


FORM IV
(Refer regulation 7(2))
Bureau of Energy Efficiency
REGISTER CONTAINING NAMES OF OFFICES AND FIRMS OF ACCREDITED
ENERGY AUDITORS

Serial Number (AEA- 0082)		As on:- 26 February, 2013	
A.			
1	Name of energy auditor	Manoj Kumar Bansal	
2	Father's name	Satya Dev Bansal	
3	Date of certification as Energy Auditor	18 th Nov. 2005	
4	Date of passing the examination in "Energy Performance Assessment for Equipment and Utility Systems"	18 th Nov. 2005	
5	CEA Registration No.	EA – 0578	
6	Certificate Registration Number of (i) Energy Manager (ii) "Energy Performance Assessment for Equipment and Utility Systems"	(Not to be submitted at this stage)	
7	Date of issue of accreditation certificate	(to be filled by BEE)	
B.	Information in respect of trade name or firms' name		
8	Trade name / firms name under which energy audit is proposed to be conducted	Grant Thornton Bharat LLP	
9	Date of accreditation as accredited energy auditor	(to be filled by BEE)	
10	Type of firm/ private/ Government / NGO etc.	Limited Liability Partnership	
11	Name of contact person along with designation, address, telephone, mobile and fax number along with STD codes and email address (All	Amit Kumar Partner L-41, Connaught Circus, Outer Circle, New Delhi-110001, India +91 124 462 8000	

	details compulsory)	Mobile: +91 9899452400 Email: amit.kumar7@in.gt.com																					
12	Professional postal address with Pin Code of the accredited energy auditor	L-41, Connaught Circus, Outer Circle, New Delhi-110001, India																					
13	E-mail address	manoj.bansal@in.gt.com																					
14	Telephone numbers with STD Code (R) (O) Mobile no:	+91 124 462 8000 Mobile: +91 9910154500																					
15	Year of establishment of the trade name / firms' name for undertaking the energy audit	2000																					
16	Year of commencement of energy audit of the firm	2023																					
17	Whether any certificate to support the excellence in the system has been obtained (ISO etc.)	No																					
18	No. of branch offices (List of complete addresses including heads of all branch offices with telephone, fax and email addresses)	Office Location: <table border="1"> <thead> <tr> <th>S.No.</th><th>Office Location</th><th>Address</th></tr> </thead> <tbody> <tr> <td>1</td><td>Delhi</td><td>L – 41 Connaught Circus, Outer Circle, New Delhi – 110 001</td></tr> <tr> <td>2</td><td>Dehradun</td><td>Suite No 2211, 2nd Floor, Building 2000, Michigan Avenue, Doon Express Business Park, Subhash Nagar, Dehradun - 248002</td></tr> <tr> <td>3</td><td>Aerocity</td><td>6th floor, Worldmark 2, Aerocity, New Delhi - 110037</td></tr> <tr> <td>4</td><td>Gurgaon</td><td>21st Floor, DLF Square, Jacaranda Marg, DLF Phase – II Gurgaon – 122 002</td></tr> <tr> <td>5</td><td>Bengaluru</td><td>5th Floor, 65/2, Block A, Bagmane Tridib, Bagmane Tech Park, C V Raman Nagar, Bengaluru – 560 093</td></tr> <tr> <td>6</td><td>Hyderabad</td><td>Floor No. 10, Unit No -1 Plot No -30/A Survey no - 83/1, My Home Twitza, Raidurg</td></tr> </tbody> </table>	S.No.	Office Location	Address	1	Delhi	L – 41 Connaught Circus, Outer Circle, New Delhi – 110 001	2	Dehradun	Suite No 2211, 2nd Floor, Building 2000, Michigan Avenue, Doon Express Business Park, Subhash Nagar, Dehradun - 248002	3	Aerocity	6th floor, Worldmark 2, Aerocity, New Delhi - 110037	4	Gurgaon	21 st Floor, DLF Square, Jacaranda Marg, DLF Phase – II Gurgaon – 122 002	5	Bengaluru	5 th Floor, 65/2, Block A, Bagmane Tridib, Bagmane Tech Park, C V Raman Nagar, Bengaluru – 560 093	6	Hyderabad	Floor No. 10, Unit No -1 Plot No -30/A Survey no - 83/1, My Home Twitza, Raidurg
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C	Details of Associated Energy Experts																																		
19	Number of resource persons available	10 (AEA+CEA)																																	
(I)	Number of full-time energy auditors in position with work experience of all energy auditors associated with the firm	<p>Name of Resource Person 1: Mr. Manoj Kumar Bansal</p> <p>Energy Audit Registration No.: AEA – 0082</p> <p>Years of Experience: 25 Years</p> <table><tr><td>Energy Auditor Sectors</td><td>Contact Details</td></tr><tr><td><ul style="list-style-type: none">• Power Plants• Iron & Steel</td><td>Grant Thornton Bharat LLP, Partner, Climate</td></tr></table>	Energy Auditor Sectors	Contact Details	<ul style="list-style-type: none">• Power Plants• Iron & Steel	Grant Thornton Bharat LLP, Partner, Climate																													
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Director in the Climate change and energy division of the firm. Among other assignments, conducted Baseline energy audits for 09 Designated Consumers in the Textile Sector, under the PAT scheme.

