State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
COR61431	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
TARA LYLE
304-558-2544

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE

SHIP TO
DIVISION OF CORRECTIONS
VARIOUS LOCALES AS INDICATED
BY ORDER

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
11/18/2010				

BID OPENING DATE: 12/16/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

****
PLEASE CALL 304-558-2036 EXT. 53456 TO PRE-REGISTER TO ATTEND THE PRE-BID MEETINGS. DUE TO SECURITY CONCERNS ONLY TWO REPRESENTATIVES WITH EACH ESCO MAY BE ALLOWED TO ATTEND.
****
MANDATORY PRE-BID SITE VISITS ARE AS FOLLOWS:

MOUNT OLIVE CORRECTIONAL CENTER (MOCC)
ONE MOUNTAINSIDE WAY
MOUNT OLIVE, WV 25185

DATE: 11/30/2010
TIME: 12:30 PM
****
DENMAR CORRECTIONAL CENTER (DCC)
HC 64, BOX 125
HILLSBORO, WV 24949

DATE: 12/01/2010
TIME: 12:30 PM
****
HUTTONSVILLE CORRECTIONAL CENTER (HCC)
ROUTE 219/2505
HUTTONSVILLE, WV 26273

DATE: 12/02/2010
TIME: 12:30 PM
****
PRUNTYTOWN CORRECTIONAL CENTER
ROUTE 4 BOX 49A
GRAFTON, WV 26354

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE

TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.

2. The State may accept or reject in part, or in whole, any bid.

3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required $125 fee.

4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.

5. Payment may only be made after the delivery and acceptance of goods or services.

6. Interest may be paid for late payment in accordance with the ***West Virginia Code***.

7. Vendor preference will be granted upon written request in accordance with the ***West Virginia Code***.

8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.

10. The laws of the State of West Virginia and the ***Legislative Rules*** of the Purchasing Division shall govern the purchasing process.

11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.

12. BANKRUPTCY: In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.

13. HIPAA BUSINESS ASSOCIATE ADDENDUM: The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at **www.state.wv.us/admin/purchase/vrc/hipaa.htm** and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

14. CONFIDENTIALITY: The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf.

15. LICENSING: Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

16. ANTITRUST: In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.

2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.

3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.

4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

State of West Virginia
Department of Administration
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2019 Washington Street East
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LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
	DATE: 12/03/2010 TIME: 12:30 PM ********** ALL INTERESTED ESCOS ARE REQUIRED TO BE REPRESENTED AT THESE MEETINGS. FAILURE TO ATTEND ANY OF THESE SITE VISITS SHALL RESULT IN THE DISQUALIFICATION OF THE BID **********					
0001	1	JB		906-28		
	ENERGY CONSERVATION DESIGN SERVICES REQUEST FOR PROPOSAL CONTRACT TO PROVIDE A GUARANTEED ENERGY SAVINGS PROGRA FOR THE DIVISION OF CORRECTIONS BUILDINGS INCLUDING THE MOUNT OLIVE CORRECTIONAL CENTER IN FAYETTE COUNTY, DENMAR CORRECTIONAL CENTER IN POCAHONTAS COUNTY, HUTTONSVILLE CORRECTIONAL CENTER IN RANDOLPH COUNTY, AND PRUNTYTOWN CORRECTIONAL CENTER IN TAYLOR COUNTY.					

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MANDATORY PRE-BID

MANDATORY PRE-BID MEETINGS WILL BE HELD ON VARIOUS DATES AT THE DIFFERENT FACILITIES. PLEASE SEE THE RFP FOR DATES AND LOCATIONS OF ALL PRE-BID MEETINGS. ALL INTERESTED PARTIES ARE REQUIRED TO ATTEND THIS MEETING FAILURE TO ATTEND THE MANDATORY PRE-BID SHALL RESULT IN DISQUALIFICATION OF THE BID. NO ONE PERSON MAY REPRESENT MORE THAN ONE BIDDER.

AN ATTENDANCE SHEET WILL BE MADE AVAILABLE FOR ALL POTENTIAL BIDDERS TO COMPLETE. THIS WILL SERVE AS THE OFFICIAL DOCUMENT VERIFYING ATTENDANCE AT THE MANDATORY PRE-BID. FAILURE TO PROVIDE YOUR COMPANY AND REPRESENTATIVE NAME ON THE ATTENDANCE SHEET WILL RESULT IN DISQUALIFICATION OF THE BID. THE STATE WILL NOT ACCEPT ANY OTHER DOCUMENTATION TO VERIFY ATTENDANCE. THE BIDDER IS RESPONSIBLE FOR ENSURING THEY HAVE COMPLETED THE INFORMATION REQUIRED ON THE ATTENDANCE SHEET. THE PURCHASING DIVISION AND THE STATE AGENCY WILL NOT ASSUME ANY RESPONSIBILITY FOR A BIDDER-S FAILURE TO COMPLETE THE PRE-BID ATTENDANCE SHEET. IN ADDITION, WE REQUEST THAT ALL POTENTIAL BIDDERS INCLUDE THEIR E-MAIL ADDRESS AND FAX NUMBER.

ALL POTENTIAL BIDDERS ARE REQUESTED TO ARRIVE PRIOR TO THE STARTING TIME FOR THE PRE-BID. BIDDERS WHO ARRIVE LATE, BUT PRIOR TO THE DISMISSAL OF THE TECHNICAL PORTION OF THE PRE-BID WILL BE PERMITTED TO SIGN IN. BIDDERS WHO ARRIVE AFTER CONCLUSION OF THE TECHNICAL PORTION OF THE PRE-BID, BUT DURING ANY SUBSEQUENT PART OF THE PRE-BID WILL NOT BE PERMITTED TO SIGN THE ATTENDANCE SHEET.

EXHIBIT 5

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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WEST VIRGINIA CODE 21-1D-5 PROVIDES THAT: ANY SOLICITATION FOR A PUBLIC IMPROVEMENT CONSTRUCTION CONTRACT REQUIRES EACH VENDOR THAT SUBMITS A BID FOR THE WORK TO SUBMIT AT THE SAME TIME AN AFFIDAVIT OF COMPLIANCE WITH THE BID. THE ENCLOSED DRUG-FREE WORKPLACE AFFIDAVIT MUST BE SIGNED AND SUBMITTED WITH THE BID AS EVIDENCE OF THE VENDOR'S COMPLIANCE WITH THE PROVISIONS OF ARTICLE 1D, CHAPTER 21 OF THE WEST VIRGINIA CODE. FAILURE TO SUBMIT THE SIGNED DRUG-FREE WORKPLACE AFFIDAVIT WITH THE BID SHALL RESULT IN DISQUALIFICATION OF SUCH BID.

NOTICE TO PROCEED: THIS CONTRACT IS TO BE PERFORMED WITHIN XXXX CALENDAR DAYS AFTER THE NOTICE TO PROCEED IS RECEIVED. UNLESS OTHERWISE SPECIFIED, THE FULLY EXECUTED PURCHASE ORDER WILL BE CONSIDERED NOTICE TO PROCEED.

CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE MATERIALS OR WORKMANSHIP SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM WITH THE SPECIFICATIONS OF THE BID AND CONTRACT HERE IN.

WAGE RATES: THE CONTRACTOR OR SUBCONTRACTOR SHALL PAY THE HIGHER OF THE U.S. DEPARTMENT OF LABOR MINIMUM WAGE RATES AS ESTABLISHED FOR FAYETTE, RANDOLPH, POCAHONTAS, AND TAYLOR COUNTIES, PURSUANT TO WEST VIRGINIA CODE 21-5A-, ET SEQ. (PREVAILING WAGE RATES APPLY TO THIS PROJECT.

ARBITRATION: ANY REFERENCES MADE TO ARBITRATION OR INTEREST FOR PAYMENTS DUE (EXCEPT FOR ANY INTEREST REQUIRED BY STATE LAW) CONTAINED IN THIS CONTRACT OR IN ANY AMERICAN INSTITUTE OF ARCHITECTS DOCUMENTS PERTAINING TO THIS CONTRACT ARE HEREBY DELETED.

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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WORKERS' COMPENSATION: VENDOR IS REQUIRED TO PROVIDE A CERTIFICATE FROM WORKERS' COMPENSATION IF SUCCESSFUL.

ALL OF THE ITEMS CHECKED BELOW WILL BE A REQUIREMENT OF THIS CONTRACT:

(XX) INSURANCE: SUCCESSFUL VENDOR SHALL FURNISH PROOF OF COMMERCIAL GENERAL LIABILITY INSURANCE PRIOR TO ISSUANCE OF CONTRACT. UNLESS OTHERWISE SPECIFIED IN THE BID DOCUMENTS, THE MINIMUM AMOUNT OF INSURANCE COVERAGE REQUIRED IS $250,000.

( ) BUILDERS RISK INSURANCE: SUCCESSFUL VENDOR SHALL FURNISH PROOF OF BUILDERS RISK - ALL RISK INSURANCE IN AN AMOUNT EQUAL TO 100% OF THE AMOUNT OF THE CONTRACT.

(XX) BONDS: FIVE PERCENT (5%) OF THE TOTAL AMOUNT OF THE BID PAYABLE TO THE STATE OF WEST VIRGINIA, SHALL B SUBMITTED WITH EACH BID AS A BID BOND. THE SUCCESSFUL BIDDER SHALL ALSO FURNISH A PERFORMANCE BOND AND LABOR/ MATERIAL BOND FOR 100% OF THE AMOUNT OF THE CONTRACT. BONDS MAY BE PROVIDED IN THE FORM OF A CERTIFIED CHECK, IRREVOCABLE LETTER OF CREDIT, OR BOND FURNISHED BY A SOLVENT SURETY COMPANY AUTHORIZED TO DO BUSINESS IN TH STATE OF WEST VIRGINIA. A LETTER OF CREDIT SUBMITTED IN LIEU OF A BOND WILL ONLY BE ALLOWED FOR PROJECTS UNDER $100,000. PERSONAL OR BUSINESS CHECKS ARE NOT ACCECPTABLE IN LIEU OF THE 5% BID BOND, PERFORMANCE BOND, OR LABOR AND MATERIAL BOND.

( ) MAINTENANCE BOND: A TWO (2) YEAR MAINTENANCE BOND COVERING THE ROOFING SYSTEM WILL BE A REQUIREMENT OF THE SUCCESSFUL VENDOR.

REV. 11/00

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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EXHIBIT 9

NOTICE FOR ISSUANCE & ACKNOWLEDGEMENT OF CONSTRUCTION PROJECT ADDENDA

THE ARCHITECT/ENGINEER AND/OR AGENCY SHALL BE REQUIRED TO ABIDE BY THE FOLLOWING SCHEDULE IN ISSUING CONSTRUCTION PROJECT ADDENDA FOR STATE AGENCIES:

(1) THE ARCHITECT/ENGINEER SHALL PREPARE THE ADDENDUM AND A LIST OF ALL PARTIES THAT HAVE PROCURED DRAWINGS AND SPECIFICATIONS FOR THE PROJECT. THE ADDENDUM AND LIST SHALL BE FORWARDED TO THE BUYER IN THE STATE PURCHASING DIVISION. THE ARCHITECT/ENGINEER SHALL ALSO SEND A COPY OF THE ADDENDUM TO THE STATE AGENCY FOR WHICH THE CONTRACT IS ISSUED.

(2) THE BUYER SHALL SEND THE ADDENDUM TO ALL INTERESTED PARTIES AND, IF NECESSARY, EXTEND THE BID OPENING DATE. ANY ADDENDUM SHOULD BE RECEIVED BY THE BUYER WITHIN FOURTEEN (14) DAYS PRIOR TO THE BID OPENING DATE.

(3) ALL ADDENDA SHOULD BE FORMALLY ACKNOWLEDGED BY ALL BIDDERS AND SUBMITTED TO THE STATE PURCHASING DIVISION. THE SAME RULES AND REGULATIONS THAT APPLY TO THE ORIGINAL BIDDING DOCUMENT SHALL ALSO APPLY TO AN ADDENDUM DOCUMENT. THE ONLY EXCEPTION MAY BE FOR AN ADDENDUM THAT IS ISSUED FOR THE SOLE PURPOSE OF CHANGING A BID OPENING TIME AND/OR DATE.

REV. 11/96

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EXHIBIT 10

ADDENDUM ACKNOWLEDGEMENT

I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.

ADDENDUM NOS.:

NO. 1 .....

NO. 2 .....

NO. 3 .....

NO. 4 .....

NO. 5 .....

I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF THE BIDS.

VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.

.....SIGNATURE

.....COMPANY

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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.....DATE

REV. 11/96

CONTRACTORS LICENSE

WEST VIRGINIA STATE CODE 21-11-2 REQUIRES THAT ALL PERSONS DESIRING TO PERFORM CONTRACTING WORK IN THIS STATE MUST BE LICENSED. THE WEST VIRGINIA CONTRACTORS LICENSING BOARD IS EMPOWERED TO ISSUE THE CONTRACTORS LICENSE. APPLICATIONS FOR A CONTRACTORS LICENSE MAY B MADE BY CONTACTING THE WEST VIRGINIA DIVISION OF LABOR CAPITOL COMPLEX, BUILDING 3, ROOM 319, CHARLESTON, WV 25305. TELEPHONE: (304) 558-7890.

WEST VIRGINIA STATE CODE 21-11-11 REQUIRES ANY PROSPECTIVE BIDDER TO INCLUDE THE CONTRACTORS LICENSE NUMBER ON THEIR BID.

BIDDER TO COMPLETE:

CONTRACTORS NAME: .....

CONTRACTORS LICENSE NO.: .....

THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FURNISH A COPY OF THEIR CONTRACTORS LICENSE PRIOR TO ISSUANCE OF A PURCHASE ORDER/CONTRACT

APPLICABLE LAW

THE WEST VIRGINIA STATE CODE, PURCHASING DIVISION RULES AND REGULATIONS, AND THE INFORMATION PROVIDED IN THE "REQUEST FOR QUOTATION" ISSUED BY THE PURCHASING DIVISION IS THE SOLE AUTHORITY GOVERNING THIS

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

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PROCUREMENT.

ANY INFORMATION PROVIDED IN SPECIFICATION MANUALS, OR ANY OTHER SOURCE, VERBAL OR WRITTEN, WHICH CONTRADICTS OR ALTERS THE INFORMATION PROVIDED FROM THE SOURCES AS DESCRIBED IN THE ABOVE PARAGRAPH IS VOID AND OF NO EFFECT.

BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.

REV. 5/2009

NOTICE

A SIGNED BID MUST BE SUBMITTED TO:

DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
BUILDING 15
2019 WASHINGTON STREET, EAST
CHARLESTON, WV 25305-0130

THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:

SEALED BID

BUYER:----------TL/FILE 32 ----------

REQ. NO.:----------COR61431----------

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	BID OPENING TIME:--------1:30 PM----------					
	PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:					

	PLEASE PRINT OR TYPE NAME OF PERSON TO CONTACT CONCERNING THIS QUOTE:					

	****** THIS IS THE END OF RFQ COR61431 ****** TOTAL:					

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Revised: 11/10/10

COR61431

REQUEST FOR PROPOSAL

West Virginia Department of Military Affairs and Public Safety (DMAPS),
Division of Corrections (DOC)
Energy Savings Performance Contract

TABLE OF CONTENTS

SECTION 1: GENERAL INFORMATION

1.1 **Purpose:** The Purchasing Division, hereinafter referred to as the "State," is soliciting proposals from Energy Services Companies, hereinafter referred to as "ESCOs," pursuant to ***West Virginia Code*** §5A-3-10b for the Department of Military Affairs and Public Safety (DMAPS), Division of Corrections (DOC), hereinafter referred to as the "Agency," to provide an Energy Savings Performance Contract in accordance with Section 5A-3B-1 and 5A-3B-2 of the West Virginia Code (Attachment A).

1.2 By signing and submitting its proposal, the successful ESCO agrees to be bound by all the terms contained in this RFP.

A Request for Proposal (RFP) is generally used for the procurement of services in situations where price is not the sole determining factor and the award will be based on a combination of cost and technical factors (Best Value). Through its proposal, the bidder offers a solution to the objectives, problem, or need specified in the RFP, and defines how it intends to meet (or exceed) the RFP requirements.

1.2.1 Compliance with Laws and Regulations: The ESCO shall procure all necessary permits and licenses to comply with all applicable Federal, State, or municipal laws, along with all regulations, and ordinances of any regulating body.

The ESCO shall pay any applicable sales, use or personal property taxes arising out of this contract and the transactions contemplated thereby. Any other taxes levied upon this contract shall be borne by the ESCO. It is clearly understood that the State of West Virginia is exempt from any taxes regarding performance of the scope of work of this contract.

1.3 **Schedule of Events:**

RFP Release	11/18/10
ESCO's Written Questions Submission Deadline	12/09/10
Mandatory Pre-bid Site Visits	11/30-12/03
Addendum	TBD
Bid Opening Date (all bids must be received by 1:30pm)	12/16/10

1.4 **Mandatory Pre-Bid Site Visits**: Mandatory pre-bid site visits will be conducted on the dates listed below. Please call 304-558-2036 extension 53456 and pre-register. Due to security concerns, only two representatives with each ESCO may be allowed.

November 30th at 12:30pm
Mount Olive Correctional Center (MOCC)
Mountain Side Way, Mount Olive, WV 25185
Telephone (304) 442-7213

December IST at 12:30pm
Denmar Correctional Center (DCC)
HC 64, Box 125
Hillsboro, WV 24946
Telephone (304) 653-4201

December 2nd at 12:30pm
Huttonsville Correctional Center (HCC)
Route 219/2505
Huttonsville, WV 26273
Telephone (304) 335-2291

December 3rd at 12:30pm
Pruntytown Correctional Center
Route 4 Box 49A
Grafton, WV 26354
Telephone (304) 265-6111

All interested ESCOs are required to be represented at these meetings. **Failure to attend any of these site visits shall result in the disqualification of the bid.** No one person may represent more than one ESCO.

All potential ESCOs are requested to arrive prior to the starting time for the site visits. ESCOs who arrive late, but prior to the dismissal will be permitted to sign in

An attendance sheet will be made available for all potential ESCOs to complete. This will serve as the official document verifying attendance. The ESCO is responsible for ensuring they have completed the information required on the attendance sheet. The Purchasing Division and the State Agency will not assume any responsibility for an ESCO's failure to complete the pre-bid attendance sheet.

1.5 **Inquiries:** Inquiries regarding specifications of this RFP must be submitted in writing to the State Buyer with the exception of questions regarding the proposal submission which may be oral. The deadline for written inquiries is identified in the Schedule of Events, Section 1.3. All inquiries of specification clarification must be addressed to:

Purchasing Division
2019 Washington Street, East
P.O. Box 50130
Charleston, WV 25305-0130
Fax: (304) 558-4115
E-Mail:

No contact between the ESCO and the Agency is permitted without the express written consent of the State Buyer. Violation may result in rejection of the bid. The State Buyer named above is the sole contact for any and all inquiries after this RFP has been released.

1.6 **Verbal Communication:** Any verbal communication between the ESCO and any State personnel is **not** binding, including that made at the mandatory pre-bid conference. Only information issued in writing and added to the RFP specifications by an official written addendum by Purchasing is binding.

1.7 **Addenda:** If it becomes necessary to revise any part of this RFP, an official written addendum will be issued by the Purchasing Division.

SECTION TWO: PROJECT SPECIFICATIONS

2.1 **Location:** West Virginia Division of Corrections
1409 Greenbrier Street
Charleston, WV 25311

2.2 **Background and Current Operating Environment:** The West Virginia Division of Corrections (WVDOC) is a state agency, which houses convicted felons. WVDOC facilities include the Central Office, 12 Correctional facilities, 4 Work Release Centers, 15 Parole offices, 1 Training Academy, and 1 Prison Industries main office. WVDOC has a total of 1,844 employees, 6,458 inmates and 2,390 parolees.

This RFP will focus on Energy Conservation Measures (ECMs) at 4 Correctional facilities. Mount Olive, Denmar, Huttonsville, and Pruntytown. Retrofit work at Mount Olive, Huttonsville and Pruntytown Correctional facilities are funded through the State Energy Program plan /American Recovery and Reinvestment Act, and Denmar Correctional facility does not have funding. Should DOC management decide to implement retrofits at Denmar Correctional facility it shall be paid by the energy savings.

Historical utility data for each site is provided, along with facility information in Attachment B.

2.3 **Project and Goals:** The project goals and objectives are:

2.3.1 **Goal 1:** Self Funded Program that provides capital improvements and achieves significant long term energy and cost savings, with a savings guarantee, while maintaining occupant comfort and consistent levels of building functionality over a 15 year contract term.

2.3.2 **Goal 2:** Program that complies with requirements set forth by the State Energy Program (SEP) and the American Recovery and Reinvestment Act as provided in Attachment C.

2.3.3 **Goal 3:** Support of goals highlighted West Virginia Energy Roadmap

2.4 **Mandatory Requirements**
The following mandatory requirements must be met by the ESCO as a part of the submitted proposal. Failure on the part of the ESCO to meet any of the mandatory specifications shall result in the disqualification of the proposal. The terms "must," "will," "shall," "minimum," "maximum," or "is/are required" identify a mandatory item or factor. Decisions regarding compliance with any mandatory requirements shall be at the sole discretion of the State

2.4.1 Mandatory Requirement 1 Ability to Meet All ARRA Grant Requirements

2.4.2 Mandatory Requirement 2 Correctional Facility ESCO Project Experience

2.4.3 Mandatory Requirement 3 Savings Guaranteed via IPMVP Standards

SECTION THREE: ESCO PROPOSAL

3.1 **Economy of Preparation**: Proposals should be prepared simply and economically providing a straightforward, concise description of the ESCO's abilities to satisfy the requirements of the RFP. Emphasis should be placed on completeness and clarity of the content.

3.2 **Incurring Cost**: Neither the State nor any of its employees or officers shall be held liable for any expenses incurred by any ESCO responding to this RFP, including but not limited to preparation, delivery, or travel.

3.3 **Proposal Format**: ESCOs should provide responses in the format listed below:

Title Page: State the RFP subject, number, ESCO's name, business address, telephone number, fax number, name of contact person, e-mail address, and ESCO signature and date.

Table of Contents: Clearly identify the material by section and page number

1. QUALIFICATIONS AND CAPABILITY

A. General Firm Information

1) **Type of Firm** (corporation, partnership, sole proprietorship, joint venture)
2) **Year Firm Established**. Number of years your firm has been in business under its present business name
3) **Other Firm Names**. Indicate all other names by which your organization has been known and the length of time known by each name.

4) **Parent Company**. If applicable, state name, address, former name if applicable, tax identification number
5) **Participating Division or West Virginia Branch Offices**. State division or West Virginia branch offices that will participate in the development of the proposal, in its evaluation process, and/or in the conduct of any services provided (office name, address and number of full time personnel at each location).
6) **Submittal**. Submittal is for (parent company, subsidiary, division, branch office)

B. Experience of Firm

1) **Years in Energy Business**. State the number of years your firm has been involved in the energy-efficiency related business. State the number of years your firm has offered Energy Management Services. State the number of years your firm has provided Guaranteed Energy Savings project services in State Correctional facilities.
2) **Number and Value of Contracts**. Indicate the dollar volume of energy savings contracts actually implemented by your firm, each year for the past 3 years. Indicate the associated dollar value. (NOTE: If this response is submitted by a branch office or division of a parent company, indicate the number of projects that have been managed directly by the specific branch or division).
3) **Number and Value of Contracts**. Indicate the dollar volume of energy savings contracts actually implemented by your firm, in the State Correctional Facilities. Indicate the associated dollar value. (NOTE: If this response is submitted by a branch office or division of a parent company, indicate the number of projects that have been managed directly by the specific branch or division).
4) **Number and Value of Contracts**. Indicate the dollar volume of ARRA contracts implemented by your firm, each year for the past 2 years. (NOTE: If this response is submitted by a branch office or division of a parent company, indicate the number of projects that have been managed directly by the specific branch or division).
5) **WV DOC Project Experience**. Firm shall provide list and brief description of any projects completed with the WV DOC of the past 3 years. Firm shall use form provided in Attachment D.
6) **NAESCO Accreditation** Firm shall provide a copy of your current accreditation certificate from the National Association of Energy Service Companies (NAESCO) or other recognized national energy company trade association.

