T5	2007-03-14	10	30800	67300	5	328	2110	40.0	2.0	2.0
BDE T5	2008-02-13	10	32000	69900	5	289	2150	45.0	2.0	2.0
BDE T5	2009-02-26 14:38:00	0	31100	67900	0	351	2460	51.0	0.0	0.0
BDE T5	2010-03-29 14:57:00	0	28900	65900	0	306	1820	36.0	0.0	0.0
BDE T5	2010-12-21 14:00:00	0	31500	72100	0	310	1900	33.0	0.0	0.0
BDE T5	2011-03-02 14:19:00	0	32300	71900	0	264	1880	31.0	0.0	0.0
BDE T5	2012-02-16 00:00:00	0	31500	70300	0	310	2100	34.0	0.0	0.0
BDE T5	2013-02-19 00:00:00	0	30700	66900	5	350	2580	37.0	0.0	0.0
BDE T5	2014-02-26 00:00:00	0	31800	74600	0	377	2790	48.0	0.0	0.0
BDE T6										
BDE T6	1993-02-22	10	30400	68500	5	286	1960	43.0	2.0	2.0
BDE T6	1994-02-16	10	30500	69200	5	345	2100	38.0	2.0	2.0
BDE T6	1995-05-03	10	31000	73000	5	291	1780	36.0	2.0	2.0
BDE T6	1996-02-15	10	31100	69900	5	286	1840	37.0	2.0	2.0
BDE T6	1997-03-27	10	29600	67700	5	313	2030	37.0	2.0	2.0
BDE T6	1998-04-01	10	29600	66100	5	268	2130	37.0	2.0	2.0
BDE T6	1999-03-05	10	30500	68900	5	417	2990	52.0	2.0	2.0
BDE T6	2000-09-13	15	28920	82813	3	716	3300	55.0	0.0	0.0
BDE T6	2001-05-02	0	25846	59521	0	310	2282	37.0	0.0	0.0
BDE T6	2002-02-20	4	35749	82449	2	389	2375	51.0	1.0	1.0
BDE T6	2003-04-08	5	35507	80844	2	259	1506	30.0	1.0	0.0
BDE T6	2006-04-04	10	32200	70600	5	289	1680	26.0	2.0	2.0
BDE T6	2007-03-14	10	32200	67000	5	256	1710	27.0	2.0	2.0
BDE T6	2008-02-13	10	32000	69400	5	256	1780	29.0	2.0	2.0
BDE T6	2009-02-26 14:37:00	0	32600	69600	0	312	2160	35.0	0.0	0.0
BDE T6	2010-03-29 14:58:00	0	31200	66200	0	229	1640	27.0	0.0	0.0
BDE T6	2011-03-02 14:20:00	0	31900	73200	0	360	2450	30.0	0.0	0.0
BDE T6	2012-02-16 00:00:00	0	35200	80400	0	313	2260	31.0	0.0	0.0
BDE T6	2013-02-19 00:00:00	0	31200	65500	0	273	2060	25.0	0.0	0.0
BDE T6	2014-02-26 00:00:00	0	34800	86500	0	316	2380	18.0	0.0	0.0
BDE T7										
BDE T7	1993-02-25	20	21700	84100	5	467	8460	28.0	12.0	2.0
BDE T7	1994-02-21	15	22400	68300	5	387	8320	23.0	11.0	2.0
BDE T7	1995-05-04	30	16700	73400	5	557	9520	19.0	14.0	2.0
BDE T7	1996-02-15	35	13400	67300	5	611	11000	22.0	15.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T7	1997-03-27	65	12500	82400	5	778	11400	18.0	14.0	2.0
BDE T7	1998-03-27	60	12800	64500	5	685	11600	12.0	10.0	2.0
BDE T7	1999-03-05	35	21700	76400	5	535	11700	18.0	10.0	2.0
BDE T7	2000-09-13	62	15793	81418	2	811	13415	12.0	5.0	0.0
BDE T7	2002-02-20	43	19509	83886	4	648	17027	19.0	7.0	0.0
BDE T7	2002-10-11	3	17922	66031	1	35	694	1.0	1.0	0.0
BDE T7	2003-04-08	9	32566	83197	3	314	2045	18.0	1.0	0.0
BDE T7	2003-09-16	24	28127	89721	4	474	3360	44.0	1.0	0.0
BDE T7	2003-09-23	5	3326	28069	5	135	485	11.0	5.0	0.0
BDE T7	2004-04-30	22	17304	79400	5	429	3302	21.0	3.0	0.0
BDE T7	2006-04-04	15	27100	65200	5	405	6110	117.0	5.0	2.0
BDE T7	2007-03-14	15	26300	66900	5	430	5570	122.0	4.0	2.0
BDE T7	2008-02-13	15	23700	68800	5	510	5540	116.0	4.0	2.0
BDE T7	2009-02-26 14:17:00	20	26200	69400	0	551	6330	139.0	3.0	0.0
BDE T7	2010-03-29 15:14:00	15	26000	66100	0	503	8770	217.0	5.0	0.0
BDE T7	2011-03-02 14:21:00	20	24700	69900	0	617	9950	251.0	5.0	0.0
BDE T7	2012-02-14 00:00:00	10	25900	69600	0	552	9710	255.0	5.0	0.0
BDE T7	2013-02-19 00:00:00	0	25900	65700	0	481	10800	255.0	4.0	0.0
BDE T7	2013-06-12 00:00:00	15	26400	70200	0	516	10500	244.0	3.0	0.0
BDE T7	2013-09-19 00:00:00	25	23900	71700	0	653	12000	237.0	0.0	0.0
BDE T7	2014-04-11 00:00:00	30	23300	66000	5	629	11200	299.0	6.0	0.0
BDE T7	2014-05-21 00:00:00	20	22800	66600	0	595	10900	212.0	3.0	0.0
BDE T10										
BDE T10	1993-02-22	20	31900	71600	5	134	1080	4.0	2.0	26.0
BDE T10	1993-05-29	20	32800	66900	5	142	1120	6.0	2.0	28.0
BDE T10	1993-10-14	20	31000	70600	5	153	1100	4.0	2.0	26.0
BDE T10	1994-02-21	20	31800	64200	5	140	1000	3.0	2.0	24.0
BDE T10	1995-05-04	20	29600	63700	5	144	1030	3.0	2.0	25.0
BDE T10	1996-02-12	20	33600	74800	5	152	1170	5.0	2.0	24.0
BDE T10	1997-03-27	15	30900	65100	5	146	1120	4.0	2.0	23.0
BDE T10	1998-03-27	15	28500	64100	5	177	1160	3.0	2.0	19.0
BDE T10	1999-03-05	15	33300	67400	5	162	1330	3.0	2.0	22.0
BDE T10	2000-09-13	21	34968	76583	2	212	1354	2.0	0.0	26.0
BDE T10	2002-02-18	15	37206	81958	3	205	1441	6.0	1.0	27.0
BDE T10	2003-04-11	18	37646	79007	1	184	1272	2.0	0.0	24.0
BDE T10	2004-04-30	20	38876	84354	1	204	1365	4.0	1.0	23.0
BDE T10	2006-04-06	20	31400	63200	5	175	1170	5.0	2.0	18.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T10	2007-03-14	15	31800	64400	5	187	1290	7.0	2.0	20.0
BDE T10	2008-02-12	15	31300	66600	5	196	1320	6.0	2.0	20.0
BDE T10	2009-02-27 14:35:00	15	32700	68900	0	200	1390	6.0	0.0	22.0
BDE T10	2010-03-29 15:15:00	15	32700	65400	0	216	1410	8.0	0.0	24.0
BDE T10	2011-03-02 14:21:00	15	32500	66300	0	216	1400	9.0	0.0	23.0
BDE T10	2012-02-14 00:00:00	0	31900	67000	0	234	1400	9.0	0.0	21.0
BDE T10	2013-02-19 00:00:00	15	30600	62900	0	211	1470	7.0	0.0	17.0
BDE T10	2014-02-26 00:00:00	20	29700	64300	0	234	1470	11.0	0.0	29.0
BDE T11										
BDE T11	1993-02-22	10	32000	68100	5	61	869	2.0	2.0	2.0
BDE T11	1994-02-21	10	33000	66600	5	60	947	2.0	2.0	2.0
BDE T11	1995-05-04	10	31000	66100	5	59	945	2.0	2.0	2.0
BDE T11	1996-02-12	10	33900	70700	5	67	1030	2.0	2.0	2.0
BDE T11	1997-03-27	10	31200	67000	5	62	1150	2.0	2.0	2.0
BDE T11	1998-03-27	10	32400	66300	5	64	1110	2.0	2.0	2.0
BDE T11	1999-03-05	10	35100	75900	5	76	1120	3.0	2.0	2.0
BDE T11	2000-09-13	12	35090	77269	0	92	1201	1.0	0.0	0.0
BDE T11	2002-02-18	5	38021	81258	2	86	1294	3.0	1.0	0.0
BDE T11	2003-04-11	12	38915	77862	1	85	1276	1.0	1.0	0.0
BDE T11	2004-04-30	12	32537	78254	2	88	1249	2.0	2.0	0.0
BDE T11	2006-04-06	10	33000	64500	5	74	1210	3.0	2.0	2.0
BDE T11	2007-03-14	10	31300	65100	5	87	1300	5.0	2.0	2.0
BDE T11	2008-02-12	10	32900	66000	5	78	1240	4.0	2.0	2.0
BDE T11	2009-02-27 14:30:00	0	34600	66600	0	77	1300	5.0	0.0	0.0
BDE T11	2010-03-29 15:16:00	0	33500	65700	0	78	1260	4.0	0.0	0.0
BDE T11	2011-03-02 14:32:00	20	33100	65600	0	68	1100	4.0	0.0	0.0
BDE T11	2012-02-14 00:00:00	15	31600	62900	0	90	1210	4.0	0.0	0.0
BDE T11	2013-02-19 00:00:00	20	32500	64200	0	98	1470	2.0	0.0	0.0
BDE T11	2014-02-24 00:00:00	15	30400	63800	0	90	1400	5.0	2.0	0.0
BDE T12										
BDE T12	1993-03-01	10	24700	60100	5	216	564	2.0	2.0	2.0
BDE T12	1994-02-21	10	27300	61800	5	220	688	2.0	2.0	2.0
BDE T12	1995-05-04	10	27800	65800	5	229	807	2.0	2.0	2.0
BDE T12	1996-02-12	10	29600	65000	5	238	963	2.0	2.0	2.0
BDE T12	1997-03-27	10	29000	67700	5	234	1000	2.0	2.0	2.0
BDE T12	1998-03-27	10	30300	71800	5	256	1090	2.0	2.0	2.0
BDE T12	1999-03-05	10	27500	65600	5	311	1320	4.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BDE T12	2000-09-13	7	25801	73850	2	558	1760	15.0	0.0	0.0
BDE T12	2002-02-18	2	32822	89068	5	612	2072	37.0	3.0	0.0
BDE T12	2003-04-11	6	32073	83201	2	572	2006	39.0	1.0	0.0
BDE T12	2004-04-30	4	28063	84893	2	520	2011	45.0	0.0	0.0
BDE T12	2007-03-14	10	25600	66400	5	418	1970	53.0	2.0	2.0
BDE T12	2008-02-12	10	25000	63700	5	432	1980	52.0	2.0	2.0
BDE T12	2009-02-27 14:53:00	0	27000	73000	0	467	2090	52.0	0.0	0.0
BDE T12	2010-03-29 15:18:00	0	25200	63900	0	474	2020	55.0	0.0	0.0
BDE T12	2011-03-02 14:33:00	0	25500	65100	0	468	2150	57.0	0.0	0.0
BDE T12	2012-02-14 00:00:00	0	24200	63100	0	494	2190	53.0	0.0	0.0
BDE T12	2013-02-19 00:00:00	0	24000	63000	0	491	2300	60.0	0.0	0.0
BDE T12	2014-02-25 00:00:00	0	30700	87000	0	389	1850	58.0	0.0	0.0
BHL T1										
BHL T1	2002-04-03	5	36592	78420	2	66	1046	2.0	0.0	0.0
BHL T1	2003-03-21	5	31902	87788	2	104	1136	0.0	2.0	0.0
BHL T1	2004-03-10	4	36501	77364	1	81	1399	0.0	0.0	0.0
BHL T1	2006-04-27	10	32400	63200	5	50	1190	2.0	2.0	2.0
BHL T1	2007-05-04	10	34000	69000	5	52	1180	2.0	2.0	2.0
BHL T1	2008-04-17	10	31300	62200	5	58	1250	2.0	2.0	2.0
BHL T1	2009-04-08 10:56:00	0	22000	60000	0	77	1330	0.0	0.0	0.0
BHL T1	2010-02-24 13:10:00	0	18500	61700	0	145	1490	0.0	0.0	0.0
BHL T1	2011-03-24 08:39:00	0	31200	63600	0	67	1380	0.0	0.0	0.0
BHL T1	2012-03-14 00:00:00	0	27700	61600	0	62	1310	0.0	0.0	0.0
BHL T1	2013-02-19 00:00:00	0	31900	61300	0	67	1450	0.0	0.0	0.0
BHL T1	5/27/2014 0:00	0	30300	62000	0	76	1470	0	0	0
BUC GT1										
BUC GT1	2010-03-09 12:01:00	0	29600	61700	0	121	954	13.0	0.0	0.0
BUC GT1	2011-04-08 14:19:00	0	28900	65700	0	130	933	13.0	0.0	0.0
BUC GT1	2012-02-26 00:00:00	0	25800	58400	0	101	939	15.0	0.0	0.0
BUC GT1	2013-03-21 00:00:00	0	30600	73900	0	138	952	14.0	0.0	0.0
BUC GT1	2014-03-06 00:00:00	0	28800	63000	0	131	989	11.0	0.0	0.0
BUC T1										
BUC T1	1993-09-08	35	17400	67700	5	707	2510	91.0	2.0	12.0
BUC T1	1994-09-29	45	17600	58200	5	662	2340	78.0	2.0	13.0
BUC T1	1998-06-25	10	3670	8670	5	21	124	2.0	2.0	2.0
BUC T1	1998-07-10	10	7210	16000	5	28	258	3.0	2.0	2.0
BUC T1	1998-07-29	10	15300	45800	5	54	408	4.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
BUC T1	1999-03-05	10	19900	56000	5	126	605	10.0	2.0	3.0
BUC T1	2000-09-16	16	26209	73769	1	390	1376	32.0	0.0	4.0
BUC T1	2002-02-19	18	33244	80261	3	412	1828	53.0	3.0	25.0
BUC T1	2003-04-01	34	22612	86045	5	496	2085	73.0	2.0	39.0
BUC T1	2004-04-07	23	28540	74548	2	424	2068	86.0	1.0	44.0
BUC T1	2006-04-07	10	25100	58200	5	310	1930	94.0	2.0	44.0
BUC T1	2007-03-14	10	25200	61000	5	348	2100	105.0	2.0	42.0
BUC T1	2009-03-10 08:48:00	0	25900	56700	0	115	802	11.0	0.0	0.0
BUC T1	2010-03-09 10:47:00	0	26400	60500	0	316	1840	96.0	0.0	35.0
BUC T1	2010-12-19 13:21:00	0	25600	61000	0	346	1770	87.0	0.0	26.0
BUC T1	2011-04-08 14:10:00	0	25000	63100	0	321	1660	89.0	0.0	27.0
BUC T1	2012-02-26 00:00:00	0	24100	57300	0	353	1880	104.0	0.0	29.0
BUC T1	2013-03-21 00:00:00	0	24100	59800	0	355	2130	114.0	3.0	33.0
BUC T1	2014-03-06 00:00:00	0	24700	60400	0	307	2010	124.0	0.0	38.0
BUC T2										
BUC T2	1999-03-05	15	21400	72800	5	88	396	3.0	2.0	2.0
BUC T2	2002-02-19	0	43969	85497	3	2	695	1.0	0.0	0.0
BUC T2	2003-08-06	0	38456	82363	0	17	649	0.0	0.0	0.0
BUC T2	2006-04-07	10	32600	62200	5	7	429	2.0	2.0	2.0
BUC T2	2009-03-10 08:49:00	0	32000	60800	0	0	428	0.0	0.0	0.0
BUC T2	2011-04-08 14:12:00	0	32100	60500	0	0	404	0.0	0.0	0.0
BUC T2	2014-06-01	0			1	1	492	0.0	7.0	0.0
BWT T1										
BWT T1	1993-03-03	10	23300	82500	5	152	619	2.0	2.0	2.0
BWT T1	1994-02-17	10	24600	88200	5	200	574	2.0	2.0	2.0
BWT T1	1995-05-03	10	17100	68800	5	282	745	2.0	2.0	2.0
BWT T1	1996-02-22	10	15600	59800	5	301	853	2.0	2.0	2.0
BWT T1	1999-03-01	10	31500	66800	5	41	679	2.0	2.0	2.0
BWT T1	2002-02-21	17	13970	92596	2	710	2004	2.0	1.0	0.0
BWT T1	2004-04-20	4	6370	74579	2	647	1701	3.0	0.0	0.0
BWT T1	2014-06-01	8			6	132	492	0.0	7.0	0.5
CAM T1										
CAM T1	1993-03-10	10	31500	66800	5	33	596	2.0	2.0	2.0
CAM T1	1994-04-25	10	33000	62700	5	26	606	2.0	2.0	2.0
CAM T1	1995-04-24	10	31300	64800	5	22	577	2.0	2.0	2.0
CAM T1	1996-02-06	10	32500	62600	5	38	649	2.0	2.0	2.0
CAM T1	1997-04-10	10	32200	64500	5	29	611	2.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
CAM T1	1998-06-02	10	31800	64700	5	35	696	2.0	2.0	2.0
CAM T1	1999-03-26	10	33500	62500	5	31	690	2.0	2.0	2.0
CAM T1	2000-09-26	1	31716	72903	0	76	845	1.0	0.0	0.0
CAM T1	2002-03-01	2	36210	86723	4	74	913	6.0	2.0	0.0
CAM T1	2003-06-18	2	38229	79202	1	60	863	0.0	0.0	0.0
CAM T1	2004-05-11	0	37795	76374	0	44	747	0.0	0.0	0.0
CAM T1	2006-05-24	10	32900	62500	5	38	751	2.0	2.0	2.0
CAM T1	2007-08-04	10	32000	62500	5	49	847	2.0	2.0	2.0
CAM T1	2008-03-12	10	29500	59100	5	47	678	2.0	2.0	2.0
CAM T1	2009-03-11 15:40:00	0	32800	62400	0	49	741	0.0	0.0	0.0
CAM T1	2010-05-19 11:12:00	0	29800	62100	0	91	809	3.0	0.0	0.0
CAM T1	2011-05-19 13:18:00	0	32200	65600	0	74	772	15.0	0.0	4.0
CAM T1	2012-05-24 00:00:00	0	35300	82100	0	86	782	4.0	0.0	0.0
CAM T1	2013-05-24 00:00:00	0	33100	64300	0	75	795	4.0	0.0	0.0
CAM T1	2014-05-27 00:00:00	0	32500	62000	0	61	889	3.0	0.0	0.0
CAT T1										
CAT T1	1993-03-10	10	29400	67500	5	232	4120	136.0	2.0	2.0