Name of Resource Person 4: Mr. Pradeep Singhvi

Energy Audit Registration No.: CEA –

Years of Experience: 16 Years

Energy Auditor Sectors	Contact Details
<ul style="list-style-type: none">• Iron and Steel• Buildings	Grant Thornton Bharat LLP, Executive Director, Climate Change and Energy Direct: +91 124 462 8000 Mobile: +91 9560600710 Email: pradeep.singhvi@in.gt.com Grant Thornton Bharat LLP, L-41, Connaught Circus, Outer Circle, New Delhi- 110001, India

Brief Description:

Pradeep has more than 16+ years of experience in energy efficiency area and he is Presently working with Grant Thornton Bharat as an Executive Director in the Climate change and energy division of the firm. He have expertise in energy audits, demand side management and preparation of feasibility studies He worked with Ispat steel industries as a Engineer. As a part of the energy management team he was involved in conducting energy audit of steel plant.

List of the other key AEA and CEA

Name	Certificate	Experience
Satish Kumar S	AEA	13+
E Nand Gopal	CEA	12+
Sabreen Ahmed	CEA	13+

		<table> <tr> <td>Amit Seth</td><td>CEA</td><td>13+</td></tr> <tr> <td>Nilay Srivastava</td><td>CEA</td><td>10+</td></tr> </table>	Amit Seth	CEA	13+	Nilay Srivastava	CEA	10+
Amit Seth	CEA	13+						
Nilay Srivastava	CEA	10+						
20 (II)	No. of part-time energy auditors in position during the current year / previous year associated with the energy auditor /energy auditor's firms.	NA						
21	Sectors in which the energy auditor/ energy audit firm has conducted energy audits since inception	Sector: Textile Iron and Steel Aluminium Cement Petrochemical Fertilizer Pulp and Paper Buildings						
22	Subject wise expertise							
(a)	Energy audit process system (list sectors) - If no energy audit has been carried out of the process system and parameters, please list nil. Bureau of Energy Efficiency will be calling for detailed information in case agency has listed its energy audit expertise in the process systems	Nil						
(b)	Energy audit thermal utility system	<ul style="list-style-type: none"> • Power Plants • Iron & Steel • Petrochemicals • Pharmaceuticals • Textiles • Automobiles • Engineering • Food Processing • Commercial Buildings 						

		<ul style="list-style-type: none">• Municipalities (Street Lighting, Water Pumping etc)• MSME										
(c)	Energy audit electrical utility system	<ul style="list-style-type: none">• Power Plants• Iron & Steel• Petrochemicals• Pharmaceuticals• Textiles• Automobiles• Engineering• Food Processing• Commercial Buildings• Municipalities (Street Lighting, Water Pumping etc)• MSME										
23	Instruments available											
	(a) Electrical	<table><tr><th>Energy Audit Instrument Name</th></tr><tr><td>Power Quality Analyzer Kit - 1</td></tr><tr><td>Power Quality Analyzer Kit - 2</td></tr><tr><td>Clamp Meter</td></tr><tr><td>Digital Lux meter</td></tr><tr><td>Digital Multifunction Instrument</td></tr><tr><td>Differential Pressure Meter</td></tr><tr><td>Digital Manometer, 0 To 350 Mbar</td></tr><tr><td>Temperature Data Logger (4-Channel)</td></tr><tr><td>Portable Ultrasonic Flow Meter</td></tr></table>	Energy Audit Instrument Name	Power Quality Analyzer Kit - 1	Power Quality Analyzer Kit - 2	Clamp Meter	Digital Lux meter	Digital Multifunction Instrument	Differential Pressure Meter	Digital Manometer, 0 To 350 Mbar	Temperature Data Logger (4-Channel)	Portable Ultrasonic Flow Meter
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Portable Ultrasonic Flow Meter												
	(b) Thermal	<table><tr><th>Energy Audit Instrument Name</th></tr><tr><td>Thermal Imaging Camera</td></tr><tr><td>Portable Digital Hygrometer</td></tr><tr><td>Digital Temperature Meter</td></tr><tr><td>Infrared Thermometer</td></tr></table>	Energy Audit Instrument Name	Thermal Imaging Camera	Portable Digital Hygrometer	Digital Temperature Meter	Infrared Thermometer					
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Infrared Thermometer												

		<table><tr><td>Portable Ultrasonic Flow Meter</td></tr><tr><td>Temperature Data Logger (4-Channel)</td></tr><tr><td>Laser Distance Meter</td></tr></table>		Portable Ultrasonic Flow Meter	Temperature Data Logger (4-Channel)	Laser Distance Meter
Portable Ultrasonic Flow Meter						
Temperature Data Logger (4-Channel)						
Laser Distance Meter						
24 (i)	Details of training programme/ seminars/ workshops conducted during the last 3 years in the field of energy efficiency / energy audit					
(ii)						

D	Remarks(if any)

I hereby state that information furnished above is true and correct to the best of my knowledge.