C. Scope of Services

1) **Types of Services**. Summarize the scope of services (auditing, design, construction, monitoring, operations, maintenance, training, financing, etc.) available from your firm.
2) **Expertise in Systems**. Describe your ability to offer services to upgrade HVAC, controls, lighting, renewables, kitchen, laundry and other systems.
3) **Provision of Insurance**. Upon contract award and prior to beginning any work ESCO shall provide certificate(s) of insurance, which complies with the requirements for insurance as described below. Insurance Coverage shall be provided by the Contractor amounts not less than the following:

- **Worker's Compensation**, including death benefits, in the statutory amount (for the State of West Virginia), including Waiver of Subrogation in favor WVDOC The ESCO shall require that all Subcontractors provide Worker's Compensation insurance for all of the latter's employees, unless such employees are covered by the protection afforded by the ESCO.

- **Comprehensive General Liability**, (including Contractual and Products Liability).

- **Minimum limits of liability**:

  Bodily Injury: $1,000,000
  Property Damage: $100,000 / $200,000

- **WV DOC's and ESCO's Protective Liability** in the name of the WVDOC, and the Engineer. Minimum limits of liability:

  Bodily Injury: $1,000,000
  Property Damage: $100,000 / $200,000

- **Motor Vehicle Liability**. Minimum limits:

  Bodily Injury: $1,000,000.
  Property Damage: $100,000 / $200,000

- **Builder's Risk**: "All Risk" (Standard ISO form as approved by State of West Virginia) in an amount equal to 100% of the Value of the Contract Sum written in the name of the ESCO and WVDOC as their interest may appear.

- **Umbrella Policy**: The Contractor shall procure and maintain during the life of the Contract, in excess of all other insurance requirements, an Umbrella Policy in the minimum amount of $1,000,000.00.

- **Provide a payment and performance bond** equal to 100% of the construction amount.

D. Financial Soundness

1) **Financial Statement**. Attach your firm's most recent audited year-end financial statements and the most recent four unaudited consecutive quarterly statement of the parent company and subsidiary (respondent).

E. Attachments for Qualifications and Capability of Firm Section

1) Label attachments and list here including Attachment Name, Description and Location in RFP Response. Insert attachments here at the end of this section, or include elsewhere in a clearly marked location for easy reference.

2. EXPERIENCE AND EXPERTISE

A. **Project History-** Include the following information on each Correctional facility project (not to exceed 10):

1) **Project Identification**. Name of project Customer, type of project, location (city, state).

2) **Project Dates**. Actual construction start and end dates

3) **Project Size**. Number of buildings, total square footage, total contract amount and the total project capital cost.

4) **List of Improvements**. Type of retrofits and operational improvements related to energy, water and other cost savings.

5) **Projected Savings**. State the projected amount of savings.

6) **Actual Annual Savings**. State the actual annual energy, water and O&M savings. Also describe if savings were measured or stipulated.

7) **Contract Terms**. Type of contract (shared-savings, lease purchase, guaranteed savings), contract term, and financing arrangement.

8) **Source of Funds**. Source of funds used for the project. If applicable, describe your firm's role in securing funds.

9) **Technical Design Personnel**. Include name(s) of primary technical design personnel.

10) **Project Schedule**. Indicate if the project was completed on schedule. If not, please explain.

11) **Comments**. Comment on any special features, services, conditions, etc.

12) **References**. Names and contact information of Customer(s)' representatives who can serve as references including email address and telephone number.

B. **Personnel Information**

1) **Qualifications and Experience**. Introduce the members or your staff you expect to participate in the following tasks: energy/technical analysis, engineering design, construction management, construction, training and post-contract monitoring. Provide resumes for Energy Engineer(s), Project Manager, and Measurement & Verification Engineer. Measurement and Verification Engineer shall have a minimum 5 years of ESCO related experience.

2) Subcontractors. Describe the nature of work generally conducted by subcontractors. Provide names and anticipated responsibility of any subcontractors for this project.

C. **ARRA Experience**

1) State your firms experience with projects involving ARRA funding and how your firm will manage the reporting requirements

D. **Attachments for Experience and Expertise Section**

Label Attachments and list here including: Attachment Name, Description and Location

in RFP Response. Insert attachments here at the end of this section, or include elsewhere
in a clearly marked location for easy reference.

3. TECHNICAL APPROACH

A. Audit

1) **Technical Site Analysis**. Describe your general approach to auditing a facility. What is involved? How is customer involved? Methodical approach? Level of expertise involved? Information and resources needed from WVDOC?

2) **Engineering Design**. Describe your firms approach to the technical design of this project.

3) **Preliminary Energy Conservation Measures**. Provide a list of preliminary Energy Conservation Measures (ECMs) that your firm believes are feasible for the WVDOC facilities. List Preliminary ECMs by number/name and include a brief ECM description. **Standard of Comfort. Describe standards** of comfort and functionality that are generally used for light levels, space temperatures, ventilation rates, etc. In the intended facilities. Also describe how those standards will be maintained throughout the contract term.

4) **Sample Technical Calculations. Submit a sample** of technical calculations conducted by your firm for this proposal. (As directed in the Proposal Submittal Information). This proposal must include a sample of the energy and economic calculations in the appendix.

B. Measurement and Verification Methodology

1) All energy conservation measures should be measureable and verifiable under the International Performance Measurement and Verification Protocol (IPMVP). The ESCO shall use the measurement and verification standards and methodologies as defined by the current IPMVP and provide an IPMVP adherent M&V Plan.

2) The ESCO shall work closely with WVDOC's in selecting which M&V Option (A, B, C or D of IPMVP) to use for each ECM. See attachment E for additional information and details.

   Option (A) Retrofit Isolation: Key Parameter Measurement

   Option (B) Retrofit Isolation: All Parameter Measurement

   Option (C) Whole Facility

   Option (D) Calibrated Simulation

3) Provide a sample measurement and verification report from a State Correctional facility.

C. Attachments for Technical Approach Section

1) Label Attachments and list here including Attachment Name, Description and Location in RFP Response. Insert attachments here at the end of this section, or include elsewhere in a clearly marked location for easy reference.

4. ENERGY MANAGEMENT SERVICES APPROACH

A. Approach

1) **Differentiation of Your Firm.** Describe particular characteristics of how your firm approaches Energy Management Services.

2) **Provide a Sample Investment Grade Audit Agreement and a Sample Performance Contracting Agreement.**

B. Other Services

1) **Training Provisions.** Describe your firm's capabilities in providing technical training for facility personnel and experience on past projects. Describe your firm's involvement in developing training manuals for facility staff.

2) **Emission Reductions Reporting.** Describe your willingness and experience/capability to calculate and report emissions reductions.

C. Attachments for Energy Management Services Approach Section

1) Label Attachments and list here including Attachment Name, Description and Location in RFP Response. Insert attachments here at the end of this section, or include elsewhere in a clearly marked location for easy reference.

5. FINANCIAL ANALYSIS (COST PROPOSAL)

A. Provide a financial analysis to model the project in this proposal over a 15 year term incorporating energy, and operational savings; Turnkey project costs for implementation; Service including, monitoring and Measurement and Verification; and financial transaction costs. Identify all escalations on energy and operational savings and service costs. Complete the B-1 Financial Cash Flow Table as Attachment to this section only. Only use energy cost savings in this cash flow. Do not estimate or include operational savings, as they will only be analyzed and considered after completion of the Investment Grade Audit.

B. **Other Costs:** Describe other costs such as maintenance and monitoring agreements and describe how they will be applied. Also state whether these are annual costs and if they are required each year of the contract.

C. **Financing Options**: Describe alternative financing options for portions of the project that may not be funded via ARRA funding. Denmar Correctional Center is currently not ARRA funded.

D. **Cost of the Investment Grade Audit**: Provide an estimate of the cost of the investment grade audit that will be conducted after ESCO selection. The cost shall be broken down into fixed cost and cost per square foot for the Investment Grade Audit.

E. **Attachments for "Financial Analysis" Section**. Label Attachments and list here including Attachment Name, Description and Location in RFP Response. Insert attachments here at the end of this section, or include elsewhere in a clearly marked location for easy reference.

ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM, (ATTACHMENT B-1)

West Virginia Department of Military Affairs and Public Safety, Division of Corrections

GUARANTEED ENERGY SAVING CONTRACT

Financed Project Cost [1]:

Escalation Rates by Utility & Fuel

Finance Term (months):

Electric: 3.0%

Annualized Interest Rate:

Natural Gas: 2.5%

Fuel Oil: 2.5%

Construction Period[2] (months):

Steam: 3.0%

Water: 3.0%

Escalation Rates for

Operational: 2.0%

Annual Fees:

Coal: 3.0%

Yr.	Electric Cost Savings	Natural Gas Cost Savings	Fuel Oil Cost Savings	Steam Cost Savings	Water Cost Savings	Other	Total Cost Savings	Guaranteed Cost Savings	Annual Service Fees [3]	Financing Payment	Net Savings
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
Total											

1. Includes: Hard costs and project fees.

2. No payments are made by Agency during the construction period.3. This figure should represent the ESCO's proposed annual service/maintenance fees including but not limited to M&V and equipment maintenance.

3.4 **Proposal Submission:** Proposals must be received in **two distinct parts**: technical and cost.

Technical proposals must not contain any cost information relating to the project.
Cost proposal shall be sealed in a separate envelope and will not be opened initially.

All proposals must be submitted to the Purchasing Division **prior** to the date and time stipulated in the RFP as the opening date. All bids will be dated and time stamped to verify official time and date of receipt.

3.4.1 ESCOs should allow sufficient time for delivery. In accordance with ***West Virginia Code*** §5A-3-11, the Purchasing Division cannot waive or excuse late receipt of a proposal, which is delayed or late for any reason. Any proposal received after the bid opening date and time will be immediately disqualified in accordance with State law.

ESCOs responding to this RFP shall submit:
One original technical and cost proposal plus 5 convenience copies to:

Purchasing Division
, Buyer Supervisor
2019 Washington Street, East
P.O. Box 50130
Charleston, WV 25305-0130

The outside of the envelope or package(s) for both the technical and the cost should be clearly marked:

ESCO: _____
Buyer: _____
Req#: _____
Opening Date: _____
Opening Time: 1:30 p.m.

3.5 **Purchasing Affidavit:** ***West Virginia Code*** §5A-3-10a requires that all bidders submit an affidavit regarding any debt owed to the State. The affidavit must be signed and submitted prior to award. It is preferred that the affidavit be submitted with the proposal.

3.6 **Resident Vendor Preference:** In accordance with ***West Virginia Code*** §5A-3-37, ESCOs may make application for Resident Vendor Preference. Said application must be made on the attached Resident Vendor Certification form at the time of proposal submission.

3.7 **Technical Bid Opening**: The Purchasing Division will open and announce only the technical proposals received prior to the date and time
specified in the Request for Proposal. The technical proposals shall then be provided to the Agency evaluation committee.

3.8 **Cost Bid Opening**: The Purchasing Division shall schedule a date and time to publicly open and announce cost proposals once the Agency evaluation committee has completed the technical evaluation and it has been approved by the Purchasing Division.

SECTION FOUR: EVALUATION AND AWARD

4.1 **Evaluation Process**: Proposals will be evaluated by a committee of three (3) or more individuals against the established criteria with points deducted for deficiencies. The ESCO who demonstrates that they meet all of the mandatory specifications required; and has appropriately presented within their written response and/or during the oral demonstration (if applicable) their understanding in meeting the goals and objectives of the project; and attains the highest overall point score of all ESCOs shall be awarded the contract. The selection of the successful ESCO will be made by a consensus of the evaluation committee.

4.2 **Evaluation Criteria**: All evaluation criteria is defined in the specifications section and based on a 100 point total score. Cost shall represent a minimum of 30 of the 100 total points.

The following are the evaluation factors and maximum points possible for technical point scores:

1. Qualifications and Capability	25	Points Possible
2. Expereince & Expertise	25	Points Possible
3. Technical Approach	10	Points Possible
4. Energy Management Services Approach	10	Points Possible
5. Financial Analysis (Cost Proposal)	30	Points Possible
	Total	100 Points Possible

Each cost proposal cost will be scored by use of the following formula for all ESCOs who attained the minimum acceptable score:

4.2.1 **Technical Evaluation**: The Agency evaluation committee will review the technical proposals, deduct points where appropriate, and make a final written recommendation to the Purchasing Division.

4.2.2 **Minimum Acceptable Score**: ESCOs must score a minimum of 70% (49 points) of the total technical points possible. All ESCOs not attaining the minimum acceptable score (MAS) shall be disqualified and removed from further consideration.

4.2.3 **Cost Evaluation**: The Agency evaluation committee will review the cost proposals, assign appropriate points, and make a final recommendation to the Purchasing Division.

4.3 **Independent Price Determination**: A proposal will not be considered for award if the price in the proposal was not arrived at independently without collusion, consultation, communication, or agreement as to any matter relating to prices with any competitor unless the proposal is submitted as a joint venture.

4.4 **Rejection of Proposals**: The State reserves the right to accept or reject any or all proposals, in part or in whole at its discretion. The State further reserves the right to withdraw this RFP at any

time and for any reason. Submission of or receipt of proposals by the State confers no rights upon the bidder nor obligates the State in any manner.

4.5 **Vendor Registration**: ESCOs participating in this process should complete and file a Vendor Registration and Disclosure Statement (Form WV-1) and remit the registration fee. Vendor is not required to be a registered Vendor in order to submit a proposal, but the **successful bidder must** register and pay the fee prior to the award of an actual purchase order or contract.

SECTION FIVE: CONTRACT TERMS AND CONDITIONS

5.1 **Contract Provisions:** The RFP and the ESCO's response will be incorporated into the contract by reference. The order of precedence shall be the contract, the RFP and any addendum, and the ESCO's proposal in response to the RFP.

5.2 **Public Record:** All documents submitted to the State Purchasing Division related to purchase orders or contracts are considered public records. All bids, proposals, or offers submitted by ESCOs shall become public information and are available for inspection during normal official business hours in the Purchasing Division Records and Distribution center after the bid opening.

5.2.1 **Risk of Disclosure**: The only exemptions to disclosure of information are listed in ***West Virginia Code*** §29B-1-4. Any information considered a trade secret must be separated from the ESCO submission and clearly labeled as such. Primarily, only trade secrets, as submitted by a bidder, are exempt from public disclosure. The submission of any information to the State by an ESCO puts the risk of disclosure on the ESCO. The State does not guarantee non-disclosure of any information to the public.

5.2.2 **Written Release of Information:** All public information may be released with or without a Freedom of Information request; however, only a written request will be acted upon with duplication fees paid in advance. Duplication fees shall apply to all requests for copies of any document. Currently, the fees are 50 cents per page, or a minimum of $10.00 per request, whichever is greater.

5.3 **Conflict of Interest**: ESCO affirms that neither it nor its representatives have any interest nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency.

5.4 **ESCO Relationship**: The relationship of the ESCO to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this contract. The ESCO as an independent contractor is solely liable for the acts and omissions of its employees and agents.

ESCO shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this RFP and resulting contract. Neither the ESCO, nor any employees or subcontractors of the ESCO, shall be deemed to be employees of the State for any purpose whatsoever.

ESCO shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability

insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, *et cetera* and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

ESCO shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

The ESCO shall not assign, convey, transfer, or delegate any of its responsibilities and obligations under this contract to any person, corporation, partnership, association, or entity without expressed written consent of the Agency.

5.4.1 **Subcontracts/Joint Ventures**: The ESCO may, with the prior written consent of the State, enter into subcontracts for performance of work under this contract.

5.4.2 **Indemnification**: The ESCO agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the ESCO, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the contract in a manner not authorized by the contract, or by Federal or State statutes or regulations; and (3) Any failure of the ESCO, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage laws.

5.4.3 **Governing Law**: This contract shall be governed by the laws of the State of West Virginia. The ESCO further agrees to comply with the Civil Rights Act of 1964 and all other applicable laws and regulations as provided by Federal, State, and local governments.

5.4.4 **Litigation or Legal Action:** The vendor shall identify any litigation, or legal action, indictments, which involved the respondent or its employees or affiliated companies to a state institution/agency.

5.5 **Term of Contract and Renewals:** In accordance with West Virginia code §5A-3B-1 and §5A-3B-2

5.6 **Non-Appropriation of Funds**: If funds are not appropriated for the Agency in any succeeding fiscal year for the continued use of the services covered by this contract, the State may terminate the contract at the end of the affected current fiscal period without further charge or penalty. The State shall give the ESCO written notice of such non-appropriation of funds as soon as possible after the Agency receives notice. No penalty shall accrue to the Agency in the event this provision is exercised.

5.7 **Changes**: If changes to the contract become necessary, a formal contract change order will be negotiated by the State, the Agency, and the ESCO.

As soon as possible, but not to surpass thirty (30) days after receipt of a written change request from the Agency, the ESCO shall determine if there is an impact on price with the change requested and provide the Agency a written Statement identifying any price impact on the contract. The ESCO shall provide a description of ~~the~~ any price change associated with the implementation.

NO CHANGE SHALL BE IMPLEMENTED BY THE ESCO UNTIL SUCH TIME AS THE ESCO RECEIVES AN APPROVED WRITTEN CHANGE ORDER FROM THE PURCHASING DIVISION.

5.8 **Invoices and Progress Payments**: The ESCO shall submit invoices, in arrears, to the Agency at the address on the face of the purchase order labeled "Invoice To." Progress payments may be made at the option of the Agency on the basis of percentage of work completed if so defined in the final contract.

5.9 **Liquidated Damages**: According to ***West Virginia Code*** §5A-3-4(8), ESCO agrees that liquidated damages shall be imposed at the rate of $100 per day_ for failure to provide (deliverables, meet milestones identified to keep the project on target, or failure to meet specified deadlines) This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other additional remedy which the State or Agency may have legal cause for action.

5.10 **Contract Termination**: The State may terminate any contract resulting from this RFP immediately at any time the ESCO fails to carry out its responsibilities or to make substantial progress under the terms of this RFP and resulting contract. The State shall provide the ESCO with advance notice of performance conditions which may endanger the contract's continuation. If after such notice the ESCO fails to remedy the conditions within the established timeframe, the State shall order the ESCO to cease and desist any and all work immediately. The State shall be obligated only for services rendered and accepted prior to the date of the notice of termination.

The contract may be terminated by the State with thirty (30) days prior notice pursuant to ***West Virginia Code of State Rules*** § 148-1-7.16.2.

5.11 **Special Terms and Conditions**:

5.11.1 **Bid and Performance Bonds**: The ESCO shall provide a 100% performance and payment bond in the amount of all labor, materials, and equipment installed for the WVDOC prior to the execution of the contract.

5.11.2 **Insurance Requirements**: *(Provide liability insurance requirements in accordance with Purchasing Division rules and regulations.*
Insurance certificates are required prior to award, but are not required at the time of bid).

- Public liability
- Property damage
- Professional liability (medical, advertising, *et cetera*)

5.11.3 **License Requirements**: ESCO shall have all required licenses to conduct business in the State of West Virginia.

5.11.4 **Protest Bond**: Any bidder that files a protest of an award shall at the time of filing the protest submit a protest bond in the amount equal to one percent of the lowest bid submitted or $5,000, whichever is greater.

The entire amount of the bond shall be forfeited if the hearing officer determines that the protest was filed for frivolous or improper purpose, including but not limited to the purpose of harassing, causing unnecessary delay, or needless expense for the Agency. All protest bonds shall be made payable to the Purchasing Division and shall be signed by the protester and the surety. In lieu of a bond, the protester may submit a cashier's check or bank money order payable to the Purchasing Division. The money will be held in trust in the State Treasurer's office.

If it is determined that the protest has not been filed for frivolous or improper purpose, the bond shall be returned in its entirety.

5.13 **Record Retention (Access and Confidentiality)**:
ESCO shall comply with all applicable Federal and State rules, regulations, and requirements governing the maintenance of documentation to verify any cost of services or commodities rendered under this contract by the ESCO. The ESCO shall maintain such records a minimum of five (5) years and make such records available to Agency personnel at the ESCO's location during normal business hours upon written request by the Agency within ten (10) days after receipt of the request.

ESCO shall have access to private and confidential data maintained by the Agency to the extent required for the ESCO to carry out the duties and responsibilities defined in this contract. ESCO agrees to maintain confidentiality and security of the data made available and shall indemnify and hold harmless the State and the Agency against any and all claims brought by any party attributed to actions of breach of confidentiality by the ESCO, subcontractors, or individuals permitted access by the ESCO.

Attachment A
West Virginia Performance Contracting Code

WEST VIRGINIA CODE

§5A-3B-1. Definitions.

As used in this article:

(a) "Agency" means any state department, division, office, commission, authority, board or other unit authorized by law to enter into contracts for the provision of goods or services;

(b) "Energy-conservation measures" means goods or services, or both, to reduce energy consumption operating costs of agency facilities. They include, but are not limited to, installation of one or more of the following:

(1) Insulation of a building structure and systems within a building;

(2) Storm windows or doors, caulking or weather stripping, multiglazed windows or doors, heat-absorbing or heat-reflective glazed and coated window or door systems, or other window or door modifications that reduce energy consumption;

(3) Automatic energy control systems;

(4) Heating, ventilating or air conditioning systems, including modifications or replacements;

(5) Replacement or modification of lighting fixtures to increase energy efficiency;

(6) Energy recovery systems;

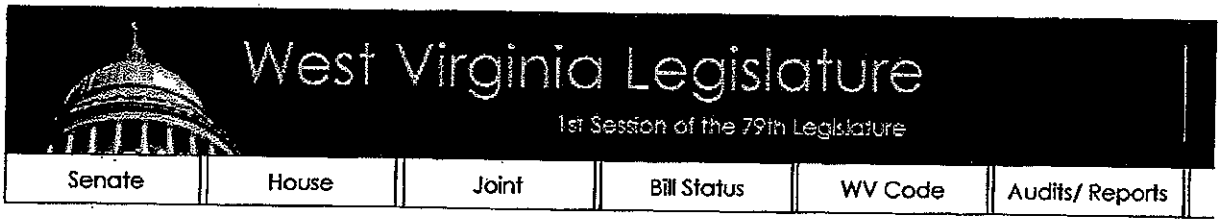
(7) Cogeneration systems that produce steam or another form of energy for use by any agency in a building or complex of buildings owned by the agency; or

(8) Energy-conservation maintenance measures that provide long-term operating cost reductions of the building's present cost of operation.

(c) "Energy-savings contract" means a performance-based contract for the evaluation and recommendation of energy operations conservation measures and for implementation of one or more measures.

(d) "Qualified provider" means a person, firm or corporation experienced in the design, implementation and installation of energy-conservation measures.

Note: Code updated with legislation passed through the 2008 2nd Extraordinary Session



WEST VIRGINIA CODE

§5A-3B-2. Contracts for energy-savings contracts.

(a) Agencies are authorized to enter into performance-based contracts with qualified providers of energy-conservation measures for the purpose of significantly reducing energy operating costs of agency owned buildings, subject to the requirements of this section.

(b) Before entering into a contract or before the installation of equipment, modifications or remodeling to be furnished under a contract, the qualified provider shall first issue a proposal summarizing the scope of work to be performed. A proposal must contain estimates of all costs of installation, modifications or remodeling, including the costs of design, engineering, installation, maintenance, repairs or debt service, as well as estimates of the amounts by which energy operating costs will be reduced. If the agency finds, after receiving the proposal, that the proposal includes one or more energy-conservation measures, the installation of which is guaranteed to result in a net savings of a minimum of five percent of the then current energy operating costs which savings will, at a minimum, satisfy any debt service required, the agency may enter into a contract with the provider pursuant to this section.