CAT T1	1994-04-25	10	29500	64400	5	284	4680	121.0	2.0	2.0
CAT T1	1995-04-24	10	28900	69500	5	292	4250	123.0	2.0	2.0
CAT T1	1996-02-07	10	23500	71500	5	417	5310	148.0	2.0	2.0
CAT T1	1997-04-10	10	26300	64700	5	432	6520	182.0	2.0	2.0
CAT T1	1998-03-18	10	27200	65800	15	460	7380	571.0	42.0	2.0
CAT T1	1998-06-02	10	31000	82700	5	464	7760	168.0	2.0	2.0
CAT T1	1999-03-26	10	28000	66400	5	372	7120	179.0	3.0	2.0
CAT T1	2000-09-28	14	11030	80973	3	1075	11951	174.0	1.0	0.0
CAT T1	2002-03-01	6	28216	81417	4	386	9195	151.0	6.0	0.0
CAT T1	2003-06-18	26	10780	83030	5	966	10466	100.0	6.0	0.0
CAT T1	2006-05-24	10	20000	66100	5	579	9350	43.0	2.0	2.0
CAT T1	2007-08-08	10	19400	66500	5	535	9910	34.0	4.0	2.0
CAT T1	2008-03-12	10	29900	88900	5	360	7270	26.0	2.0	2.0
CAT T1	2009-03-12 15:42:00	0	17300	71400	18	788	11700	27.0	8.0	0.0
CAT T1	2009-10-04 08:31:00	0	3880	7950	0	0	174	0.0	0.0	0.0
CAT T1	2010-05-18 11:19:00	0	31300	76500	0	294	3050	3.0	0.0	0.0
CAT T1	2011-05-19 13:20:00	0	28300	65500	0	296	5470	26.0	0.0	0.0
CAT T1	2012-05-24 00:00:00	0	27100	68500	0	427	7220	48.0	0.0	0.0
CAT T1	2012-11-20 00:00:00	0	23900	62600	0	503	7640	47.0	0.0	0.0
CAT T1	2013-05-24 00:00:00	0	28700	63400	0	278	5930	40.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
CAT T1	2014-05-27 00:00:00	0	29800	63900	0	227	4820	21.0	0.0	0.0
CAT T2										
CAT T2	1993-03-10	10	28400	69200	10	367	4850	755.0	105.0	2.0
CAT T2	1993-05-19	10	31400	72100	10	352	5160	730.0	93.0	2.0
CAT T2	1993-10-21	10	23400	66700	5	740	7220	698.0	79.0	2.0
CAT T2	1994-04-25	10	30400	67800	5	342	5050	596.0	60.0	2.0
CAT T2	1995-04-24	10	26600	65800	10	408	5490	528.0	55.0	2.0
CAT T2	1996-02-07	10	24500	66500	5	560	6870	590.0	50.0	2.0
CAT T2	1997-04-10	10	26800	69900	10	503	7190	586.0	49.0	2.0
CAT T2	1998-06-02	10	28700	75200	10	544	8480	539.0	40.0	2.0
CAT T2	1999-03-26	10	27700	71900	10	550	7960	537.0	38.0	2.0
CAT T2	2000-09-28	9	26385	86825	59	980	11507	715.0	60.0	0.0
CAT T2	2002-03-01	3	33331	82723	6	437	10132	732.0	55.0	2.0
CAT T2	2003-06-18	8	26551	73851	6	690	10143	589.0	45.0	0.0
CAT T2	2006-05-24	10	22500	66800	10	878	9770	414.0	24.0	2.0
CAT T2	2007-08-08	10	25000	67300	10	630	9230	347.0	22.0	2.0
CAT T2	2007-10-05	10	27000	72200	10	586	7850	300.0	19.0	2.0
CAT T2	2007-11-15	10	8290	17000	5	40	1010	7.0	2.0	2.0
CAT T2	2008-03-12	10	22000	45400	5	97	1590	15.0	2.0	2.0
CAT T2	2009-03-12 15:48:00	0	27000	63300	39	389	4620	72.0	18.0	0.0
CAT T2	2010-05-18 11:13:00	0	31800	68500	65	331	5010	216.0	55.0	0.0
CAT T2	2011-05-19 13:19:00	0	29600	65600	18	320	5110	140.0	37.0	0.0
CAT T2	2013-05-24 00:00:00	0	29600	64500	99	314	6730	470.0	127.0	0.0
CAT T2	2013-06-21 00:00:00	0	31100	72200	79	392	7690	448.0	119.0	0.0
CAT T2	2014-05-27 00:00:00	0	33100	75100	15	298	6570	309.0	86.0	0.0
CBC T1										
CBC T1	1994-03-03	10	31600	64600	5	60	1270	9.0	2.0	2.0
CBC T1	1995-04-07	10	35200	70700	5	57	1290	9.0	2.0	2.0
CBC T1	1996-04-11	10	31500	63200	5	75	1410	14.0	5.0	2.0
CBC T1	1997-01-29	10	31800	66400	5	90	1600	13.0	3.0	2.0
CBC T1	2000-08-30	4	35540	84102	1	102	2041	11.0	1.0	0.0
CBC T1	2002-02-22	6	39668	81160	2	74	1964	15.0	1.0	1.0
CBC T1	2002-02-22	5	38705	81664	3	132	2267	17.0	3.0	2.0
CBC T1	2003-03-27	5	38731	80153	2	66	1967	14.0	3.0	0.0
CBC T1	2003-03-27	5	35861	76510	2	86	2095	14.0	2.0	0.0
CBC T1	2004-05-10	7	36092	80145	2	65	1830	12.0	1.0	0.0
CBC T1	2006-03-29	10	33300	64900	5	73	2100	19.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
CBC T1	2006-03-29	10	33700	64700	5	54	1870	15.0	2.0	2.0
CBC T1	2007-04-10	10	32600	64600	5	61	1780	14.0	3.0	2.0
CBC T1	2008-06-03	10	30800	63500	5	79	2320	18.0	3.0	2.0
CBC T1	2009-04-24 14:50:00	0	31100	63400	0	74	2110	18.0	2.0	0.0
CBC T1	2010-03-22 14:36:00	0	32000	65500	0	89	2360	16.0	0.0	0.0
CBC T1	2012-03-13 00:00:00	0	33300	66300	0	48	2000	18.0	3.0	0.0
CBC T1	2013-06-18 00:00:00	0	33900	67100	0	67	2070	11.0	0.0	0.0
CBC T1	2014-04-02 00:00:00	0	37300	74900	0	53	2040	5.0	0.0	0.0
CBC T2										
CBC T2	1994-03-03	10	31500	64200	5	58	1280	7.0	3.0	2.0
CBC T2	1995-04-07	10	32600	65600	5	49	1200	7.0	2.0	2.0
CBC T2	1996-04-11	10	31000	67200	5	47	1100	9.0	3.0	2.0
CBC T2	1997-01-29	10	32200	65500	5	68	1390	10.0	2.0	2.0
CBC T2	2000-08-30	7	33715	77749	2	149	2193	15.0	1.0	0.0
CBC T2	2002-02-22	6	39668	81160	2	74	1964	15.0	1.0	1.0
CBC T2	2002-02-22	5	38705	81664	3	132	2267	17.0	3.0	2.0
CBC T2	2003-03-27	5	35861	76510	2	86	2095	14.0	2.0	0.0
CBC T2	2003-03-27	5	38731	80153	2	66	1967	14.0	3.0	0.0
CBC T2	2004-05-10	8	38939	82942	2	106	2519	23.0	2.0	0.0
CBC T2	2007-04-10	10	31200	63400	5	88	2100	18.0	3.0	2.0
CBC T2	2008-06-03	10	31200	63200	5	47	1860	13.0	2.0	2.0
CBC T2	2009-04-24 14:51:00	0	30900	66200	0	60	1850	12.0	0.0	0.0
CBC T2	2010-03-22 14:34:00	0	34600	67800	0	57	1900	13.0	0.0	0.0
CBC T2	2012-03-13 00:00:00	0	32300	63000	0	38	1710	14.0	0.0	0.0
CBC T2	2013-06-18 00:00:00	0	30800	63600	0	55	1790	11.0	0.0	0.0
CBC T2	2014-04-02 00:00:00	0	35500	66400	0	45	2100	6.0	3.0	0.0
CBF T1										
CBF T1	2003-03-25	33	23921	95687	12	801	7521	4.0	7.0	0.0
CBF T1	2004-04-20	24	17906	78249	9	940	11418	11.0	7.0	0.0
CBF T1	2004-08-27	134	20872	92234	197	1130	14753	253.0	65.0	2.0
CBF T1	2004-08-27	2416	26906	91767	1235	806	9215	198.0	43.0	0.0
CBF T1	2004-09-05	5	10589	36988	1	9	300	6.0	2.0	0.0
CBF T1	2004-09-05	4	8858	27598	1	4	216	5.0	3.0	0.0
CBF T1	2006-04-05	20	15500	72600	5	1110	11900	10.0	8.0	2.0
CBF T1	2007-07-06	10	1710	9540	5	5	30	2.0	2.0	2.0
CBF T1	2007-07-20	10	5340	24000	5	13	159	2.0	2.0	2.0
CBF T1	2008-03-03	10	19100	53900	5	300	1400	2.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
CBF T1	2009-04-02 11:27:00	0	12300	54200	5	737	2900	0.0	0.0	0.0
CBF T1	2010-03-16 14:32:00	0	7050	64800	9	1450	6710	0.0	2.0	0.0
CBF T1	2011-03-29 15:46:00	0	3760	57700	11	1640	8200	0.0	2.0	0.0
CBF T1	2012-02-14 00:00:00	0	5730	60900	13	1530	8640	0.0	2.0	0.0
CBF T1	2013-03-04 00:00:00	0	6930	73200	15	1750	10100	0.0	3.0	0.0
CBF T1	2014-03-26 00:00:00	0	5210	62000	16	1660	10500	0.0	0.0	0.0
CBF T2										
CBF T2	1993-09-23	15	11100	69800	20	1020	7100	465.0	89.0	4.0
CBF T2	1994-09-23	20	6580	65000	5	1110	8650	309.0	49.0	2.0
CBF T2	2002-02-22	105	15347	96269	83	1240	9262	251.0	24.0	132.0
CBF T2	2002-02-22	1460	13422	90841	397	2056	9760	435.0	37.0	376.0
CBF T2	2002-08-07	0	14721	38959	1	10	231	1.0	1.0	0.0
CBF T2	2003-03-25	45	30557	77040	1	261	1796	1.0	1.0	0.0
CBF T2	2004-04-20	9	27265	80508	3	780	6105	3.0	1.0	0.0
CBF T2	2006-04-05	10	26100	73800	5	643	6230	14.0	2.0	2.0
CBF T2	2007-04-04	10	24000	66500	5	557	6110	21.0	2.0	2.0
CBF T2	2008-03-03	10	27100	67200	5	416	4960	20.0	2.0	2.0
CBF T2	2009-04-02 11:15:00	0	26600	64200	0	351	4250	19.0	0.0	0.0
CBF T2	2010-03-16 14:22:00	0	19900	68100	7	885	9500	23.0	0.0	0.0
CBF T2	2011-03-29 06:53:00	0	18800	67100	0	817	10200	37.0	0.0	0.0
CBF T2	2012-02-14 00:00:00	0	19400	72600	0	869	11200	34.0	3.0	0.0
CBF T2	2013-03-04 00:00:00	0	19700	69000	6	778	10200	33.0	0.0	0.0
CBF T2	2014-03-26 00:00:00	0	29300	108000	0	768	8110	24.0	0.0	0.0
CHD T1										
CHD T1	1993-09-28									
CHD T1	1993-09-28	10	35000	76500	5	88	1080	9.0	2.0	2.0
CHD T1	1994-05-07	10	31400	64800	5	85	983	6.0	2.0	2.0
CHD T1	1994-07-05									
CHD T1	2002-04-01	7	37780	84020	4	91	1014	7.0	1.0	1.0
CHD T1	2003-03-20	7	35217	87995	2	84	813	3.0	1.0	0.0
CHD T1	2004-03-11	5	35070	71930	2	59	725	4.0	0.0	0.0
CHD T1	2006-04-25	10	33500	64700	5	53	775	7.0	2.0	2.0
CHD T1	2007-04-25	10	33000	63300	5	48	735	7.0	2.0	2.0
CHD T1	2008-04-18	10	33400	63800	5	50	767	7.0	2.0	2.0
CHD T1	2009-04-08 10:57:00	0	27100	62600	0	62	780	5.0	0.0	0.0
CHD T1	2010-02-10 13:08:00	0	35100	65500	0	43	791	5.0	0.0	0.0
CHD T1	2011-03-23 08:40:00	0	32600	62800	0	40	749	6.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
CHD T1	2012-03-21 00:00:00	0	34100	67900	0	41	702	5.0	0.0	0.0
CHD T1	2013-03-05 00:00:00	0	33200	62300	0	47	810	5.0	0.0	0.0
CHD T1	2014-05-27 00:00:00	0	32300	62300	0	37	780	0	2	0
CRV T1										
CRV T1	1997-03-25	30	3800	78900	5	214	511	12.0	12.0	2.0
CRV T1	1998-04-01	25	3530	69000	5	202	540	9.0	12.0	2.0
CRV T1	1999-03-04	30	3310	72300	20	216	581	10.0	13.0	2.0
CRV T1	2002-07-22	54	7135	105944	9	265	771	6.0	7.0	1.0
CRV T1	2014-05-25	55	2830	77800	31	261	1100	6.0	26.0	0.0
DHR T1										
DHR T1	1993-09-29	10	29500	64600	5	187	1180	2.0	2.0	2.0
DHR T1	1994-09-22	15	27500	63100	5	171	1150	2.0	2.0	2.0
DHR T1	2002-04-08	10	35819	75807	2	95	946	0.0	0.0	0.0
DHR T1	2003-03-19	8	34659	91974	2	107	824	2.0	1.0	0.0
DHR T1	2003-08-22	12	38477	79018	1	94	950	1.0	0.0	0.0
DHR T1	2004-03-11	7	32840	87683	0	93	723	0.0	0.0	0.0
DHR T1	2004-08-05	0	5650	35691	0	16	155	1.0	0.0	0.0
DHR T1	2006-04-20	10	26500	52700	5	55	581	2.0	2.0	2.0
DHR T1	2006-04-20	10	32700	63900	5	101	918	2.0	2.0	2.0
DHR T1	2007-04-25	10	30200	64700	5	76	646	2.0	2.0	2.0
DHR T1	2007-04-25	10	30700	62300	5	104	925	2.0	2.0	2.0
DHR T1	2008-04-24	10	30900	61900	5	108	973	2.0	2.0	2.0
DHR T1	2008-04-24	10	29200	58500	5	82	706	2.0	2.0	2.0
DHR T1	2009-04-06 11:08:00	0	28000	60900	0	87	762	0.0	0.0	0.0
DHR T1	2010-02-15 11:31:00	0	33300	64300	0	104	859	0.0	0.0	0.0
DHR T1	2011-03-23 08:41:00	0	31100	62100	0	106	799	0.0	0.0	0.0
DHR T1	2011-03-23 08:43:00	0	31800	65100	0	125	993	0.0	0.0	0.0
DHR T1	2012-03-22 00:00:00	0	32700	66100	0	86	750	0.0	0.0	0.0
DHR T1	2013-02-22 00:00:00	0	31500	60900	0	103	882	0.0	0.0	0.0
DHR T1	2014-05-28 00:00:00	0	29700	62300	0	92	869	0	0	0
DHR T2										
DHR T2	1993-09-29	10	30200	65000	5	173	1250	2.0	2.0	2.0
DHR T2	1994-09-22	10	28400	62500	5	152	1150	2.0	2.0	2.0
DHR T2	2002-04-08	7	33503	75251	1	83	836	0.0	0.0	0.0
DHR T2	2003-03-19	7	36635	87536	0	91	869	0.0	0.0	0.0
DHR T2	2003-08-22	12	38406	82270	1	97	971	0.0	0.0	0.0
DHR T2	2004-03-11	7	31596	88668	1	124	917	0.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
DHR T2	2009-04-06 15:22:00	0	33200	63100	0	109	1070	0.0	0.0	0.0
DHR T2	2010-02-15 13:13:00	0	32900	64400	0	123	1090	0.0	0.0	0.0
DHR T2	2012-03-22 00:00:00	0	31200	60900	0	97	947	0.0	0.0	0.0
DHR T2	2013-02-22 00:00:00	0	30800	60600	0	131	1080	0.0	0.0	0.0
DHR T2	2014-05-28 00:00:00	0	29700	62300	0	92	869	0.0	0.0	0.0
DHR T2	2014-05-28 00:00:00	0	29400	61700	0	113	1050	0	0	0
DLK T1										
DLK T1	1993-09-23	10	28700	65600	5	150	1540	31.0	2.0	2.0
DLK T1	1994-09-13	10	28900	62000	5	145	1480	29.0	2.0	2.0
DLK T1	2002-04-09	8	36367	84394	5	105	1809	38.0	3.0	1.0
DLK T1	2003-03-17	4	34941	80610	1	106	1315	37.0	0.0	0.0
DLK T1	2004-04-20	4	35083	94792	3	134	1318	33.0	1.0	1.0
DLK T1	2006-04-06	10	31800	65200	5	113	1330	31.0	2.0	2.0
DLK T1	2007-04-04	10	30700	63500	5	92	1200	29.0	2.0	2.0
DLK T1	2008-03-06	10	32200	71000	5	93	1110	28.0	2.0	2.0
DLK T1	2009-04-01 10:35:00	0	27800	60800	0	82	1070	23.0	0.0	0.0
DLK T1	2010-03-25 13:53:00	0	31600	63500	0	89	1230	27.0	0.0	0.0
DLK T1	2011-03-29 15:58:00	0	30000	61900	0	108	1580	36.0	0.0	0.0
DLK T1	2012-02-22 00:00:00	0	31400	66100	0	116	1810	40.0	0.0	0.0
DLK T1	2013-03-08 00:00:00	0	26700	60400	0	116	1660	41.0	0.0	0.0
DLK T1	2014-04-02 00:00:00	0	27500	62700	0	132	1660	33.0	0.0	0.0
DLK T2										
DLK T2	1993-09-23	10	25500	65500	5	368	1680	5.0	2.0	2.0
DLK T2	1994-09-13	15	24100	64000	5	540	2170	10.0	2.0	4.0
DLK T2	2002-04-09	27	34111	84769	4	401	2601	53.0	3.0	35.0
DLK T2	2003-03-17	19	35509	82954	3	368	1728	55.0	1.0	33.0
DLK T2	2004-04-20	11	28988	83901	2	341	1596	45.0	2.0	32.0
DLK T2	2006-04-06	10	28000	66900	5	252	1390	40.0	2.0	31.0
DLK T2	2007-04-04	10	28800	69300	5	292	1530	48.0	2.0	37.0
DLK T2	2008-03-06	10	28500	64500	5	267	1470	47.0	3.0	39.0
DLK T2	2009-04-01 10:33:00	0	26600	73800	0	286	1560	45.0	0.0	39.0
DLK T2	2010-03-25 13:49:00	0	29800	64400	0	280	1520	53.0	0.0	46.0
DLK T2	2011-03-29 15:59:00	0	28800	62900	0	282	1600	53.0	0.0	55.0