Place: Gurgaon

Signature: Date:.....
Name: Manoj Kumar Bansal
Designation: Partner

Annexure III

Certificates of:

- Certified Energy Auditor
- Certified Measurement & Verification Professional

Annexure IV

List of Energy Audit Reports being
submitted

DETAILS

S. No.	Name of detailed energy audit	Sector	Remarks
1	Baseline Energy Audit of BSL ltd	Textile	Self attested & bound copies of all reports are enclosed
2	Baseline Energy Audit of Anant Syntex limited	Textile	
3	Energy Audit of Bihar Caustic & Chemicals limited, Rehla, Jharkhand	Chemical	
4	Energy Audit report of Videsh Sanchar Nigam limited (Tata Communications limited)	Buildings	
5	Energy Audit of NTPC Power Plant (Singrauli)	Power	
6	Energy Audit of Bhushan steel limited	Steel	
7	Energy Audit of GAIL, Pata	Petrochemical	
8	Energy Audit of Damodar Valley Corporation's power plant (Mejia, West Bengal)	Power	

Annexure V

Feedback on Energy Audit Reports (Self
attested copies)

Annexure VI

Partial List of Energy Audits Conducted
by Manoj Kumar Bansal

ENERGY AUDIT EXPERIENCE

I have conducted more than 50 energy audits in different industrial sectors like power plants, steel, automobile, textile, food & brewery, petrochemicals, engineering, buildings, municipalities etc. Every energy audit studies included analysis of existing energy use pattern of the industry, evaluation of all energy consuming equipments like Chillers, boilers, compressors, pumps, fans, HVAC systems, cooling towers, turbines etc and provide recommendations for various energy conservation opportunities available in the plant. Other responsibilities included:

- Measurements at Site
- Analysis and identification of energy conservation opportunities
- Preparation of audit report with recommendations
- Discussion of the report with the client's management / energy cell.

Partial list of energy audits conducted by me is given below:

S. No.	Audited Company Name	Sector
1	National Thermal Power Corporation, Singrauli	Power Plant
2	National Thermal Power Corporation, Auriya	Power Plant
3	Damodar Valley Power Corporation, Mejia	Power Plant
4	Videsh Sanchar Nigam Limited, Delhi	Building
5	Star TV, Delhi	Building
6	Bottling plants of Coca-cola Co. Limited	Breweries
7	Gas Authority of India Limited, Pata	Petrochemical
8	Bhushan Steel Limited, Ghaziabad	Steel
9	Dainik Bhaskar, Noida	Printing Press

10	Uttam Galva Steels, Raigad	Steel
11	K. S. Oil, Gwalior	Food Processing
12	10 - Water Pumping stations of Delhi Jal Board	Municipality
13	Bihar Caustic & Chemicals Limited (Chlor-Alkali Unit)	Chlor-Alkali
14	Cheviot Company Limited, Budge Budge	Textile
15	Cheviot Company Limited, Falta	Textile
16	Sona Koyo Steering Systems Limited	Automobile
17	Sandhar Auto Limited	Automobile
18	Indo Farm Tractors & Motors Limited	Automobile
19	M & M Auto Limited	Automobile
20	CIPLA Limited	Pharmaceutical
21	Republic Industries	Engineering
22	Energy audit of street lighting of 50 cities in AP	Municipality
23	Fortune Steel	Steel
24	MM Aqua	Engineering

Annexure VII

Certificate of Incorporation of PwC

Annexure VII: Certificate of Incorporation of Firm



Co. No - 21-36093.

नाम में तब्दीली के परिणामस्वरूप नियोजन के लिये गया प्रमाण-पत्र FRESH CERTIFICATE OF INCORPORATION CONSEQUENT ON CHANGE OF NAME

कम्पनियों के रजिस्ट्रार के कार्यालय में.....
[कम्पानी अधिनियम, 1956 (1956 का 1) के अधीन]
In the Office of the Registrar of Companies..... West Bengal, Kolkata
[Under the Companies Act, 1956 (1 of 1956)]

के विषय में ।
IN THE MATTER OF PRICEWATERHOUSE COOPERS LIMITED.

में एतद्वारा प्रमाणित करता हूँ कि..... परिसीमित जिसका निगमन मूलतः
200..... के..... के..... दिन इस #..... अधिनियम के अधीन और..... परिसीमित
नाम द्वारा किया गया था कम्पानी अधिनियम 1956 की धारा 21/22 (1) (क) /22. (1) (ख) 31(1), 43A(4), 44(2)(b) के
निर्बन्धनों के अनुसार आवश्यक संकल्प पारित कर चुकी है और इसकी बावद केन्द्रीय सरकार का लिखित अनुमति कम्पनी कार्य विभाग
द्वारा प्रदान कर दी गई है ।

I hereby certify that PriceWaterhouse Coopers - Limited, which was originally
incorporated on Twenty sixth day of March 200 1983 under the
Companies Act, 1956 and under the name PriceWaterhouse Coopers Private Limited having
duly passed the necessary special resolution in terms of section 21/22(1) (a) / 22(1) (b) 31(1), 43A(4),
44(2)(b) of Companies Act, 1956. and the approval of the Central Government signified in writing having
been accorded thereto in the Department of Company Affairs.