(c) An energy-savings contract must include the following:

(1) A guarantee of a specific minimum net percentage amount of at least five percent of energy operating costs each year over the term of the contract that the agency will save;

(2) A statement of all costs of energy-conservation measures, including the costs of design, engineering, installation, maintenance, repairs and operations; and

(3) A provision that payments, except obligations upon termination of the contract before its expiration, are to be made over time.

(d) An agency may supplement its payments with federal, state or local funds to reduce the annual cost or to lower the initial amount to be financed.

(e) An energy-savings contract is subject to competitive bidding requirements and other requirements of article three of this chapter.

(f) An energy-savings contract may extend beyond the fiscal year in which it first

becomes effective: *Provided*, That such a contract may not exceed a fifteen-year term: *Provided, however*, That the long term contract will be void unless the agreement provides that the agency shall have the option during each fiscal year of the contract to terminate the agreement.

(g) Agencies may enter into a "lease with an option to purchase" contract for the purchase and installation of energy-conservation measures if the term of the lease does not exceed fifteen years and the lease contract includes the provisions contained in subsection (f) of this section and meets federal tax requirements for tax-exempt municipal leasing or long-term financing.

(h) The agency may include in its annual budget for each fiscal year any amounts payable under long-term energy-savings contracts during that fiscal year.

(i) Upon the issuance of a request for proposals or request for quotations for an energy-savings contract, the agency shall provide a copy thereof to the joint committee on government and finance.

(j) Before signing an energy-savings contract or extending an existing energy-savings contract, the agency shall give thirty days' written notice, which notice shall include a copy of the proposal containing the information required by subsection (b) of this section, to the joint committee on government and finance.

Note: Code updated with legislation passed through the 2008 2nd Extraordinary Session

Attachment B
Historical Utility Data

Denmar Correctional Facility

The Denmar Correctional Center is located near Hillsboro in Pocahontas County, West Virginia. Originally opened as a state hospital for treatment of tuberculosis patients, the hospital was later utilized as a long-term health care facility for the chronically ill. The Denmar Hospital was closed in 1990.

In February 1993, the Pocahontas County Commission conveyed the deed for the former Denmar Hospital to the West Virginia Division of Corrections for conversion to a state correctional facility. During the 1993 session of the West Virginia Legislature, funds were appropriated to the Division of Corrections for renovation and occupation of the facility now known as Denmar Correctional Center.

In December 1998, the Regional Jail Authority provided funding for a building project at Denmar. The project included a Multi-Purpose Building, a Correctional Industries/Vocational Building and a new roof for the Greenbrier Birthing Center.

The building project was completed in January of 2000.

Additional information about the existing heating and cooling systems would be provided during the mandatory pre bid conference at the facility.

Denmar Correctional Center

ATTACHMENT B

	AGE	SQUARE FEET
Main Building	50+ years	60,000 est
Birthing Center	50+ years	9,000 est
Correctional Industries	10 years	12,000 est

	2010	2009	2008	2007	2006
Allegheny Power (main bldg)	$ 81,102	$ 63,812	$ 63,556	$ 63,818	$ 60,350
Allegheny Power (Warden Residence)	$ 2,667	$ 2,253	$ 2,174	$ 2,661	$ 2,439
Allegheny Disposal (garbage removal)	$ 18,844	$ 18,000	$ 18,380	$ 13,881	$ 11,485
LP Gas - Kitchen equipment use	$ 1,566	$ 1,860	$ 3,281	$ 2,438	
Heating Fuel for buildings	$ 281,757	$ 275,780	$ 404,586	$ 240,948	$ 239,226
Water - we operate our own system	0	0	0	0	0

Mt. Olive Correctional Facility

The Mt. Olive correctional facility built in 1994 consists of multiple buildings totaling 483,296 sq. ft. The total inmate population at the facility is 1050. The Q-Hall 1 & 2,

The boiler plant consists of two (2) Superior gas fired hot water boilers. Two (2) Lochinvar gas fired hot water boilers with a separate storage tank provide the domestic hot water for these buildings.

Two (2) air-cooled chillers provide cooling to these buildings with a recently renovated primary and secondary pumping system, including variable frequency drives for the secondary loop.

The air-handling unit (AHU) serving the main building is a face-bypass system with fan powered VAV boxes. A multi-zone unit with hot deck and cold deck serves Q1 & Q2. Additional spaces are served with typical single-zone AHUs with hot water and chilled water coils.

Buildings J, K, L, M, N, and O are inmate pods, with two sections per pod except for pod L which has only one housing section. Each pod section receives heating and cooling from z York direct gas-fired rooftop unit (RTU) complete with DX cooling. A newer AO Smith gas fired domestic hot water generator feeds to each section of a pod.

A recently-installed Johnson Controls Metasys DDC-based Building Management System (BMS) controls the majority of larger HVAC equipment in the main building.

The majority of interior lighting systems in the facilities remain a magnetic-based T-12 fluorescent system, with limited high intensity discharge (HID) metal halide and high pressure sodium lighting systems also in use, for both interior and exterior applications.

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

ATTACHMENT B

	July 1, 2008 to June 30, 2009 GAS			July 1, 2007 to June 30, 2008 GAS			July 1, 2006 to June 30, 2007 GAS		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	970	$13,842	$14.27	937	$10,782	$11.51	787	$12,128	$15.41
.UGUST	1004	$14,326	$14.27	1015	$11,678	$11.51	1124	$17,263	$15.36
EPTEMBER	1208	$17,232	$14.26	1441	$16,569	$11.50	1475	$22,580	$15.31
ICTOBER	2089	$29,782	$14.26	1693	$19,257	$11.37	2849	$38,958	$13.67
IOVEMBER	5484	$78,144	$14.25	4378	$48,817	$11.15	4031	$46,304	$11.49
IECEMBER	4818	$69,438	$14.41	5153	$57,455	$11.15	4490	$51,574	$11.49
ANUARY	5352	$76,264	$14.25	5078	$56,619	$11.15	5875	$67,475	$11.49
EBRUARY	2278	$32,464	$14.25	6344	$70,728	$11.15	5326	$61,172	$11.49
/IARCH	3132	$44,640	$14.25	2780	$31,008	$11.15	3114	$35,776	$11.49
.PRIL	2525	$35,993	$14.25	2098	$23,407	$11.16	1612	$18,532	$11.50
/IAY	1225	$17,475	$14.27	1350	$15,070	$11.16	1145	$13,170	$11.50
UNE	1044	$14,896	$14.27	1345	$17,238	$12.82	1103	$12,688	$11.50
'OTAL GAS	31129	$444,497	$14.28	33612	$378,628	$11.26	32931	$397,620	$12.07

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2005 to June 30, 2006 GAS			July 1, 2004 to June 30, 2005 GAS			July 1, 2003 to June 30, 2004 GAS		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	987	$11,465	$11.62	834	$8,605	$10.32	1106	$8,345	$7.55
UGUST	729	$8,513	$11.68	1261	$12,923	$10.25	940	$7,119	$7.57
EPTEMBER	991	$11,511	$11.62	1157	$11,872	$10.26	1430	$11,498	$8.04
CTOBER	2096	$26,341	$12.57	1881	$20,069	$10.67	1656	$15,914	$9.61
OVEMBER	5215	$74,183	$14.22	3409	$39,461	$11.58	3787	$36,194	$9.56
ECEMBER	4348	$61,879	$14.23	5124	$59,226	$11.56	4953	$47,285	$9.55
NUARY	5071	$72,140	$14.23	4898	$56,621	$11.56	6994	$66,739	$9.54
EBRUARY	4478	$63,724	$14.23	6878	$78,739	$11.45	3598	$34,362	$9.55
IARCH	3589	$52,956	$14.76	2638	$30,356	$11.51	4183	$40,431	$9.67
PRIL	1325	$20,301	$15.32	2145	$24,715	$11.52	2102	$21,490	$10.22
IAY	1393	$21,334	$15.32	1336	$15,459	$11.57	756	$7,782	$10.29
JNE	1136	$17,430	$15.34	821	$9,612	$11.71	1391	$14,238	$10.24
OTAL GAS	31358	$441,777	$14.09	32382	$367,658	$11.35	32896	$311,397	$9.47

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2008 to June 30, 2009 ELECTRIC			July 1, 2007 to June 30, 2008 ELECTRIC			July 1, 2006 to June 30, 2007 ELECTRIC		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	9030	$40,879	$4.53	7280	$32,467	$4.46	8260	$30,743	$3.72
UGUST	7910	$36,947	$4.67	8015	$34,493	$4.30	8680	$32,463	$3.74
EPTEMBER	7000	$34,699	$4.96	7560	$32,664	$4.32	5950	$24,922	$4.19
CTOBER	5810	$29,071	$5.00	6685	$29,570	$4.42	5565	$23,541	$4.23
IOVEMBER	6475	$28,987	$4.48	5740	$24,629	$4.29	5530	$21,215	$3.84
ECEMBER	6405	$27,995	$4.37	7315	$27,861	$3.81	6265	$22,621	$3.61
ANUARY	5460	$26,378	$4.83	5600	$24,690	$4.41	5180	$20,542	$3.97
EBRUARY	6475	$28,844	$4.45	5425	$23,956	$4.42	4795	$20,295	$4.23
ARCH	4235	$24,337	$5.75	5845	$25,054	$4.29	5915	$23,082	$3.90
PRIL	6160	$29,767	$4.83	5950	$24,529	$4.12	5355	$22,746	$4.25
AY	6685	$30,586	$4.58	5985	$26,480	$4.42	7140	$26,752	$3.75
UNE	7245	$34,138	$4.71	7700	$34,602	$4.49	7945	$30,813	$3.88
OTAL ELEC	78890	$372,628	$4.72	79100	$340,995	$4.31	76580	$299,736	$3.91

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2005 to June 30, 2006 ELECTRIC			July 1, 2004 to June 30, 2005 ELECTRIC			July 1, 2003 to June 30, 2004 ELECTRIC		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	7805	$27,817	$3.56	7245	$25,977	$3.59	6895	$25,141	$3.65
.UGUST	7665	$27,499	$3.59	7490	$25,959	$3.47	7945	$27,163	$3.42
EPTEMBER	6265	$23,170	$3.70	6300	$23,723	$3.77	5670	$21,642	$3.82
ICTOBER	6195	$23,023	$3.72	5530	$20,161	$3.65	5285	$19,995	$3.78
IOVEMBER	5285	$18,984	$3.59	5565	$19,934	$3.58	5705	$20,214	$3.54
IECEMBER	5915	$20,221	$3.42	5495	$18,427	$3.35	5600	$19,128	$3.42
ANUARY	4865	$18,369	$3.78	5145	$18,700	$3.63	5670	$19,230	$3.39
EBRUARY	5320	$19,035	$3.58	4725	$17,771	$3.76	4830	$18,290	$3.79
IARCH	4585	$17,094	$3.73	4445	$17,125	$3.85	5040	$17,659	$3.50
PRIL	5355	$19,437	$3.63	4760	$18,013	$3.78	5635	$20,658	$3.67
IAY	5600	$22,545	$4.03	5355	$19,476	$3.64	6930	$23,780	$3.43
UNE	7420	$25,806	$3.48	7280	$26,105	$3.59	6895	$24,728	$3.59
OTAL ELEC	72275	$263,000	$3.64	69335	$251,371	$3.63	72100	$257,628	$3.57

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2008 to June 30, 2009 WATER			July 1, 2007 to June 30, 2008 WATER			July 1, 2006 to June 30, 2007 WATER		
MONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JULY	39222	$28,814	$0.73	35422	$24,997	$0.71	35475	$22,327	$0.63
AUGUST	31474	$23,127	$0.73	48896	$34,716	$0.71	33577	$21,209	$0.63
SEPTEMBER	32074	$23,567	$0.73	37720	$26,781	$0.71	31750	$22,177	$0.70
OCTOBER	39660	$29,135	$0.73	36411	$25,852	$0.71	32413	$20,474	$0.63
NOVEMBER	35790	$26,295	$0.73	40255	$28,581	$0.71	37828	$23,891	$0.63
DECEMBER	33495	$24,610	$0.73	37034	$26,294	$0.71	33626	$21,239	$0.63
JANUARY	42518	$31,233	$0.73	45114	$32,031	$0.71	38688	$24,434	$0.63
FEBRUARY	36371	$26,721	$0.73	36218	$25,691	$0.71	38893	$24,563	$0.63
MARCH	43183	$31,721	$0.73	34260	$25,172	$0.73	29428	$20,771	$0.71
APRIL	29127	$22,716	$0.78	47755	$35,077	$0.73	34922	$24,644	$0.71
MAY	29030	$22,641	$0.78	28552	$20,982	$0.73	41473	$29,446	$0.71
JUNE	35371	$27,580	$0.78	36563	$26,862	$0.73	33173	$23,553	$0.71
TOTAL WATER	427315	$318,160	$0.74	464199	$333,037	$0.72	421246	$278,727	$0.66

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2005 to June 30, 2006 WATER			July 1, 2004 to June 30, 2005 WATER			July 1, 2003 to June 30, 2004 WATER		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	36617	$19,773	$0.54	31663	$15,091	$0.48	36182	$17,242	$0.48
UGUST	33512	$18,118	$0.54	32060	$16,789	$0.52	31309	$14,923	$0.48
EPTEMBER	30028	$18,048	$0.60	36947	$19,345	$0.52	31953	$15,229	$0.48
CTOBER	32523	$20,543	$0.63	29178	$15,282	$0.52	35956	$17,135	$0.48
OVEMBER	29716	$18,772	$0.63	31132	$16,303	$0.52	30648	$14,608	$0.48
ECEMBER	34640	$25,811	$0.75	35403	$18,537	$0.52	30758	$14,660	$0.48
NUARY	34285	$21,656	$0.63	32953	$17,256	$0.52	34307	$17,816	$0.52
EBRUARY	31403	$19,836	$0.63	29883	$15,650	$0.52	31478	$15,003	$0.48
ARCH	35256	$22,268	$0.63	30868	$16,165	$0.52	30161	$14,376	$0.48
PRIL	30410	$19,210	$0.63	28393	$14,871	$0.52	40312	$19,208	$0.48
AY	33363	$21,074	$0.63	31700	$17,139	$0.54	29616	$16,038	$0.54
JNE	35349	$22,327	$0.63	28679	$17,059	$0.59	34690	$16,532	$0.48
OTAL WATER	397102	$247,436	$0.62	378859	$199,487	$0.53	397370	$192,770	$0.49

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2008 to June 30, 2009 SEWER			July 1, 2007 to June 30, 2008 SEWER			July 1, 2006 to June 30, 2007 SEWER		
IONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
JLY	35603	$19,395	$0.54	37000	$19,395	$0.52	35200	$15,030	$0.43
UGUST	36768	$19,395	$0.53	42763	$19,395	$0.45	33600	$15,030	$0.45
EPTEMBER	32209	$19,395	$0.60	38733	$19,395	$0.50	31302	$17,213	$0.55
CTOBER	36088	$19,395	$0.54	37296	$19,395	$0.52	39067	$19,395	$0.50
OVEMBER	35000	$19,395	$0.55	36710	$19,395	$0.53	31709	$19,395	$0.61
ECEMBER	35294	$19,395	$0.55	34622	$19,395	$0.56	33626	$19,395	$0.58
NUARY	36753	$19,395	$0.53	42171	$19,395	$0.46	39705	$19,395	$0.49
EBRUARY	35676	$19,395	$0.54	36218	$19,395	$0.54	32005	$19,395	$0.61
ARCH	33901	$19,395	$0.57	37642	$19,395	$0.52	34120	$19,395	$0.57
PRIL	29200	$19,395	$0.66	37602	$19,395	$0.52	34900	$19,395	$0.56
AY	29010	$19,395	$0.67	35225	$19,395	$0.55	37447	$19,395	$0.52
JNE	32375	$21,420	$0.66	41250	$19,395	$0.47	36174	$19,395	$0.54
OTAL SEWER	407877	$234,765	$0.58	457232	$232,740	$0.51	418855	$221,828	$0.53

otal Sq Ft 484,500

UTILITY BILLS FOR MOUNT OLIVE CORRECTIONAL COMPLEX
2004 THRU 2009

	July 1, 2005 to June 30, 2006 SEWER			July 1, 2004 to June 30, 2005 SEWER			July 1, 2003 to June 30, 2004 SEWER		
MONTH	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST	QUANTITY	DOLLARS	UNIT COST
ULY	32600	$15,030	$0.46	31486	$11,925	$0.38	32580	$11,925	$0.37
UGUST	34937	$15,030	$0.43	32834	$11,925	$0.36	32630	$11,925	$0.37
EPTEMBER	32559	$15,030	$0.46	33772	$11,925	$0.35	34812	$11,925	$0.34
CTOBER	31000	$15,030	$0.48	31726	$11,925	$0.38	33468	$11,925	$0.36
OVEMBER	30505	$15,030	$0.49	35346	$11,925	$0.34	30400	$11,925	$0.39
ECEMBER	32500	$15,030	$0.46	35914	$11,925	$0.33	32340	$11,925	$0.37
ANUARY	34000	$15,030	$0.44	29789	$11,925	$0.40	32605	$11,925	$0.37
EBRUARY	30512	$15,030	$0.49	28730	$11,925	$0.42	29328	$11,925	$0.41
ARCH	36718	$15,030	$0.41	30177	$12,690	$0.42	36048	$11,925	$0.33
PRIL	33274	$15,030	$0.45	28500	$12,690	$0.45	34016	$11,925	$0.35
AY	30944	$15,030	$0.49	30448	$15,030	$0.49	33367	$11,925	$0.36
UNE	34463	$15,030	$0.44	32634	$15,030	$0.46	32536	$11,925	$0.37
OTAL SEWER	394012	$180,360	$0.46	381356	$150,840	$0.40	394130	$143,100	$0.36

Huttonsville Correctional Facility

The original Huttonsville Correctional Facility, built in1939, has experienced various additions and renovations throughout its history and now encompasses approximately 477,000 sq. ft. The campus currently houses 1,130 inmates.

The boiler plant consists of two (2) 600 HP Cleaver Brooks and one 400 HP Kewanee dual-fuel high pressure steam boilers. The majority of heating in the facility is accomplished through individual and in many locations steam radiation. The Block sections contain a variety of heating systems, both steam radiation and AHUs or RTUs with steam coils and limited DX cooling in a few building sections. There are a few AHUs with hot water coils supplied by a heat exchanger located in the original boiler room basement.

Domestic Hot Water (DHW) is provided by three (3) AERCO steam to hot water converters.

Newer or renovated sections of the campus have a mix (pneumatic, electric and limited electronic) of Building Management Systems (BMS) for HVAC operations, such as the four (4) Trane AHUs for sections B and E employing Andover Controls. The facility consists of multiple electric account meters, which are not currently tied into any monitoring system for monitoring or energy usage accumulation analysis.

The majority of interior lighting systems in the facilities remain a magnetic-based T-12 fluorescent system, with limited high intensity discharge (HID) metal halide and high pressure sodium lighting systems also in use, for both interior and exterior applications.

Window and door conditions vary extensively at this facility due to the many phases of addition and and renovations. The 1939 and B and E buildings and joining corridors are still equipped with single-pane reinforced window systems, which may also be of historical value and expensive to modify and / or replace.

The campus has its own water production where the water is pulled from the river and treated at the near by water treatment facility.

HUTTONSVILLE CORRECTIONAL CENTER

	2005	2006	2007	2008	2009
TRASH	$57,180.10	$60,460.35	$82,013.63	$93,600.00	$109,920.00
ELECTRIC	$262,585.11	$270,873.11	$296,917.45	$295,031.50	$320,609.96
FUEL OIL	$741,202.04	$947,281.30	$912,100.13	$1,254,900.88	$980,997.42

Bldg	Sq Ft	Yr Built
Main Bldg	279060	1939
Boiler Room	4000	1975
Vehicle Maint Garage	7300	1958
Chapel D	2500	2000
Water Plant	1200	1900 ?
Maint/carp Welding	12000	1965
Prison Industries	10410	1994
Service Station	264	1900?
Prison Ind K Bldg	12000	2000
Multi-Purpose Bldg	24582	1993
Staff Services	6613	1993
Vocational Education	15000	1993
Wardens Residence	1421	1900
Assoc Wardens Residence	3932	1900
Guard Quarders	2130	1900
Bus Mngr Residence	2526	1900
Sewage Disposal Plt	757	1900
Indoor Rec Bldg	9112	1988
Canine Training Center	5000	1900
Firing Range Building	1000	1900
Wardens Mens Dwelling	510	1987
Arts & Crafts Store	576	1900
Arts & Crafts	2500	2000

Pruntytown Correctional Facility

The Administration Building serving Pruntytown Correctional Facility was built in 1908, and is one of many individual buildings constructed or recently renovated during various periods. A total of 359 inmates are housed at Pruntytown.

The buildings are heated by various methods, including gas-fired hot water or low pressure Weil-McLain cast iron steam boilers with radiators, electric baseboard strip or unit heaters, PTACs, heat pumps and hot air furnaces. A few buildings make use of small AHUs with hot water coils for heating the space.

There is no central Controls system. Cooling systems are very limited and include DX systems, window air conditioning units and heat pumps. Domestic hot water is provided by either gas-fired or electric heaters for each building..

The majority of interior lighting systems in the facilities remain a magnetic-based T-12 fluorescent system, with limited high intensity discharge (HID) metal halide and high pressure sodium lighting systems also in use, for both interior and exterior applications. Some areas have been retrofitted with T-8 lighting systems, although this is sporadic and not yet fully employed.

Window and door conditions vary extensively at the facilities with some buildings using 6 mil or heavier plastic for inner storm windows.

Pruntytown Correctional Center
Utilities

	FY 2005	FY2006	FY2007	FY2008	FY2009
Water	59,067.54	61,470.02	56,837.72	53,839.71	61,353.92
Gas	181,888.55	197,331.98	224,260.57	174,936.30	210,971.27
Electric	110,358.72	109,930.80	106,296.61	107,963.28	112,645.47
Garbage	11,462.91	11,641.29	11,815.54	12,943.99	13,419.95
Fire Protection Fee	1,927.20	1,927.20	1,927.20	1,927.20	1,927.20

	Square Footage	Year of Construction	Age
Administration Building #1	25,200	1900	110
Administration Building #2	4,345	1937	73
Arts and Craft #1	880	1900	110
Arts and Craft #2	4,212	1900	110
Barnes School and Hospital	26,700	1952	58
Dog Kennels	960	2008	2
Dining Hall and Old Chapel	6,294	1973	37
Gym	16,976	1954	56
Horse Barn Old Cannery	13,500	1950?	60
Old Potato House	1,050	1953	57
2 Story	2,100	1920	90
Storage/Refrigeration/Medical	12,892	1900	110
Unit 18	4,661	1973	37
Unit 19	4,661	1973	37
Unit 20	21,770	1998-1999	11
Unit 20 Education Building	968	2004	6
Unit 24/Prison Industries/Maint Shop	44,792	1950	60
Unit 25	10,080	1989	21
Unit 25 Education Building	960	2001	9
Unit 25 offices	2,000	2006	4

Attachment C
State Energy Program and American Recovery and Reinvestment Act

Department of Energy
Washington, DC 20585

GUIDANCE ON DOCUMENTING COMPLIANCE WITH THE RECOVERY ACT BUY AMERICAN PROVISIONS

EFFECTIVE DATE: May 24, 2010

SUBJECT: GUIDANCE FOR RECIPIENTS OF RECOVERY ACT FINANCIAL ASSISTANCE FROM THE OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY ON DOCUMENTING COMPLIANCE WITH THE RECOVERY ACT BUY AMERICAN PROVISIONS.

PURPOSE: To provide information on the roles and responsibilities of different stakeholders in documenting compliance with section 1605 (the Buy American provisions) of the Recovery Act.

SCOPE: This guidance applies to State, Local and Tribal Government recipients and sub-recipients (grantees and subgrantees) of Recovery Act financial assistance from the Office of Energy Efficiency and Renewable Energy (EERE).