DLK T2	2012-02-22 00:00:00	0	30000	64400	0	272	1600	51.0	0.0	57.0
DLK T2	2013-03-08 00:00:00	0	27200	63100	0	279	1450	47.0	0.0	46.0
DLK T2	2014-04-02 00:00:00	0	28000	63700	0	313	1570	41.0	0.0	44.0
DLS T1										

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
DLS T1	2002-04-09	11	30095	88290	6	575	2016	81.0	3.0	0.0
DLS T1	2003-03-21	5	30524	84646	4	460	1650	67.0	1.0	0.0
DLS T1	2004-04-19	6	22267	76714	2	512	1827	68.0	1.0	1.0
DLS T1	2006-04-04	10	24100	65100	5	409	1760	63.0	2.0	2.0
DLS T1	2007-04-05	10	26800	70700	5	255	1810	60.0	2.0	2.0
DLS T1	2008-03-04	10	20200	66500	5	399	1670	58.0	2.0	2.0
DLS T1	2009-04-02 10:57:00	0	5280	62400	0	522	1840	49.0	0.0	0.0
DLS T1	2010-03-23 14:05:00	0	6650	77200	9	523	1870	39.0	0.0	0.0
DLS T1	2011-03-25 16:03:00	0	5480	74400	16	505	1790	24.0	8.0	0.0
DLS T1	2012-02-17 00:00:00	0	4930	67800	21	489	1770	17.0	11.0	5.0
DLS T1	2013-03-06 00:00:00	0	5960	63900	16	498	1760	10.0	8.0	0.0
DLS T1	2014-03-28 00:00:00	0	8330	70100	13	473	1820	3.0	6.0	0.0
DPD T1										
DPD T1	2006-05-11	10	26900	69300	5	26	168	2.0	2.0	2.0
DPD T1	2014-06-01	5			4	144	1147	5.0	19.0	0.5
EHW T1										
EHW T1	1993-02-22	30	30900	65500	5	63	834	2.0	2.0	2.0
EHW T1	1994-02-22	15	32300	64200	5	69	883	2.0	2.0	2.0
EHW T1	1995-05-02	10	30200	62600	5	56	875	2.0	2.0	2.0
EHW T1	1996-02-14	10	32400	62900	5	63	962	2.0	2.0	2.0
EHW T1	1997-03-25	10	31900	73400	5	68	975	2.0	2.0	2.0
EHW T1	1998-04-01	10	33800	65900	5	55	977	2.0	2.0	2.0
EHW T1	1999-03-04	10	32700	72100	5	68	1100	2.0	2.0	2.0
EHW T1	2000-09-12	4	37367	76997	2	84	1102	0.0	0.0	0.0
EHW T1	2002-02-21	1	40197	81264	3	86	1317	1.0	1.0	0.0
EHW T1	2003-03-20	5	36728	79779	1	86	1157	0.0	0.0	0.0
EHW T1	2006-04-16	10	30600	62000	5	65	1080	2.0	2.0	2.0
EHW T1	2007-03-28	10	32100	65500	5	85	1190	2.0	2.0	2.0
EHW T1	2008-02-13	10	31300	61700	5	82	1170	2.0	2.0	2.0
EHW T1	2009-02-26 14:56:00	0	32800	65500	0	89	1260	0.0	0.0	0.0
EHW T1	2010-03-30 15:36:00	0	33000	64600	0	86	1170	0.0	0.0	0.0
EHW T1	2011-03-16 14:35:00	0	30500	61000	0	82	1100	0.0	0.0	0.0
EHW T1	2012-02-14 00:00:00	0	32600	63200	0	75	1020	0.0	0.0	0.0
EHW T1	2013-02-20 00:00:00	0	36300	77900	0	84	1070	0.0	0.0	0.0
EHW T1	2014-03-18 00:00:00	0	32100	60300	0	69	1040	0.0	0.0	0.0
FHD T1										
FHD T1	1993-03-11	10	29700	63600	5	121	917	2.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
FHD T1	1994-03-01	10	32200	67600	5	114	913	2.0	2.0	2.0
FHD T1	1995-05-09	10	30800	66700	5	119	931	2.0	2.0	2.0
FHD T1	1996-03-01	10	31000	61100	5	115	988	2.0	2.0	2.0
FHD T1	1997-04-04	55	29600	64100	5	126	1040	12.0	2.0	25.0
FHD T1	1998-04-17	20	31300	62100	5	114	1030	7.0	2.0	13.0
FHD T1	1999-03-30	10	32500	63600	5	118	1090	7.0	2.0	11.0
FHD T1	2000-10-17	5	34680	78092	2	137	1070	2.0	0.0	3.0
FHD T1	2002-02-22	2	39808	83980	4	163	1227	3.0	1.0	3.0
FHD T1	2003-06-30	6	39256	80795	2	132	1149	2.0	1.0	4.0
FHD T1	2004-05-11	3	33243	73361	1	143	1041	1.0	1.0	0.0
FHD T1	2006-04-25	10	32100	63700	5	114	1040	2.0	2.0	2.0
FHD T1	2007-03-30	10	30600	62700	5	124	1020	2.0	2.0	2.0
FHD T1	2008-02-26	10	36300	85000	5	136	994	4.0	2.0	2.0
FHD T1	2009-02-24 14:58:00	0	32300	64700	0	137	1120	0.0	0.0	0.0
FHD T1	2010-05-20 11:05:00	0	34000	67100	0	129	1120	0.0	0.0	0.0
FHD T1	2011-04-19 08:06:00	0	33000	66200	0	150	1070	0.0	0.0	0.0
FHD T1	2012-02-10 00:00:00	0	31900	63000	0	123	1090	0.0	0.0	0.0
FHD T1	2013-03-28 00:00:00	0	33400	71000	0	142	1170	2.0	0.0	0.0
FHD T1	2014-04-17 00:00:00	0	31400	63300	0	130	1130	4.0	0.0	0.0
GBK T1										
GBK T1	2002-04-09	11	35256	85010	5	256	1217	1.0	1.0	0.0
GBK T1	2003-03-19	6	34685	77519	1	198	947	1.0	1.0	0.0
GBK T1	2004-04-20	2	32443	78291	2	249	1156	2.0	0.0	0.0
GBK T1	2006-04-04	10	28000	63400	5	277	1190	3.0	2.0	2.0
GBK T1	2007-04-03	10	28000	66400	5	326	1140	6.0	2.0	2.0
GBK T1	2008-03-05	10	26400	62000	5	349	1160	10.0	2.0	2.0
GBK T1	2009-04-01 11:48:00	0	25700	64100	0	352	1160	12.0	0.0	0.0
GBK T1	2010-03-18 14:09:00	0	28300	64500	0	377	1220	16.0	0.0	0.0
GBK T1	2011-03-29 15:45:00	0	27700	62300	0	383	1280	16.0	0.0	0.0
GBK T1	2012-02-17 00:00:00	0	26900	61400	0	348	1240	16.0	0.0	0.0
GBK T1	2013-03-11 00:00:00	0	27800	64400	0	352	1250	18.0	0.0	0.0
GBK T1	2014-04-07 00:00:00	0	27200	60800	0	338	1230	14.0	0.0	0.0
GCL T1										
GCL T1	2004-05-31	53	5669	59683	1	292	1361	0.0	0.0	0.0
GCL T1	2007-06-13	10	3590	51800	5	463	2550	2.0	2.0	2.0
GCL T1	2008-06-11	10	4010	52200	5	486	3050	2.0	2.0	2.0
GCL T1	2010-07-27 14:15:00	0	2960	52500	7	558	3530	0.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
GCL T1	2011-06-08 13:37:00	0	4760	51500	7	510	3580	0.0	0.0	0.0
GCL T1	2012-05-23 00:00:00	0	3470	49700	9	548	3900	0.0	0.0	0.0
GCL T1	2013-06-20 00:00:00	0	4330	55000	5	622	4180	0.0	0.0	0.0
GFC T1										
GFC T1	1993-03-17	10	19700	62100	5	532	2310	100.0	4.0	2.0
GFC T1	1994-03-02	10	18500	61300	5	626	2530	111.0	4.0	2.0
GFC T1	1995-05-10	15	18700	61000	5	606	2260	108.0	4.0	2.0
GFC T1	1996-02-20	10	19700	65500	5	653	2370	118.0	5.0	2.0
GFC T1	1997-04-07	10	17200	63900	5	663	2610	129.0	4.0	2.0
GFC T1	1998-03-27	10	14600	63500	5	653	3290	127.0	3.0	2.0
GFC T1	1999-03-04	10	12300	61700	5	524	2110	99.0	4.0	2.0
GFC T1	2000-10-26	6	19600	69877	4	699	2723	148.0	2.0	0.0
GFC T1	2002-02-18	11	25133	92177	13	932	3433	194.0	4.0	1.0
GFC T1	2003-03-31	15	24042	86474	9	829	3024	177.0	4.0	0.0
GFC T1	2004-04-08	6	22001	74425	2	647	2190	124.0	2.0	0.0
GFC T1	2006-04-06	10	19700	61200	5	565	1900	119.0	4.0	2.0
GFC T1	2006-09-26	15	18100	64300	5	671	2140	106.0	3.0	2.0
GFC T1	2006-11-14	10	2000	4100	5	8	91	2.0	2.0	2.0
GFC T1	2007-03-13	10	11100	29600	5	42	261	2.0	2.0	2.0
GFC T1	2008-02-11	10	14500	38300	5	169	655	11.0	2.0	2.0
GFC T1	2009-03-09 15:47:00	0	23500	54100	0	217	937	21.0	0.0	0.0
GFC T1	2010-03-15 10:48:00	0	24100	57200	7	404	1840	26.0	2.0	0.0
GFC T1	2011-04-04 14:09:00	0	24000	58600	0	382	1800	26.0	3.0	0.0
GFC T1	2012-02-13 00:00:00	0	25800	59300	0	363	1790	23.0	2.0	0.0
GFC T1	2013-03-14 00:00:00	0	24500	59700	0	424	1890	27.0	3.0	0.0
GFC T1	2014-03-26 00:00:00	0	26500	62200	7	424	1990	20.0	3.0	0.0
GFC T2										
GFC T2	1993-03-17	10	12200	64000	5	776	3820	165.0	6.0	2.0
GFC T2	1994-03-02	10	9890	63000	5	820	3790	158.0	4.0	2.0
GFC T2	1995-05-10	10	9030	64900	5	904	3130	116.0	3.0	2.0
GFC T2	1996-02-20	10	8010	63900	15	928	3040	97.0	4.0	2.0
GFC T2	1997-04-07	10	4790	59300	10	874	2680	68.0	4.0	2.0
GFC T2	1998-03-27	10	4680	62400	15	952	2920	60.0	5.0	2.0
GFC T2	1999-03-04	10	7490	63000	25	721	2260	44.0	5.0	2.0
GFC T2	2000-11-26	4	5647	72593	47	1158	3464	45.0	9.0	0.0
GFC T2	2002-02-18	8	7577	106764	61	1713	5672	68.0	34.0	1.0
GFC T2	2003-03-31	9	10639	98358	45	1348	4104	48.0	23.0	1.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
GFC T2	2004-04-08	6	6817	79821	38	1183	3343	30.0	21.0	0.0
GFC T2	2006-04-13	15	5830	59000	30	892	2360	16.0	13.0	2.0
GFC T2	2007-03-13	10	6170	63100	35	1010	2610	14.0	14.0	2.0
GFC T2	2007-06-27	15	3810	66200	40	1100	2840	15.0	15.0	2.0
GFC T2	2007-07-06	10	2360	4830	5	5	81	2.0	2.0	2.0
GFC T2	2007-07-07	10	1970	4050	5	5	30	2.0	2.0	2.0
GFC T2	2007-07-12	10	2960	6070	5	21	225	2.0	2.0	2.0
GFC T2	2008-02-11	10	13200	31500	5	117	875	2.0	2.0	2.0
GFC T2	2009-03-09 15:46:00	0	27000	77000	0	235	1430	9.0	0.0	0.0
GFC T2	2010-03-15 10:49:00	0	21100	56900	0	424	2780	57.0	0.0	0.0
GFC T2	2011-04-04 13:56:00	0	19500	57200	0	489	3710	105.0	0.0	0.0
GFC T2	2012-02-13 00:00:00	0	20100	60900	0	582	5020	126.0	0.0	0.0
GFC T2	2013-03-14 00:00:00	0	23900	60400	0	423	5340	137.0	2.0	0.0
GFC T2	2014-03-26 00:00:00	0	19900	60600	5	656	7160	121.0	0.0	0.0
GLB T1										
GLB T1	1993-09-28	10	31500	66400	5	196	1450	2.0	2.0	2.0
GLB T1	1994-09-19	10	31800	65700	5	153	1310	2.0	2.0	2.0
GLB T1	2002-04-03	18	34933	77090	4	142	1101	3.0	1.0	0.0
GLB T1	2003-03-20	10	35073	87732	2	158	1145	1.0	1.0	0.0
GLB T1	2003-08-20	17	37932	85619	2	215	1422	2.0	0.0	0.0
GLB T1	2004-03-09	12	31069	69938	0	147	1021	0.0	0.0	0.0
GLB T1	2006-04-26	10	31300	63800	5	131	1100	2.0	2.0	2.0
GLB T1	2007-05-03	10	30800	62000	5	139	1090	3.0	2.0	2.0
GLB T1	2008-04-17	10	29100	64500	5	137	1110	4.0	2.0	2.0
GLB T1	2009-04-07 10:55:00	0	24100	59700	0	148	1130	2.0	0.0	0.0
GLB T1	2010-02-10 12:23:00	0	31700	63600	0	155	1290	3.0	0.0	0.0
GLB T1	2011-03-16 08:55:00	0	30200	60600	0	140	1150	3.0	0.0	0.0
GLB T1	2012-04-03 00:00:00	0	31400	66300	0	97	1150	0.0	0.0	0.0
GLB T1	2013-03-12 00:00:00	20	30600	63300	0	162	1320	4.0	0.0	0.0
GLB T1	2014-05-27 00:00:00	15	29900	60800	0	134	1250	0	0	0
HBY T1										
HBY T1	1993-09-29	10	32600	65000	5	124	1860	3.0	2.0	2.0
HBY T1	1994-09-20	10	31700	65400	5	117	1750	2.0	2.0	2.0
HBY T1	2002-04-09	5	36888	77780	2	123	1330	3.0	2.0	0.0
HBY T1	2003-03-10	6	38907	87870	1	121	1255	3.0	1.0	0.0
HBY T1	2004-03-16	3	35329	71955	1	101	935	2.0	1.0	1.0
HBY T1	2006-04-12	10	36600	79000	5	98	1080	6.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HBY T1	2007-04-26	10	32500	62600	5	97	1130	6.0	2.0	2.0
HBY T1	2008-04-25	10	32900	62000	5	90	1140	8.0	2.0	2.0
HBY T1	2009-04-09 11:18:00	0	31700	69500	0	100	1040	6.0	0.0	0.0
HBY T1	2010-02-22 13:01:00	0	32800	64000	0	96	1140	22.0	2.0	0.0
HBY T1	2011-03-23 09:15:00	0	31600	59400	0	86	1050	13.0	0.0	0.0
HBY T1	2012-03-22 00:00:00	0	33500	64300	0	84	945	9.0	0.0	0.0
HBY T1	2013-03-05 00:00:00	0	31900	61400	0	79	988	7.0	0.0	0.0
HBY T1	2014-04-16 00:00:00	0	32200	61500	0	86	1010	8.0	0.0	0.0
HBY T2										
HBY T2	1993-09-29	15	30500	64900	5	235	1590	2.0	2.0	2.0
HBY T2	1994-09-20	15	29700	63500	5	177	1350	2.0	2.0	2.0
HBY T2	2002-04-09	13	36090	81667	2	126	1053	2.0	1.0	0.0
HBY T2	2003-03-10	7	37043	89941	1	146	1026	2.0	0.0	0.0
HBY T2	2003-08-22	11	35767	77410	1	186	1298	2.0	0.0	0.0
HBY T2	2004-03-16	5	35996	80414	0	138	951	1.0	0.0	0.0
HBY T2	2006-04-12	10	27500	61100	5	153	1120	5.0	2.0	2.0
HBY T2	2007-04-26	10	32800	70900	5	159	1140	5.0	2.0	2.0
HBY T2	2008-04-25	10	29100	61900	5	153	1190	6.0	2.0	2.0
HBY T2	2009-04-09 11:19:00	0	27400	60300	0	150	1140	6.0	0.0	0.0
HBY T2	2010-02-22 13:13:00	0	31100	62400	0	159	1210	8.0	0.0	0.0
HBY T2	2011-03-23 08:57:00	0	30700	61700	0	152	1160	7.0	0.0	0.0
HBY T2	2012-03-22 00:00:00	0	31800	64300	0	151	1150	5.0	0.0	0.0
HBY T2	2013-03-05 00:00:00	0	30000	63100	0	168	1150	7.0	0.0	0.0
HBY T2	2014-04-16 00:00:00	0	29200	61100	0	140	1090	7.0	0.0	0.0
HBY T2	2014-04-16 00:00:00	0	29200	61100	0	140	1090	7.0	0.0	0.0
HDN T1										
HDN T1	1993-03-10	10	35900	80200	5	31	686	2.0	2.0	2.0
HDN T1	1993-03-15	10	35100	71400	5	25	719	2.0	2.0	2.0
HDN T1	1994-02-16	10	37600	82400	5	34	704	2.0	2.0	2.0
HDN T1	1996-02-21	10	35100	70200	5	30	746	2.0	2.0	2.0
HDN T1	1997-04-15	10	33100	66600	5	35	798	2.0	2.0	2.0
HDN T1	1998-04-01	10	28900	62400	5	27	853	2.0	2.0	2.0
HDN T1	1999-03-02	10	35900	70100	5	28	801	2.0	2.0	2.0
HDN T1	2000-09-28	3	37758	77783	0	50	901	0.0	0.0	0.0
HDN T1	2002-02-20	0	34919	75293	2	59	917	1.0	1.0	0.0
HDN T1	2003-04-10	4	35331	78572	0	43	804	0.0	0.0	0.0
HDN T1	2004-04-21	4	37239	77216	0	51	839	0.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HDN T1	2006-04-12	10	33500	62400	5	31	775	2.0	2.0	2.0
HDN T1	2007-03-15	10	33100	63100	5	35	822	2.0	2.0	2.0
HDN T1	2008-02-14	10	32800	60700	5	36	805	2.0	2.0	2.0
HDN T1	2009-03-05 14:11:00	0	35200	66500	0	40	880	0.0	0.0	0.0
HDN T1	2010-03-10 10:51:00	0	33600	62500	0	38	861	0.0	0.0	0.0
HDN T1	2011-04-06 14:44:00	0	34000	64300	0	45	879	0.0	0.0	0.0
HDN T1	2012-02-14 00:00:00	0	32400	62400	0	43	816	0.0	0.0	0.0
HDN T1	2013-03-11 00:00:00	0	29300	67000	0	58	823	2.0	0.0	0.0
HDN T1	2014-03-05 00:00:00	0	33600	69000	0	44	749	2.0	0.0	0.0
HLK T1										
HLK T1	2009-11-15 14:02:00	0	1380	3330	0	0	60	0.0	0.0	0.0
HLK T1	2010-03-23 14:24:00	0	16200	33700	0	47	573	0.0	0.0	0.0