क्षेत्रीय निदेशक के तारीख..... 200..... के पत्र सं०..... द्वारा प्राप्त
हो जाने पर उक्त कम्पनी का नाम इस दिन..... परिसीमित में तब्दील कर दिया गया है और यह प्रमाण पत्र
उक्त अधिनियम की धारा 23 (1) अनुसरण में जारी किया जाता है ।

Regional Director X letter No. X dated X 200.....
the name of the said company is this day changed/Converted/Reconverted to PRICEWATERHOUSE COOPERS PVT
LTD. Limited and this certificate is issued pursuant to section 23(1) of the said Act. By virtue of Companies Amendment
Act 1988 W.E. 13-12-88

मेरे हस्ताक्षर से यह तारीख.....
को दिया गया ।

Given under my hand at Kolkata this 8th day of March 2001.
(One thousand nine hundred Two Thousand One).



My
सहकर्मियों की सहायता
Asst. Registrar of Companies
रजिस्ट्रार की सहायता
West Bengal

यहाँ पर कम्पनी का वह नाम लिखिए जो कि तब्दीली से पूर्व था ।

* Here give the name of the company as existing prior or the change.

यहाँ पर अधिनियम (अधिनियमों का नाम लिखिए जिनके अधीन कम्पनी का मूलतः रजिस्ट्रीकरण और निगमन किया गया था ।

Here give the name of the Act. (As under which the Company was originally registered and incorporated.

जे० एस० सी०-7

J. S. C. -7

Annexure VIII

Various International Certifications
possessed by PwC in Quality and other
areas

- ISO 9001:2008
- ISO/IEC 27001:2005
- Tick IT



DET NORSKE VERITAS MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 04552-2006-AQ-IND-UKAS Rev. 01

This is to certify that

PRICEWATERHOUSECOOPERS PVT. LIMITED

at

Saltlake Plot 56 & 57, Block DN, Sector V, Salt Lake, Kolkata - 700 091, INDIA

has been found to conform to the Quality Management System Standard:

ISO 9001:2008 & TickIT

This certificate is valid concerning all activities related to:

**PROVISION OF SERVICES FROM REQUIREMENTS ANALYSIS, DESIGN,
DEVELOPMENT, TESTING, DELIVERY AND IMPLEMENTATION THROUGH
TO WARRANTY FOR CUSTOM AND LEVERAGED SOFTWARE SOLUTIONS
FOR THE INDIAN AND EXPORT MARKETS**

Initial Certification date:

06 June 1997

This Certificate is valid until:

06 June 2012

*The audit has been performed under the
supervision of:*

Ulhas Shreekant Argekar
Lead Auditor



Place and date:

Chennai, 27 October 2009

for the Accredited Unit:

DET NORSKE VERITAS CERTIFICATION B.V.,
THE NETHERLANDS

Bhupalam Ajit
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

DET NORSKE VERITAS CERTIFICATION B.V. Zwolseweg 1, 2994 LB Barendrecht, The Netherlands, TEL: +31 10 2922 688 - www.dnv.com / www.dnv.nl



DET NORSKE VERITAS MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 1287-2007-AIS-IND-UKAS Rev. 02

This is to certify that

PRICEWATERHOUSECOOPERS PVT. LTD.

at

Plot # Y-14, 5th & 6th Floor, Plot No. XI/1, South City Pinnacle, Block # EP, Sector V,
Salt Lake, Kolkata - 700 091, INDIA

Plot # 56 & 57, Block # DN, Sector V, Salt Lake, Kolkata - 700 091, INDIA

10th Floor, Tower 'A', DLF IT Park, Premises No. 8, Block AF, Major Arterial Road,
New Town, Rajarhat, Kolkata - 700 156, INDIA

has been found to conform to the Information Security Management System standard:

ISO/IEC 27001:2005

This Certificate is valid for the following product or service ranges:

PERFORMANCE IMPROVEMENT (PI), GOVERNMENT REFORMS & INTERNATIONAL DEVELOPMENT (GRID), SYSTEMS & PROCESS ASSURANCE (SPA) FOR THE INDIAN AND GLOBAL MARKETS ALONGWITH GLOBAL TECHNOLOGY SOLUTIONS (GTS), LEGAL, HUMAN RESOURCES, FINANCE, LEARNING & EDUCATION AND ADMINISTRATION DEPARTMENTS IN ACCORDANCE WITH THE LATEST STATEMENT OF APPLICABILITY

Initial Certification date BS7799:

15 October 2003

Initial Certification date ISO 27001:

12 April 2007

This Certificate is valid until:

15 October 2012

The audit has been performed under the supervision of:

Sachin Ratnakar

Lead Auditor



013

Place and date:

Chennai, 12 November 2009

for the Accredited Unit:

DET NORSKE VERITAS CERTIFICATION B.V.,
THE NETHERLANDS

Bhupalam Ajit
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

Det Norske Veritas Certification B.V., Zeehaven 1, 3004 LB Rotterdam, The Netherlands. TEL: +31 10 9699 500. www.dnv.com / www.dnv.nl

Annexure IX

List of Branch Offices of PwC

Annexure IX: Address list of branch offices of PricewaterhouseCoopers Pvt. Ltd.