LEGAL AUTHORITY: Section 1605 of the American Recovery and Reinvestment Act of 2009 (Recovery Act; Pub. L. 111-5) sets forth the Buy American provisions for recipients of Recovery Act financial assistance.

DEFINITIONS: Public building or public work means a public building of, or a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying islands of the United States; state and local governments; and multi-state, regional, or interstate entities which have governmental functions). These buildings and works may include, without limitation, bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, pumping stations, heavy generators, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals, and the construction, alteration, maintenance, or repair of such buildings and works.

Indian tribes are also considered governmental entities for the purpose of defining "public building or public work" and are therefore subject to the Buy American provisions of the Recovery Act.

A **manufactured good** is defined as a good brought to the construction site for incorporation into the public building or work that has been processed into a specific form and shape or combined with other materials to create a material that has a different property than the individual raw materials.

There is no requirement with regard to the origin of components or subcomponents in manufactured goods used in a project, as long as the manufacturing occurs in the United States.[1]

GUIDANCE: Recipients of EERE financial assistance funded by the Recovery Act must comply with the requirement in section 1605 that all of the iron, steel, and manufactured goods used for a project for the construction, alteration, maintenance, or repair of a public building or public work be produced in the United States, unless one of the three listed exceptions applies and EERE issues a waiver, or a recipient can legally avail itself of the United States' obligations under international agreements.

Recipients should retain documentation that supports their compliance with the Buy American provisions. During post-award monitoring activities, which may include desk reviews, on-site reviews, audits, and other activities, recipients may be asked to produce records sufficient to verify compliance with the Recovery Act Buy American provisions.

Such documentation could include: (1) language in contractual documents that obligates sub-recipients and/or contractors to comply with the Buy American provisions; (2) receipts for items produced domestically indicating such; (3) a documented certification from the contractor, vendor, distributor, supplier, or manufacturer verifying that the product was manufactured domestically; (4) detailed and verifiable information supporting the claim that the manufactured good has undergone substantial transformation in the United States; and/or (5) other reasonable documentation per the discretion of the state, local, or tribal government financial assistance recipient demonstrating compliance with the Buy American provisions.

There are no specific requirements imposed by the Recovery Act or the Office of Management and Budget (OMB) guidance in 2 CFR 176 concerning the type of documentation necessary to prove compliance with the Recovery Act Buy American provisions. Therefore, grantees are encouraged to reference their obligations under the Department of Energy's Financial Assistance Rules, 10 CFR Part 600 and their individual financial assistance award provisions.

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[1] See 2 CFR 176.70(a)(2)(ii).

Department of Energy Financial Assistance Rules

State Recipients
According to the Department of Energy's Financial Assistance Rules found at 10 CFR § 600.220, "Standards for financial management systems," Section (a) and sub-section (a)(2), "A State must expend and account for grant funds in accordance with State laws and procedures for expending and accounting for its own funds. Fiscal control and accounting procedures of the State, as well as is subgrantees and cost-type contractors must be sufficient to -- ...[p]ermit the tracing of funds to a level of expenditures adequate to establish that such funds have not been used in violation of the restrictions and prohibitions of applicable statutes." Additionally, according to 10 C.F.R. § 600.237(a)(1), States shall ensure that every subgrant includes any clauses required by Federal statute and executive orders and their implementing regulations (including the Buy American provisions).

Local Government and Tribal Recipients
The Department of Energy's Financial Assistance Rules found at 10 CFR § 600.220, "Standards for financial management systems," Section (b)(2) *Accounting records,* states that "[g]rantees *[other than States]* and subgrantees must maintain records which adequately identify the source and application of funds provided for financially-assisted activities..."

For purposes of Buy American documentation, the types of documentation identified in the list above (numbers 1-5) should be sufficient to satisfy the requirements set forth for State, local governments, and tribal recipients in the Financial Assistance Rules. However, States, local governments and tribes are encouraged to consult with their General Counsel's offices, to ensure compliance with the Buy American provisions and 10 CFR § 600.220(a) and (b) more broadly.

OMB Circular A-133

In addition to the procurement documentation guidance provided above, grantees should also be mindful of the standard Federal assistance audit guidance defined in OMB Circular A-133 for state and local governments.

The DOE Acquisition and Financial Assistance Implementation Guide for the American Recovery and Reinvestment Act of 2009 [p. 3-3, section 3.4(1)] states: "Non-Federal entities (States, local governments, tribes and non-profit organizations) are required by the Single Audit Act Amendments of 1996 (Single Audit) and OMB Circular A-133, to have an annual audit of the federal awards (e.g. grant programs)." This requirement generally applies to Non-Federal entities that expend $500,000 or more in Federal awards in a fiscal year, and stipulates that they shall have a single or program-specific audit conducted for that year, in accordance with the provisions of OMB Circular A-133. Recipients are encouraged to review OMB Circular A-133, Subpart B, Sections 200

through 235 for the audit requirements for Non-Federal assistance recipients. Additionally, recipients should review the Federal Audit Clearinghouse website for instructions on how to appropriately submit Single Audits.

Single Audit Information for Recipients of American Recovery and Reinvestment Act Funds (2 CFR 176 Subpart D and OMB A-133 Compliance Supplement: Appendix VII)

Recovery Act financial assistance recipients subject to OMB Circular A-133 should also closely follow 2 CFR 176.210 (Subpart D) and OMB A-133 Compliance Supplement: Appendix VII, general instructions regarding recipient responsibilities for tracking and documenting sub-recipient expenditures of Recovery Act funds on the Schedule of Expenditures of Federal Awards" (SEFA).

Sub-awards, Sub-recipients and Vendors

The Special Terms and Conditions applicable to Recovery Act funded projects require that the financial assistance recipient flow down the Recovery Act special terms and conditions in any subaward or subcontract.

In 2 C.F.R. § 176.30, the OMB defines the term "sub-award" to include a "legal instrument to provide support for the performance of any portion of the substantive project or program for which the recipient received this award and that the recipient awards to an eligible sub-recipient." A sub-recipient means a "non-Federal entity that expends Federal awards received from a pass-through entity to carry out a Federal program, but does not include an individual that is a beneficiary of such a program. A sub-recipient may also be a recipient of other Federal awards directly from a Federal awarding agency." (2 C.F.R. § 176.30)

Subcontract is defined as "a legal instrument used by a recipient for procurement of property and services needed to carry out the project or program."

Note that the definition of a "sub-recipient" in 2 C.F.R. § 176.30 specifically excludes "the recipient's procurement of property and services needed to carry out the project or program." This section refers to OMB Circular A-133 to distinguish between a sub-recipient and a vendor. A vendor is defined in OMB Circular A-133 as "a dealer, distributor, merchant, or other seller providing goods or services that are required for the conduct of a Federal program. These goods or services may be for an organization's own use or for the use of beneficiaries of the Federal program."

Based on the fact that the Special Terms and Conditions flow down to all subawards and sub-contracts, and the fact that a vendor is not a subawardee, sub-recipient, or sub-contractor, the Recovery Act financial assistance recipient and sub-recipients are not required to flow down the Recovery Act's Special Terms and Conditions to vendors. However, financial assistance recipients, sub-recipients and subawardees are ultimately

responsible for complying with the Special Terms and Conditions, and should take whatever measures they deem necessary to ensure that the Buy American requirements of the Recovery Act are adhered to by their respective vendors.

CONCLUSION: Please be advised that the Department of Energy cannot answer all questions on a case-by-case basis concerning the appropriate levels of documentation needed to verify compliance with the Recovery Act Buy American provisions. Therefore, financial assistance recipients should consult with their legal counsel in order to ascertain whether they have secured adequate documentation in accordance with the Department of Energy's Financial Assistance Rules found at 10 C.F.R. § 600.220.

To summarize, recipients of EERE Recovery Act financial assistance should take the following steps toward demonstrating compliance with the Buy American provisions:

1. State and local governments and tribes must follow their own procurement policies and procedures, per 10 CFR 600.236, "Procurement", and are expected to maintain maximum oversight over their project and procurement activities with regards to Buy American compliance.
2. Recipients should maintain documentation at a level they feel is appropriate to show compliance with the Recovery Act Buy American provisions.
    a. A list of recommended documentation is outlined above.
3. In addition, in order to ensure broader compliance with any potential audit, grantees should (1) determine whether a single audit or program audit is applicable (see OMB Circular A-133), and should then initiate the appropriate audit review process.
4. Moreover, grantees subject to OMB Circular A-133 should also maintain ongoing compliance with SEFA requirements (2 CFR 176.210 and OMB A-133 Compliance Supplement).

Resources for further review:

Section 1605 (Buy American provisions) of the American Recovery and Reinvestment Act (Pub. L. 111-5)
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=63f99139a28cbed199c115ec9d34faf0&rgn=div5&view=text&node=2:1.1.1.2.3&idno=2

Full Text of the American Recovery and Reinvestment Act (Pub. L. 111-5)
http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf

Department of Energy's Financial Assistance Rules [10 C.F.R. Part600]
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title10/10cfr600_main_02.tpl

OMB Circular A-133: This document identifies Audit roles and responsibilities pertaining to the State and local governments, including tribal entities.
http://www.whitehouse.gov/omb/rewrite/circulars/a133/a133.html

OMB Circular A-133 Compliance Supplement – Appendix VII
Other OMB Circular A-133 Advisories:
http://www.whitehouse.gov/omb/assets/a133_compliance/app_7.pdf

2 CFR 176.210: This section of the Code of Federal Regulations provides the guidelines for the required Recovery Act expenditure documentation pertaining to "Recovery Act Transactions Listed in the Schedule of Expenditures of Federal Awards and Recipient Responsibilities for Informing Sub-recipients."
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=f03ceaca224c1a658c2ad682f212e869&rgn=div8&view=text&node=2:1.1.1.2.3.4.1.2&idno=2

Federal Audit Clearinghouse: http://harvester.census.gov/sac/

DOE Acquisition and Financial Assistance Implementation Guide for the American Recovery and Reinvestment Act of 2009
http://management.energy.gov/policy_guidance/1672.htm

Cathy Zoi
Assistant Secretary for Energy Efficiency and Renewable Energy
U.S. Department of Energy

May 24, 2010

Department of Energy
Washington, DC 20585

STATE ENERGY PROGRAM NOTICE 10-003A

EFFECTIVE DATE: 04/7/10

REVISION: THIS GUIDANCE HAS BEEN AMENDED FROM THE DECEMBER 30, 2009. THE CHANGE IN THIS AMENDED GUIDANCE IS RELATED TO THE REQUIREMENT TO PROVIDE A WAGE DETERMINATION TO CONTRACTORS AND SUBCONTRACTORS.

SUBJECT: GUIDANCE ON IMPLEMENTATION OF THE DAVIS-BACON ACT PREVAILING WAGE REQUIREMENTS FOR STATE ENERGY PROGRAM GRANT RECIPIENTS UNDER THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

PURPOSE: To issue guidance to State Energy Program (SEP) participants, on compliance with Davis-Bacon Act (DBA)[1] requirements associated with the expenditure of American Recovery and Reinvestment Act of 2009 (Recovery Act) funds. The Department of Labor (DOL), Employment Standards Administration, Wage and Hour Division (WHD) has issued guidance on applicability of DBA requirements to all agencies engaged in funding projects for construction, alteration, and/or repair funded in whole or in part by funds appropriated under the Recovery Act.[2] This guidance does not modify or replace the DOL guidance or any requirements or terms and conditions contained in the grant instrument.

SCOPE: The provisions of this guidance apply to recipients of SEP funds, as named in a Notification of Grant Award (Grant Award) from DOE under the SEP and their subrecipients. The provisions of this guidance do not apply to U.S. Territories. Tribal governments are only exempt from the DBA provisions when the Tribal government performs work using its employees. The DBA applies to all contractors that employ laborers and/or mechanics performing work under a Grant Award.

BACKGROUND: The Davis-Bacon Act

The DBA is applicable to contracts of the United States[3] in excess of $2,000[4] for the construction, alteration, and/or repair (including painting and decorating)[5] of public buildings or public works.

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[1] 40 U.S.C. 3141 *et seq.*
[2] See DOL All Agency Memorandum No, 207, dated May 29, 2009, available at http://www.dol.gov/whd/recovery/AAM207.pdf (AAM No. 207).
[3] This includes the District of Columbia. For applicability of the Davis-Bacon Act to government agencies, such as states, under Section 1606 of the Recovery Act, see the DOL Advisory Letter to DOE (Advisory Letter) at http://www.dol.gov/whd/recovery/AvisoryLetter DOE.pdf, page 2.

The DBA requires all contractors and subcontractors to pay laborers and mechanics employed on a covered contract wages and fringe benefits determined by the Secretary of Labor to be prevailing for corresponding classes of employees engaged on similar projects in the locality. In numerous additional laws, Congress has specifically required adherence to DBA prevailing wage requirements where they might not otherwise be applicable.

On February 17, 2009, President Obama signed the Recovery Act to jumpstart the economy by saving and creating jobs, and to foster energy efficiency efforts and achieve other goals.[6] Section 1606 of the Recovery Act specifically requires that all laborers and mechanics employed by contractors and subcontractors on any project "funded directly by or assisted in whole or in part by" Recovery Act funds be paid prevailing wages as determined by the Secretary of Labor.[7]

Accordingly, contractors and subcontractors must ensure that any laborers and mechanics[8] employed on projects funded or assisted in whole or in part by Recovery Act funds are paid prevailing wages as determined by the Secretary of Labor for construction, alteration, and/or repair (including painting and decorating). All recipients, grantees and subgrantees, with the exception of State and local governments that use their own employees to perform this work, must pay their employees, performing construction, alteration, or repair work, the DBA prevailing wage rate. If the entity receiving Recovery Act assistance for such projects contracts out the work, it must ensure that the DBA requirements flow down to the entities that employ laborers and mechanics that do the work.[9]

Contract Clauses

On projects where DBA prevailing wage requirements must be paid, the requirements set out in the DOL regulations at 29 CFR Parts 1, 3, and 5 are applicable. In accordance with 29 CFR Part 1, Federal agencies directly contracting for projects or providing assistance under the Recovery Act to other entities for such projects must include the DBA contract clauses in their solicitations, assistance agreements, and the resulting contracts and grants, and must require that those requirements flow down to any contracts or subcontracts for the performance of the work.[10] As a consequence of the required DBA contract clauses, the recipient of the Recovery Act funds is responsible for the compliance by its subgrantees, contractors, and their subcontractors.[11]

DOE is responsible for ensuring that the applicable wage determinations are included in solicitations, assistance agreements, and the resulting contracts and grants. SEP projects using

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[4] The $2,000 threshold for coverage pertains to the amount of the prime contract, not to the amount of individual subcontracts. If the covered prime contract exceeds $2,000, all work on the project is covered.
[5] These work activities are defined at 29 CFR Part 5.2(k).
[6] *See* http://www.recovery.gov/?q=content/our-mission
[7] For the text of the Davis-Bacon provision in Section 1606, see AAM No. 207 page 2, and Advisory Letter page 2.
[8] Apprentice and trainees may be paid at less than the DBA prevailing wage rate if the requirements set forth in 29 CFR Part 5.5(a)(4) are met.
[9] *See* Advisory Letter page 2.
[10] *See* DOE Acquisition and Financial Assistance Guide for the American Recovery and Reinvestment Act of 2009, version 2.1a, Attachment 3 at: http://management.energy.gov/policy_guidance/1672.htm
[11] *See* 29 CFR Part 5.5(a)(6) (making prime contractor responsible for lower-tier contractor compliance).

Recovery Act funds must incorporate the most current DOL Wage Determination(s) as found at http://www.wdol.gov/Index.aspx for the worker classifications applicable to the work being performed by employees or contractors. Please also note that the rates posted at the DOL site are minimums.

Grantees/subgrantees and contractors must attach the applicable wage determinations to the solicitation, assistance agreement, and resulting contract or grant. A grantee or subgrantee and contractors/subcontractors contracting out work on a covered project must also attach the applicable wage determination(s) to the solicitation and resulting contract or grant.
If an ongoing construction project, awarded prior to the Recovery Act or was not initially assisted or funded in whole or part by Recovery Act funds, later receives Recovery Act funding, the DOE contracting officer will insert the appropriate wage determination(s) in relevant contracts and federal assistance agreements effective as of the date the Recovery Act funding is approved for use on the project. The wage determinations must thereafter be included in any contracts or subcontracts for the DBA-covered work. Projects that are already subject to the DBA labor standards would not require application of a new Davis-Bacon wage determination upon receipt of Recovery Act funding unless the funding is for work not contemplated under the existing contract for construction.

Payroll Records

In addition, Grantees/sub-grantees and contractors/subcontractors on these projects funded or assisted in whole or part by Recovery Act funds shall maintain payrolls and basic records relating to payroll during the course of the work and preserve them for a period of three years thereafter for all laborers and mechanics working on the project, or as designated in the grant document.[12] **They must also ensure that all laborers and mechanics on a project funded or assisted in whole or part with Recovery Act funds are paid on a weekly basis and must submit weekly certified payroll records to the contracting and administering agency.**[13]

Published Wage Rates

Wage rates can be found at www.wdol.gov. If county recipients in any State do not have published DOL wage rates, then the county must submit a request for conformance to the DOE contracting officer for forwarding to the DOL. The conformance process often takes up to six weeks to be completed so county should plan its project activities accordingly.[14]

Administrative Costs

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[12] *See* 29 CFR Part 5.5(a)(3)(i) for the payroll and record-keeping requirements, including a list of the required contents of the records and additional record-keeping requirements.
[13] *See* 29 CFR Part 5.5(a)(ii)(A)-(D) for additional requirements relating to the submission of weekly certified payroll records.
[14] The Department of Labor has provided guidance for anyone who must submit a conformance request for a Wage Determination on its website at http://www.dol.gov/whd/recovery/dbsurvey/conformance.htm

Costs associated with DBA compliance can be charged as an administrative cost. SEP recipients should contact their respective DOE Project Management Center for specific guidance on how to appropriately charge these costs.

Recovery Act Funded State Energy Program Consumer Rebate Programs

Consumer rebate programs for individual homeowners are among SEP eligible project activities. DOL has determined that rebates to individual homeowners for energy efficiency and renewable energy improvements to an individual's home are not subject to the DBA prevailing wage requirements. Individual homeowners may apply for rebates either prior to or after the energy efficiency and/or renewable energy improvements are completed and will not be subject to the DBA requirements.

TRAINING

Training on DBA implementation, frequently asked questions, labor standards clauses, and other related Recovery Act information can be found at the following website:
http://apps1.eere.energy.gov/state_energy_program/

Claire Broido Johnson

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Weatherization and Intergovernmental ProgramEnergy Efficiency and Renewable Energy

A DESK GUIDE TO THE DAVIS-BACON ACT

Prevailing Wage Requirements for Contractors on Federal Contracts and DBA-Covered Federally Financed or Assisted Construction Projects

Introduction.

The U. S. Department of Energy (DOE) has prepared this Desk Guide for the use of contractors and subcontractors performing work on construction projects under a federal contract, or under a statute authorizing federal financial assistance, that requires the application of Davis-Bacon Act (DBA or the Act) prevailing wage requirements. This Desk Guide may also be used by grantees, subgrantees, and federal personnel to administer their respective roles and functions with respect to the DBA.

The objective of this Desk Guide is to provide simple, non-technical guidance to help contractors and subcontractors better understand their obligations under DBA. This objective supports DOE's policy that proper and consistent implementation of contract labor standards, along with full and open compliance by contractors, promotes good business and effective contracting in terms of price, quality of work, speed of delivery, customer satisfaction, and project success.

The guidance provided in this document does not constitute legal advice or substitute for full and careful review of the contract or agreement requiring application of DBA provisions, and compliance with all applicable statutes and regulations. Questions pertaining to

the labor standards, including wage determinations, applicable to specific projects, contracts, or agreements must be addressed to the designated DOE contracting officer. Questions pertaining to the general application of DBA and other labor standards compliance issues may be referred to the Department of Labor's (DOL's) nearest regional office. In addition, the answers to many questions may be found on various DOE websites listed in Appendix A. This Desk Guide does not address contractor obligations under any state prevailing wage laws. Questions pertaining to the application of, or compliance with, various state labor laws should be addressed to the cognizant agency within each state.

The Desk Guide will be updated as further guidance is received from the Department of Labor, or as circumstances change.

A DESK GUIDE TO THE DAVIS-BACON ACT

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A DESK GUIDE TO THE DAVIS-BACON ACT

Prevailing Wage Requirements for Contractors on Federal Contracts and DBA-Covered Federally Financed or Assisted Construction Projects

Chapter 1 Statutes, Regulations, Contract Clauses, Responsibilities.

Section 1-1 Labor Statutes Applicable to Federal Contractors.

a. The Davis-Bacon Act (40 U.S.C. 3141-48).

(1) DBA applies to contracts in excess of $2,000 for the construction, alteration, and/or repair of public buildings or public works, including painting and decorating, where the United States or the District of Columbia is a direct party to the contract. DBA specifies that each covered contract contain provisions, found at Title 29 CFR 5.5, requiring contractors to pay the laborers and mechanics employed on the project's site of the work, on a weekly basis, no less than the wages and benefits that are prevailing in the area as determined by the Secretary of Labor. Construction includes activities performed **on the site of the work** such as preparation for construction (*e.g.*, demolition of existing structures, equipment and material set-up, *etc.*), fabrication of materials, installation of materials, and post-construction clean-up. The federal agency awarding the contract must make the determination that DBA applies to the project and must incorporate the applicable DBA clauses and wage determinations (also referred to as "wage decisions") into the requirements of the contract.

(2) A construction "project" may often involve more than one "contract" if all such contracts are closely related in purpose, time, and place (*e.g.*, preparatory demolition contracts and final interior decorating contracts are often separate from the "construction" contract). DBA will apply to all such individual contracts, regardless of amount, if the overall project is in excess of $2,000.

b. Davis-Bacon and Related Acts (DBRA).

(1) The Davis-Bacon "Related Acts" are numerous statutes that authorize federal assistance such as contributions, grants, loans, insurance, or guarantees for various programs involving construction, alteration and/or repair of hospitals, housing, sewage and water treatment plants, highways, airports, and similar structures. A DBRA will often include language further defining work that must be covered by the DBA prevailing wage requirements. The American Recovery and Reinvestment Act (Public Law 111-5 February 17, 2009) (Recovery Act) is an example of a DBRA statute. The Recovery Act states, "Notwithstanding any other provision of law and in a manner consistent with other provisions in this Act, all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to this Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor...." In order to implement this Recovery Act requirement, the federal agency awarding the contract or providing the funding assistance must first make the determination that DBA applies to the project under the Recovery Act, and must then ensure that DBA clauses and wage determinations are made applicable to the performance of the work.

(2) Where DOE has determined that DBRA provisions apply, "contract" means contracts and subcontracts for construction, alteration, and/or repair awarded under DOE grants, cooperative agreements, technology investment agreements, loans, and loan guarantees authorized by a statute requiring the payment of DBA wages.

c. The Copeland "Anti-Kickback" Act (40 U.S.C. 3145 and 18 U.S.C. 874) (Copeland Act). The Copeland Act makes it unlawful to induce any person working on a federal contract or on a

federally financed or assisted construction project to give up any part of the compensation to which he or she is entitled under his or her contract of employment. The Copeland Act and its regulations require contractors and subcontractors to submit weekly to DOE, as the contracting agency, a copy of all payrolls, along with a weekly "Statement of Compliance" certifying that the contractor has paid the full wages and benefits due the covered workers.

d. The Fair Labor Standards Act of 1938 (29 U.S.C. 201 *et seq*) (FLSA). FLSA covers most workers employed throughout the United States, including non-exempt workers employed on federal contracts. FLSA requires employers to pay their workers no less than the federal minimum wage ($7.25/hour as of July 24, 2009), and to pay overtime compensation for hours worked in excess of 40 per week. (See Section 3-3 in this Desk Guide for guidance on overtime requirements.) FLSA also restricts the employment of children less than 18 years of age.

e. The Contract Work Hours and Safety Standards Act (40 U.S.C. 3701 *et seq*) (CWHSSA). CWHSSA applies to certain federal contracts (including contracts for services, construction, or supply) that are in excess of $100,000 and which may require or involve the employment of laborers or mechanics upon a public work. CWHSSA also applies to federally financed and assisted contracts in excess of $100,000, where a federal law provides wage standards for the work. CWHSSA does not apply to such contracts where the federal assistance is solely in the nature of a loan guarantee or insurance. CWHSSA requires covered contractors to pay overtime compensation to laborers and mechanics (including watchmen and guards). Similar to the provisions in FLSA, CWHSSA requires overtime compensation to be paid at no less than one and one-half times the worker's basic hourly rate of pay for hours worked in excess of 40 per week. Failure to comply with the overtime requirements under CWHSSA can result in the contracting agency assessing the contractor liquidated damages computed at $10/day per violation. CWHSSA also requires covered contractors to ensure that their workers are performing in a safe environment.