HLK T1	2011-03-28 15:35:00	0	28400	59800	0	152	1560	2.0	0.0	0.0
HLK T1	2012-02-21 00:00:00	0	31300	66200	0	206	2480	3.0	0.0	0.0
HLK T1	2013-03-07 00:00:00	0	29600	63800	0	212	2550	8.0	0.0	0.0
HLK T1	2014-04-02 00:00:00	10	37500	92500	0	223	2680	12.0	0.0	0.0
HLK T2										
HLK T2	2010-03-23 14:36:00	0	27000	66600	0	372	4050	85.0	0.0	0.0
HLK T2	2010-09-14 08:13:00	0	23800	66500	0	494	4660	91.0	0.0	0.0
HLK T2	2010-09-15 08:18:00	0	0	0	0	0	0	0.0	0.0	0.0
HLK T2	2010-09-15 08:19:00	0	0	0	0	0	0	0.0	0.0	0.0
HLK T2	2010-09-20 10:37:00	0	1600	4010	0	0	57	0.0	0.0	0.0
HLK T2	2010-09-20 11:44:00	0	0	0	0	0	0	0.0	0.0	0.0
HLK T2	2011-03-28 15:37:00	0	19700	41900	0	75	890	3.0	0.0	0.0
HLK T2	2012-02-21 00:00:00	0	24600	58600	0	243	2700	6.0	0.0	0.0
HLK T2	2013-03-07 00:00:00	0	26100	64000	0	306	3410	18.0	0.0	0.0
HLK T2	2014-04-02 00:00:00	0	26900	64200	0	301	3890	19.0	0.0	0.0
HLY T2										
HLY T2	1993-09-24	10	32400	73800	5	123	1610	2.0	2.0	2.0
HLY T2	1994-09-13	10	28900	63200	5	136	1640	2.0	2.0	2.0
HLY T2	2002-04-09	8	35132	83326	4	173	3320	9.0	3.0	0.0
HLY T2	2003-03-20	5	36260	78184	2	157	2399	7.0	1.0	0.0
HLY T2	2004-04-20	0	40789	104947	3	133	2158	10.0	0.0	0.0
HLY T2	2006-04-06	10	32700	71300	5	113	1810	7.0	2.0	2.0
HLY T2	2007-04-03	10	29800	62600	5	109	1850	11.0	2.0	2.0
HLY T2	2008-03-05	10	27200	62300	5	114	1790	12.0	2.0	2.0
HLY T2	2009-03-31 10:31:00	0	28800	60500	0	117	1890	12.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HLY T2	2010-03-23 14:21:00	0	32900	65100	0	116	2270	11.0	0.0	0.0
HLY T2	2011-03-28 06:54:00	0	42100	109000	0	114	1650	10.0	0.0	0.0
HLY T2	2012-02-21 00:00:00	0	32400	65000	0	99	1910	9.0	0.0	0.0
HLY T2	2013-03-07 00:00:00	0	31100	62600	0	110	1930	10.0	0.0	0.0
HLY T2	2014-04-02 00:00:00	0	33200	70500	0	113	1890	6.0	0.0	0.0
HRD69KV T1										
HRD69KV T1	2010-06-17 08:01:00	0	3380	83500	0	140	403	0.0	0.0	0.0
HRD69KV T1	2012-03-12 00:00:00	0	4250	71200	0	136	412	0.0	0.0	8.0
HRD69KV T1	2013-06-17 00:00:00	0	2960	75000	0	147	424	0.0	0.0	0.0
HRD69KV T1	2014-02-11 00:00:00	0	2720	64400	0	141	406	0.0	0.0	0.0
HRD SST1-2										
HRD SST1-2	1994-03-02	15	31000	65900	5	104	977	6.0	2.0	2.0
HRD SST1-2	1995-04-07	25	31000	68700	5	116	1050	8.0	2.0	2.0
HRD SST1-2	1996-04-08	15	30800	65400	5	126	964	6.0	2.0	2.0
HRD SST1-2	1997-02-03	10	30200	65500	5	132	1010	5.0	2.0	2.0
HRD SST1-2	2002-02-21	61	33546	83408	2	202	1354	9.0	2.0	0.0
HRD SST1-2	2003-03-25	6	36667	80725	2	139	1010	3.0	1.0	0.0
HRD SST1-2	2006-03-23	10	31600	65500	5	143	1280	9.0	2.0	2.0
HRD SST1-2	2007-05-16	10	31500	65200	5	128	905	5.0	2.0	2.0
HRD SST1-2	2008-06-16	25	28800	68000	5	133	2220	5.0	2.0	2.0
HRD SST1-2	2009-04-01 14:01:00	0	33600	66400	0	115	1040	4.0	0.0	0.0
HRD SST1-2	2010-06-29 13:50:00	0	33000	65000	0	102	947	3.0	0.0	0.0
HRD SST1-2	2012-03-08 00:00:00	0	31500	62500	0	72	893	6.0	0.0	0.0
HRD SST1-2	2013-06-19 00:00:00	0	33000	66600	0	103	995	0.0	0.0	0.0
HRD SST1-2	2014-02-11 00:00:00	0	34300	70000	0	95	959	2.0	0.0	0.0
HRD SST3-4										
HRD SST3-4	1994-03-02	15	35500	81500	5	76	722	2.0	2.0	2.0
HRD SST3-4	1995-04-07	10	31000	66100	5	59	756	2.0	2.0	2.0
HRD SST3-4	1996-04-08	15	30600	63600	5	77	858	2.0	2.0	2.0
HRD SST3-4	1997-02-03	15	31800	68400	5	95	1040	2.0	2.0	2.0
HRD SST3-4	2000-09-18	22	33682	77453	1	96	1057	0.0	0.0	0.0
HRD SST3-4	2002-02-21	18	35740	84918	2	114	1295	4.0	0.0	0.0
HRD SST3-4	2003-03-25	15	37378	79501	0	98	1161	0.0	0.0	0.0
HRD SST3-4	2004-04-29	14	35001	73855	1	94	1104	1.0	1.0	0.0
HRD SST3-4	2006-03-23	10	31900	65000	5	84	1170	2.0	2.0	2.0
HRD SST3-4	2007-05-16	10	29900	63500	5	89	1210	2.0	2.0	2.0
HRD SST3-4	2008-06-17	10	29100	64500	5	84	1160	2.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HRD SST3-4	2009-04-01 14:02:00	0	34300	67800	0	81	1250	0.0	0.0	0.0
HRD SST3-4	2010-06-29 14:11:00	0	33400	65000	0	86	1220	0.0	0.0	0.0
HRD SST3-4	2012-03-08 00:00:00	0	31400	61400	0	41	1010	0.0	0.0	0.0
HRD SST3-4	2013-06-20 00:00:00	0	33500	67800	0	78	1100	0.0	0.0	0.0
HRD SST3-4	2014-02-11 00:00:00	0	32800	64600	0	70	1030	0.0	0.0	0.0
HRD T1										
HRD T1	1994-03-02	10	28100	65600	5	251	2370	44.0	7.0	2.0
HRD T1	1995-04-07	15	25500	73800	5	201	1870	25.0	3.0	2.0
HRD T1	1996-04-08	15	23000	63300	5	361	3140	42.0	5.0	2.0
HRD T1	1997-01-30	10	29200	77300	5	335	3360	40.0	3.0	2.0
HRD T1	2000-09-19	2	31749	73448	1	200	2854	53.0	1.0	0.0
HRD T1	2002-02-21	18	28269	90979	5	692	5712	84.0	7.0	0.0
HRD T1	2003-03-25	24	27756	84020	4	570	5300	80.0	3.0	0.0
HRD T1	2004-04-23	15	29968	85399	2	477	5407	75.0	4.0	0.0
HRD T1	2006-03-23	10	28700	64400	5	219	3500	63.0	3.0	2.0
HRD T1	2007-05-16	10	30800	71600	5	186	2860	55.0	2.0	2.0
HRD T1	2008-06-17	10	24800	66000	5	217	2610	50.0	3.0	2.0
HRD T1	2008-09-09 00:00:00	0	28800	65600	0	189	2600	51.0	0.0	0.0
HRD T1	2008-09-17	10	2050	4200	5	5	116	2.0	2.0	2.0
HRD T1	2009-04-01 13:32:00	0	32700	80700	0	71	982	3.0	0.0	0.0
HRD T1	2010-06-29 14:07:00	0	32700	64100	0	117	1150	9.0	0.0	0.0
HRD T1	2011-09-22 09:05:00	0	31500	64200	0	110	1130	15.0	0.0	0.0
HRD T1	2012-03-08 00:00:00	0	32400	64400	0	115	1290	15.0	0.0	0.0
HRD T1	2013-06-19 00:00:00	0	33300	70600	0	122	1120	12.0	0.0	0.0
HRD T1	2014-02-11 00:00:00	0	31900	63600	0	126	1340	11.0	0.0	0.0
HRD T10										
HRD T10	1994-03-02	10	30000	73500	5	153	588	2.0	2.0	2.0
HRD T10	1995-04-07	10	30300	71500	5	170	710	2.0	2.0	2.0
HRD T10	1996-04-08	10	27400	63100	5	160	824	2.0	2.0	2.0
HRD T10	1997-02-03	10	28900	62300	5	193	1030	2.0	2.0	2.0
HRD T10	2000-09-18	5	31065	69077	1	244	1314	1.0	0.0	0.0
HRD T10	2002-02-20	13	29579	96910	2	475	1979	6.0	0.0	0.0
HRD T10	2003-03-25	5	28983	86618	1	474	1664	12.0	1.0	0.0
HRD T10	2004-04-29	7	29497	77455	1	492	1775	25.0	0.0	0.0
HRD T10	2006-03-23	10	24100	62900	5	457	1950	46.0	2.0	2.0
HRD T10	2007-04-17	10	24900	63500	5	462	2090	58.0	2.0	2.0
HRD T10	2008-06-18	10	23200	64000	5	427	2090	62.0	2.0	2.0

Work to be Performed on Transformers
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		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HRD T10	2009-03-30 14:29:00	0	27900	66800	0	439	2310	70.0	0.0	0.0
HRD T10	2010-06-17 14:06:00	0	22100	64300	0	559	2290	74.0	0.0	0.0
HRD T10	2012-03-02 00:00:00	0	24900	63600	0	456	2250	69.0	0.0	0.0
HRD T10	2013-06-20 00:00:00	0	23300	66200	0	472	2180	65.0	0.0	0.0
HRD T10	2014-02-10 00:00:00	0	24100	64200	0	477	2360	60.0	0.0	0.0
HRD T2										
HRD T2	1994-03-02	20	17100	77300	5	642	4600	91.0	5.0	2.0
HRD T2	1995-04-07	20	7920	65200	5	763	4960	93.0	2.0	2.0
HRD T2	1996-04-08	15	5790	61500	25	654	5240	93.0	6.0	2.0
HRD T2	1997-01-30	15	8750	84500	45	770	5930	93.0	17.0	2.0
HRD T2	2000-09-18	6	5545	77906	69	721	3893	55.0	76.0	0.0
HRD T2	2002-02-21	32	8002	110886	235	1424	8872	37.0	175.0	1.0
HRD T2	2003-03-25	15	5616	100969	236	1228	6945	28.0	203.0	0.0
HRD T2	2004-04-23	19	4015	77841	131	845	4559	21.0	151.0	0.0
HRD T2	2006-03-23	10	3370	66900	80	667	3300	19.0	128.0	2.0
HRD T2	2007-05-16	15	3060	68700	75	789	3490	17.0	108.0	2.0
HRD T2	2008-08-15	10	5480	66500	80	707	3070	16.0	107.0	2.0
HRD T2	2008-08-22 00:00:00	0	2900	5950	0	7	94	0.0	0.0	0.0
HRD T2	2008-08-22	10	2900	5950	5	7	94	2.0	2.0	2.0
HRD T2	2009-04-01 13:33:00	0	15500	34500	0	105	873	6.0	3.0	0.0
HRD T2	2010-06-29 13:45:00	0	22000	56500	0	302	1470	52.0	3.0	0.0
HRD T2	2012-03-08 00:00:00	0	26000	61800	0	334	1960	89.0	2.0	0.0
HRD T2	2013-06-20 00:00:00	0	26600	66800	0	423	2360	88.0	0.0	0.0
HRD T2	2014-02-11 00:00:00	0	29300	69600	0	321	2210	70.0	2.0	0.0
HRD T3										
HRD T3	1994-03-02	10	25800	6400	5	209	1290	9.0	2.0	2.0
HRD T3	1995-04-07	10	23500	60900	5	232	1390	14.0	2.0	2.0
HRD T3	1996-04-08	10	25500	61400	5	352	1780	24.0	2.0	2.0
HRD T3	1997-01-30	10	25900	65100	5	400	1940	28.0	2.0	2.0
HRD T3	2000-09-18	3	32837	82808	1	306	1510	34.0	1.0	0.0
HRD T3	2002-02-21	18	34667	91625	5	565	2589	55.0	8.0	1.0
HRD T3	2003-03-25	12	32876	82325	3	438	2049	52.0	1.0	0.0
HRD T3	2004-04-23	11	31632	79537	3	416	2095	44.0	1.0	0.0
HRD T3	2006-03-23	10	29000	66600	5	366	1990	39.0	2.0	2.0
HRD T3	2008-06-17	10	26200	65500	5	408	1910	34.0	2.0	2.0
HRD T3	2009-04-01 13:36:00	0	31100	68600	0	317	2030	32.0	0.0	0.0
HRD T3	2010-06-29 14:09:00	0	29700	66000	0	408	1950	38.0	0.0	0.0

Work to be Performed on Transformers
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		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HRD T3	2012-03-08 00:00:00	0	28000	65300	0	452	2720	30.0	0.0	0.0
HRD T3	2013-06-20 00:00:00	0	27600	68300	0	471	2130	22.0	0.0	0.0
HRD T3	2014-02-11 00:00:00	0	28900	63600	0	306	2530	9.0	0.0	0.0
HRD T5										
HRD T5	1994-03-02	50	31300	66300	5	218	1740	69.0	9.0	63.0
HRD T5	1995-04-07	60	30600	67500	5	204	1550	62.0	7.0	51.0
HRD T5	1996-04-08	55	29400	63100	5	187	1500	50.0	6.0	60.0
HRD T5	1997-01-30	45	31400	69900	5	215	1500	42.0	6.0	59.0
HRD T5	2000-09-18	20	35467	78476	1	254	1544	35.0	1.0	48.0
HRD T5	2002-02-20	21	38542	85411	5	285	1695	35.0	4.0	45.0
HRD T5	2003-03-25	29	35489	77086	3	294	1598	32.0	2.0	40.0
HRD T5	2004-04-23	16	36144	86291	1	297	1718	32.0	2.0	40.0
HRD T5	2006-03-23	15	32500	66000	5	227	1570	27.0	2.0	29.0
HRD T5	2007-04-17	10	30800	66400	5	246	1570	29.0	2.0	26.0
HRD T5	2008-06-18	10	28300	64700	5	234	1470	28.0	2.0	22.0
HRD T5	2009-03-30 13:39:00	10	36300	77100	0	215	1500	25.0	2.0	22.0
HRD T5	2010-06-18 13:47:00	0	33000	65300	0	205	1360	26.0	2.0	15.0
HRD T5	2012-03-02 00:00:00	20	26500	63300	43	212	1400	115.0	16.0	15.0
HRD T5	2013-06-20 00:00:00	30	33000	70000	58	202	1390	188.0	26.0	18.0
HRD T5	2014-02-10 00:00:00	30	31800	64800	67	226	1640	207.0	30.0	18.0
HRD T6										
HRD T6	1994-03-02	10	14700	34500	5	93	535	4.0	2.0	2.0
HRD T6	1995-04-07	10	17800	51900	5	242	987	11.0	2.0	2.0
HRD T6	1996-04-08	10	18100	50100	5	200	760	7.0	2.0	2.0
HRD T6	1997-01-30	10	22700	58900	5	304	1050	10.0	2.0	2.0
HRD T6	1997-02-18	155	28900	70900	40	46	304	9.0	3.0	28.0
HRD T6	2000-09-18	11	27263	72776	2	512	1666	22.0	0.0	1.0
HRD T6	2002-02-20	29	30421	89137	3	609	1990	31.0	1.0	3.0
HRD T6	2003-03-25	15	30264	82007	3	538	1723	23.0	2.0	0.0
HRD T6	2004-04-23	11	23237	67247	1	495	1586	28.0	0.0	1.0
HRD T6	2006-03-23	10	24400	61900	5	432	1750	35.0	2.0	2.0
HRD T6	2007-04-17	10	20200	63200	5	505	1830	37.0	2.0	2.0
HRD T6	2008-06-18	10	20400	61600	5	465	1810	39.0	2.0	3.0
HRD T6	2009-03-30 13:55:00	0	25100	62700	0	456	1810	38.0	0.0	0.0
HRD T6	2010-06-18 13:46:00	0	25500	62300	0	518	1750	40.0	0.0	0.0
HRD T6	2012-03-02 00:00:00	0	23800	59700	0	462	1770	46.0	0.0	2.0
HRD T6	2013-06-20 00:00:00	0	24600	66000	0	440	1940	43.0	0.0	3.0

Work to be Performed on Transformers
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		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HRD T6	2014-02-10 00:00:00	0	23700	61800	0	461	2050	45.0	0.0	3.0
HRD T7										
HRD T7	1994-03-02	15	20600	59600	5	517	1740	69.0	3.0	38.0
HRD T7	1995-04-07	10	29500	62500	5	15	1240	6.0	2.0	2.0
HRD T7	1996-04-08	180	9500	21500	5	61	579	5.0	2.0	6.0
HRD T7	1997-02-03	135	23700	70100	5	170	1270	11.0	2.0	11.0
HRD T7	2000-09-18	37	21854	55588	1	303	1582	21.0	0.0	8.0
HRD T7	2002-02-20	52	28947	85136	4	520	2424	42.0	1.0	6.0
HRD T7	2003-03-25	42	31124	83942	4	508	2098	37.0	0.0	2.0
HRD T7	2003-04-01	34	22612	86045	5	496	2085	73.0	2.0	39.0
HRD T7	2004-04-29	43	24049	72266	1	496	2096	36.0	0.0	6.0
HRD T7	2006-03-23	40	23000	60100	5	449	2020	40.0	2.0	10.0
HRD T7	2007-04-17	35	23000	62200	5	504	2280	47.0	2.0	10.0
HRD T7	2008-06-17	25	21800	61000	5	468	2240	46.0	2.0	8.0
HRD T7	2009-03-30 13:57:00	20	25100	65800	0	477	2350	48.0	0.0	7.0
HRD T7	2010-06-18 11:30:00	20	24000	62800	0	486	2480	53.0	0.0	9.0
HRD T7	2012-03-02 00:00:00	0	23100	59100	0	474	2220	57.0	0.0	10.0
HRD T7	2013-06-20 00:00:00	20	22000	63500	0	485	2320	55.0	0.0	11.0