S.NO	LOCATION	S.NO	LOCATION
1	Ahmedabad PricewaterhouseCoopers Pvt Ltd President Plaza, 1st Floor Opposite Muktidham Derasar Thaltej Cross Road, S.G. Highway Ahmedabad, Gujarat 380054, India Telephone: [91] (79) 3091 7000 Telecopier: [91] (79) 3091 7082	2	Bangalore PricewaterhouseCoopers Pvt Ltd The Millenia, Tower D # 1 & 2 Murphy Road, Ulsoor Bangalore, Karnataka 560008, India Telephone: [91] (80) 4079 4000/ 5000/ 6000/ 7000 Telecopier: [91] (80) 4079 4222
3	Bhubaneswar PricewaterhouseCoopers Pvt Ltd IDCOL House, Sardar Patel Bhawan Block III, Ground Floor, Unit 2 Bhubaneswar 751 009, India Telephone: [91] (674) 2532 459/2530 370 Telecopier: [91] (674) 2531 674	4	Chennai PricewaterhouseCoopers Pvt Ltd PwC Centre #32, Khader Nawaz Khan Road Nungambakkam, Chennai, Tamil Nadu 600 006, India Telephone: [91] (44) 4228 5000 Telecopier: [91] (44) 4228 5100
5	Delhi NCR PricewaterhouseCoopers Pvt Ltd Building 10, Tower C DLF Cyber City Gurgaon, Haryana 122002, India Telephone: [91] (124) 3306 000 Telecopier: [91] (124) 3306 999	6	Delhi NCR PricewaterhouseCoopers Pvt Ltd Building 8, Tower B DLF Cyber City Gurgaon, Haryana 122002, India Telephone: [91] (124) 462 0000/306 0000 Telecopier: [91] (124) 462 0620
7	Hyderabad PricewaterhouseCoopers Pvt Ltd # 8-2-293/82/A/1131A Road No. 36, Jubilee Hills Hyderabad 500 034, India Telephone: [91] (40) 6624 6600 Telecopier: [91] (40) 6624 6200/6300	8	Kolkata PricewaterhouseCoopers Pvt Ltd Plot Nos 56 & 57 Block DN-57, Sector-V Salt Lake Electronics Complex Kolkata, West Bengal 700 091, India Telephone: [91] (33) 2357 9100/9101/4400 1111 Telecopier: [91] (33) 2357 3395/2754
9	Kolkata PricewaterhouseCoopers Pvt Ltd 10th Floor, Tower A, DLF IT Park Premises No. 8, Block AF, Major Arterial Road New Town, Rajarhat Kolkata, West Bengal 700 156, India Telephone: [91] (33) 4401 5000 Telecopier: [91] (33) 4400 0482	10	Kolkata PricewaterhouseCoopers Pvt Ltd Plot No Y - 14, Block EP Sector V, Salt Lake Electronics Complex Bidhan Nagar, Kolkata, West Bengal 700 091, India Telephone: [91] (33) 2357 9260/7600 Telecopier: [91] (33) 2357 7496/745
11	Kolkata PricewaterhouseCoopers Pvt Ltd South City Pinnacle XI Block EP, Sector V Salt Lake City Kolkata, West Bengal 700 091, India Telephone: [91] (33) 4404 6000	12	Mumbai PricewaterhouseCoopers Pvt Ltd PwC House Plot No. 18 A, Guru Nanak Road (Station Road) Bandra, Mumbai 400 050, India Telephone: [91] (22) 6689 1000 Telecopier: [91] (22) 6689 1888

	Telecopier: [91] (33) 4404 8225		
13	Mumbai PricewaterhouseCoopers Pvt Ltd 252 Veer Savarkar Marg, Next to Mayor's Bungalow Shivaji Park, Dadar Mumbai 400 028, India Telephone: [91] (22) 6669 1000 Telecopier: [91] (22) 6654 7800/7801/7802	14	Pune PricewaterhouseCoopers Pvt Ltd Mutha Towers - 5th Floor, Suite 8 Off Airport Road, Yerawada Pune 411006, India Telephone: [91] (20) 4100 4444 Telecopier: [91] (20) 4100 6161
15	Pune PricewaterhouseCoopers Pvt Ltd GF-02, Tower C Panchshil Tech Park, Don Bosco School Road, Yerwada Pune 411 006, India Telephone: [91] (20) 4100 4444 Telecopier: [91] (20) 4100 4599		