Section 1-2 Related Federal Regulations.

a. "Procedures for Predetermination of Wage Rates" (29 CFR Part 1). DOL regulations that govern the determination of prevailing wage and benefit rates under DBA, the publication of DBA wage determinations, and the procedures for obtaining and using timely DBA wage determinations.

b. "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States" (29 CFR Part 3). DOL regulations that govern the application and enforcement of DBA, DBRA, and the Copeland Act, and detail the requirements under the Copeland Act for weekly payrolls, statements of compliance, and restrictions on payroll deductions.

c. "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (Also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to the Contract Work Hours and Safety Standards Act)" (29 CFR Part 5). DOL regulations governing the responsibilities of federal agencies to administer and enforce the provisions of DBA and DBRA, including applicable contract provisions and definitions of terms such as construction, public buildings and public works, site of work, laborers and mechanics, apprentices and trainees, wages, and bona fide benefits. These regulations outline federal agency responsibilities and procedures for enforcement of DBA and CWHSSA provisions and procedures for resolving disputes concerning payment of wages.

d. U. S. Department of Energy Regulations. Regulations concerning DBA provisions that are specific to contractors who are party to a direct contract with DOE may be found at 48 CFR Part 970-2204-1-1.

Section 1-3 Responsibilities.

a. **Federal Contracting Agency.**

(1) As the federal contracting agency directly awarding a contract or providing federal funding assistance for a construction project, **DOE must determine whether DBA or DBRA applies** to a project and, if applicable, to ensure that the appropriate DBA clauses and wage determination(s) are incorporated into the requirements of the project. These standard DBA clauses may be found at 29 CFR 5.5. Clauses modified with DOL approval for DOE-specific programs may be found as follows:

(a) Weatherization Assistance Program – http://www2.eere.energy.gov/wip/pdfs/dba_clauses_weatherization.pdf

(b) Non-Weatherization Assistance Program (these clauses do not apply to direct federal contracts, loans under the Advanced Technologies Vehicles Manufacturing Program, or Title XVII loan guarantee programs) – http://www1.eere.energy.gov/wip/pdfs/dba_clauses_non_wap.pdf

(2) As the contracting agency, DOE has **primary responsibility for the enforcement of construction labor standards** for the contracts, financial assistance, and other agreements it awards. The person designated as the contracting officer, as defined in 29 CFR 5.2, is responsible for ensuring that contractors and subcontractors submit timely certified payrolls consistent with contract terms, and for monitoring labor standards compliance by reviewing pay records and conducting worker interviews. (See Section 5-1 of this Desk Guide concerning Compliance Reviews.) DBA- and DBRA-covered contracts resulting from grants, cooperative agreements, technology investment agreements, loans, or loan guarantees, will specifically identify the responsibilities of recipients, subrecipients, local agencies, guaranteed parties, and contractors to administer and enforce the provisions of DBA, including reporting and recordkeeping requirements; obtaining, maintaining, monitoring, and reviewing payrolls; and assisting DOE in its DBA enforcement responsibilities.

b. **Prime Contractor.**

(1) The **prime contractor** (often referred to as the **principal** or **general** contractor) is responsible for applying the appropriate DBA and CWHSSA labor standards and DBA wage determinations to all subcontracts for work performed by laborers and mechanics on the site of the work for the project. The prime contractor is also responsible for the labor standards compliance of all contractors on the project, including subcontractors at any level. DOE, as the contracting agency, may withhold on its own action, and shall withhold upon written request of DOL, sufficient monies from accrued payments or advances due the prime contractor as may be necessary to cover any underpayment of wages, fringe benefits, or overtime compensation resulting from violations of DBA and CWHSSA provisions. (Reference 29 CFR 5.5.) Financial assistance recipients must ensure contractor and subcontractor compliance with DBA and CWHSSA provisions as set forth in the applicable financial assistance agreement, and may also withhold sufficient monies from accrued payments or advances as may be necessary to cover any underpayment of wages, fringe benefits, or overtime compensation due as a result of DBA or CWHSSA violations.

(2) Under DBA or DBRA, "contractor" **does NOT include a unit of a state, local, or tribal government where the construction activities are performed by its own employees.** Any contracts awarded under DBRA by a state, local, or tribal government, however, must include DBA provisions and the contractors' laborers and mechanics will be covered by the DBA requirements.

(3) Many contracts and financial assistance agreements will require the prime contractor to report all subcontracts awarded by the prime contractor. The prime contractor must submit to the contracting officer a completed SF-1413 Statement and Acknowledgment for each subcontract on covered projects within 14 days of the subcontract award. The prime contractor must execute a statement on this form that it has inserted all appropriate labor requirements into its subcontracts, and must include a statement signed by the subcontractor acknowledging that the appropriate clauses have been included in its subcontract. A copy of SF-1413 is included in

the Appendices of this Desk Guide, and is also available at http://contacts.gsa.gov/webforms.nsf/0/70B4872D16EE95A785256A26004F7EA8/$file/SF%201413.pdf.

c. **U. S. Department of Labor. DOL** has authority under Reorganization Plan No. 14 of 1950 to issue regulations, interpretations and opinions, and prevailing wage determinations under DBA/DBRA. DOL will also conduct investigations and take further steps to enforce the provisions of DBA/DBRA such as withholding of contract funds and conducting hearings to consider debarment of contractors found to be in violation. (See Section 5-3 of this Desk Guide concerning the penalties for violation of contract labor standards.)

Chapter 2 DBA Wage Determinations.

Section 2-1 DBA Wage Determinations. As noted above, when a federal contracting agency such as DOE determines that DBA/DBRA are applicable to a construction project, the agency is responsible for ensuring that DBA clauses are incorporated into the contract, along with the applicable **DBA wage determination(s).** DBA wage determinations are issued by DOL and reflect the wages and benefits found to be prevailing for various classifications of workers in the locality (usually a county or group of counties) covered by each wage determination. Contracting agencies access DOL-published **general wage determinations** on www.wdol.gov and select the appropriate DBA general wage determination for each contract action. The contract or agreement for a covered project will contain clauses that direct the prime contractor and all subcontractors to comply with specific wage determination(s). **Any questions concerning which DBA wage determination is applicable to specific work must be addressed to the DOE contracting officer.**

NOTE: As more fully described below in Section 3-1, a DBA wage determination is selected based upon the location where the work will be performed ("site of the work") and the nature of the construction project. If a project involves work at multiple sites, each with a different DBA wage determination, the contracting officer must insert the DBA wage determination appropriate for each locality. If work is to be performed in a locality not

previously identified, the contracting officer must modify the contract and incorporate the DBA wage determination appropriate for that locality.

Section 2-2 General Wage Determinations.

a. Description of DBA General Wage Determinations. General wage determinations are issued not only by locality, but for certain types of construction within a locality, often referred to as "schedules." For example, DOL will issue wage determinations for building construction (construction of sheltered enclosures with walk-in access, including multi-unit residential buildings five stories or more); highway construction (includes construction of roads, sidewalks, runways, alleyways, trails, paths, parking areas, etc.); residential construction (construction of single family homes and up to four-story apartment buildings); and heavy construction (construction of other public works that do not fit within the other schedules). Some localities also have separate DBA wage determinations for projects involving dredging, water and sewer line construction, dams, major bridges, or flood control.

NOTE: Guidance on the appropriate use of wage determinations in each schedule is noted in DOL's "All Agency Memoranda #130 and #131" found on the WDOL.gov "Library" at http://www.wdol.gov/aam.aspx.

b. **Projects Involving Multiple Types of Construction.** When a project requires different types of construction, *e.g.*, building construction and highway construction, DOE, as the contracting agency, must incorporate the DBA wage determination for each schedule or type of construction if the separate type of construction comprises at least 20% of the total project cost, and/or costs $1 million or more. If the separate type of construction comprises work that is only incidental to the total project (*i.e.*, less than 20% and costs less than $1 million), the separate schedule will not be necessary.

Section 2-3 Project Wage Determinations. If the database for DBA general wage determinations does not contain an appropriate DBA wage determination schedule for the particular type of construction to be performed in a specific locality, the contracting agency,

must submit a request to DOL (on **SF-308**, "Request for Wage Determination") for a **project-specific wage determination**. If virtually all of the work on a contract will be performed by a classification that is not listed on a general wage determination that would otherwise apply, the contracting agency may submit a SF-308 request to DOL for a project-specific wage determination, or may attach the applicable wage determination to the contract and require the contractor to submit to DOL an SF-1444 "Request for Authorization of Additional Classification and Rate" for the missing classification. See Section 3-1 e, of this Desk Guide on "conformances." DOL will issue a wage determination applicable only for that specific project. Project wage determinations are effective for 180 days from date of issuance, and, if not incorporated into an awarded contract prior to expiration, the contracting agency must request a new project wage determination. DOL has issued project wage determinations uniquely applicable to work performed under DOE's Weatherization Assistance Program which is funded under the Recovery Act and covered by DBA. As with the application of DBA general wage determinations, it is DOE's responsibility as the contracting agency to determine the need for and to request a project wage determination from DOL, and to incorporate it into the project's requirements.

Section 2-4 Timely Application of DBA Wage Determinations. The timely applicability of a DBA wage determination, and any modification issued by DOL for that wage determination, to any particular contract action is addressed in 29 CFR 1.6. It is the responsibility of DOE, as the contracting agency, to ensure that the most current DBA wage determinations are applied in accordance with these requirements. Generally, a DBA wage determination selected for a particular construction project is effective for the life of the project unless there is a substantial change in the scope of work. If, however, the contract contains options to extend the term of the contract, the contracting officer must incorporate the most current DBA wage determination in effect on the exercise of that option.

Section 2-5 Posting DBA Wage Determinations. It is the **responsibility of the prime contractor** to post all applicable DBA wage determinations on the job site in a prominent and accessible location, or to otherwise notify each worker employed on the job site of the wage and

benefits due under DBA. DOL Form WH-1321, "Notice to All Employees," is available at http://www.dol.gov/whd/programs/dbra/wh1321.htm.

Chapter 3 Contractor Compliance with Contract Labor Standards.

Section 3-1 Worker Classifications under DBA Wage Determinations.

a. **Construction.** DBA applies to contracts for construction, alteration, and/or repair of public buildings or public works, including painting and decorating. Construction also includes activities such as those performed **on the site of the work** in preparation for construction (*e.g.*, demolition, equipment and material set-up, *etc.*), fabrication of materials, installation of materials, and post-construction clean-up. (Reference 29 CFR 5.2(j).)

b. **Site of the Work.** Under DBA, **laborers and mechanics employed on the site of the work** are covered by the Act. The site of the work is the physical place or places where the building or work called for in the contract will remain, and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contract or project. Job headquarters, tool yards, batch plants, borrow pits, *etc.*, are part of the site of the work provided they are dedicated exclusively, or nearly so, to performance of the contract or project and provided they are adjacent, or virtually adjacent, to the site of the work. (Reference 29 CFR 5.2(l).)

c. **Laborers and Mechanics.** DBA applies to **laborers and mechanics working on the covered site of the work**. Laborers and mechanics are defined as workers whose duties are **manual or physical in nature** as distinguished from mental or managerial work. Mechanics include workers who use tools or who are performing the work of a particular trade (*e.g.*, carpentry, plumbing, sheet metal work). (Reference 29 CFR 5.2(m).) Laborers and mechanics do not include individuals performing non-manual work such as supervising, engineering, architecture, timekeeping, clerical work, energy audits, electricity usage monitoring, or other administrative functions.

(1) **Guards and Watchmen.** Guards and watchmen who perform no manual duties on the site of the work are not considered to be laborers or mechanics under DBA. Note, however, for purposes of CWHSSA's overtime compensation and safety requirements, the term "laborers and mechanics" includes watchmen and guards.

(2) **Apprentices and Trainees.** Laborers and mechanics include workers who are registered in approved apprenticeship or training programs. Approved programs are those which have been registered with DOL's Employment and Training Administration, Office of Apprenticeship, or registered with a DOL-recognized State Apprenticeship Council. Workers who participate in approved apprenticeship and training programs are provided documentation as evidence of their enrollment. Apprentices and trainees are paid wage rates in accordance with the provisions listed in the approved program. The rates are generally listed as a percentage to be applied to the wage rate listed in the applicable DBA wage determination for journeymen working in a particular classification. (Reference 29 CFR 5.2(n).)

(a) Under DBA, a **contractor must pay no less than the full wages and benefits of a journeyman,** as listed on the applicable wage determination, **to any worker who is not registered** in an approved program, **or to any worker for whom the contractor has no documentation** evidencing the worker's enrollment in an approved program. Contractors and subcontractors are responsible for obtaining proper documentation to support designating a worker as an apprentice or trainee.

(b) The wage rates listed in an apprenticeship and training program are generally expressed as a **percentage of the journeyman wage rate** for a specific period of time, increasing as the worker progresses through the program (example: 0-6 months 65%; 6 months to 1 year 70%). Apprenticeship programs also **restrict the ratio of apprentices to journeymen** working on a job site in a specific classification. Example: An approved program permits no more than three apprentice plumbers for each journeyman plumber working on the job site. If a contractor or subcontractor employs apprentices in excess of the ratio, all apprentices employed in excess of the ratio are not considered apprentices and are subject to the full journeyman wage requirements. As a practical enforcement policy, DOL will consider the first three apprentices (in

this example) employed within the ratio, and workers that are employed subsequent to reaching the ratio will be due back wages to bring them to the DBA-required wage rate. (Reference DOL's *Field Operations Handbook*, Chapter 15, 15e01, at www.wdol.gov, "Library.")

(3) **Helpers.** "Helpers" under DBA are permitted only if the helper classification is listed on the contract's DBA wage determination. The duties of a helper are clearly defined by area practice within the locality, and are distinct from the duties of any other classification on the wage determination. If the classification of helper is not listed on the wage determination applicable to the work, the contractor must obtain approval from DOL for the use of that classification through the conformance process described in Section 3-1e of this Desk Guide on "Unlisted or Additional Classifications." A conformance request for a helper rate will only be approved by DOL if the contractor submitting the request includes information showing that helpers are a separate and distinct classification from other classifications on the wage determination, and that use of helpers is a prevailing practice in the specific construction industry in the locality.

(4) **Working Foremen.** Foremen or supervisors who regularly spend more than 20% of their time performing the duties of a laborer or mechanic on the site of the work, and who do not meet the exemption criteria under 29 CFR Part 541, are **covered by DBA for the hours spent performing the construction work,** and must be paid at no less than the appropriate wage rate for the classification of the work being performed by the working foreman. The other, non-construction hours spent by a supervisor or foreman directing the work of others, or performing other non-manual work such as timekeeping and reporting, are not covered by DBA.

(5) **Suppliers.** The manufacture and delivery to the work site of supply items such as sand, gravel, lumber, concrete, paint, and other materials, when accomplished by regular suppliers to the public in general, are activities not covered by DBA. However, if the material supplier's laborers and mechanics, in the course of delivering the products, perform more than an incidental amount of construction work at the job site, those laborers and mechanics are subject to DBA wages and benefits for the hours performing such work on the job site.

(6) **Self-Employed Subcontractors.** The statutory language of DBA requires that all laborers and mechanics employed directly on the site of the work be paid no less than the predetermined wages **"regardless of any contractual relationship which may be alleged to exist between the contractor or subcontractor and such laborers and mechanics."** (Reference 40 U.S.C. 3142(c)(1).) Under DBA, the term "employed" is not necessarily limited to "employee" and, therefore, may encompass certain independent contractors or workers. Self-employed "independent contractors" (often referred to as "1099 workers") who perform as laborers or mechanics on a covered project are subject to DBA. The prime contractor must ensure that the "independent contractor" receives no less than the applicable DBA wage rate for the hours worked on the site of the work, and must ensure that such worker is reported on the certified payroll each week. However, an exception may apply to bona fide business owners – defined as any employee who owns at least 20% equity interest in the enterprise and who is actively engaged in its management – may be considered exempt under 29 CFR 541 even though they are themselves performing the work of a laborer or mechanic on the covered project. DBA would, therefore, not apply to these workers. Prime contractors are cautioned to consider use of this exemption carefully, and to seek advice from the nearest DOL Wage and Hour regional office (listed at http://www.dol.gov/whd/whdkeyp.htm) if they have questions. (See subparagraph 1-3b.(3) of this Desk Guide on the requirement to report subcontractors.)

(7) **Owner/Operators of Construction Equipment.** Except as noted below, owner-operators of equipment employed on the site of the work by covered construction contractors or subcontractors must be recognized as DBA-covered laborers or mechanics and must be paid in accordance with the applicable DBA wage determination for the hours worked on the job site.

(a) The exception to this rule is DOL's administrative policy that DBA and CWHSSA do NOT apply to **bona fide owner-operators of trucks** or other hauling equipment who are employed as independent contractors performing such activity on the site of the work. DOL policy requires contractors and subcontractors to note these individuals on the certified payrolls by name, dates of work, and the notation, "Owner-Operator." It will not be necessary to record the owner-operator's hours or wages.

NOTE: Workers employed as truck drivers (NOT owner-operators of trucks or other hauling equipment) driving on the site of the work are subject to DBA and CWHSSA. For further information concerning the application of DBA and CWHSSA to truck drivers, contact the nearest DOL Wage and Hour regional office (http://www.dol.gov/whd/whdkeyp.htm).

(b) The exception does NOT apply to owner-operators of equipment other than "hauling." Therefore, owner-operators of equipment such as bulldozers, backhoes, drilling rigs, welding machines, and similar equipment are covered by DBA provisions. (Reference DOL's "Significant All Agency Memoranda from the Administrator," and *Field Operations Handbook*, Chapter 15, Section 15e, www.wdol.gov "Library.")

(8) **Volunteers.** There are no exceptions to DBA coverage for volunteer labor unless an exception is provided for in a specific DBRA. The Recovery Act, one of the DBRA statutes applied to various projects funded or assisted through DOE, does NOT have any exception from DBA requirements for volunteer labor. Therefore, a Recovery Act-funded project requires that **all workers on the job site receive no less than full DBA wages and fringe benefits.** Questions concerning the use of volunteer labor on a Recovery Act-funded project must be addressed to the contracting officer.

d. **Area Practice and Worker Classifications.** The DBA wage determination is simply a listing of worker classifications and the basic hourly wage and fringe benefit rates that DOL has determined to be prevailing in the locality for each classification. Those rates must be paid to anyone performing work within those classifications on a covered project in that locality. The classifications are not generally defined by skill level or years of experience. Any worker performing work within the classification is subject to the wages and benefits for that classification regardless of skill or years of experience.

(1) There are no nationwide standard classification definitions under DBA. The proper classification of work performed by laborers and mechanics is that classification used by firms whose wage rates DOL determined to be prevailing in the area. While the duties of many classifications are usually clear (*e.g.*, plumbers, carpenters, painters, *etc.*), in some localities the

contractor must determine the "prevailing area practice" in order to properly classify a worker. A survey of the firms performing similar construction work in that locality will provide the prevailing definition for each classification.

(2) If the DBA wage determination notes that the wage survey demonstrated that work in a particular construction classification in a locality is primarily performed by individuals represented by labor organizations, DOL will publish as the DBA minimum requirement the wage and benefit requirements found in the union agreements. The union contractors' area practice would be used to define worker classifications. If a classification within a locality is not union-prevailing, DOL will publish the average resulting from its survey of rates paid to workers in a classification, and the definition of each classification will be determined by the prevailing area practice of firms performing such work within the survey.

(3) **Prime contractors and subcontractors** performing work on a covered project **are responsible for classifying each worker** properly in accordance with the applicable wage determination. Questions pertaining to classifications within a locality should be addressed to the nearest DOL regional office (listed at www.dol.gov/whd).

e. **Unlisted or Additional Classifications.** DBA wage determinations reflect the wages and benefits determined to be prevailing in a particular locality, based upon survey information provided to the Secretary of Labor. The survey information may not always be complete, and some wage determinations may not list a classification that is needed in the performance of the contract. If a worker classification needed on the project is not listed on the DBA wage determination, the contractor will need to request DOL's approval of an **additional classification and the wage/benefit rate proposed for that classification.** The procedures for obtaining approval of an additional classification are found in DOL regulations 29 CFR 5.5(a)(1)(ii), and in the contract clauses. The process is also known as a "conformance" because the contractor is required to classify the unlisted worker classification "in conformance with" the classifications and rates that are listed on the wage determination.

(1) The contractor's "conformance" request is **submitted in writing** through the contracting officer to DOL. **Subcontractors must submit their requests through the prime contractor** to the contracting officer. Generally, contractors will complete and sign an **SF-1444, "Request for Authorization of Additional Classification and Rate"** (copy included in this Desk Guide and available at www.wdol.gov/library.aspx), providing the contractor's information, contract information, the job title and a full description of duties, any information on "area practice," the contractor's proposed wage and benefit rates, and any other information that will support the request. The contractor is not obligated to use the SF-1444 form, but must provide the same information that is requested in that form. The request for approval must be submitted within 30 days of initial employment of workers in the additional classification.

(2) If the contractor has already employed workers in the proposed additional classification, the contractor's SF-1444 request should include the signature of each worker in that classification, noting whether they concur or disagree with the contractor's proposed rates. If the contractor's request is submitted to DOL through the contracting officer prior to employment of the workers in the classification, it would not include employee signatures.

(3) The completed request is then submitted by the contractor to DOE, as the contracting agency. The contracting officer must sign the request, either concurring or disagreeing with the contractor's proposal. If a worker or the contracting officer disagrees with the contractor's proposed additional classification or rate, a statement must be attached providing and supporting an alternate recommendation. DOE does not have authority to approve or reject a contractor's request for approval of an additional classification. Only DOL has this authority.

(4) **Tips for Obtaining DOL's Approval of Additional Classifications.** DOL cannot approve a contractor's request to add a classification to a DBA wage determination applicable to a specific project unless the contractor submits complete and proper information with the request. Some tips below will help in deciding what information is required.

(a) If a contractor is requesting DOL approval of a **"Helper"** classification, the request should provide sufficient information that the "Helper" classification is the "area

practice" for that locality (*i.e.*, that the helper duties are clear and distinct from other classifications and use of the classification is prevailing in the particular locality).

(b) The contractor must ensure that the work to be performed by the additional classification is not part of the work routinely performed by another classification already listed on the wage determination. DOL will not approve a request based upon splitting the duties of a classification that is already listed on the wage determination in order to create a classification at a lower wage rate.

(c) The proposed wage and benefit rates for the proposed additional classification should bear a reasonable relationship to the wage rates listed on the wage determination. The proposed rates for a new skilled classification should be no lower than the wage rate of the lowest skilled classification listed on the wage determination. The contractor or subcontractor must pay the worker in the requested classification no less than the wage rate proposed in its conformance request, pending DOL's approval of the rate.

(d) DOL may request additional information before issuing an approval or denial of the contractor's request. Prompt and complete response to DOL's request will help in quickly resolving any questions. Disagreements on the contractor's proposal from either the worker or DOE, as the contracting agency, will be resolved by DOL.