HRD T7	2014-02-10 00:00:00	15	23600	60300	0	419	2100	48.0	0.0	12.0
HRD T8										
HRD T8	1994-03-02	20	29300	70600	5	236	672	2.0	2.0	2.0
HRD T8	1995-04-07	20	27900	66500	5	239	788	2.0	2.0	2.0
HRD T8	1996-04-08	15	25500	61200	5	191	705	2.0	2.0	2.0
HRD T8	1997-01-31	25	33000	67800	5	9	508	2.0	2.0	10.0
HRD T8	1997-02-03	15	32300	81500	5	241	867	2.0	2.0	2.0
HRD T8	2000-09-18	7	31993	72497	1	307	1497	1.0	1.0	1.0
HRD T8	2002-02-20	19	33935	89362	4	390	1796	3.0	3.0	0.0
HRD T8	2003-03-25	18	33343	82595	2	311	1486	1.0	0.0	0.0
HRD T8	2004-04-29	13	29349	72602	1	358	1573	4.0	0.0	0.0
HRD T8	2006-03-23	10	23800	63300	5	520	1730	11.0	2.0	2.0
HRD T8	2007-04-17	10	24300	64200	5	594	1960	21.0	2.0	2.0
HRD T8	2008-06-17	10	19800	63300	5	563	1910	26.0	2.0	2.0
HRD T8	2009-03-30 14:22:00	0	26400	69200	0	564	2030	34.0	0.0	0.0
HRD T8	2010-06-18 14:05:00	0	26600	64800	0	627	2050	44.0	0.0	0.0
HRD T8	2012-03-02 00:00:00	0	24600	63500	0	560	1960	50.0	0.0	0.0
HRD T8	2013-06-20 00:00:00	0	28500	75800	0	506	2110	51.0	0.0	0.0
HRD T8	2014-02-10 00:00:00	15	26400	63800	0	469	2140	51.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HWD GT1										
HWD GT1	1994-03-04	10	28000	66500	5	154	808	12.0	2.0	2.0
HWD GT1	1995-04-07	10	28400	64400	5	192	882	12.0	2.0	2.0
HWD GT1	1996-04-08	10	27300	62200	5	199	901	14.0	2.0	2.0
HWD GT1	1997-01-31	10	28600	71800	5	200	904	13.0	2.0	2.0
HWD GT1	2000-08-31	10	28034	74966	1	283	1262	10.0	0.0	0.0
HWD GT1	2002-02-19	18	33004	96585	3	353	1321	22.0	1.0	0.0
HWD GT1	2003-03-24	9	32232	81241	1	263	1170	18.0	1.0	0.0
HWD GT1	2004-04-27	10	28105	78954	2	283	1203	18.0	0.0	0.0
HWD GT1	2006-03-22	20	14500	63700	5	298	1290	18.0	2.0	2.0
HWD GT1	2007-05-23	10	8880	65400	5	303	1410	18.0	2.0	2.0
HWD GT1	2008-06-10	15	5530	66100	10	298	1460	14.0	3.0	2.0
HWD GT1	2009-03-17 15:09:00	20	6430	70500	7	308	1410	12.0	6.0	0.0
HWD GT1	2010-02-26 14:48:00	20	2510	65800	14	340	1470	11.0	9.0	0.0
HWD GT1	2012-02-28 00:00:00	25	6130	65700	7	296	1460	7.0	8.0	0.0
HWD GT1	2013-12-14 00:00:00	40	10200	78200	9	330	1570	7.0	6.0	0.0
HWD GT1	2014-03-19 00:00:00	30	9590	68600	0	288	1490	3.0	5.0	0.0
HWD T1										
HWD T1	1994-03-02	10	28100	65600	5	251	2370	44.0	7.0	2.0
HWD T1	1994-03-04	10	31000	71000	5	291	2990	16.0	2.0	2.0
HWD T1	1995-04-07	10	30500	66200	5	273	2770	15.0	2.0	2.0
HWD T1	1996-04-08	10	29300	64000	5	267	2790	16.0	2.0	2.0
HWD T1	1997-01-31	10	28800	68300	5	265	2700	17.0	4.0	2.0
HWD T1	2000-08-31	5	33872	74627	1	276	2297	8.0	0.0	0.0
HWD T1	2002-02-19	12	35965	82064	2	322	2545	15.0	2.0	0.0
HWD T1	2003-03-24	12	36415	78507	1	299	2506	13.0	1.0	0.0
HWD T1	2004-04-27	4	35411	76701	2	293	2332	14.0	0.0	0.0
HWD T1	2006-03-22	10	29300	64100	5	305	2610	13.0	2.0	2.0
HWD T1	2007-05-23	10	29600	64700	5	293	2420	16.0	2.0	2.0
HWD T1	2008-06-10	10	28400	63800	5	281	2230	13.0	2.0	2.0
HWD T1	2009-03-17 15:02:00	0	27800	63200	0	298	2210	11.0	0.0	0.0
HWD T1	2010-02-26 14:47:00	0	29100	66300	0	346	2240	12.0	0.0	0.0
HWD T1	2012-02-27 00:00:00	0	29200	65200	0	360	2490	8.0	0.0	0.0
HWD T1	2013-12-14 00:00:00	15	28300	65200	0	430	2720	13.0	0.0	0.0
HWD T1	2014-03-19 00:00:00	15	25900	62400	0	505	2920	13.0	0.0	0.0
HWD T2										
HWD T2	1994-03-04	20	30100	62000	5	170	1220	18.0	3.0	34.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HWD T2	1995-04-07	15	32500	71600	5	165	1250	18.0	3.0	30.0
HWD T2	1996-04-08	15	29900	63600	5	170	1380	15.0	3.0	32.0
HWD T2	1997-01-31	15	33300	80700	5	163	1400	14.0	2.0	28.0
HWD T2	2000-08-31	16	33723	71830	1	188	1766	13.0	1.0	36.0
HWD T2	2002-02-19	27	36671	90337	2	223	1947	21.0	3.0	37.0
HWD T2	2003-03-24	22	37854	81439	2	188	1790	15.0	3.0	35.0
HWD T2	2004-04-27	10	34061	69008	1	183	1614	12.0	0.0	31.0
HWD T2	2006-03-22	15	30600	62500	5	178	1700	11.0	2.0	32.0
HWD T2	2007-05-23	15	29200	61500	5	168	1660	11.0	2.0	32.0
HWD T2	2008-06-10	10	29500	63300	5	187	1660	9.0	2.0	30.0
HWD T2	2009-03-17 15:03:00	0	28900	60500	0	176	1550	8.0	0.0	26.0
HWD T2	2010-02-25 14:49:00	10	31300	63700	0	198	1830	9.0	0.0	32.0
HWD T2	2012-02-27 00:00:00	15	32500	66900	0	213	1890	10.0	0.0	36.0
HWD T2	2013-12-14 00:00:00	20	31200	64900	0	190	1960	16.0	0.0	38.0
HWD T2	2014-03-19 00:00:00	25	31300	69600	0	211	1980	16.0	0.0	39.0
HWD T3										
HWD T3	1994-03-04	10	24700	61600	5	414	1960	33.0	2.0	2.0
HWD T3	1995-04-07	10	25500	62600	5	396	1970	38.0	3.0	2.0
HWD T3	1996-04-08	10	23500	59900	5	407	2200	42.0	2.0	2.0
HWD T3	1997-01-31	10	24200	61500	5	404	2290	48.0	2.0	2.0
HWD T3	2000-08-31	10	27085	72708	2	480	2503	66.0	1.0	0.0
HWD T3	2002-02-19	13	31497	94587	4	541	2799	89.0	1.0	0.0
HWD T3	2003-03-24	15	30920	83879	4	509	2734	90.0	2.0	0.0
HWD T3	2004-05-10	13	27646	75267	2	513	2683	91.0	2.0	0.0
HWD T3	2006-03-22	10	25400	69000	5	680	3100	47.0	2.0	2.0
HWD T3	2007-05-23	10	22300	59700	5	466	2570	84.0	2.0	2.0
HWD T3	2008-06-10	10	18300	60100	5	468	2670	86.0	2.0	2.0
HWD T3	2009-03-17 15:05:00	0	21300	61100	0	447	2560	80.0	0.0	0.0
HWD T3	2010-02-26 14:50:00	10	24800	76800	0	532	2970	90.0	0.0	0.0
HWD T3	2012-02-27 00:00:00	0	20100	60100	0	536	2950	84.0	0.0	0.0
HWD T3	2013-12-14 00:00:00	25	23700	77200	0	636	3160	88.0	0.0	0.0
HWD T3	2014-02-11 00:00:00	0	28900	63600	0	306	2530	9.0	0.0	0.0
HWD T4										
HWD T4	1994-03-04	45	20300	44100	5	141	318	2.0	2.0	2.0
HWD T4	1995-04-07	20	26700	58700	5	184	526	2.0	2.0	2.0
HWD T4	1996-04-08	10	27800	59800	5	192	715	2.0	2.0	2.0
HWD T4	1997-01-31	10	27900	63400	5	212	910	2.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
HWD T4	2000-08-31	14	31004	72870	1	277	1353	1.0	0.0	0.0
HWD T4	2002-02-19	17	33113	89943	3	529	2044	11.0	3.0	1.0
HWD T4	2003-03-24	18	30060	85142	3	757	2157	15.0	1.0	0.0
HWD T4	2004-04-27	16	25411	73825	1	772	2134	27.0	0.0	1.0
HWD T4	2006-03-22	20	22700	60600	5	467	2570	76.0	2.0	2.0
HWD T4	2007-05-23	10	24800	64100	5	646	2190	50.0	2.0	2.0
HWD T4	2008-06-10	10	22700	63600	5	591	2270	55.0	2.0	2.0
HWD T4	2009-03-17 15:06:00	0	23900	61900	0	574	2280	53.0	0.0	0.0
HWD T4	2010-02-26 14:52:00	10	25600	73200	0	677	2590	66.0	0.0	0.0
HWD T4	2012-02-27 00:00:00	10	23100	63400	0	622	2620	69.0	0.0	0.0
HWD T4	2013-12-14 00:00:00	20	26100	72500	0	683	2550	84.0	0.0	0.0
HWD T4	2014-03-19 00:00:00	25	23700	66900	0	718	2740	88.0	0.0	0.0
HWD T5										
HWD T5	1994-03-04	25	30800	63800	5	103	1060	2.0	2.0	2.0
HWD T5	1995-04-07	15	31200	65400	5	129	1190	2.0	2.0	2.0
HWD T5	1996-04-08	10	29100	62500	5	111	1110	2.0	2.0	2.0
HWD T5	1997-01-31	10	30800	65200	5	115	1140	2.0	2.0	2.0
HWD T5	2000-08-31	8	34315	72109	1	135	1344	1.0	0.0	0.0
HWD T5	2002-02-19	16	35880	80377	3	155	1384	5.0	1.0	0.0
HWD T5	2003-03-25	10	34836	81039	1	147	1322	1.0	1.0	0.0
HWD T5	2004-04-27	10	31681	72371	1	131	1184	2.0	0.0	0.0
HWD T5	2006-03-22	10	31100	63300	5	115	1270	3.0	2.0	2.0
HWD T5	2007-05-23	10	32200	65800	5	117	1290	3.0	2.0	2.0
HWD T5	2008-06-10	10	26200	63300	5	131	1280	3.0	2.0	2.0
HWD T5	2009-03-17 15:07:00	0	26100	61300	0	115	1180	6.0	0.0	0.0
HWD T5	2010-02-26 15:45:00	40	31400	63600	45	114	1300	120.0	12.0	3.0
HWD T5	2010-03-16 15:14:00	0	1770	5550	0	13	167	16.0	0.0	0.0
HWD T5	2010-03-16 15:26:00	0	580	4890	0	14	138	13.0	0.0	0.0
HWD T5	2010-03-16 15:27:00	0	943	8260	0	19	158	14.0	0.0	0.0
HWD T5	2010-03-16 15:32:00	0	1710	6270	0	12	138	13.0	0.0	0.0
HWD T5	2010-03-26 10:40:00	0	3630	7440	0	15	212	18.0	2.0	0.0
HWD T5	2010-03-30 10:23:00	0	2750	8260	6	19	267	21.0	3.0	0.0
HWD T5	2010-05-25 11:47:00	0	8800	18000	0	21	381	21.0	2.0	0.0
HWD T5	2010-10-04 12:18:00	75	15800	35900	46	62	777	27.0	3.0	0.0
HWD T5	2012-02-27 00:00:00	0	28400	61200	0	82	826	11.0	0.0	0.0
HWD T5	2013-12-14 00:00:00	10	30100	62300	0	108	980	9.0	0.0	0.0
HWD T5	2014-03-19 00:00:00	0	31500	63200	0	92	1000	4.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
JAM T1										
JAM T1	1994-02-16	10	36400	75500	5	36	722	2.0	2.0	2.0
JAM T1	1995-05-02	10	31900	64300	5	35	707	2.0	2.0	2.0
JAM T1	1996-02-21	10	36600	73600	5	40	754	2.0	4.0	2.0
JAM T1	1997-04-10	10	31500	62900	5	37	751	2.0	2.0	2.0
JAM T1	1998-04-01	10	32700	62200	5	41	803	2.0	2.0	2.0
JAM T1	1999-03-02	10	33900	70100	5	35	786	2.0	2.0	2.0
JAM T1	2000-09-28	1	34609	76250	1	79	1003	1.0	0.0	0.0
JAM T1	2002-02-20	0	36148	77081	2	53	909	1.0	2.0	0.0
JAM T1	2003-04-09	4	38443	78525	1	91	1088	1.0	1.0	0.0
JAM T1	2004-04-21	0	38844	78670	0	47	871	0.0	0.0	0.0
JAM T1	2006-04-12	10	35900	73300	5	45	921	2.0	2.0	2.0
JAM T1	2007-03-15	10	33900	62400	5	52	951	4.0	2.0	2.0
JAM T1	2008-02-14	10	32400	60900	5	55	929	4.0	2.0	2.0
JAM T1	2009-03-05 14:13:00	0	31200	65300	0	69	970	4.0	0.0	0.0
JAM T1	2010-05-20 11:20:00	0	31200	63000	0	60	928	6.0	0.0	0.0
JAM T1	2011-04-06 14:41:00	0	34900	69400	0	52	875	4.0	0.0	0.0
JAM T1	2012-02-14 00:00:00	0	37500	77600	0	43	819	4.0	0.0	0.0
JAM T1	2013-03-12 00:00:00	0	34700	71700	0	43	861	6.0	0.0	4.0
JAM T1	2014-03-04 00:00:00	0	32400	63700	0	31	794	7.0	0.0	0.0
MBK T1										
MBK T1	1993-09-30	10	30200	64600	5	162	1100	2.0	2.0	2.0
MBK T1	1994-09-21	10	30200	63900	5	164	1130	2.0	2.0	2.0
MBK T1	1997-08-08	10	30500	66500	5	141	1190	2.0	2.0	2.0
MBK T1	2002-05-01	4	29059	81412	3	132	1157	0.0	0.0	0.0
MBK T1	2003-03-13	7	33762	87236	1	135	1029	0.0	0.0	0.0
MBK T1	2004-04-15	2	38284	82226	1	125	1119	0.0	0.0	0.0
MBK T1	2006-04-13	10	32200	63400	5	121	1140	2.0	2.0	2.0
MBK T1	2007-07-27	10	31400	63500	5	119	1300	2.0	2.0	2.0
MBK T1	2008-05-27	10	30900	62100	5	100	1100	2.0	2.0	2.0
MBK T1	2009-05-21 14:54:00	0	33600	64800	0	109	1190	0.0	0.0	0.0
MBK T1	2010-02-25 11:35:00	0	28900	63300	0	119	1150	0.0	0.0	0.0
MBK T1	2011-03-31 14:27:00	0	33000	68400	0	123	1160	0.0	0.0	0.0
MBK T1	2012-04-03 00:00:00	0	29600	61600	0	79	1010	0.0	0.0	0.0
MBK T1	2013-06-05 00:00:00	0	33800	76400	0	132	1150	0.0	0.0	0.0
MBK T1	2014-05-28 00:00:00	0	30500	61100	0	104	1170	0	0	0
MDR GT1										

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
MDR GT1	1993-09-23	35	20600	59800	5	349	2330	8.0	2.0	2.0
MDR GT1	1994-09-29	35	23400	60100	5	335	2210	6.0	2.0	2.0
MDR GT1	2002-04-09	37	27727	82491	3	346	2734	16.0	2.0	1.0
MDR GT1	2003-03-25	30	30730	83926	2	362	2288	20.0	0.0	0.0
MDR GT1	2006-04-07	25	22100	58300	5	317	2200	17.0	2.0	2.0
MDR GT1	2007-04-04	25	23400	59500	5	337	2340	20.0	2.0	2.0
MDR GT1	2008-03-04	25	23400	60900	5	350	2440	22.0	2.0	2.0
MDR GT1	2009-02-09 09:33:00	30	23300	59100	0	339	2460	19.0	0.0	0.0
MDR GT1	2009-04-01 10:55:00	20	21400	58700	0	303	2240	19.0	0.0	0.0
MDR GT1	2010-03-19 13:57:00	20	24800	62100	0	304	2270	18.0	0.0	0.0
MDR GT1	2011-03-31 06:56:00	20	27300	70000	0	287	2150	14.0	0.0	0.0
MDR GT1	2012-02-22 00:00:00	25	25700	59900	0	299	2400	12.0	0.0	0.0
MDR GT1	2013-03-06 00:00:00	30	24200	59100	0	317	2440	9.0	0.0	0.0
MDR GT1	2014-04-01 00:00:00	20	25600	61400	0	296	2330	6.0	0.0	0.0
MDR T1										
MDR T1	2000-10-24	14	26148	82776	6	768	2206	2.0	0.0	0.0
MDR T1	2002-04-09	33	24162	91113	17	897	4416	28.0	3.0	2.0
MDR T1	2003-03-25	24	23453	88845	9	840	3796	44.0	2.0	0.0
MDR T1	2004-04-20	10	30057	102876	4	621	3414	45.0	0.0	0.0
MDR T1	2006-04-07	10	17400	62300	5	595	3150	61.0	2.0	2.0
MDR T1	2007-04-04	10	19500	68000	5	460	2720	61.0	2.0	2.0
MDR T1	2008-03-04	10	16300	64800	5	551	2980	71.0	2.0	2.0
MDR T1	2009-04-01 10:53:00	0	17400	61100	0	492	2800	74.0	0.0	0.0
MDR T1	2010-03-19 14:11:00	0	20000	61900	0	405	2680	71.0	0.0	0.0
MDR T1	2011-03-31 15:48:00	0	20700	62500	0	402	2660	76.0	0.0	0.0
MDR T1	2012-02-20 00:00:00	0	21200	65100	0	369	2450	72.0	0.0	0.0
MDR T1	2013-03-06 00:00:00	0	18200	61800	0	426	2470	70.0	0.0	0.0
MDR T1	2014-04-01 00:00:00	0	18800	62500	0	378	2230	62.0	0.0	0.0
MDR T2										
MDR T2	1993-09-08	15	21300	61100	5	597	3060	57.0	3.0	2.0
MDR T2	1994-09-29	15	22700	60000	5	564	2850	45.0	2.0	2.0
MDR T2	2000-10-24	7	37613	100807	2	755	4178	113.0	2.0	0.0
MDR T2	2002-04-09	13	30626	82695	7	496	3482	84.0	2.0	2.0