Annexure X

List of Fulltime Energy Auditors in PwC

Annexure X: List of Fulltime Energy Auditors working with PwC

S. No.	Name of Energy Auditor	Current Position	Total Experience	Experience with Firm	Registration Number
1	Kulbhushan Kumar	Manager	>19 Years	>4 Years	EA-1639
2	Jayakrishnan P. Nair	Manager	>14 Years	>1 year	EA- 0252
3	Rajeev Ralhan	Manager	>12 Years	>4 Years	EA- 0577
4	Manoj Kumar Bansal	Manager	>11 Years	>4 Years	EA- 0578
5	Vaibhav Chowdhary	Consultant	>4 Years	>2 Years	EA-13151
6	Anurag Verma	Consultant	>4 Years	>2 Years	EA-13187
7	Niranjan Rao	Consultant	>4 Years	>1 Years	EA-14470
8	Pradeep Singhvi	Consultant	>4 Years	>1 Years	EA-14558

Annexure XI

List of sectors where energy audits have
been carried out by PwC Auditors

Annexure XI: List of sectors in which energy auditors conducted Energy Audits:

S. No.	Name of Energy Auditor	Sectors
1	Kulbhushan Kumar	Textile
		Power Plant
		Chemical
		Paper
		Engineering
		Cement
		Aluminum
		SMEs
		Chlor-Alkali
		Petro chemical
2	Jayakrishnan P. Nair	Railways
		Petroleum
		Chemical/Pharmaceutical
		Textile
		Engineering
		SMEs
		Iron& Steel
		Foundry
		Buildings
		Telecom& Data centers
3	Rajeev Ralhan	Iron & Steel
		Cement Plants
		Textile Units
		Electroplating Units
		Non Ferrous Plant (Graphite Plants)
		Food Processing
		Buildings
		Glass Units
		MSME
		Brick Kilns
4	Manoj Kumar Bansal	Power Plants
		Iron & Steel
		Chlor-Alkali
		Textiles
		Petrochemicals
		Buildings
		Pharmaceutical
		Automobiles
		Engineering
		MSMEs
5	Vaibhav Chowdhary	Municipalities
		Textile
6	Anurag Verma	Non ferrous metals
		Textile
		Cement
		Pharmaceutical

7	Niranjan Rao	Textile
		Pharmaceutical
		Iron & Steel
		Engineering
		Buildings
		Municipalities
8	Pradeep Singhvi	Iron & Steel
		Buildings

Annexure XII

List of Instruments available with PwC
and their Calibration certificates


Annexure XII: List of Energy Audit Instruments available with PwC

S. No.	Name of the Instrument & Model	Make/ Country	Serial No.	Purpose
1	3- Phase Portable Power Analyzer-ARL5	Circutor(Spanish)	362903007	To measure electrical power parameters
2	Power Analyzer-C80	Circutor(Spanish)	384724049	To measure electrical power parameters
3	Portable Flue Gas Analyzer-KANE 900 Plus	KANE (UK)	042011011	To measure combustion efficiency and flue gas analysis
4	Contact & Non Contact Laser Tachometer- Extexh461995	Extech (USA)	Q548264	To measure the speed of rotating objects
5	Infrared Thermometer-Testo845	Testo (USA)	01330937	To measure the temperature
6	Thermo Hygrometer-Testo625	Testo (USA)	02048329	To measure Humidity (% RH) and wet bulb and dry bulb temp
7	Vane Anemometer-Testo416	Testo (USA)	02086818	To measure the air velocity from blowers, fans, AC, etc.
8	Differential Pressure Meter – Testo510	Testo (USA)	38965644/011	To measure air pressure
9	Ultrasonic flow meter	GE Sensing (USA)	PT7-6751E	To measure flow rate of fluids
10	Lux Meter	Extech (USA)	080613409	To measure lux levels

Note: PwC is procuring more instruments to execute multiple assignments at a time. The order for those has been placed.

Calibration Certificates

3- Phase Portable Power Analyzer(ARL5) & 1-Phase Power Analyzer (C80)

DEZAC GRUPO CIRCUTOR VIAL SANT JORDI, S/N 08232 VILADECABALLS (BARCELONA) ESPAÑA / SPAIN INFORME DE FABRICACIÓN	BUREAU VERITAS Certification  ISO 9001 ISO 14001 OHSAS 18001	Web: www.dezac.com E-mail: info@dezac.com Tel: (+34) 93 745 29 30 Fax: (+34) 93 745 29 31
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Página 2 de 2

TEST REPORT

Vial Sant Jordi, s/n - 08232 Viladecavalls
(Barcelona) SPAIN

Tel : (93) 745 29 00
Fax : (93) 745 29 14

EQUIPO DE VERIFICACION AUTOMATICA / AUTOMATIC VERIFICATION EQUIPMENT

NO : 362903007

ESTACION / STATION	:	EST-5
OPERARIO / OPERATOR	:	80
MODELO / MODEL	:	AR5L
ORDEN DE FABRICACION / FABICATION ORDER	:	EMPTY

DESCRIPCION DISCRPTION	SEÑAL ENTRADA INPUT SIGNAL	MEDIDA MEASUREMENT	UNIDAD UNIT	OK/NOT
Amp.L1	1.9832	4.95	V , A	OK
Amp.L2	1.9768	4.942	V , A	OK
Amp.L3	1.9963	4.991	V , A	OK
Amp.LN	1.9768	4.942	V , A	OK
Volt.L1	499.68	500	V	OK
Volt.L2	499.63	500	V	OK
Vc .3	499.63	500	V	OK
Display Test	--	--	-	OK
Keyboard Test	--	--	-	OK
Communication Test	--	--	-	OK
Battery Test	--	--	-	OK
Memory Test	--	--	-	OK