(5) **DOL will respond to the contractor's request for approval of an additional classification** by written notification to DOE, as the contracting agency. DOE will then notify the contractor of DOL's decision. If DOL denies the contractor's proposed wage or benefit rate, and directs rates in excess of the initial proposal, the contractor must pay the worker(s) no less than the approved rate retroactive to their initial work on the job site in that classification. The DOE contracting officer, either directly or through the financial assistance recipient, will request written confirmation from the contractor of its full and retroactive compliance with DOL's decision.

(6) Questions concerning the use of unlisted or additional DBA classifications should be referred to the nearest DOL regional office.

Section 3-2 Payment of DBA Wages and Benefits.

a. **Weekly Payrolls.** The DBA statute and regulations require that all laborers and mechanics employed under DBA "will be **paid unconditionally and not less often than once a week**, and without subsequent deduction or rebate on any account . . . except as permitted . . ." by requirements such as taxes or garnishments, or a worker's voluntary agreement. (Reference 29 CFR 5.5(a).)

b. **Recordkeeping and Timecards.** It is the **contractor's responsibility to keep and maintain accurate records of the hours worked** and the classification of work performed by each worker. Errors should be corrected promptly, with prompt payment of any back wages or benefits that may be due the worker as a result of the error. Failure to maintain complete and accurate pay, benefit, and time records may result in an investigation to determine the contractor's status of compliance with the contract labor standards.

NOTE: It is the responsibility of the prime contractor or the financial assistance recipient to ensure that DOL's DBA poster (WH-1321) and applicable DBA wage determinations are posted on the job site in a prominent and accessible place where they can be seen by the workers. The poster can be downloaded from DOL's website at www.dol.gov/whd/regs/compliance/posters/davis.htm.

c. **Basic Hourly Wage and Benefit Rates.**

(1) DBA wage determinations list the various classifications of laborers and mechanics and the basic hourly wage rates that are found to be prevailing in each locality as determined by DOL's surveys. Many DBA wage determinations also list hourly fringe benefit rates that must be paid to each worker in addition to the basic hourly wage rate. Contractors must ensure that **each**

worker receives no less than the sum of the basic hourly wage rate and the hourly fringe benefit rate listed on the applicable wage determination for the worker's classification.

NOTE: If a DBA wage determination lists the wages and benefits for a particular classification as "$20.00" and "$3.00 + 3%," the contractor must pay at least the basic wage rate of $20.00, and the hourly benefit rate of $3.00 plus 3% of the basic hourly wage rate (or $.60). The percentage is always applied to the basic hourly wage rate. The contractor must pay no less than $23.60/hour for this worker.

(2) A contractor may discharge its obligation to each worker by paying the total wage and fringe benefit requirement in cash, or by providing a combination of wages paid in cash along with providing bona fide fringe benefits paid by the contractor such as health and life insurance premiums, retirement and savings contributions, vacation and other paid leave plans. (See Section 3-2f of this Desk Guide, "Payment of DBA Fringe Benefits," for references pertaining to "bona fide fringe benefits.")

(a) **Example:** The DBA wage determination requires $18.00/hour basic hourly wage rate, and $3.00/hour fringe benefits, for a total obligation of $21.00/hour for the worker. The contractor may pay the entire $21.00/hour in cash to the worker. Or, the contractor may pay $18.00/hour in cash and provide a bona fide health insurance plan that costs the contractor $3.00/hour in premiums. Or, the contractor may pay $20.00/hour in cash and provide $1.00/hour in benefits. Or, the contractor may pay $16.00/hour in cash, and provide $5.00/hour in fringe benefits.

(b) Contractors are obligated to record and report the type of payments made each week to meet their DBA requirement for wages and fringe benefits for each worker – payments made in cash to the worker in lieu of providing a fringe benefit plan; payments made to provide plans for each worker; and any combination of cash and benefit plan provided to each worker. (See Section 3-2f of this Desk Guide on payment of DBA fringe benefits, and Chapter 4 on preparing certified payrolls.)

d. **Workers Performing at Two or More Classifications.** Contractors are required to maintain complete and accurate records of the hours worked by each worker, including identifying the hours worked by a worker at two or more classifications. The worker must be paid no less than the DBA wage rate for each of the hours worked at each classification. Failure to record the hours worked at each classification will result in DOL requiring the contractor to pay all hours worked that week at the highest of the multiple wage rates. (See Section 3-3c of this Desk Guide on the proper computation of overtime compensation for a worker working at multiple wage rates.)

e. Payment of Piecework Rates, Salaries, or Other-Than-Hourly Rates.

(1) Some workers may be hired on the basis of **"piecework rates."** For example, a drywall hanger may be paid based upon the square feet of sheetrock hung, or a roofer may be paid on the basis of the number of square feet of roofing completed; or painters may be paid on the number of units or square feet painted each week. Other workers may be hired on the basis of an hourly rate plus piecework accomplished each week, or even paid on the basis of a **fixed salary** each week.

(2) Under DBA, the piecework or salaried **worker must still receive no less than the DBA** minimum wages and benefits for each covered hour worked each week. Therefore, the contractor must maintain accurate records of hours worked by each worker each week, and ensure that the worker receives no less than the DBA minimum for each hour worked regardless of pay method. **If the piecework or salary is not sufficient** to cover the DBA requirement for all covered hours that week, the **contractor must provide additional pay for that week** to bring the worker's wages up to the minimum requirement. Each week will stand on its own, and any payments to the worker in excess of the DBA requirement in one week cannot be allocated to cover any underpayments of the DBA requirement in another week.

(3) Example: A laborer on a covered project is subject to $20.00/hour DBA wage rate. He works a total of 35 hours in Week #1, which would require a DBA minimum of $700.00 for that week. His pay is computed at a piecework rate that yields a total gross wage of $1,000.00 for that

week. He has, therefore, earned more than the minimum requirement under DBA. In Week #2, the worker works 45 covered hours and his piecework pay is computed at $800.00. Total weekly pay for Week #2 is divided by total weekly hours, and equals $17.78/hour – short of the DBA requirement of $20.00/hour. The contractor must then pay the worker the $800.00 in piecework pay, plus an additional $100.00 to ensure that the worker receives the full DBA rate for all hours worked. The piecework wages paid in excess of the DBA minimum for Week #1 cannot offset the underpayment in Week #2. Salaried workers are computed the same way, each week.

NOTE: See Section 3-3c in this Desk Guide for information on computing proper FLSA and CWHSSA overtime compensation for workers employed at other than hourly wage rates.

f. Payment of DBA Fringe Benefits.

(1) DBA wage determinations often list both a basic hourly wage and a fringe benefit rate that must be paid to covered workers. The fringe benefit rate is usually listed as an hourly amount which must be paid for all hours worked each week, including overtime hours.

(2) Fringe benefits include contractor payments for life and health insurance premiums; retirement contributions; vacation, holiday, sick, and other paid leave; and other **bona fide benefit plans**; or equivalent payments to the worker in cash. The criteria used to determine whether a fringe benefit is bona fide under DBA are described in detail at 29 CFR 5.20 through 5.29, and in the DBA statute itself at Section 3141, Definitions. DOL's *Field Operations Handbook*, Chapter 15, Section 15f, also provides details on defining bona fide fringe benefits (http://www.dol.gov/whd/FOH/index.htm).

(3) Fringe benefits **do not include** contractor payments required by other federal, state, or local laws such as taxes (*e.g.*, Social Security), workers compensation, or state disability insurance requirements. Fringe benefits also **do not include** payments made to or on behalf of workers for transportation expenses, board and lodging, or required uniforms or tools. These are customarily business expenses of the contractor and not a fringe benefit for the worker.

(Reference 29 CFR Part 5, Subpart B, for guidance on providing bona fide fringe benefits under DBA.)

Section 3-3 Overtime Compensation.

a. DBA requires a contractor to pay no less than the minimum wage and fringe benefit listed on the applicable wage determination for each covered hour worked each week. DBA has no overtime (OT) compensation requirements. However, most contractors performing work on these projects are **required by FLSA to pay OT compensation at time and one-half the worker's "regular rate of pay" for the hours worked in excess of 40 each week.**

b. **CWHSSA,** applicable to laborers and mechanics (including guards and watchmen) on covered projects, also requires contractors to pay OT compensation for hours worked in excess of 40 hours each week, counting only those hours worked on CWHSSA-covered contracts during that week. CWHSSA does not have a site of the work limitation on coverage. All hours worked on covered contracts, including hours worked on the contract at off-site locations, are combined for the purpose of determining CWHSSA obligations.

(1) Overtime compensation under CWHSSA is computed on the basis of time and one-half the employee's basic hourly rate of pay, or the employee's "regular rate of pay" (if he works at two or more classifications with different hourly wage rates or is paid on a basis other than hourly). The basic hourly rate used for computing CWHSSA overtime compensation can never be less than the basic hourly wage rate required by the applicable DBA wage determination excluding any fringe benefits listed.

(2) Cash payments made to a DBA/CWHSSA worker for the purpose of meeting DBA fringe benefit requirements are not included in determining the basic hourly rate of pay for overtime purposes. See the example at paragraph c. (5) below.

c. A worker's **"regular rate of pay"** is determined by dividing the worker's total compensation each week by the worker's total number of hours worked that week (including both DBA-

covered hours and non-DBA hours worked, *i.e.*, hours worked under FLSA). Additional information on overtime requirements and regular rate of pay can be found at 29 CFR Part 778.

Examples:

(1) If a worker works 45 hours in a week and is paid $20.00/hour for all hours worked that week, the contractor is obligated to pay an additional $10.00/hour for the five hours worked in excess of 40 that week.

(2) A second worker works only at **piecework** on a contract. The minimum DBA wage rate is $15.00/hour. In Week #1, the worker works a total of 45 hours in a week, and earns a total of $1,000 in piecework. His regular rate of pay will be $1,000.00 divided by 45 hours, or $22.22/hour for that week. The piecework more than meets the DBA minimum wage for all hours worked. For overtime requirements, the contractor must also pay the worker an additional $11.11/hour (one-half of the $22.22 regular rate) for the five hours over 40 that week.

(3) A third worker works **two different classifications in one week** – 25 hours at $17.00/hour and 20 hours at $20.00/hour. His straight-time pay will be 25 times $17.00 or $425.00, plus 20 times $20.00 or $400.00, for a total straight-time pay of $825.00 that week. His overtime compensation will be computed at $825.00 total, divided by 45 hours, which equals a regular rate of pay of $18.33/hour. The contractor must pay this worker an additional $9.16/hour for the five hours over 40 that week.

(4) A fourth worker works on a **salary basis**, a fixed amount for each week regardless of straight-time hours or work production. He is a mechanic and therefore not exempt from the requirements of DBA minimums or FLSA/CWHSSA overtime compensation. The salary is $1,000/week. The DBA minimum for his classification is $20.00/hour. In Week #1, this worker works 50 hours. His regular rate of pay is $20.00/hour ($1,000 / 50 hours = $20.00/hour). The contractor has met the DBA minimum wage requirement. The contractor is now required to pay an additional $100.00 (one-half of the regular rate of pay = $10.00 x 10 OT hours) in OT compensation, for a total weekly compensation of $1,100.00. In Week #2, the worker works 60

hours. His regular rate of pay is now $16.67/hour ($1,000 / 60 hours = $16.67/hour). The contractor is therefore required to bring the worker up to the DBA minimum wage requirement of $20.00/hour by paying an additional $3.33/hour (DBA rate of $20.00/hour less $16.67/hour paid), times 60 hours worked, or $199.80. The worker's regular rate of pay is now $20.00/hour, and the contractor must now compute the additional OT compensation due. He owes an additional $200.00 (one-half the regular rate of $20.00 equals $10.00/hour, times 20 OT hours, or $200.00). Total wages due this worker for this week are the $1,000.00 salary, plus $199.80 to bring him to the DBA minimum, plus OT compensation of $200.00, or a total of $1,399.80 for this week.

(5) A fifth worker works in a classification that requires $20.00/hour DBA wage rate and $3.00/hour DBA fringe benefits. The contractor pays for all of this in cash payments each week (reporting on the WH-347 that he pays $20.00/$3.00 in Column (6) of the report). The contractor's obligation for overtime compensation will be time and one-half the basic wage rate on the DBA wage determination ($20.00), or an additional $10.00/hour for each of the hours worked in excess of 40 per week. If the worker works 45 hours in Week #1, the contractor is obligated to pay 45 hours times $20.00/hour DBA basic hourly rate; plus 45 hours times $3.00/hour DBA fringe benefits; plus five hours times $10.00/hour for overtime compensation, for total earnings that week of $1,085.00.

d. Reference 29 CFR 778 for further guidance on paying OT compensation, and reference DOL's website at www.dol.gov/whd, "Overtime." Questions may also be addressed to DOL's nearest regional office.

Section 3-4 Payroll Deductions. DBA, Copeland Act, and related regulations require contractors and subcontractors to pay all laborers and mechanics "**. . . unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account . . . except as permitted . . ..**" (Reference 29 CFR Part 3 concerning allowable payroll deductions.) **Allowable deductions** include withholding for income taxes, worker share of Social Security tax, wage garnishments or payments for judgments legally imposed against the worker by an appropriate authority (*e.g.*., a court), and any legally-permissible deduction voluntarily

authorized by the worker such as insurance premiums, retirement contributions, savings contributions, and similar payments. The Copeland Act prohibits contractors from requiring workers to kick-back (*i.e.*, give up) any earnings due them under DBA or CWHSSA. Contractors are cautioned to accurately record any and all deductions from workers' earnings, and to maintain records supporting the authorization of any deductions from a worker's earnings. (See Section 4-2f of this Desk Guide on reporting deductions.)

Chapter 4 DBA Certified Payrolls.

Section 4-1 Wage and Fringe Benefit Reporting Requirements.

a. DBA requires covered contractors to pay their workers not less than DBA-required wages and fringe benefits, in full, **on a weekly basis**.

b. The Copeland Act and DBA regulations require contractors to **provide payroll information** each week to the contracting agency, listing the workers on the project, including work classifications, hours worked, wage rates, benefits, overtime compensation, total wages paid, and information related to payroll deductions. The basic information required is almost identical to the information already required of contractors by the IRS, DOL, and other federal and state agencies concerned with various taxes, hours worked, wages and benefits paid, and similar contractor requirements.

NOTE: Contractors performing covered work with financial assistance funds through grants, loans, *etc.*, must submit certified payroll information to the financial assistance recipient in accordance with the terms of the applicable contract.

c. In addition, the Copeland Act requires DBA-covered contractors to provide a signed **"Statement of Compliance"** (or **"certified payroll"**) certifying that the weekly payroll information is correct and complete and that each laborer and mechanic has been paid not less than the DBA prevailing wage and benefit rate for the work performed that week.

d. The **due date** for each certified payroll to be submitted to DOE, as the contracting agency, or to the financial assistance recipient in accordance with the contract, is **no later than one week after each weekly pay date.** (For information regarding penalties for failure to submit certified payrolls or for falsification of payroll information, see Section 4-4b of this Desk Guide.)

e. The **prime contractor is responsible for the timely submission to DOE of certified payrolls for all subcontractors.** The prime contractor is obligated to notify all subcontractors of the labor provisions of the contract and to ensure that each subcontractor submits timely, accurate and complete certified payrolls.

NOTE: Financial assistance recipients must provide DOE certified payrolls consistent with the terms of the applicable contract.

f. DOL's Form WH-347, "Payroll," and instructions for completing it, can be found in a fillable PDF format at www.dol.gov/whd/forms/index.htm. The second page is used to report information about payment of fringe benefits and contains the "Statement of Compliance."

g. Form WH-347 is recommended for contractor use. Contractors may, however, provide another payroll reporting format as long as the payroll information is identical to that required by WH-347, and the "Statement of Compliance" contains the same certification language. Each separate page and attachment to a report must include the contractor's name, the project number, the week-ending date for the report, and the sequential payroll number.

Section 4-2 Completing Certified Payroll Form WH-347.

a. Name of Contractor/Subcontractor and Address. Check the box noting the category (contractor or subcontractor) of the reporting contractor and insert the contractor's complete name and address.

b. Payroll No. Each payroll report must be numbered, beginning with "#1" as the first payroll submitted by the reporting contractor for the first week in which it employs covered workers on the site.

c. For Week Ending. Each contractor must establish a fixed workweek period of seven consecutive days (*e.g.*, Monday through Sunday; Sunday through Saturday). The hours worked by each laborer and mechanic during that workweek must be reported on each weekly payroll, along with wages and benefits paid for that week.

d. Project and Location. A brief description of the project name and the location where the work is performed (include the county or counties).

e. Project or Contract No. Prime contractors will report the number of the contract/project awarded to them; subcontractors may use the same number if they have it, or use the number of their subcontract with the named prime contractor.

f. Worker Information.

Column (1) **Worker name and** worker identifying **number** (or last four digits of worker's Social Security Number – do **NOT** report the worker's full SSN).

NOTE: Contractors are required by DBA, FLSA, and many other statutes to maintain accurate records of worker addresses and full SSNs. The WH-347 certified payroll reports that are required under DBA/Copeland Act do not require reporting worker addresses and full SSNs. Contractors must provide this information in a separate report if requested to do so during a compliance review.

Column (2) **Number of withholding exemptions.** This information may be reported for the contractor's convenience in computing withholding taxes, or the column may be left blank.

Column (3) **Worker classification(s).** List the classification of work actually performed by each laborer and mechanic. If a worker works at more than one classification within a single week, show each classification separately for that worker, along with the hours worked and hourly rate of pay for each classification.

NOTE: Workers properly documented and employed as **apprentices** or **trainees** must be reported as such with the classification in which they work (example: "Plumber/Apprentice"), and supporting documentation evidencing the worker's enrollment in an approved program must be attached to the first certified payroll reporting their hours worked on the project. (See Section 3-1 on Apprentices and Trainees.)

Column (4) **Workweek.**

(a) At the head of the column each contractor must note the **days of the week** that constitute the established seven-day **workweek** (*e.g.*, "S-M-T-W-T-F-S" or "T-W-T-F-S-S-M," *etc.*). In the box below the day of the week, note the **date** for each day reported (*e.g.*, 25th, 26th, 27th, *etc.*). A workweek is a fixed and regularly recurring period of seven consecutive 24-hour periods. It need not coincide with the calendar week. (Reference 29 CFR 778.105.)

(b) In the boxes below the dates, report **only** the hours worked each day **on this covered project,** noting in the boxes marked "S" the straight-time hours worked, and in the boxes marked "O" the overtime hours worked. Do <u>not</u> include hours worked on <u>any other project</u>.

(c) Overtime hours reported in Column 4 (and totaled in Column 5) on the WH-347 are those hours worked on the covered project in excess of 40 hours in any workweek.

NOTE: Overtime Compensation. Reference Section 3-3 of this Desk Guide for information on meeting the requirements for overtime compensation under FLSA and CWHSSA.

Column (5) **Total hours** worked for the week <u>**on this project**</u>.

Column (6) **Rate of Pay.** Show the straight-time rate of pay on the "S" line in this column, and show the overtime rate of pay on the "O" line in this column. If the contractor pays cash in lieu of providing a fringe benefit plan to meet the benefit requirements on the DBA wage determination, show both the regular wage rate and the fringe benefit rate paid in cash in Column 6 "S" box, in the following manner:

Example for reporting workers earning hourly wages and cash in lieu of fringe benefits: A worker earns the DBA basic hourly wage rate of $18.00/hour, and $3.00/hour for fringe benefits paid in cash each week. The contractor should report the rate of pay in Column (6) "S" (straight-time rate), $21.00. If the worker worked overtime hours, the overtime rate of pay reported in Column (6) "O" will be no less than time and one-half the basic hourly wage rate of $18.00, or $27.00/hour, plus $3.00/hour for the cash in lieu of fringe benefit requirement, for a total overtime rate of pay at $30.00/hour.

Example for reporting workers employed at **piecework rates**: For a week in which an employer paid piecework instead of an hourly rate of pay, the employer must show on a signed attachment to the WH-347, or equivalent form, the computation for the worker's basic hourly wage rate and overtime rate of pay.

> Example A: In a week in which a worker worked 40 hours and was paid $550.00 in piecework, the worker's hourly wage rate is $550.00 divided by 40 hours, or $13.75/hour. If the DBA minimum for the classification is $18.00/hour plus $3.00/hour in fringe benefits, the employer must pay an additional $7.25/hour to the worker to bring him to the total DBA minimum requirement of $21.00/hour, and then report in Column (6) of the WH-347 "$21.00" as rate of pay. The rate of pay reported in Column (6) for overtime ("O" hours) will be the same as noted in the example above, "$30.00/hour" (time and one-half the straight-time rate plus cash in lieu of fringe benefits).

Example B: In a week in which a worker worked 40 hours and was paid $1,000.00 in piecework, the worker's hourly wage rate is $1,000.00 divided by 40 hours, or $25.00/hour. If the DBA minimum wage rate for the classification is $18.00/hour plus $3.00 in fringe benefits, the employer has met and exceeded the DBA requirement, and must report in Column (6) of the WH-347 "$25.00" as the worker's straight-time rate of pay. The rate of pay reported in Column (6) for overtime ("O" hours) will be "$37.50/hour" (time and one-half the worker's regular rate of pay).

(Reference Section 3-2 of this Desk Guide on piecework pay under DBA.)

Column (7) **Gross amount earned.** Each box has a diagonal line permitting the contractor to report each worker's total gross wages paid **specifically for work on the project** reported by this particular payroll (noted in the **upper portion of the box**), and total gross wages earned for the entire week (noted in the **lower portion of the box**). The total gross wages reported in the lower portion of the box would include not only the project work, but also any and all work performed by the worker on other DBA projects and work performed on non-DBA projects.

NOTE: For workers **working at more than one classification** on the project, the contractor must report for each worker the hours worked, total hours, rate of pay for each classification, and total gross wages (in columns (3), (4), (5), (6), and (7)).

Column (8) **Deductions.** Five columns are provided for reporting all deductions from each worker's gross wages, and a sixth column for the total of all deductions. Each deduction must be identified. If more columns are necessary, the contractor may provide this information on a separate, attached sheet. The total of the deductions on the separate attachment can be reported in the column headed "Other." The total amount of all deductions is reported in the last (6^{th}) deduction column, "Total Deductions." When reporting a worker who has worked on a covered project as well as on non-project work in the same week, the entry in Column (8)'s

"Total Deductions" should reflect the amount of deductions taken from the worker's total wages for that week.

NOTE: Deductions must be identified (*e.g.*, "state income tax," "loan repayment," "purchase of equipment"). Any deduction other than those required by law (such as taxes) or required by order of an appropriate authority (such as wage garnishments) must be voluntary and authorized in writing by the worker or authorized by a collective bargaining agreement. For voluntary deductions, a short note describing the deduction and signed by the worker should be attached to the payroll report on which the deduction first appears.

Column (9) **Net wages paid for week.** Net wages paid is the total gross amount earned for all of the work performed that week (reported in the lower section of Column (7)) less total deductions (reported in the last section of Column (8)).

Section 4-3 Reporting Fringe Benefit Payments on Form WH-347.

a. Contractors are obligated to report payments made to comply with the DBA fringe benefit requirement and the manner in which these payments were made – either cash paid in lieu of providing a fringe benefit plan and/or payments made to a plan that provides benefits to the worker. Section (4) on the second page of the WH-347 serves the purpose of reporting the manner of payment of DBA benefits. Contractors should attach to a certified payroll report any additional information concerning payment of fringe benefits.

b. If the contractor pays all workers the required DBA **fringe benefits in cash, in lieu of providing a benefit plan**, the contractor must report the payment on the first page of the WH-347, in Column (6) "Rate of Pay" and in Column (7) "Gross Amount Earned." The contractor must also check **Box (4)(b)** on the second page of the WH-347 indicating payment of cash in lieu of providing benefits.

c. If a contractor **pays the required DBA fringe benefit rate into a bona fide fringe benefit plan** for all workers, the contractor should check the box in Box **(4)(a)** on the second page of the

WH-347. It is not necessary to show the amount paid into these plans on the first page of the WH-347 in Column (6). It will be necessary, of course, to maintain supporting documents for the benefit plan(s), and documents that evidence the contractor's contributions for those plans. A compliance review or investigation will include a review of these documents.

d. If a contractor **pays some of the workers cash in lieu** of providing a benefit plan, **and provides other workers benefit plans** to meet the DBA fringe benefit requirement, or pays a portion of the fringe benefit requirement in cash and a portion of the requirement into a bona fide benefit plan, the contractor should check whichever box in Section (4) represents the most-used payment method, and note in Section 4(c) the exceptions and the details of the payment method.

e. In reporting fringe benefits on the WH-347 or equivalent form, it is important that the contractor clearly show the method used to comply with DBA. Information that is confusing, incomplete, or inaccurate will generate further inquiries during payroll reviews and may result in a full investigation to ensure contractor compliance.