MDR T2	2003-03-25	12	32994	84184	9	498	2875	95.0	3.0	0.0
MDR T2	2004-04-20	8	33237	85846	3	398	2198	66.0	1.0	0.0
MDR T2	2006-04-07	10	25300	58900	5	378	2140	64.0	2.0	2.0
MDR T2	2007-04-04	10	20900	58400	5	443	2160	67.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
MDR T2	2008-03-04	10	24500	60100	5	419	2100	68.0	3.0	2.0
MDR T2	2009-04-01 10:40:00	0	21900	56800	0	369	1910	56.0	0.0	0.0
MDR T2	2010-03-19 14:10:00	0	22500	56900	0	400	2040	63.0	3.0	0.0
MDR T2	2011-03-31 16:01:00	0	24100	57900	0	403	2070	64.0	0.0	0.0
MDR T2	2012-02-20 00:00:00	0	24100	58800	0	398	2080	61.0	0.0	0.0
MDR T2	2013-03-06 00:00:00	0	23700	58200	6	411	2100	63.0	0.0	3.0
MDR T2	2014-04-01 00:00:00	0	25300	62800	0	445	2460	64.0	0.0	0.0
MDR T3										
MDR T3	1993-09-08	20	25100	64200	5	349	1670	5.0	2.0	2.0
MDR T3	1994-09-29	25	23100	62700	5	410	1690	7.0	2.0	3.0
MDR T3	2000-10-24	46	28132	74410	0	424	1738	50.0	0.0	1.0
MDR T3	2002-04-09	51	29392	84919	8	440	2529	61.0	3.0	5.0
MDR T3	2003-03-25	31	33008	85698	4	392	1610	58.0	3.0	4.0
MDR T3	2004-04-20	27	35192	84293	4	404	1765	66.0	4.0	4.0
MDR T3	2006-04-07	20	28400	67200	5	315	1540	71.0	6.0	5.0
MDR T3	2007-04-04	25	21100	63200	5	341	1510	72.0	7.0	4.0
MDR T3	2008-03-04	15	26500	62100	5	326	1460	75.0	8.0	3.0
MDR T3	2009-04-01 10:38:00	10	24100	59900	0	303	1400	62.0	5.0	2.0
MDR T3	2011-03-31 15:49:00	10	27500	64300	0	319	1470	61.0	3.0	6.0
MDR T3	2012-02-20 00:00:00	15	26200	61100	0	301	1440	56.0	3.0	6.0
MDR T3	2013-03-03 00:00:00	0	26900	67300	0	339	1510	54.0	2.0	5.0
MDR T3	2014-04-01 00:00:00	0	26800	62400	0	301	1470	52.0	0.0	7.0
MDR T3	2014-05-02 00:00:00	15	27900	71200	0	313	1580	48.0	2.0	7.0
OPD GT1										
OPD GT1	1994-03-07	60	23600	59600	5	359	1890	7.0	2.0	2.0
OPD GT1	1995-04-07	75	24300	63100	5	390	1980	9.0	2.0	2.0
OPD GT1	1996-04-13	60	23300	61000	5	397	2060	12.0	2.0	2.0
OPD GT1	1997-01-30	65	21300	60200	5	393	2130	11.0	2.0	2.0
OPD GT1	2000-08-31	67	19988	71376	1	540	2802	20.0	0.0	0.0
OPD GT1	2002-02-18	88	26779	86350	2	685	3514	26.0	3.0	0.0
OPD GT1	2003-03-24	68	30827	86798	1	497	2597	21.0	0.0	0.0
OPD GT1	2004-04-22	0	22825	70284	1	445	2228	17.0	0.0	0.0
OPD GT1	2006-03-22	55	19600	59800	5	453	2720	25.0	2.0	2.0
OPD GT1	2007-05-15	55	20800	58700	5	421	2840	29.0	2.0	2.0
OPD GT1	2008-06-05	40	21600	61000	5	390	2940	30.0	2.0	2.0
OPD GT1	2009-03-16 15:12:00	55	26600	74300	0	419	3320	30.0	0.0	0.0
OPD GT1	2010-02-24 11:27:00	55	23800	75100	0	470	3270	30.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
OPD GT1	2011-10-08 14:19:00	50	21100	57100	0	426	3130	31.0	0.0	0.0
OPD GT1	2012-03-14 00:00:00	25	21600	56500	0	361	2720	31.0	0.0	0.0
OPD GT1	2013-07-04 00:00:00	30	22100	58400	0	466	3000	25.0	0.0	0.0
OPD GT1	2014-02-04 00:00:00	50	23000	59200	0	395	3000	33.0	0.0	0.0
OPD T1										
OPD T1	1994-03-07	40	22900	58900	5	421	1920	62.0	5.0	18.0
OPD T1	1995-04-07	50	20800	61200	5	439	1970	63.0	5.0	10.0
OPD T1	1996-04-13	35	23500	60100	5	443	2160	68.0	5.0	8.0
OPD T1	1997-01-29	25	24000	66900	5	469	2120	63.0	5.0	7.0
OPD T1	2000-08-31	18	22383	69721	3	635	2549	68.0	1.0	2.0
OPD T1	2002-02-18	35	25719	84547	4	759	3116	96.0	3.0	3.0
OPD T1	2003-03-26	59	27703	82769	7	756	3158	106.0	2.0	14.0
OPD T1	2004-04-22	67	24120	75350	2	679	2857	98.0	2.0	8.0
OPD T1	2006-03-22	35	20000	58500	5	616	2770	99.0	3.0	16.0
OPD T1	2007-05-15	45	20200	58400	10	603	2800	106.0	3.0	22.0
OPD T1	2008-06-05	35	19800	60000	10	619	2880	111.0	4.0	23.0
OPD T1	2009-03-16 14:30:00	40	21700	61900	6	653	3060	121.0	3.0	26.0
OPD T1	2010-02-24 11:23:00	60	21400	74900	6	727	3160	130.0	3.0	34.0
OPD T1	2011-10-08 14:16:00	35	20600	59100	6	615	2840	126.0	3.0	34.0
OPD T1	2012-03-14 00:00:00	20	18500	57500	0	683	3140	130.0	0.0	0.0
OPD T1	2013-07-04 00:00:00	35	18000	59000	0	761	3230	131.0	0.0	37.0
OPD T1	2014-01-31 00:00:00	55	19800	60800	11	741	3860	151.0	0.0	45.0
OPD T1	2014-02-21 00:00:00	50	20500	59700	9	633	3390	134.0	2.0	43.0
OPD T1	2014-03-18 00:00:00	65	18800	58400	11	723	3450	152.0	4.0	45.0
OPD T2										
OPD T2	1994-03-07	35	24900	63100	5	397	2180	2.0	4.0	2.0
OPD T2	1995-04-07	35	28900	74000	5	421	2460	2.0	4.0	2.0
OPD T2	1996-04-01	35	25600	62800	5	426	2730	2.0	3.0	2.0
OPD T2	1996-04-13	30	26900	66000	5	393	2530	2.0	3.0	2.0
OPD T2	1997-01-29	35	27900	77300	5	420	2740	4.0	5.0	2.0
OPD T2	2000-08-31	49	19618	67489	2	742	3715	17.0	2.0	0.0
OPD T2	2002-02-18	64	24930	85550	3	1001	5215	39.0	11.0	1.0
OPD T2	2003-03-26	53	26805	81701	3	898	5064	44.0	6.0	0.0
OPD T2	2004-04-22	76	22621	74003	2	831	4602	49.0	3.0	0.0
OPD T2	2006-03-22	40	20900	63600	5	808	4740	63.0	6.0	2.0
OPD T2	2007-05-15	50	20700	62000	5	738	4690	69.0	5.0	2.0
OPD T2	2008-06-05	40	20800	64500	5	743	4720	77.0	5.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
OPD T2	2009-03-16 14:32:00	40	22500	67500	0	809	5320	85.0	6.0	0.0
OPD T2	2010-02-24 11:26:00	45	19400	66500	0	894	5840	95.0	4.0	0.0
OPD T2	2011-10-08 14:18:00	30	27500	83100	0	759	4650	91.0	5.0	0.0
OPD T2	2012-03-14 00:00:00	30	18500	65000	6	912	5810	115.0	6.0	0.0
OPD T2	2013-07-04 00:00:00	25	21300	62400	0	913	5820	108.0	3.0	0.0
OPD T2	2014-02-04 00:00:00	50	22400	65600	7	835	6370	136.0	6.0	0.0
OPD T3										
OPD T3	1994-03-07	15	27600	62700	5	268	1490	183.0	57.0	3.0
OPD T3	1995-04-07	65	28700	67000	5	283	1510	152.0	46.0	2.0
OPD T3	1996-04-13	35	27200	62300	5	284	1660	147.0	44.0	4.0
OPD T3	1996-04-13	40	28100	64900	5	304	1740	152.0	43.0	5.0
OPD T3	1997-01-30	25	29500	72900	5	285	1720	134.0	35.0	6.0
OPD T3	2000-08-31	19	28962	72347	3	355	2119	106.0	19.0	22.0
OPD T3	2002-02-18	32	31990	82056	5	381	2446	113.0	14.0	25.0
OPD T3	2003-03-26	31	32333	85897	5	356	2244	92.0	12.0	12.0
OPD T3	2004-04-22	42	28212	80642	4	381	2365	91.0	11.0	20.0
OPD T3	2006-03-22	20	27400	63700	5	333	2200	70.0	9.0	18.0
OPD T3	2007-05-15	20	26800	62000	5	323	2120	63.0	7.0	17.0
OPD T3	2008-06-05	15	26800	64200	5	325	2180	61.0	6.0	16.0
OPD T3	2009-03-16 14:34:00	15	30000	69100	0	351	2430	64.0	6.0	17.0
OPD T3	2010-02-24 11:25:00	20	27000	64500	5	385	2450	59.0	5.0	21.0
OPD T3	2011-10-08 14:17:00	15	26200	59600	0	337	2160	53.0	5.0	20.0
OPD T3	2012-03-14 00:00:00	0	29300	72900	7	339	2290	55.0	4.0	19.0
OPD T3	2013-07-04 00:00:00	10	27700	65900	0	458	2630	53.0	3.0	23.0
OPD T3	2014-02-04 00:00:00	25	26900	62700	9	407	2890	65.0	5.0	25.0
OPD T3	2014-02-21 00:00:00	25	29700	74500	7	422	2760	50.0	3.0	20.0
OPD T3	2014-03-18 00:00:00	30	30200	78600	9	484	2930	65.0	5.0	25.0
P235(PORT)										
P235 (PORT)	2009-05-15 11:02:00	0	34100	66200	0	90	876	9.0	0.0	4.0
P235 (PORT)	2010-04-14 15:37:00	0	31300	65400	0	104	834	10.0	0.0	5.0
P235 (PORT)	2011-07-22 13:38:00	0	17000	53000	0	15	301	0.0	0.0	0.0
P235 (PORT)	2011-08-31 08:53:00	0	5950	16900	0	21	353	0.0	0.0	0.0
P235 (PORT)	2012-07-08 00:00:00	0	5910	16400	0	0	63	2.0	0.0	0.0
P235 (PORT)	2012-07-24 00:00:00	0	26400	81700	0	18	238	6.0	0.0	6.0
P235 (PORT)	2012-07-26 00:00:00	0	27500	77100	0	18	244	6.0	2.0	7.0
P235 (PORT)	2012-07-27 00:00:00	0	25100	76000	0	20	257	6.0	0.0	6.0
P235 (PORT)	2012-07-28 00:00:00	0	27000	78400	0	17	246	6.0	0.0	7.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
P235 (PORT)	2012-10-25 00:00:00	0	25900	69100	0	44	434	10.0	0.0	11.0
P235 (PORT)	2012-11-30 00:00:00	0	26900	71000	0	34	434	9.0	0.0	11.0
P235 (PORT)	2013-06-25 00:00:00	0	30000	67500	0	49	523	7.0	0.0	9.0
P235 (PORT)	2014-05-28 00:00:00	0	30600	64800	0	39	503	0.0	2.0	8.0
PBN T1										
PBN T1	2002-04-08	19	36766	77373	2	144	1436	1.0	0.0	0.0
PBN T1	2003-03-21	10	36010	81041	1	145	1344	1.0	1.0	0.0
PBN T1	2004-03-11	6	30575	67309	0	132	1305	0.0	0.0	0.0
PBN T1	2006-04-20	10	31700	61900	5	118	1650	2.0	2.0	2.0
PBN T1	2007-04-26	10	29100	58500	5	113	1650	2.0	2.0	2.0
PBN T1	2008-04-24	10	26200	57300	5	120	1770	2.0	2.0	2.0
PBN T1	2009-04-06 11:10:00	0	28700	61500	0	116	1790	0.0	0.0	0.0
PBN T1	2010-02-23 13:10:00	0	29000	58000	0	123	1930	0.0	0.0	0.0
PBN T1	2011-03-23 08:51:00	0	30400	58200	0	114	1910	0.0	0.0	0.0
PBN T1	2012-03-22 00:00:00	0	30100	57800	0	99	1700	0.0	0.0	0.0
PBN T1	2013-03-05 00:00:00	0	30300	59300	0	120	2080	0.0	0.0	0.0
PBN T1	2014-05-28 00:00:00	0	29600	59600	0	87	1980	0	0	0
PPD T1										
PPD T1	1993-09-28	20	29000	66100	5	186	1410	2.0	2.0	2.0
PPD T1	1994-09-22	20	26300	64700	5	181	1300	2.0	2.0	2.0
PPD T1	2002-04-08	24	35026	79803	2	132	1145	1.0	0.0	0.0
PPD T1	2003-03-21	20	36096	86734	2	133	1137	0.0	0.0	0.0
PPD T1	2004-03-11	14	35140	78726	1	140	1129	0.0	0.0	0.0
PPD T1	2006-04-25	15	29700	62200	5	131	1120	2.0	2.0	2.0
PPD T1	2007-04-25	15	29700	61500	5	126	1130	2.0	2.0	2.0
PPD T1	2008-04-18	15	28900	60700	5	132	1200	2.0	2.0	2.0
PPD T1	2009-04-08 11:07:00	15	30200	65200	0	150	1320	0.0	0.0	0.0
PPD T1	2010-02-15 13:06:00	15	33700	78000	0	156	1310	0.0	0.0	0.0
PPD T1	2010-10-17 11:41:00	20	26800	64400	0	194	1480	0.0	0.0	0.0
PPD T1	2011-03-23 08:40:00	15	30200	67000	0	158	1320	0.0	0.0	0.0
PPD T1	2012-03-21 00:00:00	15	29900	66700	0	137	1230	0.0	0.0	0.0
PPD T1	2013-03-05 00:00:00	15	29100	61900	0	163	1390	0.0	0.0	0.0
PPD T1	2014-05-28 00:00:00	10	28000	62700	0	142	1300	0	0	0
PPT T1										
PPT T1	2002-04-09	5	37840	73952	3	76	646	1.0	2.0	0.0
PPT T1	2003-03-11	6	39284	77856	2	75	674	1.0	3.0	0.0
PPT T1	2004-03-16	1	37016	73597	0	73	705	0.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
PPT T1	2006-04-19	10	33100	66600	5	64	758	2.0	2.0	2.0
PPT T1	2007-04-24	10	31300	58800	5	60	764	2.0	2.0	2.0
PPT T1	2008-04-22	10	31100	58000	5	60	773	2.0	2.0	2.0
PPT T1	2009-04-13 11:20:00	0	29800	56900	0	64	753	0.0	0.0	0.0
PPT T1	2010-02-22 13:10:00	0	31100	59400	0	73	798	0.0	0.0	0.0
PPT T1	2011-03-25 08:54:00	0	31200	57800	0	58	773	0.0	0.0	0.0
PPT T1	2012-03-19 00:00:00	0	32700	66900	0	55	736	0.0	0.0	0.0
PPT T1	2013-03-06 00:00:00	0	30500	58300	0	66	782	0.0	0.0	0.0
PPT T1	2014-05-28 00:00:00	0	31300	59200	0	53	803	0	0	0
PRV T1										
PRV T1	1994-03-08	10	3140	65000	5	626	8810	36.0	45.0	2.0
PRV T1	1995-04-07	10	5030	67300	115	603	7040	27.0	91.0	2.0
PRV T1	1996-04-11	10	3490	65800	135	650	7180	22.0	131.0	2.0
PRV T1	1997-01-31	10	4330	65800	130	607	6990	14.0	167.0	2.0
PRV T1	2000-09-13	4	3856	77427	161	655	6959	17.0	229.0	0.0
PRV T1	2002-02-27	8	6013	97535	185	887	10023	20.0	305.0	2.0
PRV T1	2003-03-31	12	6887	102352	148	872	7392	17.0	279.0	0.0
PRV T1	2004-05-10	10	4920	88432	134	891	7572	12.0	216.0	1.0
PRV T1	2006-06-06	10	4120	69600	125	721	6050	12.0	175.0	2.0
PRV T1	2007-06-01	10	2750	70200	130	827	6200	14.0	180.0	2.0
PRV T1	2008-06-25	10	2940	69600	140	845	6630	11.0	169.0	2.0
PRV T1	2010-01-13 11:07:00	10	2590	74900	78	662	5400	6.0	153.0	0.0
PRV T1	2011-12-15 11:24:00	2480	5200	63200	8680	1290	7980	7080.0	3370.0	10.0
PRV T1	2012-01-12 11:26:00	20	15200	36400	125	19	324	203.0	131.0	0.0
PRV T1	2012-01-12 11:30:00	0	16700	38400	49	8	224	62.0	37.0	0.0
PRV T1	2012-01-12 11:32:00	0	14200	36000	27	7	149	21.0	11.0	0.0
PRV T1	2012-01-14 10:04:00	0	1980	4060	10	0	72	12.0	4.0	0.0
PRV T1	2012-01-27 10:30:00	25	4240	8690	76	38	552	76.0	29.0	0.0
PRV T1	2012-02-02 09:08:00	30	5940	17800	71	38	576	74.0	28.0	0.0
PRV T1	2012-02-15 00:00:00	25	4840	13300	99	73	866	101.0	37.0	0.0
PRV T1	2012-03-13 00:00:00	25	8050	22600	106	142	1410	117.0	43.0	0.0
PRV T1	2012-04-10 00:00:00	20	9320	26800	118	259	2230	137.0	51.0	0.0
PRV T1	2012-06-15 00:00:00	20	12700	41200	95	375	3280	148.0	49.0	0.0
PRV T1	2012-08-21 00:00:00	0	17300	59200	69	455	3800	164.0	45.0	0.0
PRV T1	2012-11-02 00:00:00	10	17000	74400	58	754	5900	214.0	44.0	0.0
PRV T1	2013-04-22 00:00:00	0	12000	63900	30	697	6760	219.0	30.0	0.0
PRV T1	2013-04-22 00:00:00	0	5710	59600	34	992	8950	265.0	47.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
PRV T1	2013-06-20 00:00:00	0	20100	70400	16	654	6250	178.0	25.0	0.0