PARAMETROS TEST	ALIMENTACION / SUPPLY	:	230 Vac
TEST PARAMETERS	TENSION / VOLTAGE	:	500 Vac
	CORRIENTE / CURRENT	:	2.0 Vac





GRUPO CIRCUTOR

VIAL SANT JORDI, S/N

08232 VILADECARVALLS (BARCELONA)

ESPAÑA / SPAIN



Web: www.dezac.com

E-mail: info@dezac.com

Tel: (+34) 93 745 29 30

Fax: (+34) 93 745 29 31

INFORME DE FABRICACIÓN

Página 1 de 2

Informe de Fabricación / Verification Report

FECHA / DATE: 04/03/2011

Según los datos de fabricación en la Línea de Producción, el equipo:
According to manufacture data in Production Line, the following unit:

TIPO / TYPE: AR5-L

Nº SERIE / SERIAL NUMBER: 362903007

Ha pasado las verificaciones estándar de fabricación, así como la Inspección Final de salida.
Passed the manufacture standard testing as well as the starting Final Inspection

ESTACION QUE HA REALIZADO EL TRABAJO

WORK REALIZED BY THE STATION

Torre de Calibración / Calibration tower 5

Operario / Operative 80

PARAMETROS DEL TEST / TEST PARAMETERS

Tensión de alimentación / Tension supply 12VDC

Tensión de medida / Measurement tension 500V

Corriente de medida / Measurement current 5A

CORRIENTE / CURRENT

Medidas de test / Test measurement 5A

(Controlado por generador YOKOGAWA) / (Controlled by Yokogawa generator)

Medidas leídas por los equipos / Measures read by the equipment → OK

TENSION / TENSION

Medidas de test / Test measurement 500V

(controlado por Torre de Calibración) / (controlled by Calibration Tower)

Medidas leídas por los equipos / Measures read by the equipment → OK

COMUNICACIONES

COMMUNICATIONS

Resultados del test / Test results → OK

EQUIPO FABRICADO OK / MANUFACTURED UNIT OK



Portable Flue Gas Analyzer (KANE 900 Plus)



www.kane.co.uk

Kane International Limited
Kane House, Swallowfield, Welwyn Garden City, Hertfordshire, AL7 1JG, UK
T: +44 (0) 1707 375550 F: +44 (0) 1707 393277 E: sales@kane.co.uk

ANALYSER CALIBRATION REPORT

Instrument: Kane 900 Plus *Serial No:* 042011011

Parameter(s)	Signal Input(s)	Instrument Reading(s)	Equipment
Temperature	0 °C	0	Temperature Simulator EX/T/ 117
	100 °C	99	
	1000 °C	998	
Oxygen (O ₂)	0 %	0	Using CO test gas
	10 %	10	Standard certified gas
Carbon Monoxide (CO)	0 ppm	0	In ambient air
	1020 ppm	1019	Standard certified gas
Pressure	0 mbar	0	Dead Weight tester
	100 mbar	100.03	EX/C/100
Measured Flow Rate	>0.7 l/min	✓	TL529
Measured Pump Suction	>100 mbar	✓	EX/C/147

Signed: R.W. Dear

Date: 16/05/2011

Calibration Results

Test Method: **Temperature:** The temperature input is subjected to a known and traceable voltage simulating a thermocouple input. The references voltages are taken from International Tables - BS4937 (1973).
Gas: The gas input is subjected to a known and traceable value of a Certified gas mixture.
Pressure: The pressure input is subjected to a known and traceable pressure using a dead weight tester.

Measurement Uncertainties: The uncertainty assigned to the above measurements is 2°C for temperature, ± 2% for gas measurements and 0.05% for pressure.

Contact & Non Contact Laser Tachometer- Extexh461995




285 Bear Hill Road, Waltham MA 02451 USA
Phone: +1 781 890 7440 Fax: +1 781 890 7864

CALIBRATION CERTIFICATE

We hereby certify that the best of our knowledge, the instrument listed below meet or exceed the specifications stated in the appropriate instruction manuals. Extech instruments Corporation, an ISL9001 certified company, inspects its incoming shipment using an approved sampling plan with an AQL. All incoming inspections are performed using test equipment that is traceable to National Standards.