Section 4-4 Statement of Compliance (or Certification of Payroll).

a. The required Statement of Compliance is located on the second page of the WH-347. If a contractor uses any payroll format other than Form WH-347, the same Statement of Compliance must be signed and submitted with each weekly payroll. The **Statement of Compliance must be signed by a principal of the firm** (owner or an officer such as president, treasurer, or payroll administrator). The signature must always be that of a person who has authority to direct the payment of wages and benefits to the workers.

NOTE: Proper use of electronic signatures on certified payrolls and related compliance statements is permitted, and carries the same legal effect as handwritten signatures.

NOTE: In completing DOL's fillable pdf form, note that the Statement's "payroll period" dates require entries to be made numerically (example: instead of entering "14 day of **June**, 2010," enter "14 day of **06**, 2010."

b. The **willful falsification of a payroll report or a Statement of Compliance** may subject the contractor to civil and/or criminal prosecution and may also be a cause for debarment. Inducing any person to "give up any part of the compensation to which he/she is entitled under" DBA and its related Acts (known as "kickbacks") may also subject a contractor to prosecution and/or debarment.

Section 4-5 "No Work" Payrolls. Certified payrolls must be submitted each week to the designated agency for the project. If a contractor or subcontractor on a project performs no covered work in a specific week, there is no need to submit a certified payroll. If the contractor does not expect to be on the job site for several weeks, it is recommended that the contractor submit a statement to DOE, as the contracting agency, or to the financial assistance recipient, notifying it that the contractor will not be working on the project for an extended period of time, and providing an approximate date of return. For the next week in which work is performed on site by that contractor's laborers or mechanics, the contractor must submit a certified payroll numbered sequentially following the last certified payroll submitted. This will help to avoid confusion about interruptions in receipt of weekly payroll reports.

Section 4-6 Retaining Payroll Records. Every contractor and subcontractor on covered projects must keep a complete set of pay records for **at least three years** after the project is completed. This includes basic payroll information, time cards, cancelled checks or receipts for cash payments for wages or benefits, apprenticeship documentation, evidence of payments to fringe benefit plans, and information on taxes and other payroll deductions.

Chapter 5 Payroll Reviews and Corrections.

Section 5-1 Compliance Reviews.

a. **General. Federal contracting agencies, including DOE,** have primary responsibility for the day-to-day enforcement of contract labor standards on a covered construction project. Generally, the contracting agency will be responsible for ensuring that contractors and subcontractors

comply with the labor standards requirements. Prime contractors and first-tier financial assistance recipients must also ensure compliance by subcontractors. Compliance reviews include visits to the job site, worker interviews, review of time and pay records and related information, and discussions with the contractors and subcontractors. In addition, DOL may conduct its own investigation to determine compliance under DBA, FLSA, CWHSSA, and other labor laws applicable to a contractor. (See Section 5-3 concerning DOL's enforcement sanctions under these contract labor standards.)

b. **Worker Interviews.** The compliance reviewer will visit the job site and interview workers concerning their wages, hours, benefits, classifications, payroll deductions, and other related subjects. Contractors are required by law to provide access to their workers for the purpose of interviewing at the job site by either the designated compliance reviewer or a DOL investigator. Every effort will be made to ensure that the interviews cause as little disruption as possible in performance of the work on the job site. It is DOL's policy to protect the identity of workers and other sources during a compliance review or labor investigation. Therefore, such information will not be disclosed without prior consent of the source. On occasion, workers (including former workers) will be contacted off-site, by telephone, or at their place of residence. Contractor and subcontractor cooperation with this task is essential and any questions pertaining to the process should be addressed to DOE or the DOL investigator.

c. **Project Payroll Reviews.** The compliance reviewer will collect certified payroll reports submitted to DOE via the prime contractor (or recipient of loan, grant, loan guarantee, *etc.*), along with documents supporting the use of apprentices and trainees, documents supporting payroll deductions, written interviews completed at the job site and elsewhere, the applicable DBA wage determination, and other pertinent information such as the daily construction or contract progress reports. These documents will be reviewed to determine the contractor's status of compliance. The contracting officer will notify the prime contractor and subcontractor(s) of any discrepancies found during the review.

NOTE: As noted before, DOE, as the contracting agency, and financial assistance recipients may withhold accrued payments or advances as may be necessary to cover any

underpayment of wages, fringe benefits, or overtime compensation due as a result of DBA or CWHSSA violations. For this reason, prime contractors and financial assistance recipients should review each contractor's payroll report for compliance issues **prior to submitting the report** to the contracting officer, consistent with the terms of the applicable contract. Systematic and careful review of contractor reports may detect any errors or violations early in the project, and thus avoid costly compliance reviews and underpayments of wages and/or fringe benefits due the workers.

d. **Common DBA/CWHSSA Payroll Errors and Corrections.**

(1) **Incomplete or inadequate payroll information.** If the contractor does not use the optional DOL Form WH-347 to report weekly payrolls, it must still provide all the information requested by that form.

(2) **Missing addresses and identifying worker number.** The contractor must report an identification number for each worker (or the last four digits of the worker's Social Security number if there is no other worker identification system in use). **Do NOT include full Social Security numbers or home addresses** on the weekly certified payrolls. Contractors must maintain such information in its basic pay and employment records and are obligated to provide this information, if requested, to the compliance reviewer or the DOL investigator.

(3) **Classifications.** If a contractor reports worker classifications that are not listed on the DBA wage determination, the contractor will be asked to either reclassify the worker in compliance with the classifications listed on the wage determination, or submit with the certified payroll report a copy of the SF-1444 "Request for Approval of Additional Classifications" that was submitted to DOL for approval. DOL's response will be sent to DOE, as the contracting agency. DOE will notify the prime contractor of DOL's response. If DOL's decision denies the contractor's proposed wage or benefit rate and directs an increase in either rate, the contractor must comply with the decision retroactive to the start of employment of the missing classification. If DOL denies the request for conformance of a proposed classification, noting that a classification already listed on the applicable wage determination is applicable, the

contractor must comply with the decision retroactive to the start of employment of that classification. The contractor must submit a certified payroll reporting any retroactive payment of wages/benefits to the worker(s) as a result of DOL's decision.

(4) **Apprentices and Trainees.** The most typical violation involving the use of apprentices and trainees is the **contractor's failure to submit documentation** evidencing the worker's enrollment in an approved program. The second most typical violation involving these workers is the **contractor's failure to comply with the apprenticeship program's ratio of apprentices to journeymen.**

(5) **Overtime Compensation.** Payroll reports that indicate a worker worked in excess of 40 hours per week MUST include information regarding the contractor's compliance with the requirement to pay overtime compensation at not less than time and one-half the regular rate of pay. If the contractor failed to pay proper overtime compensation under CWHSSA, the contractor may also be liable to the United States for liquidated damages of $10.00 per day per violation. If CWHSSA is not applicable to the worker, FLSA overtime violations may be referred to DOL for further investigation.

(6) **Fringe Benefits.** If the contractor or subcontractor fails to report payment of DBA fringe benefits that are required by the wage determination, the contractor will be asked to confirm compliance with the requirement to pay no less than the total wage and fringe benefit rates per hour, and to submit a corrected payroll report.

(7) **Signature.** If the signature is missing or does not have the level of authority required by the Act, the payroll report will be returned for correction.

Section 5-2 Violations and Restitution of Underpayment of Wages.

a. If DOE's compliance reviewer **discovers a contractor's failure to pay the appropriate DBA wages and fringe benefits,** the contractor will be notified immediately and the **contractor will be required to pay full restitution to the workers.** Typically, the contractor will be allowed 30

days to correct the underpayments. The prime contractor is always responsible to the DOE contracting officer to ensure that subcontractors on the project pay the back wages in full and promptly.

b. **Simple Reporting Errors and Corrections.** Errors resulting from calculation errors, failure to attach proper documentation, and failure to report proper classifications may be resolved quickly and completely with informal notification to the prime contractor and subcontractor from the compliance reviewer, and prompt corrective response from the contractor. Contractors and subcontractors are responsible for knowing the contract's labor standards requirements and they must cooperate completely and promptly with all requests for compliance.

c. The **contractor found to be in violation and liable for unpaid wages or benefits must also submit a corrected payroll** report to the contracting officer showing the computation of back wages and evidence of full payment to the workers.

d. **Unlocated Workers Who Are Due Back Wages.** After an investigation discloses a contractor's failure to pay proper DBA wages or benefits, the contractor must make every reasonable effort to locate former workers and to pay back wages. If the contractor fails to locate any of the former workers, the contractor may be asked to provide to the DOE contracting officer evidence of its attempts to locate the workers (*e.g.,* returned mailings, *etc.*), and a list of the missing workers including name, last known address, Social Security number, dates of employment, and gross amount of underpayment due each of the workers. The contracting officer may withhold contract funds in the total amount of underpayment due the missing workers (or the contractor may be asked to provide payment by check to DOE as the contracting agency) for the purpose of asking the Comptroller General's office for assistance in locating the missing workers. The Act specifically authorizes the Comptroller General to disburse funds withheld for wages found to be due to laborers and mechanics under DBA. (Reference 40 U.S.C. Sec. 3144.)

Section 5-3 Labor Standards Disputes and Sanctions for Violations of DBA Requirements.

a. **Labor Standards Disputes.** It is the responsibility of the contractor and subcontractor to be knowledgeable about their obligations under the several contract labor standards. It is DOE's responsibility as the contracting agency to enforce the provisions of DBA and CWHSSA. When the compliance reviewer notes violations such as failure to record hours worked, misclassification of workers, inappropriate use of apprentices and trainees, failure to pay benefits or overtime compensation, or unallowable deduction from wages, DOE will notify the prime contractor of the violations (and the subcontractor, if the violations are the result of the subcontractor's pay practices). If the contractor disagrees with the findings of the compliance reviewer, the prime contractor and/or subcontractor, or any other interested party, may ask DOL's Wage and Hour Administrator for a review and reconsideration of the issue. The Administrator's decision may then be appealed to DOL's Administrative Review Board. The requests must be timely and in writing. (Reference 29 CFR Part 1 for the procedures.)

b. **Withholding.** The **contracting officer has the responsibility to withhold from payments due to the prime contractor any amounts believed to be due and unpaid to workers** because of DBA violations. An authorized representative of DOL may also direct DOE to withhold contract payments due to violations of DBA. If funds remaining due to the contractor on the contract under which DBA violations occurred are insufficient, DOE can withhold funds from other contracts subject to DBA or CWHSSA that are held by the same prime contractor. Prime contractors and subcontractors will be notified in writing of any action to withhold payments due to labor violations.

c. **Debarment.** Contractors and/or subcontractors that are found by the Secretary of Labor to be in aggravated or willful violation of DBA will be debarred – ineligible to participate in any DBA/DBRA contracts – for up to three years. Debarment applies to the contractor or subcontractor and any firm, corporation, partnership, or association in which the contractor or subcontractor has a substantial interest. Debarment proceedings can be recommended by the DOE contracting officer or may be initiated by DOL. Proceedings are described in 29 CFR 5.12.

Debarment under DBA and violations of contract clauses including DBA, CWHSSA, requirements for certified payroll reports, and other contract labor standards, can be the basis for DOE to terminate the contract.

d. **Falsification of Certified Payroll Reports.** Contractors or subcontractors found to have willfully falsified payroll reports (Statements of Compliance), including payrolls reporting correction of earlier violations, may be subject to civil or criminal prosecution. Penalties up to $1,000 and/or one year in prison for each false statement may be imposed. (Reference 18 U.S.C. 1001 and 31 U.S.C. 231.)

A DESK GUIDE TO
THE DAVIS-BACON ACT

APPENDICES

A. **Web Links for Additional Information**

B. **SF-1413 – "Statement and Acknowledgment"**

C. **SF-1444 – "Request for Authorization of Additional Classification and Rate"**

D. **WH-347 – "DBA Certified Payroll Form (Optional)"**

A DESK GUIDE TO
THE DAVIS-BACON ACT

WEB LINKS FOR ADDITIONAL
DAVIS-BACON ACT INFORMATION

- **Frequently Asked Questions:**
  - http://www.gc.energy.gov/GCHotlineFAQ%20.htm#Davis_Bacon
  - http://apps1.eere.energy.gov/weatherization/davis_bacon_faqs.cfm
  - http://apps1.eere.energy.gov/state_energy_program/davis_bacon_faqs.cfm
  - http://www.eecbg.energy.gov/davisbacon.html

- **Davis-Bacon Act Clauses:**
  - Weatherization Assistance Program:
    http://www2.eere.energy.gov/wip/pds/dba_clauses_weatherization.pdf
  - Other Recovery Act Programs:
    http://www1.eere.energy.gov/wip/pdfs/dba_clauses_non_wap.pdf

- **U. S. Department of Labor, Wage and Hour Division:**
  - http://www.dol.gov/whd/programs/dbra/wh1321.htm - DBA Poster
  - http://www.dol.gov/whd/whdkeyp.htm - DOL WHD Key Personnel and Regional Office Addresses
  - http://www.dol.gov/whd/recovery/pwrb/toc.htm - DBA Area Practice Surveys
  - http://www.dol.gov/whd/FOH/index.htm - DBA policies, including definitions of bona fide benefits
  - http://www.wdol.gov – Website containing DBA general wage determinations, policy statements ("All Agency Memoranda"), and links to federal agency labor advisors, federal labor regulations, and forms

Attachment D:
WV DOC Project Experience

Attachment D:
WV DOC Project Experience

Date of Work Performed	WV DOC Facility	Scope of Work for Project

Attachment E:
M&V Option
(A, B, C or D of IPMVP)

Familiarize Yourself with IPMVP

Any organization contracting for large energy efficiency projects should be familiar with the International Performance Measurement and Verification Protocol (IPMVP). Although the word "large" is a relative term, for educational institutions that is probably going to mean projects that cost over $100,000. Information on IPMVP is easy to obtain. You can download a copy from their web site at: http://www.ipmvp.org.

Purpose of IPMVP

"How can I be sure I'm really saving money?"

The purpose of IPMVP is to answer this question. IPMVP provides a "framework to determine energy and water savings resulting from the implementation of an energy efficiency program." The framework provided by IPMVP has become the industry standard for savings verification. This article is concerned with *Volume I, Concepts and Options for Determining Energy and Water Savings*. Other volumes address the subjects of monitoring the performance of renewable energy systems and enhancing indoor environmental quality in buildings.

According to the IPMVP, it provides "an overview of current best practice techniques available for verifying results of energy efficiency, water efficiency, and renewable energy projects." Volume I addresses energy conservation measures that reduce energy through the installation or retrofit of equipment or the modification of operating procedures.

Because energy consumption and costs are often "invisible" to all but a very few administrators, a very important question arises when considering energy efficiency projects, "how can we know what we are really saving?" Large energy efficiency contracts should include at least some of the elements recommended in the IPMVP. Often these contracts include a savings guarantee that pays for part or all of the costs of the project. The IPMVP provides a very credible guidance to help the project administrator verify that savings have occurred and how much has been realized.

Key Points

According to *Environmental Energy Technologies News*, Lawrence Berkeley National Laboratory, "use of IPMVP has become standard in almost all energy efficiency projects where payments to the contractors are based on the energy savings that will result from the implementation of a variety of energy conservation measures (ECM's). IPMVP has been translated into ten languages. More than 300 professionals from 100 U.S. and international organizations have contributed thousands of hours on a completely voluntary basis to update and revise IPMVP." Although the volume is large and somewhat technical there are several sections that administrators should be familiar with.

- Savings Measurement
- Measurement Options
- The Measurement & Verification Plan
- Third Party Verification
- Valuation of units of utility resource savings

Savings Measurement

There is a very simple formula for measuring savings:

Energy Savings = Base Year Energy Use – Post Retrofit Energy Use + or – Adjustments

It is very important to understand where these numbers come from and especially how adjustments will be applied. Adjustments are made in order to more realistically compare post retrofit conditions to the base year conditions (significant changes in square feet, weather differences, operational hours, and the addition of other loads that did not exist during the base year). If these factors were not accounted for, it is possible that savings would be improperly calculated too low or too high. The use of adjustment factors yields savings that are often referred to as "avoided" energy use of the post retrofit period.

Measurement Options

There are four approaches to measuring savings that are termed "Options A, B, C, and D." These are the cornerstones of the standardized set of procedures contained in the IPMVP. This group of options can be divided in to two main categories.

Options A and B (Isolation Retrofit Approach)
Options A and B focus on the performance of specific ECM's such as items of equipment and installed retrofits that can be measured in isolation from the rest of the building. Before and after measurements are taken and compared to determine the savings. A lighting retrofit is a good example for Option A. Installation of variable speed drives is a good example for Option B.

Options C and D (Whole Building Approach)
These options are used when the nature of the ECM is not easily measured in isolation from the rest of the building operations. This could be typical of operational and control changes that affect many areas of the building. The Option C approach assesses savings at the whole-facility level by analyzing utility bills before and after the implementation of the ECM's. Option D uses computer simulations and modeling of the whole facility, usually when base year energy data is not available or reliable. Installation of energy management control systems (EMS) and training/awareness programs are good examples for Option C. Generally, Options C and D involve much more time and skill to conduct and, therefore, are going to be more costly to measure.

Measurement and Verification (M&V) Plan

According to the IPMVP, "an M&V Plan is central to proper savings determination and the basis for verification." The M&V Plan "fundamentally defines the meaning of the word 'savings' for each project" and should include the following elements:

- A description of the ECM and its intended result
- An overview of the intended IPMVP option to be used that applies to the ECM's to be employed, documentation of pre-ECM or base year operating data, design of the energy savings program, and the boundaries of the savings determination
- Measurement methods and equipment to be used
- Commissioning of the newly installed ECM's
- Documentation of post ECM energy and operating data
- Savings report
- Costs of M&V operations and equipment

The IPMVP provides an extensive list of other elements to be included in an M&V Plan depending on the nature of the project.

Third Party Verification
According to the IPMVP, "where the firm performing the energy savings determination has more experience than the owner, the owner may seek assistance in reviewing savings reports." This should begin at the time that the M&V plan is being developed.

This is especially important for contracts where a guarantee of savings has been included so that both parties believe the information that determines the payments is valid and accurate.

Valuation of Units of Utility Resource Savings

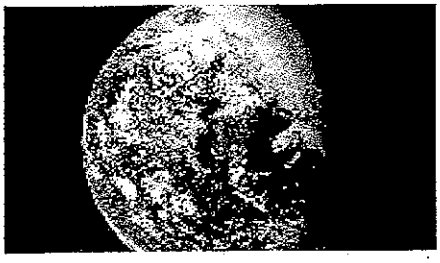
The IPMVP section that relates to Energy Prices is quoted in its entirety:

> "Energy cost savings may be calculated by applying the price of each energy or demand unit to the determined savings. The price of energy should be the energy provider's rate schedule or an appropriate simplification thereof. Appropriate simplifications use marginal prices which consider all aspects of billing affected by metered amounts, such as consumption charges, demand charges, transformer credits, power factor, demand ratchets, early payment discounts."

It is highly advisable that you do not permit the use of "average unit costs" for energy savings, as you will run the risk of significantly over stating actual savings.

EVO

EFFICIENCY VALUATION ORGANIZATION



International Performance Measurement and Verification Protocol

Concepts and Options for Determining Energy and Water Savings
Volume 1

Prepared by Efficiency Valuation Organization
www.evo-world.org

September 2010

EVO 10000 – 1:2010

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EVO Vision

A global marketplace that correctly values the efficient use of natural resources and utilizes end-use efficiency options as a viable alternative to supply options

EVO Mission

To develop and promote the use of standardized protocols, methods and tools to quantify and manage the performance risks and benefits associated with end-use energy-efficiency, renewable-energy, and water-efficiency business transactions

September 2010

Dear Readers,

As the world is coming to recognize energy efficiency as foundational to good environmental management, the importance of proper savings documentation has never been greater. It is certainly in everyone's interest that predicted savings are achieved, and shown to be achieved. Notably:

- purchasers of energy efficiency products want to know that the products they might buy have proven themselves using widely recognized methods;
- purchasers of energy efficiency products or services need to have feedback on the effectiveness of their purchases, to help them fine tune performance and decide about further purchases;
- investors in energy efficiency projects need to know that the value of the energy savings can be unequivocally distinguished from the complex energy use patterns of industries or buildings, so that the achieved positive cash flow can be identified as collateral for any needed investment capital;
- governments and utilities need to know that savings reported from area-wide energy efficiency programs are based on actual field measured results following a widely accepted protocol.

Basically, the knowledge that energy savings can be transparently reported is vital to the acceptance of energy efficiency proposals. This is the role that IPMVP fills: defining transparency, while assembling best practice from around the world, so that practitioners can report results that will be widely recognized.

EVO is the world's only organization dedicated to provision of tools to quantify the results of energy efficiency projects and programs. To this end, EVO has published the IPMVP (now in its sixth edition since inception in 1996) and the International Energy Efficiency Financing Protocol.

IPMVP's flexible framework of M&V Options allows practitioners to craft the right M&V Plan for their building or industrial facility, inspiring confidence in those who wish to harvest their financial and/or environmental benefits. Clear definitions of terminology and heavy emphasis on consistent, transparent methods are the core precepts of the IPMVP. The details may differ from project to project, but the general methods in the following pages have been successfully applied to thousands of projects and programs, large and small, in dozens of countries, using the full range of energy efficiency techniques.

IPMVP is the work of numerous volunteers and sponsors, listed herein and in previous editions. I'd like to thank all those shown in the Acknowledgments section herein. You can join this truly unique group of professionals by submitting examples, sharing experiences on EVO's blog, joining an EVO committee, or subscribing to EVO. I encourage all readers to provide feedback, so we can continuously improve the IPMVP (email to: ipmvprev@evo-world.org).

John Cowan
Chair of the Board
Toronto, Canada

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www.evo-world.org

TABLE OF CONTENTS

1.1 Purpose And Scope Of IPMVP

Efficiency Valuation Organization (EVO) publishes the International Performance Measurement and Verification Protocol (IPMVP) to increase investment in energy and water efficiency, demand management and renewable energy projects around the world.

The IPMVP promotes efficiency investments by the following activities.

- IPMVP documents common terms and methods to evaluate performance of efficiency projects for buyers, sellers and financiers. Some of these terms and methods may be used in project agreements, though IPMVP does not offer contractual language.
- IPMVP provides methods, with different levels of cost and accuracy, for determining savings[1] either for the whole facility or for individual energy conservation measures (ECM)[2];
- IPMVP specifies the contents of a Measurement and Verification Plan (M&V Plan). This M&V Plan adheres to widely accepted fundamental principles of M&V and should produce verifiable savings reports. An M&V Plan must be developed for each project by a qualified professional[3].
- IPMVP applies to a wide variety of facilities including existing and new buildings and industrial processes. Chapter 1.4, User's Guide, summarizes how different readers might use IPMVP.

IPMVP Volume I defines *M&V* in Chapter 2, presents the fundamental principles of *M&V* in Chapter 3, and describes a framework for a detailed *M&V Plan* in Chapter 4. The details of an *M&V Plan* and *savings* report are listed in Chapters 5 and 6, respectively. The requirements for specifying use of IPMVP or claiming adherence with IPMVP are shown in Chapter 7. Volume I also contains a summary of common M&V design issues, Chapter 8, and lists other *M&V* resources. Twelve example projects are described in Appendix A and basic uncertainty analysis methods are summarized in Appendix B. Region-specific materials are in Appendix C.