PRV T1	2014-04-14 00:00:00	0	16300	64900	10	995	11400	143.0	17.0	0.0
RHR T1										
RHR T1	1993-09-29	90	21400	69600	5	245	522	24.0	5.0	111.0
RHR T1	1994-09-22	125	21300	69500	5	246	519	23.0	5.0	92.0
RHR T1	2002-04-01	89	19659	81343	13	447	770	33.0	8.0	76.0
RHR T1	2002-09-04	167	18202	98191	29	557	1279	31.0	7.0	89.0
RHR T1	2003-06-13	151	22866	93099	28	520	964	32.0	9.0	88.0
RHR T1	2003-08-21	150	20495	96330	18	504	941	27.0	2.0	85.0
RHR T1	2004-03-10	124	18084	80080	26	467	816	30.0	4.0	72.0
RHR T1	2004-08-23	166	17465	86071	21	514	1032	26.0	3.0	83.0
RHR T1	2006-04-27	95	16000	64500	20	424	854	26.0	4.0	58.0
RHR T1	2007-05-03	115	18300	74100	25	459	870	26.0	5.0	66.0
RHR T1	2008-04-16	105	13700	66200	25	493	945	27.0	6.0	64.0
RHR T1	2009-09-01 09:57:00	105	16000	73700	17	556	1190	26.0	4.0	78.0
RHR T1	2010-02-10 13:01:00	95	16300	70900	25	522	1100	28.0	4.0	70.0
RHR T1	2012-08-16 00:00:00	95	11900	69000	21	558	1210	27.0	4.0	64.0
RHR T1	2014-05-27 00:00:00	100	14200	72000	22	620	1290	5	23	61
RHR T1	2014-05-27 00:00:00	95	13900	72200	18	621	1250	4	23	61
RWC T2										
RWC T2	1989-09-20	20	32800	71500	5	132	818	2.0	2.0	2.0
RWC T2	1990-10-25	90	32300	72600	5	209	1130	2.0	9.0	2.0
RWC T2	1992-03-31	10	27400	65300	5	195	1120	2.0	2.0	2.0
RWC T2	1993-09-30	10	30000	67800	5	243	1660	2.0	2.0	2.0
RWC T2	1994-09-21	10	32800	74300	5	248	1750	2.0	2.0	2.0
RWC T2	1997-09-04	10	32300	67400	5	219	2050	2.0	2.0	2.0
RWC T2	2002-05-01	23	31300	81371	4	242	2019	1.0	1.0	0.0
RWC T2	2003-03-13	7	34485	85730	1	219	1729	0.0	0.0	0.0
RWC T2	2004-04-15	3	29967	73809	2	236	1718	2.0	0.0	0.0
RWC T2	2006-04-13	10	30500	69900	5	210	1620	3.0	2.0	2.0
RWC T2	2007-07-27	10	28600	64100	5	236	1810	3.0	2.0	2.0
RWC T2	2008-05-29	10	30700	61800	5	185	1510	3.0	2.0	2.0
RWC T2	2009-05-12 14:55:00	0	29400	76400	0	251	1660	3.0	0.0	0.0
RWC T2	2010-03-10 13:16:00	0	28300	61700	0	219	1520	4.0	0.0	0.0
RWC T2	2011-03-30 14:13:00	0	30800	62900	0	230	1600	4.0	0.0	0.0
RWC T2	2012-04-03 00:00:00	0	28700	61900	0	228	1490	5.0	0.0	0.0
RWC T2	2013-05-16 00:00:00	0	28500	61000	0	239	1590	7.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
RWC T2	2014-05-28 00:00:00	0	29000	61400	0	209	1600	0	3	0
SCV T1										
SCV T1	2011-10-27 13:07:00	45	23500	71600	7	213	972	0.0	5.0	0.0
SCV T1	2014-05-27 00:00:00	60	19600	67100	7	280	1230	7	0	0
SDP T1										
SDP T1	1997-08-28	3	5890	12700	1	6	62	0.2	0.1	0.1
SDP T1	1997-08-28	3	6770	1660	1	6	58	0.2	0.1	0.1
SDP T1	1997-08-28	3	6940	15800	1	11	53	0.2	0.1	0.1
SDP T1	1997-09-29	10	3430	7030	5	5	51	2.0	2.0	2.0
SDP T1	2002-05-01	15	31230	74824	2	160	586	1.0	1.0	0.0
SDP T1	2003-03-10	10	36449	75432	1	159	473	1.0	1.0	0.0
SDP T1	2004-04-15	30	32918	75234	1	199	556	2.0	0.0	0.0
SDP T1	2006-04-10	10	31000	62700	5	192	617	3.0	2.0	2.0
SDP T1	2007-07-18	15	23500	63200	5	410	991	9.0	2.0	2.0
SDP T1	2008-06-04	10	24900	62500	5	386	923	12.0	2.0	2.0
SDP T1	2009-06-16 11:56:00	0	26300	64600	0	406	1040	16.0	0.0	0.0
SDP T1	2010-02-24 13:10:00	0	24400	61200	0	393	958	17.0	0.0	0.0
SDP T1	2012-04-03 00:00:00	0	25300	60100	0	408	893	20.0	0.0	0.0
SDP T1	2013-06-06 00:00:00	0	26600	63900	0	424	1180	21.0	0.0	0.0
SDP T1	2011-03-31 14:12:00	0	26500	64000	0	427	1100	19.0	0.0	0.0
SOK T1										
SOK T1	1993-03-04	10	20800	61200	5	451	2190	53.0	2.0	2.0
SOK T1	1994-03-02	10	22100	61800	5	443	2210	58.0	2.0	2.0
SOK T1	1995-05-04	10	23200	65300	5	416	2050	63.0	2.0	2.0
SOK T1	1996-02-19	10	24700	68200	5	478	2220	72.0	2.0	2.0
SOK T1	1997-04-04	10	20000	62300	5	459	2280	82.0	2.0	2.0
SOK T1	1998-04-03	10	21200	61700	5	471	2240	86.0	2.0	2.0
SOK T1	1999-03-03	10	21800	64800	5	481	2450	98.0	2.0	2.0
SOK T1	2000-09-29	7	20098	76668	2	751	3158	113.0	1.0	0.0
SOK T1	2002-02-21	10	25459	84934	3	693	3370	115.0	0.0	0.0
SOK T1	2003-04-04	9	26574	86703	2	751	3604	112.0	1.0	0.0
SOK T1	2004-04-22	3	22456	73321	2	614	2855	76.0	1.0	0.0
SOK T1	2006-04-10	10	21100	66600	5	539	2580	56.0	2.0	2.0
SOK T1	2007-03-15	10	21900	70100	5	545	2610	53.0	2.0	2.0
SOK T1	2008-02-15	10	18800	60600	5	559	2670	51.0	2.0	2.0
SOK T1	2009-03-06 14:09:00	0	18200	62900	0	616	2800	48.0	0.0	0.0
SOK T1	2010-04-15 15:34:00	0	19400	64000	0	617	2730	50.0	0.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
SOK T1	2011-04-06 14:20:00	0	18900	62200	0	610	2800	45.0	0.0	0.0
SOK T1	2012-02-14 00:00:00	0	17300	61300	0	646	2840	48.0	0.0	0.0
SOK T1	2013-03-14 00:00:00	0	16200	60900	0	689	3060	53.0	0.0	0.0
SOK T1	2014-03-05 00:00:00	0	16400	62500	0	683	2900	54.0	0.0	0.0
SSD T1										
SSD T1	1994-03-07	25	24600	69200	5	402	2170	27.0	4.0	7.0
SSD T1	1995-04-04	25	26000	69100	5	415	2640	32.0	4.0	8.0
SSD T1	1996-04-11	25	23800	64400	5	405	2500	38.0	5.0	7.0
SSD T1	1997-01-28	30	23200	65300	5	429	2740	41.0	5.0	9.0
SSD T1	2000-08-30	26	27161	72754	2	438	3032	45.0	1.0	2.0
SSD T1	2002-02-22	49	29918	87519	4	490	3559	55.0	3.0	3.0
SSD T1	2003-03-26	35	29927	80664	3	473	3412	53.0	4.0	3.0
SSD T1	2004-04-27	32	27959	70632	2	427	3080	51.0	1.0	2.0
SSD T1	2006-03-29	15	28700	63700	5	336	2410	34.0	2.0	2.0
SSD T1	2006-03-29	25	26100	66400	5	389	3060	52.0	3.0	2.0
SSD T1	2008-06-03	20	24800	63200	5	333	3030	51.0	5.0	6.0
SSD T1	2009-05-05 14:46:00	25	21700	62100	0	327	3020	50.0	4.0	7.0
SSD T1	2010-03-22 14:31:00	25	27400	65200	0	341	3070	50.0	4.0	8.0
SSD T1	2012-02-24 00:00:00	20	25900	61100	0	310	2640	49.0	3.0	8.0
SSD T1	2012-03-13 00:00:00	10	26400	62100	0	267	2610	47.0	4.0	7.0
SSD T1	2013-09-11 00:00:00	30	26600	64100	0	373	3160	52.0	4.0	11.0
SSD T4										
SSD T4	1994-03-01	20	26400	63000	5	330	1940	7.0	3.0	3.0
SSD T4	1995-04-07	20	25100	61800	5	340	1870	10.0	2.0	2.0
SSD T4	1996-04-11	20	26600	63900	5	370	2080	17.0	2.0	4.0
SSD T4	1997-01-28	15	26700	65000	5	372	2280	24.0	3.0	6.0
SSD T4	2000-08-30	14	29665	88313	1	430	2498	33.0	1.0	1.0
SSD T4	2002-02-22	24	34892	87688	2	458	3009	39.0	3.0	3.0
SSD T4	2003-03-26	25	34782	82731	4	419	2933	41.0	3.0	1.0
SSD T4	2004-04-21	22	34432	80183	2	399	2819	39.0	2.0	2.0
SSD T4	2007-04-10	20	28500	62600	5	302	2250	31.0	3.0	4.0
SSD T4	2008-06-03	10	26600	63400	5	302	2400	32.0	2.0	4.0
SSD T4	2009-05-05 14:47:00	10	26600	61900	0	273	2290	31.0	3.0	4.0
SSD T4	2010-03-22 14:32:00	15	30500	66000	0	296	2370	30.0	0.0	2.0
SSD T4	2012-02-24 00:00:00	0	30500	66100	0	263	2050	27.0	0.0	5.0
SSD T4	2012-03-13 00:00:00	0	27800	62100	0	213	2140	29.0	0.0	4.0
SSD T4	2013-09-11 00:00:00	15	29000	63500	0	322	2350	29.0	0.0	6.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
SSD T4	2014-01-27 00:00:00	15	32100	72200	0	290	2910	22.0	0.0	2.0
SSD T4	2014-04-02 00:00:00	15	33400	73600	0	273	2710	16.0	0.0	7.0
SSD T4	2014-04-21 00:00:00	0	30000	64200	0	240	2530	16.0	0.0	0.0
STA SST										
STA SST-1	2004-03-10	73	23320	87035	11	439	1250	1.0	16.0	0.0
STA SST-1	2006-04-27	75	21900	78100	5	429	1440	2.0	17.0	2.0
STA SST-1	2007-05-02	80	20100	75600	10	456	1500	2.0	18.0	2.0
STA SST-1	2008-04-18	85	22300	88300	10	483	1540	2.0	17.0	2.0
STA SST-1	2009-09-01 09:56:00	95	18100	81100	7	566	1900	0.0	15.0	0.0
STA SST-1	2011-10-17 09:41:00	65	17700	68300	8	488	1630	0.0	16.0	0.0
STA SST-1	2012-06-21 00:00:00	10	24300	63700	9	181	1610	0.0	14.0	0.0
STA SST-1	2014-05-28 00:00:00	0	28500	63400	0	92	1780	16	0	0
STA T1										
STA T1	1997-09-09	10	24100	51100	10	79	212	2.0	2.0	2.0
STA T1	2002-05-01	12	35423	79623	2	151	638	0.0	1.0	0.0
STA T1	2003-03-10	4	38334	76855	1	140	594	1.0	1.0	0.0
STA T1	2004-04-15	4	37819	76826	0	125	575	0.0	0.0	0.0
STA T1	2006-04-12	10	29700	63900	5	202	779	4.0	2.0	2.0
STA T1	2007-07-27	10	26100	64400	5	351	1100	11.0	2.0	2.0
STA T1	2008-06-04	10	28800	61800	5	267	934	12.0	2.0	2.0
STA T1	2009-05-21 14:52:00	0	33600	78400	0	298	1080	12.0	0.0	0.0
STA T1	2010-02-11 13:09:31	0	28600	63400	0	294	1160	16.0	0.0	0.0
STA T1	2011-03-28 14:20:00	0	29200	63900	0	301	1160	15.0	0.0	0.0
STA T1	2012-04-03 00:00:00	0	28200	62700	0	284	1100	15.0	0.0	0.0
STA T1	2013-06-07 00:00:00	0	29200	63000	0	294	1150	15.0	0.0	0.0
STB T1										
STB T1	1993-03-17	15	27600	64500	5	303	1940	19.0	3.0	2.0
STB T1	1994-03-02	15	27700	63600	5	364	2280	24.0	3.0	3.0
STB T1	1995-05-10	15	26800	64000	5	359	2340	27.0	3.0	3.0
STB T1	1996-02-21	15	27700	64600	5	368	2590	32.0	4.0	2.0
STB T1	1997-04-07	15	26800	64200	5	373	2680	28.0	3.0	2.0
STB T1	1998-03-27	10	28300	63400	5	332	2540	24.0	3.0	2.0
STB T1	1999-03-04	15	27300	66200	5	348	2830	27.0	3.0	2.0
STB T1	2000-11-26	18	30136	73352	1	450	3332	31.0	1.0	1.0
STB T1	2002-02-18	24	35183	83099	4	474	3758	40.0	3.0	1.0
STB T1	2003-04-01	30	32002	82029	4	438	3214	35.0	3.0	2.0
STB T1	2004-04-08	21	32469	75643	2	396	2636	30.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
STB T1	2006-04-06	25	29700	72200	5	379	2420	25.0	3.0	4.0
STB T1	2007-03-13	20	26600	65200	5	410	2560	27.0	2.0	2.0
STB T1	2008-02-11	20	27000	62100	5	407	2510	23.0	2.0	2.0
STB T1	2009-03-09 14:52:00	25	27700	70500	0	481	4600	67.0	3.0	13.0
STB T1	2009-12-10 08:25:00	25	25200	64600	0	484	2860	24.0	2.0	0.0
STB T1	2010-03-15 10:53:00	25	27900	65000	0	462	2790	27.0	3.0	0.0
STB T1	2011-04-05 14:00:00	20	27600	65400	0	436	2640	25.0	2.0	0.0
STB T1	2012-02-13 00:00:00	20	27300	65800	0	481	3300	26.0	2.0	0.0
STB T1	2013-03-14 00:00:00	30	25600	64800	0	586	4330	39.0	3.0	0.0
STB T1	2014-01-14 00:00:00	25	26300	65400	0	580	5280	34.0	0.0	0.0
STB T2										
STB T2	1993-03-17	25	28600	68200	5	281	2140	43.0	4.0	48.0
STB T2	1993-04-20	35	27600	63800	5	347	2650	46.0	3.0	58.0
STB T2	1993-10-07	35	26000	64200	5	386	2850	51.0	4.0	59.0
STB T2	1994-03-02	35	27200	63800	5	353	2600	50.0	2.0	62.0
STB T2	1995-05-10	25	25700	63700	5	356	2710	52.0	3.0	52.0
STB T2	1996-02-21	20	29800	78700	5	368	2860	51.0	4.0	45.0
STB T2	1997-04-07	15	27000	69400	5	373	3080	55.0	4.0	36.0
STB T2	1998-03-27	15	26800	62900	5	357	2990	49.0	3.0	27.0
STB T2	1999-03-04	15	26600	65000	5	390	3410	50.0	3.0	24.0
STB T2	2000-11-26	19	27515	71647	3	469	3469	49.0	1.0	22.0
STB T2	2002-02-18	30	36060	88921	5	526	4493	73.0	4.0	25.0
STB T2	2003-04-01	30	32442	81068	4	427	3703	59.0	2.0	20.0
STB T2	2004-04-08	21	30973	76697	2	439	3933	62.0	2.0	17.0
STB T2	2006-04-06	25	26600	63700	5	411	3740	59.0	4.0	16.0
STB T2	2007-03-13	20	26500	64000	5	427	3970	65.0	3.0	14.0
STB T2	2008-02-11	25	26000	62800	5	447	4290	64.0	4.0	15.0
STB T2	2009-03-09 15:43:00	20	28300	66700	0	450	2730	23.0	2.0	2.0
STB T2	2010-03-15 10:52:00	20	26200	64700	0	487	4820	74.0	3.0	13.0
STB T2	2011-04-05 13:58:00	20	23900	62700	0	486	4630	74.0	3.0	11.0
STB T2	2012-02-13 00:00:00	25	26600	67400	0	528	5390	69.0	2.0	11.0
STB T2	2013-03-14 00:00:00	25	25000	65000	0	559	5520	81.0	5.0	9.0
STB T2	2014-01-14 00:00:00	25	24900	65000	0	599	6260	68.0	0.0	10.0
STL T1										
STL T1	2007-06-01 00:00:00	15	27000	85400	0			82.0	3.0	0.0
STL T1	2014-05-27 00:00:00	10	25900	63000	0	271	3990	8.0	0.0	0.0
SVL GT1										

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
SVL GT1	1993-09-13	30	22200	73000	5	144	1350	2.0	2.0	2.0
SVL GT1	1994-09-23	40	22700	71700	5	160	1360	2.0	2.0	2.0
SVL GT1	2002-04-09	68	24067	98220	7	309	2533	2.0	2.0	1.0
SVL GT1	2003-03-24	57	23682	98060	2	341	2183	1.0	1.0	0.0
SVL GT1	2004-04-20	34	32291	112652	4	279	2125	2.0	1.0	0.0
SVL GT1	2006-04-03	35	20900	69300	5	274	2330	2.0	3.0	2.0
SVL GT1	2006-04-05	20	30200	64300	5	286	2160	74.0	15.0	27.0
SVL GT1	2007-04-05	20	23200	71800	5	248	2190	2.0	3.0	2.0
SVL GT1	2008-03-03	30	19700	70900	5	310	2380	2.0	3.0	2.0
SVL GT1	2009-04-02 11:30:00	40	17500	65700	6	329	2610	0.0	3.0	0.0
SVL GT1	2010-03-15 13:55:00	35	16700	70400	0	366	2670	0.0	3.0	0.0
SVL GT1	2011-03-23 06:52:00	40	16800	69700	5	387	2910	0.0	5.0	0.0
SVL GT1	2012-02-15 00:00:00	45	18600	78900	0	406	2980	0.0	4.0	0.0
SVL T1										
SVL T1	1993-09-13	10	34300	73800	5	114	1270	2.0	2.0	2.0