Instrument : Digital Non-Contact Tachometer
Model : 461995
Sr.No. : Q548264
Date of calibration : 08/06/2011
Next due date : 08/06/2012

Parameter	Applied range	Instrument reading
RPM Range: 10-99,999	100	100
	30000	29999
	60000	59997

Authorized Extech Signature 

Infrared Thermometer (Testo845)



Kalibrier-Protokoll

Certificate of conformity • Protocole d'étalonnage
Protocollo di collaudo • Informe de calibración

Gerät / Module type: **Testo 845**
Serien-Nr. / Serial no: **01330937**

Anzeigentest / Display test	OK
Tastaturtest / Push button test	OK
Druckertest / Printer test	OK
Feuchtefühler test / Test of humidity module	OK
Thermoelementtest / Test of thermocouple	OK
LASER-Kreuz-Test / Test of LASER cross	OK

Meßwerte / Measured values:

Sollwert Reference	Zulässige Toleranz Permissible tolerance	Istwert Actual Value	
		Standardfokus Standard focus	Nahfokus Close focus
24,2°C	± 0,75°C	24,3°C	24,3°C
500,0°C	± 3,75°C	500,3°C	500,0°C

Datum / Date: 10.12.2009



Kalibrier-Protokoll

Certificate of conformity • Protocole d'étalonnage
Certificato di taratura • Informe de calibración

Gerät / Module type /
Modèle / Modelo:
Serien-Nr. / Serial no. /
No. de série / Número de serie:

testo 625
02048329

Serien-Nr. Fühler / Serial no. probe /
No. de série de sonde / No. de serie de la sonda:

02045875

Segmenttest / Display test /
Test d'affichage / Test del visualizador:

ok

Tastaturtest / Keyboard test /
Testes de clavier / Test del teclado:

ok

Messwerte mit externe Messfühler /
Measured values with external probe /
Valeurs mesurées avec sonde de mesure externe /
Valores medidos con sonda externa:

Sollwert / Reference / Référence / Referencia:	Toleranz / Tolerance / Tolérance / Tolerancia:	Istwert / Actual Value / Valeur réelle / Valor medido:
---	---	---

Temperatur / Temperature / Température / Temperatura (NTC)

25.0 °C	± 0.5 °C	25.1 °C
---------	----------	---------

relative Luftfeuchte/relative humidity/humidité relative/humedad relativa

11.3 %	± 2.5 %	11.3 %
40.0 %	± 2.5 %	40.6 %
75.3 %	± 2.5 %	75.3 %

24.02.2011
Datum / Date /
Date / Fecha

(162)
Prüfer / Inspector /
Vérificateur / Verificador

Vane Anemometer (Testo416)



Kalibrier-Protokoll

Certificate of conformity • Protocole d'étalonnage
Certificato di taratura • Informe de calibración

Gerät / Module type / **testo 416**
Modèle / Modelo:
Serien-Nr. / Serial no. /
No. de série / Número de serie: **02086818**

Segmenttest / Display test /
Test d'affichage / Test del visualizador: **ok**

Tastaturtest / Keyboard test /
Testes de clavier / Test del teclado: **ok**

Messwerte mit externe Messfühler /
Measured values with external probe /
Valeurs mesurées avec sonde de mesure externe /
Valores medidos con sonda externa:

Sollwert / Reference / Référence / Referencia:	Toleranz / Tolerance / Tolérance / Tolerancia:	Istwert / Actual Value / Valeur réelle / Valor medido:
---	---	---

Strömung/Velocity/Vitesse d'air/Velocidad

10.0 m/s	± 0.4 m/s	10.0 m/s
20.0 m/s	± 0.5 m/s	20.2 m/s

25.05.2011
Datum / Date /
Date / Fecha

(163)
Prüfer / Inspector /
Vérificateur / Verificador

Differential Pressure Meter (Testo510)



Kalibrier-Protokoll

Certificate of conformity • Protocole d'étalonnage
Protocollo di collaudo • Informe de calibración

Gerät / Module type /

Modèle / Modelo:

testo 510

Messbereich / Measuring range /

Etendue de mesure / Rango de medición :

0...100 hPa

Serien-Nr. / Serial no. /

N°. de série / Número de serie:

38965644/011

Segmenttest / Display test /

Test d'affichage / Test del visualizador:

☒ **OK**

Messwerte / Measured values / Valeurs mesurées / Valores medidos:		
Sollwert / Reference / Référence / Referencia:	Zulässige Toleranz / Permissible tolerance / Tolérance admise / Tolerancia permitida :	Istwert / Actual Value / Valeur réelle / Valor medido :
Differential pressure:		
1.00hPa	±0.05hPa	0.99hPa
80.00hPa	±1.30hPa	80.01hPa

J. Yeung

Prüfer / Inspector /
Responsable / Verificador

Ultrasonic flow meter (PT 878)

GE Sensing Flowtest Lab

Sensing House
Shannon Free Zone East
Shannon, Co. Clare Ireland
Tel: +353 61 470200 Fax: +353 61 471359

Liquid Flowmeter Test Report

Customer: GE INDIA

Test: 32119

Sales Order: 2009501

Channel: 1

Flowmeter: PT878

Serial # PT7-6751E

The above referenced Ultrasonic Liquid Flowmeter was functionally tested on the GE in-house calibrated flowloop* on 17/08/11.

This is to certify that the unit passed the flow test.

Ref. Flow Ltr/m	Measured Flow Ltr/m	% Error
1102.678	1102.272	-0.037
2219.729	2219.183	-0.025

Technician: Emma-Jean Laffan

Date: 17/08/11

Signed: EJ Laffan

(Authorised Signatory)

*The GE flowloop reference meter is calibrated by an EA (European Co-operation for Accreditation) accredited calibration facility. The calibration is traceable to Primary Standards.