SVL T1	1994-09-23	10	32200	66100	5	107	1170	2.0	2.0	2.0
SVL T1	2001-01-15	6	35061	69471	1	85	916	1.0	1.0	0.0
SVL T1	2002-04-09	19	37102	78381	6	123	1722	1.0	2.0	0.0
SVL T1	2003-03-24	16	39351	87449	1	103	1063	0.0	0.0	0.0
SVL T1	2004-04-20	8	37946	85737	4	106	1104	1.0	1.0	0.0
SVL T1	2006-04-05	10	34100	66600	5	89	1120	2.0	2.0	2.0
SVL T1	2007-04-05	10	33100	68200	5	102	1110	2.0	2.0	2.0
SVL T1	2008-03-03	10	31400	67500	5	154	1340	2.0	2.0	2.0
SVL T1	2009-04-02 11:50:00	0	29700	62200	0	186	1600	0.0	0.0	0.0
SVL T1	2010-03-15 14:13:00	40	29700	63900	55	252	1980	120.0	16.0	0.0
SVL T1	2010-12-06 16:14:00	35	31900	70800	67	297	2290	180.0	31.0	0.0
SVL T1	2010-12-06 16:16:00	35	32900	74500	67	299	2280	184.0	31.0	0.0
SVL T1	2011-03-23 15:31:00	25	31300	65500	59	251	2030	183.0	23.0	0.0
SVL T1	2012-02-15 00:00:00	20	31000	63400	24	197	1670	98.0	21.0	0.0
SVL T1	2013-03-04 00:00:00	15	32300	67000	15	134	1280	64.0	16.0	0.0
SVL T1	2014-03-28 00:00:00	0	37400	82900	0	146	1390	35.0	8.0	0.0
SVL T3										
SVL T3	1993-09-13	30	30100	65900	5	250	1750	13.0	2.0	110.0
SVL T3	1994-09-23	35	30800	63600	5	209	1510	14.0	2.0	103.0
SVL T3	2001-01-15	30	36589	86834	2	334	1969	35.0	4.0	45.0
SVL T3	2002-04-09	39	35186	82672	9	365	2441	43.0	6.0	47.0
SVL T3	2003-03-24	38	36871	84475	7	367	2449	65.0	7.0	47.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
SVL T3	2004-04-20	21	33845	75628	3	303	2234	66.0	7.0	37.0
SVL T3	2006-04-05	20	30200	64300	5	286	2160	74.0	15.0	27.0
SVL T3	2007-04-05	20	29000	64900	5	327	2240	81.0	18.0	26.0
SVL T3	2008-03-05	25	28300	65400	5	474	2810	85.0	23.0	27.0
SVL T3	2009-04-02 10:59:00	20	24900	61900	6	526	3140	77.0	23.0	20.0
SVL T3	2010-03-15 13:52:00	20	27900	67100	6	601	3690	90.0	29.0	21.0
SVL T3	2011-03-23 15:47:00	20	25500	64000	7	655	4230	87.0	33.0	18.0
SVL T3	2012-02-15 00:00:00	20	27100	66200	7	560	4010	90.0	41.0	15.0
SVL T3	2013-03-04 00:00:00	15	29100	66400	6	428	3500	93.0	38.0	12.0
SVL T3	2014-03-28 00:00:00	15	30800	75200	0	534	4040	80.0	38.0	10.0
USL T1										
USL T1	1993-03-30	860	4220	89100	105	719	4020	34.0	109.0	2.0
USL T1	1993-05-26	730	5590	77800	115	799	4510	34.0	136.0	2.0
USL T1	1993-10-13	1410	11500	111000	130	692	4700	30.0	121.0	2.0
USL T1	1994-02-23	195	13000	98100	80	811	5420	35.0	145.0	2.0
USL T1	1994-05-25	170	5010	72400	85	851	5380	35.0	151.0	2.0
USL T1	1995-05-05	10	6610	68400	115	889	5180	35.0	156.0	2.0
USL T1	1996-01-30	755	16700	134000	115	832	6880	36.0	137.0	2.0
USL T1	1997-03-24	20	3760	65000	105	874	5340	39.0	157.0	2.0
USL T1	1998-03-25	100	13200	77600	105	645	6470	34.0	157.0	2.0
USL T1	1999-03-02	290	10500	78400	100	695	5090	40.0	138.0	2.0
USL T1	2000-09-13	252	4219	78878	145	1109	7251	50.0	164.0	0.0
USL T1	2002-02-19	22	6253	97061	159	1244	7689	74.0	217.0	1.0
USL T1	2003-04-10	18	4995	93937	160	1301	7882	83.0	199.0	0.0
USL T1	2004-07-04	25	15425	126947	137	1213	6166	56.0	119.0	1.0
USL T1	2006-04-05	15	7840	58100	5	637	5210	152.0	7.0	2.0
USL T1	2006-09-14	10	8710	60900	5	651	5330	141.0	7.0	2.0
USL T1	2007-03-28	10	7850	63800	5	783	6490	146.0	8.0	2.0
USL T1	2007-05-03	0	14	85	0	0	1	0.0	0.0	0.0
USL T1	2007-05-03	10	16300	67100	10	579	5380	122.0	7.0	2.0
USL T1	2007-05-03	10	16600	67400	10	576	5500	124.0	7.0	2.0
USL T1	2007-08-21	15	8490	64100	5	841	6210	120.0	7.0	2.0
USL T1	2008-03-04	10	9820	63400	5	826	6730	123.0	7.0	2.0
USL T1	2009-02-27 14:55:00	10	7770	66600	6	1010	8460	114.0	8.0	0.0
USL T1	2010-09-02 14:17:00	10	10800	68100	0	998	7170	89.0	4.0	0.0
USL T1	2011-03-15 14:33:00	0	8490	64300	0	1110	8480	99.0	5.0	0.0
USL T1	2012-03-01 00:00:00	0	9310	60700	6	1180	8660	127.0	6.0	0.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
USL T1	2013-03-06 00:00:00	0	7660	64600	8	1230	9460	116.0	3.0	0.0
USL T1	2013-06-12 00:00:00	10	8090	66100	0	1230	9000	112.0	4.0	0.0
USL T1	2013-11-05 00:00:00	0	11200	68300	5	1170	8910	71.0	2.0	0.0
USL T1	2014-01-15 00:00:00	0	16000	66900	6	880	7870	84.0	0.0	0.0
USL T1	2014-05-21 00:00:00	0	17700	70600	0	860	7960	77.0	2.0	0.0
VBN T1										
VBN T1	2013-06-25 00:00:00	0	14500	44200	0	46	234	0.0	0.0	0.0
VBN T1	2014-03-28 00:00:00	0	5580	13800	0	66	295	0.0	0.0	0.0
VBN T2										
VBN T2	2013-06-25 00:00:00	0	4730	9700	0	40	162	0.0	0.0	0.0
VBN T2	2014-03-28 00:00:00	0	4030	9010	0	60	297	0.0	0.0	0.0
WAV GT1										
WAV GT1	1994-03-03	55	11500	60400	5	468	2230	12.0	2.0	2.0
WAV GT1	1995-04-07	50	19800	65100	5	440	2040	14.0	2.0	2.0
WAV GT1	1996-04-11	55	22600	66500	5	456	2310	17.0	2.0	2.0
WAV GT1	2000-09-01	81	26106	87582	1	693	3531	36.0	0.0	0.0
WAV GT1	2002-02-22	98	29230	88600	3	614	3245	36.0	1.0	1.0
WAV GT1	2003-03-26	48	27476	87147	2	500	2558	27.0	0.0	0.0
WAV GT1	2004-05-11	61	22479	70242	1	484	2506	26.0	0.0	0.0
WAV GT1	2006-03-30	45	20900	61700	5	478	2570	31.0	2.0	4.0
WAV GT1	2007-06-11	40	20800	63000	5	462	2690	30.0	2.0	2.0
WAV GT1	2008-06-09	30	19900	61200	5	416	2420	25.0	2.0	2.0
WAV GT1	2009-04-28 11:52:00	40	20500	62700	0	453	2680	25.0	0.0	0.0
WAV GT1	2010-05-18 15:15:00	40	22400	66000	0	465	2760	24.0	0.0	0.0
WAV GT1	2012-02-08 14:30:00	40	22400	62100	0	453	2660	19.0	0.0	0.0
WAV GT1	2013-06-25 00:00:00	40	23500	64100	0	441	2660	14.0	0.0	0.0
WAV GT1	2014-02-12 00:00:00	50	26800	87200	0	487	2500	9.0	0.0	0.0
WAV T1										
WAV T1	1994-03-03	10	20500	53500	5	284	1480	78.0	5.0	728.0
WAV T1	1995-03-03	10	20500	53500	5	284	1480	78.0	5.0	728.0
WAV T1	1995-04-07	10	22100	58900	5	326	1600	90.0	6.0	741.0
WAV T1	1996-04-10	10	24500	66300	5	379	1900	100.0	5.0	768.0
WAV T1	1997-01-29	10	21700	60200	10	433	2190	106.0	5.0	786.0
WAV T1	2000-09-01	15	19611	70246	2	698	3706	79.0	1.0	500.0
WAV T1	2002-02-22	23	28270	80040	5	602	3454	98.0	4.0	529.0
WAV T1	2002-04-19	16	33377	95080	11	116	1301	83.0	9.0	175.0
WAV T1	2003-03-31	7	33101	90719	5	409	2695	42.0	1.0	327.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
WAV T1	2004-04-23	8	22514	64184	2	405	2083	35.0	1.0	181.0
WAV T1	2006-03-30	10	19800	58300	5	516	2900	52.0	2.0	164.0
WAV T1	2007-04-11	10	19800	60200	5	553	3020	59.0	2.0	143.0
WAV T1	2008-06-06	10	20300	61500	5	553	3270	67.0	2.0	123.0
WAV T1	2010-05-18 15:09:00	0	18600	62100	0	720	3890	80.0	0.0	101.0
WAV T1	2011-02-22 10:10:00	0	18700	62100	0	702	4340	81.0	0.0	97.0
WAV T1	2012-02-08 14:34:00	0	16900	61200	0	779	4850	87.0	2.0	82.0
WAV T1	2013-06-25 00:00:00	0	14200	64100	0	1020	6020	78.0	0.0	54.0
WAV T1	2014-02-12 00:00:00	0	16000	68500	6	1040	6550	61.0	0.0	48.0
WAV T1	2014-04-21 00:00:00	0	9970	61000	0	1280	9770	54.0	0.0	33.0
WAV T2										
WAV T2	1994-03-03	15	24000	63300	5	560	6780	60.0	8.0	2.0
WAV T2	1995-04-07	15	23500	66500	5	602	6940	61.0	10.0	2.0
WAV T2	1996-04-10	20	24000	65200	5	578	7590	57.0	10.0	2.0
WAV T2	1997-01-28	20	25400	75700	5	623	7840	56.0	10.0	2.0
WAV T2	2000-09-01	18	25020	78050	3	907	11062	72.0	4.0	0.0
WAV T2	2003-03-26	15	28150	76356	2	644	9340	57.0	10.0	0.0
WAV T2	2004-04-23	18	30279	81904	2	644	8439	57.0	5.0	0.0
WAV T2	2006-03-30	10	27300	72700	5	568	6340	37.0	6.0	2.0
WAV T2	2007-04-11	15	26100	64000	5	490	5000	31.0	6.0	2.0
WAV T2	2008-06-06	10	26500	65600	5	472	4820	31.0	4.0	2.0
WAV T2	2009-04-28 11:46:00	0	27300	65100	0	524	5430	28.0	5.0	0.0
WAV T2	2010-05-18 15:10:00	0	27700	68300	0	571	5680	31.0	4.0	0.0
WAV T2	2012-02-08 14:31:00	0	26500	67300	0	644	6950	27.0	5.0	0.0
WAV T2	2013-06-25 00:00:00	10	24800	66800	0	783	7840	22.0	4.0	0.0
WAV T2	2014-02-12 00:00:00	15	21800	70100	0	1110	10400	13.0	3.0	0.0
WAV T2	2014-03-31 00:00:00	15	20700	64300	6	1030	9250	33.0	5.0	0.0
WAV T2	2014-04-21 00:00:00	10	19900	64000	0	1050	11200	8.0	0.0	0.0
WAV T3										
WAV T3	1994-03-03	10	22600	48100	5	129	856	4.0	2.0	18.0
WAV T3	1995-04-07	10	24100	59400	5	225	1160	9.0	2.0	16.0
WAV T3	1996-04-10	10	26800	59900	5	266	1320	12.0	2.0	17.0
WAV T3	1997-01-28	10	25600	62800	5	335	1580	14.0	2.0	14.0
WAV T3	2000-09-01	10	28189	71901	1	448	2043	25.0	0.0	13.0
WAV T3	2002-02-22	14	36129	86031	2	499	2574	32.0	3.0	16.0
WAV T3	2003-03-26	12	33297	78572	2	406	2234	35.0	1.0	16.0
WAV T3	2004-05-11	7	31180	74772	1	423	2142	35.0	1.0	12.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
WAV T3	2006-03-30	10	26900	63800	5	383	2310	38.0	2.0	12.0
WAV T3	2007-04-11	10	26100	62900	5	399	2340	41.0	2.0	12.0
WAV T3	2008-06-06	10	27000	65500	5	402	2510	45.0	2.0	11.0
WAV T3	2009-04-28 11:48:00	0	28400	67400	0	434	2800	48.0	0.0	14.0
WAV T3	2010-05-18 15:12:00	0	26700	65200	0	462	2650	47.0	0.0	14.0
WAV T3	2012-02-08 14:32:00	0	28200	65400	0	427	2880	53.0	0.0	15.0
WAV T3	2013-06-25 00:00:00	0	27700	65700	0	486	3180	55.0	0.0	16.0
WAV T3	2014-02-12 00:00:00	15	30300	80400	0	558	3520	48.0	0.0	17.0
WAV T4										
WAV T4	1994-03-03	10	20400	57300	5	185	1020	8.0	2.0	6.0
WAV T4	1995-04-07	10	19100	48300	5	147	637	6.0	2.0	2.0
WAV T4	1996-04-11	10	23300	61400	5	349	1320	14.0	2.0	2.0
WAV T4	1997-01-28	10	25600	77000	5	445	1540	19.0	2.0	2.0
WAV T4	2000-09-01	11	22970	74875	1	683	2117	34.0	0.0	1.0
WAV T4	2002-02-22	17	30361	87624	4	773	2438	45.0	3.0	1.0
WAV T4	2003-03-26	21	29900	81757	2	665	2181	48.0	1.0	0.0
WAV T4	2004-05-11	14	27135	81812	2	630	2125	45.0	1.0	2.0
WAV T4	2006-03-30	10	22000	63100	5	603	2120	52.0	2.0	2.0
WAV T4	2007-04-11	15	20100	61000	5	583	2060	57.0	2.0	2.0
WAV T4	2008-06-06	10	21700	64500	5	560	2150	58.0	2.0	5.0
WAV T4	2009-04-28 11:49:00	10	20400	63000	0	608	2260	62.0	0.0	4.0
WAV T4	2010-05-18 15:13:00	15	21500	62800	0	612	2280	67.0	0.0	5.0
WAV T4	2012-02-08 14:28:00	10	22200	62800	0	565	2240	70.0	0.0	8.0
WAV T4	2013-06-25 00:00:00	15	24900	77400	0	705	2450	79.0	0.0	8.0
WAV T4	2014-02-12 00:00:00	20	21000	67300	0	784	3210	75.0	0.0	4.0
WAV T5										
WAV T5	1994-03-03	10	26900	60000	5	203	697	2.0	2.0	6.0
WAV T5	1995-04-07	10	26800	65000	5	193	815	2.0	2.0	4.0
WAV T5	1996-04-11	10	28700	61400	5	171	945	2.0	2.0	5.0
WAV T5	1997-01-28	10	28800	64400	5	193	1100	2.0	2.0	4.0
WAV T5	2000-09-01	10	36970	98438	2	294	1607	1.0	0.0	2.0
WAV T5	2002-02-22	20	38067	85964	2	280	1771	4.0	1.0	0.0
WAV T5	2003-03-26	18	34396	78510	1	339	1668	3.0	0.0	0.0
WAV T5	2004-05-11	14	27357	79308	1	450	1782	12.0	1.0	1.0
WAV T5	2006-03-30	10	25100	64900	5	417	1830	30.0	2.0	2.0
WAV T5	2007-04-11	15	22700	64600	5	394	1790	35.0	2.0	2.0
WAV T5	2008-06-06	10	25700	64000	5	371	1850	43.0	2.0	2.0

Work to be Performed on Transformers
Appendix B

		Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene
UNIT	Sample Date	H2	O2	N2	CH4	CO	CO2	C2H4	C2H6	C2H2
		gas level values are in parts per million (ppm)								
WAV T5	2009-04-28 11:50:00	15	25000	64800	0	381	2010	48.0	0.0	0.0
WAV T5	2010-05-18 15:14:00	15	26200	63800	0	392	2130	55.0	0.0	0.0
WAV T5	2012-02-08 14:29:00	15	27700	71200	0	377	1920	53.0	0.0	0.0
WAV T5	2013-06-25 00:00:00	0	28100	66400	0	372	2020	54.0	0.0	0.0
WDL T1										
WDL T1	2008-07-28	10	30900	65600	5	17	622	2.0	2.0	2.0
WDL T1	2008-08-29	10	30900	65100	5	20	638	2.0	2.0	2.0
WDL T1	2008-08-29 00:00:00	0	30900	65100	0	20	638	0.0	0.0	0.0
WDL T1	2009-04-07 10:53:00	0	27400	61600	0	50	643	0.0	0.0	0.0
WDL T1	2010-02-10 13:05:00	15	32700	66400	0	92	890	0.0	0.0	0.0
WDL T1	2011-03-16 09:14:00	0	28800	59300	0	93	853	0.0	0.0	0.0
WDL T1	2012-04-03 00:00:00	0	29000	69000	0	66	877	0.0	0.0	0.0
WDL T1	2013-03-13 00:00:00	10	30000	61100	0	89	988	0.0	0.0	0.0
WDL T1	2014-05-27 00:00:00	0	30400	61400	0	89	1000	0	0	0

APPENDIX C

SCHEDULE TO COMPLETE OVERDUE TRANSFORMER PMS

Overdue PMs - 2014	
Power Transformer	Criticality
HRDTS,T8	B
SLKTS, T1	B
OPDTS,T3	B
MDRTS,T1	B
GFCTS,T2	B
HRDTS,T7	B
HBYTS T2	B
BCVTS T1	B

Transformer PM Schedule								
Transformer Category	Number Transformers per Month							Quantity
	2014							
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Critical	1	1	2	2	1	1	0	8