IPMVP Volume II provides a comprehensive approach to evaluating building indoor-environmental-quality issues that are related to ECM design, implementation and maintenance. Volume II suggests measurements of indoor conditions to identify changes from conditions of the baseline period.

IPMVP Volume III provides greater detail on M&V methods associated with new buiding construction, and with renewable energy systems added to existing facilities.

IPMVP's three volumes are a living suite of documents, with the latest modifications to each edition available on EVO's website (www.evo-world.org).

1.2 Benefits Of Using IPMVP

IPMVP's history since 1995 and its international use brings the following benefits to programs that adhere to IPMVP's guidance.

- Substantiation of payments for performance. Where financial payments are based on demonstrated energy or water *savings*, adherenece to IPMVP ensures that *savings* follow good practice. An IPMVP-adherent *savings report* allows a customer, an energy user or a

[1] Words in italics have the special meanings defined in Chapter 8.
[2] Although there is some debate over the differences between two terms — energy conservation measure (ECM) and energy efficiency measure (EEM) — the common ECM term is defined to include both conservation and efficiency actions. See Chapter 8.
[3] www.evo-world.org contains the current list of Certified *M&V* Professionals (CMVPs), persons with appropriate experience and who have demonstrated their knowledge of IPMVP by passing an examination.

utility, to readily accept reported performance. *Energy service companies* (*ESCOs*) whose invoices are supported by IPMVP-adherent *savings reports*, usually receive prompt payments.

- Lower transaction costs in an *energy performance contract*. Specification of IPMVP as the basis for designing a project's *M&V* can simplify the negotiations for an *energy performance contract*.
- International credibility for energy *savings reports*, thereby increasing the value to a buyer of the associated energy *savings*.
- Enhanced building rating under programs to encourage or label sustainably designed and/ or operated buildings.
- Help national and industry organizations promote and achieve resource efficiency and environmental objectives. The IPMVP is widely adopted by national and regional government agencies and by industry organizations to help manage their programs and enhance the credibility of their reported results.

1.3 IPMVP's Relationship To Other *M&V* Guidelines

Chapter 9 lists other interesting resources for readers of IPMVP. Two particular documents are worth highlighting:

- ASHRAE, Guideline 14-2002 Measurement of Energy and Demand Savings (see Reference 3 in Chapter 10). This American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. document provides complementary detail for IPMVP. Guideline 14 had many of the same original authors as IPMVP. Though Guideline 14 provides technical detail following many of the same concepts of IPMVP, it does not use the same Option names as IPMVP. Guideline 14 is a unique and useful resource for *M&V* professionals around the world and is available for purchase through ASHRAE's bookstore at http://resourcecenter.ashrae.org/store/ashrae/.
- The Greenhouse Gas Protocol for Project Accounting (2005), jointly developed by the World Resources Institute and the World Business Council for Sustainable Development. The IPMVP Technical Committee was represented on the advisory committee for this document which defines means of reporting the greenhouse gas impact of carbon emission reduction and carbon sequestration projects. See www.ghgprotocol.org.

1.4 Who Uses IPMVP?

IPMVP presents common principles and terms that are widely accepted as basic to any good *M&V* process. It does not define the *M&V* activities for all applications. Each project must be individually designed to suit the needs of all readers of energy or water *savings reports*. This individual design is recorded in the project's *M&V Plan* and *savings* are reported as defined therein.

This document is written to progressively provide greater levels of definition of *M&V* practice as it progresses through the Chapters as summarized below.

- Chapter 2 defines M&V and descibes eight different applications for *M&V* techniques.
- Chapter 3 present the six foundational principles of good *M&V* practice and the IPMVP. They are useful for guiding *M&V* design details where IPMVP is silent.
- Chapter 4 presents the general framework and *savings* computation equations needed to properly express *savings*. Table 1 summarizes four M&V design Options and Chapters 4.8 - 4.10 describe each of them. Chapter 4.11 offers guidance and a logic diagram for selecting

the right Option for any application. Appendix A provides example applications of IPMVP's methods to 12 typical projects.

- Chapter 5 lists the topics and data which should be included in an *M&V Plan* and offers some suggestions on key issues which might be discussed under each topic. Readers can use this as a checklist for describing the *M&V* design for a particular project.
- Chapter 6 lists the topics and data that should be included in *savings* reports.
- Chapter 7 shows the requirements for claiming adherence with IPMVP and suggests terms for specifying the use of IPMVP in contracts.
- Chapter 8 reviews a variety of common *M&V* issues that need to be considered in any *M&V* program. A key issue governing the design and operation of an *M&V* system is the competing needs for reasonable accuracy and reasonable cost. Each user must find its own balance between the accuracy and cost of reporting. Chapter 8.5 particularly focuses on the factors involved in this tradeoff. Appendix B provides an overview of some uncertainty and statistical methods, but this overview is not a definitive text on the topic. Users are advised to seek appropriate statistical design help for any *M&V* program data normalization, sampling or uncertainty evaluation techniques they may use. Chapter 8 also presents design issues surrounding metering for *M&V* programs, though it is not a definitive text on metering.
- Chapter 9 contains the definitions of key terms used in this document. The terms are italicized throughout the document to indicate that they have the special meanings given in Chapter 9.
- Chapter 10 lists useful readings, references, and other sources of useful material.

Though the application of IPMVP is unique to each project, certain types of users will have similar methods in their *M&V Plans* and implementation. Chapters 1.4.1 through 1.4.10 point out some of the key ways this document may be used by the following user groups:

- Energy performance contractors and their building customers
- Energy performance contractors and their industrial process customers
- Energy users doing their own retrofits and wanting to account for *savings*
- Facility managers properly accounting for energy budget variances
- New building designers
- New building designers seeking recognition for the sustainability of their designs
- Existing building managers seeking recognition for the environmnetal quality of their building operations
- Utility demand side management program designers and managers
- Water efficiency project developers
- Emission reduction trading program designers

Financial backers and purchasers of emission credits from any of the above applications will find the key ways to use this document under these same headings.

This Chapter uses terms explained in subsequent Chapters as noted in brackets, or as defined in Chapter 9 for italicized words.

1.4.1 Energy-Performance Contractors and Their Building Customers

The primary purpose of *M&V* in the context of building *energy-performance contacts* is presenting the actual monetary performance of a retrofit project. The *M&V Plan* becomes part of

the *energy-performance contract's* terms, and defines the measurements and computations to determine payments or demonstrate compliance with a guaranteed level of performance.

M&V costs may be controlled by considering the responsibilities of all parties to the contract. Where some parameters can be estimated with accuracy sufficient for all parties, Option A (Chapter 4.8.1) may be most economical. For example, a contractor undertaking to improve the efficiency of a chiller plant may simply be required to demonstrate the before and after retrofit chiller efficiency, without consideration of the ongoing energy use, which is driven by cooling loads that are not the contractor's responsibility. However if the contractor agrees to reduce chiller plant energy use, comparison of before and after chiller plant energy use would be required. In this latter case Option B (Chapter 4.8.2) would be used if chiller plant energy meters are used, or Option C (Chapter 4.9) if whole *facility* (utility) meters are used to measure total building energy performance.

Where the *energy-performance contract* focuses on total facility performance, or where it is difficult to evaluate the effects or several *ECMs*, Option C would be used. Care should be taken to ensure that the *M&V Plan* (Chapter 5) lists baseline *static factors* and assigns responsibility for their monitoring throughout the *reporting period*. However for new construction, Option D would be used (Chapter 4.10 or IPMVP Volume III Part I). Where central metering exists on a multiple building campus and no individual building meters are yet in place, Option D (Chapter 4.10) can be used, so that the retrofit does not have to be held up to obtain new sub-meter *baseline* data for a year before planning the retrofit.

Measurements may be made throughout the term of the *energy-performance contract* or for a contract defined test period shortly after retrofit. The longer the *reporting period* (Chapter 4.5.2), or the broader the *boundary of measurement* (Chapter 4.4), the more attention must be paid to the possibility of *baseline* change after retrofit. This possibility requires good advance recording of *static factors* in the *M&V Plan* and diligent monitoring of conditions after retrofit (Chapter 8.2).

The complexity of the *M&V* system's meter design (Chapters 4.8.3 and 8.11) and computations should also consider *M&V* costs, the expected magnitude of the *savings*, project economics and desired accuracy of reporting (Chapters 8.3 - 8.5, and Appendix B).

The prices used for monetizing the energy/water/demand units saved should be those established in the contract (Chapter 8.1).

Where an energy user feels it does not have the capability to review an *M&V Plan* or *savings* report, it may hire a verifier, separate from the *energy-performance contractor* (Chapter 8.6).

Appendix A contains examples IPMVP applications to buildings (Sections A-7, A-8, A-9, while A-2, A-3 and A-6 relate to technologies found in most buildings).

1.4.2 Energy-Performance Contractors and Their Industrial Customers

The primary purpose of *M&V* for industrial *energy-performance contacts* is usually to demonstrate the short-term performance of a retrofit project. Following such demonstration the plant management takes over responsibility for operation, and usually does not seek an ongoing relationship with an ESCO. The *M&V Plan* becomes part of the *energy performance contract* terms, and defines the measurements and computations to determine payments or demonstrate compliance with any guaranteed level of performance.

Industrial processes often involve complex relationships between energy use and a wider range of energy-governing variables than do buildings. In addition to weather, parameters such as product type, raw material variations, production rate and shift scheduling may be considered. Use caution selecting the *independent variables* to be used (Appendix B-2.1). The analysis becomes very difficult if attempting to identify savings at the main plant *energy* meters, especially if there is more than one product type being produced in the plant.

Retrofit-Isolation Options (Chapter 4.8) help to minimize the complications from production variables that are usually unrelated to terms of the performance contract. Retrofit Isolation narrows the *measurement boundary* to just those systems whose *energy* performance can be easily compared to production variables. The installation of isolation meters for *M&V* may also provide helpful feedback for process control.

M&V costs may be controlled by considering the responsibilities of all parties to the *energy-performance contract*. Where some parameters can be estimated with accuracy sufficient for all parties, Option A (Chapter 4.8.1) may be most economical. For example, a contractor who agrees to increase furnace efficiency may demonstrate the change in furnace energy use at peak load after installation of a flue gas heat recovery device. He is not responsible for ongoing energy use of the furnace, which is governed by production parameters beyond his control. However, if the contractor agrees instead to reduce furnace energy use, retrofitted furnace energy use is compared to the predicted energy requirements of the original furnace over a time period. In this latter case Option B (Chapter 4.8.2) governs the agreement if a meter measures the furnace's fuel consumption. Option C (Chapter 4.9) governs the agreement if main plant utility meters or departmental sub-meters measure total energy performance of the plant or a department within the plant.

Take care when using Retrofit-Isolation techniques to consider all energy flows affected by the *ECM* (Chapter 4.4), including *interactive effects*.

Energy-performance contracts in industrial plants often require measurements for a short *reporting period* after retrofit. Longer *reporting periods* (Chapter 4.5.2), or broader *boundaries of measurement* (Chapter 4.4), require more attention to possible *baseline* change after retrofit. Good advance recording of *static factors* in the *M&V Plan* (Chapter 5) and diligent monitoring of conditions after retrofit (Chapter 8.2) will help identify *baseline* change.

Plant managers would normally employ long-term energy monitoring to continuously minimize energy waste. *Energy-performance contractors* may focus instead on short-term monitoring to demonstrate their performance (Chapter 4.5.2).

For retrofits that may be easily turned off temporarily, such as a heat recovery device, sequential short-term tests, which use the On/Off Test technique (Chapter 4.5.3), can demonstrate performance.

The complexity of the *M&V* system's meter design (Chapters 4.8.3 and 8.12) and computations should also consider *M&V* costs, the expected magnitude of the *savings*, project economics and desired accuracy of reporting (Chapters 8.3 - 8.5 and Appendix B).

The prices used for valuing the *savings* should be those established in the *energy performance contract* (Chapter 8.1).

The *energy* user may hire a verifier, separate from the *energy-performance contractor* (Chapter 8.6) when he or she lacks the ability to review an *M&V Plan* or *savings* report.

Appendix A contains examples of industrial applications of IPMVP (Sections A-4, A-5, while A-2, A-3.1 and A-6 relate to technologies found in most industrial plants).

1.4.3 Industrial and Building Energy Users Doing Their Own Retrofits

Energy users often install ECMs themselves. When they are confident about achieving the planned *savings*, a 'no *M&V*' approach leaves the entire budget available for retrofits. However energy users may need to justify investments, add credibility to requests for future investments, or quantify uncertain performance.

M&V design issues would be similar to those described in Chapters 1.4.1. or 1.4.2, above, except that there is no division of responsibility between *energy* user and an *energy performance contractor*. Reporting costs may be lower because of less formal reporting.

1.4.4 Facility Managers Accounting For Energy/Water Budget Variances

To manage *energy* costs successfully, a *facility* manager should understand the relationship between *energy* use and *facility* operating parameters. Important operating parameters include occupancy, production rate, and weather. If a facility manager neglects these *independent variables*, he or she may struggle to explain variances from predicted *energy* budgets. He/she also risks future budgeting errors. *Baseline adjustments* are also necessary to account for non-routine changes at the *facility*.

Even if no *savings* are planned, the calculation techniques of Chapter 4 can help to explain *energy*-budget variances. Therefore, *M&V Plans* (Chapter 5) are useful with or without retrofits. Whole facility, Option C methods (Chapter 4.9), may be used, based on main (utility) meters or sub-meters for major sections of the facility. If sub-meters are in place on specific pieces of equipment (Chapter 4.8) they may help allocate costs to user departments or tenants within the *facility* (using Option A or B approaches).

Components critical to the variations in the overall *energy* budget may be isolated for separate metering of either their *energy* use (Option B, Chapter 4.8.2) or of a key parameter of *energy* use (Option A, Chapter 4.8.1). Both of these cases call for long-term metering. Pay close attention to the cost of maintaining and calibrating meters and managing data received from the meters (see Chapter 4.8.3 and 8.12).

1.4.5 New Building Designers

New building investors often wish to compare their performance to what it would have been if they had not included some specific *energy* efficiency features in the design. The absence of real *baseline* data normally requires the use of Option D (Chapter 4.10) to develop a *baseline*. The computer simulation skills needed to properly apply Option D might normally be on the design team at the time of design. However the critical element of Option D is the calibration of the simulation against data gathered after a one-year period. Therefore it is important to ensure that the simulation skills remain available until calibration is achieved.

Following the first year of steady operation it would be normal to use the actual *energy* data of the first steady year as a new *baseline*, switching to using Option C (Chapter 4.9) to determine changes from the first year's new *baseline*.

All the challenges for new buildings are addressed in more depth in IPMVP Volume III Part I, New Construction, including different methods for special situations.

1.4.6 New Building Designers Seeking Recognition for Their Sustainable Designs

Building designers may seek to have their designs recognized under a sustainable design program. To qualify, the building may need to have an *M&V* system that adheres to IPMVP. IPMVP adherence is defined in Chapter 7 as preparation of an *M&V Plan* (Chapter 5) using IPMVP terminology, and then following the *M&V Plan*.

The designer would also follow the guidance above in Chapter 1.4.5 and IPMVP Volume III Part I.

1.4.7 Existing Building Managers Seeking Recognition for the Environmental Quality of their Building Operations

Managers of existing buildings may seek recognition for the environmental quality of their operating methods. To qualify they may need to have an M&V system that adheres to IPMVP. IPMVP adherence is defined in Chapter 7 as preparation of an *M&V Plan* (Chapter 5) using IPMVP terminology and then following the *M&V Plan*. IPMVP's Retrofit Isolation type *M&V* (Chapter 4.8) may also assist in obtaining recognition for the number of installed sub-meters.

Option C (Chapter 4.9) would provide the total facility performance monitoring that is appropriate to existing buildings. However if no whole building meters existed before seeking recognition, Option D (Chapter 4.10) is needed during the period of developing a *baseline* for a year after main meters are initially installed on the building.

Building managers would also follow the guidance above in Chapter 1.4.3.

1.4.8 Regional Efficiency-Program Designers and Managers

Designers and managers of regional or utility-company demand-side-management (DSM) programs usually need to develop rigorous ways to evaluate the effectiveness of their energy-efficiency programs. One way to evaluate a DSM program's impact is to assess the *savings* made in randomly chosen end-user *facilities*. This data can be used to project the results across the entire group of DSM program participants. Use IPMVP Options presented in Chapter 4 to assess the *savings* in the sample *facilities*.

The evaluation design for any regional program should specify which of the IPMVP Options are allowable. It should also specify the minimum required sampling, measurement, and analytical accuracies, in order to provide sufficient rigor in program reporting.

Utilities already have the whole facility data for their commodity in their databases, so may apply Option C (Chapter 4.9) on all program participants or a sample of them. However without adequate knowledge of changes within each facility, a large percentage of variation in the *savings* should be expected, especially as time elapses between the *baseline* and *reporting periods*.

EVO is monitoring the needs of the utility program evaluation community. EVO is considering development of special M&V guidance for DSM program evaluation, and for establishing baselines for measuring the 'demand response' of customers receiving utility price or curtailment signals (see Preface – EVO's Future Plans).

1.4.9 Water-Efficiency Project Developers

Water-efficiency *M&V* is analogous to energy-efficiency *M&V*, so uses similar *M&V* techniques. The relevant technique for any project depends upon the nature of the change being evaluated, and upon the user's situation as discussed in Chapters 1.4.1 through 1.4.5 and 1.4.8.

Water-consuming equipment is often in the control of facility users (building occupants or production managers). Therefore it can be difficult to monitor user behavior as needed to make adjustments to total-facility water use for the application of Option C methods. Retrofit Isolation methods are often more easily applied (Chapter 4.8), using a sample of the retrofits (Appendix B-3) to demonstrate the performance of an entire group of changes.

Where outdoor water use is being evaluated, the adjustments term in IPMVP Equation 1 (Chapter 4) may be related to parameters that drive water use such as rainfall.

Liquid flow measurements devices (see Chapter 8.11, Table 5) are most commonly applied in *M&V* for water efficiency projects.

1.4.10 Emission Trading Programs

Energy-efficiency programs can be central to helping large energy users meet their regulated emission allocation. All of the techniques of this document help energy users manage their energy use, through proper accounting (Chapters 1.4.3 and 1.4.4).

Energy-efficiency projects may also be the basis of trades in emission-reduction commodities (credits, offsets, set asides, etc). Since such trades must hold up under public scrutiny, compliance with an industry recognized protocol adds credibility to emission reduction claims.

Trading-program designers should specify compliance with IPMVP, 2002 edition or later. They may go further and require fully measured energy-*savings* approaches (i.e. Options B or C,

Chapters 4.8.2 or 4.9). This further specification reduces the uncertainty in the quantification by eliminating Options using estimated or simulated values rather than measured values.

Chapter 8.7 discusses the special *M&V* design issues for emission trades.

CHAPTER 2 DEFINITION AND PURPOSES OF *M&V*

"*Measurement and Verification*" (*M&V*) is the process of using measurement to reliably determine actual *saving*[4] created within an individual facility by an energy management program. *Savings* cannot be directly measured, since they represent the absence of *energy* use. Instead, *savings* are determined by comparing measured use before and after implementation of a project, making appropriate adjustments for changes in conditions.

M&V activities consist of some or all of the following:

- meter installation calibration and maintenance,
- data gathering and screening,
- development of a computation method and acceptable estimates,
- computations with measured data, and
- reporting, quality assurance, and third party verification of reports.

When there is little doubt about the outcome of a project, or no need to prove results to another party, *M&V* may not be necessary. However, it is still wise to verify that the installed equipment is able to produce the expected *savings*. Verification of the potential to achieve *savings* involves regular inspection and commissioning of equipment. However, such verification of the potential to generate *savings* should not be confused with *M&V*. Verification of the potential to generate *savings* does not adhere to IPMVP since no site *energy* measurement is required.

2.1 Purposes Of M&V

M&V techniques can be used by facility owners or *energy* efficiency project investors for the following purposes:

a) Increase *energy savings*

Accurate determination of *energy savings* gives facility owners and managers valuable feedback on their *energy conservation measures (ECMs)*. This feedback helps them adjust *ECM* design or operations to improve *savings*, achieve greater persistence of *savings* over time, and lower variations in *savings* (Kats et al. 1997 and 1999, Haberl et al. 1996).

b) Document financial transactions

For some projects, the energy efficiency savings are the basis for performance-based financial payments and/or a guarantee in a performance contract. A well-defined and implemented *M&V Plan* can be the basis for documenting performance in a transparent manner and subjected to independent verification.

c) Enhance financing for efficiency projects

A good *M&V Plan* increases the transparency and credibility of reports on the outcome of efficiency investments. It also increases the credibility of projections for the outcome of efficiency investments. This credibility can increase the confidence that investors and sponsors have in *energy* efficiency projects, enhancing their chances of being financed.

d) Improve engineering design and facility operations and maintenance

The preparation of a good *M&V Plan* encourages comprehensive project design by including all *M&V* costs in the project's economics. Good *M&V* also helps managers discover and reduce maintenance and operating problems, so they can run facilities more effectively. Good *M&V* also provides feedback for future project designs.

[4] Words in italics have the special meanings defined in Chapter 9.

e) Manage *energy* budgets

Even where *savings* are not planned, *M&V* techniques help managers evaluate and manage *energy* usage to account for variances from budgets. *M&V* techniques are used to adjust for changing facility-operating conditions in order to set proper budgets and account for budget variances.

f) Enhance the value of emission-reduction credits

Accounting for emission reductions provides additional value to efficiency projects. Use of an *M&V Plan* for determining energy *savings* improves emissions-reduction reports compared to reports with no *M&V Plan*.

g) Support evaluation of regional efficiency programs

Utility or government programs for managing the usage of an *energy* supply system can use *M&V* techniques to evaluate the savings at selected *energy* user facilities. Using statistical techniques and other assumptions, the *savings* determined by *M&V* activities at selected individual facilities can help predict savings at unmeasured sites in order to report the performance of the entire program.

h) Increase public understanding of energy management as a public policy tool

By improving the credibility of energy management projects, *M&V* increases public acceptance of the related emission reduction. Such public acceptance encourages investment in energy-efficiency projects or the emission credits they may create. By enhancing *savings*, good *M&V* practice highlights the public benefits provided by good *energy* management, such as improved community health, reduced environmental degradation, and increased employment.

CHAPTER 3 PRINCIPLES OF M&V

The fundamental principles of good *M&V*[5] practice are described below, in alphabetical order.

Accurate *M&V* reports should be as accurate as the *M&V* budget will allow. *M&V* costs should normally be small relative to the monetary value of the *savings* being evaluated. *M&V* expenditures should also be consistent with the financial implications of over- or under-reporting of a project's performance. Accuracy tradeoffs should be accompanied by increased conservativeness in any estimates and judgements.

Complete The reporting of *energy savings* should consider all effects of a project. *M&V* activities should use measurements to quantify the significant effects, while estimating all others.

Conservative Where judgements are made about uncertain quantities, *M&V* procedures should be designed to under-estimate *savings*.

Consistent The reporting of a project's *energy* effectiveness should be consistent between:

- different types of *energy* efficiency projects;
- different *energy* management professionals for any one project;
- different periods of time for the same project; and
- *energy* efficiency projects and new *energy* supply projects.

'Consistent' does not mean 'identical,' since it is recognized that any empirically derived report involves judgements which may not be made identically by all reporters. By identifying key areas of judgement, IPMVP helps to avoid inconsistencies arising from lack of consideration of important dimensions.

Relevant The determination of *savings* should measure the performance parameters of concern, or least well known, while other less critical or predictable parameters may be estimated.

Transparent All *M&V* activities should be clearly and fully disclosed. Full disclosure should include presentation of all of the elements defined in Chapters 5 and 6 for the contents of an *M&V Plan* and a *savings* report, respectively.

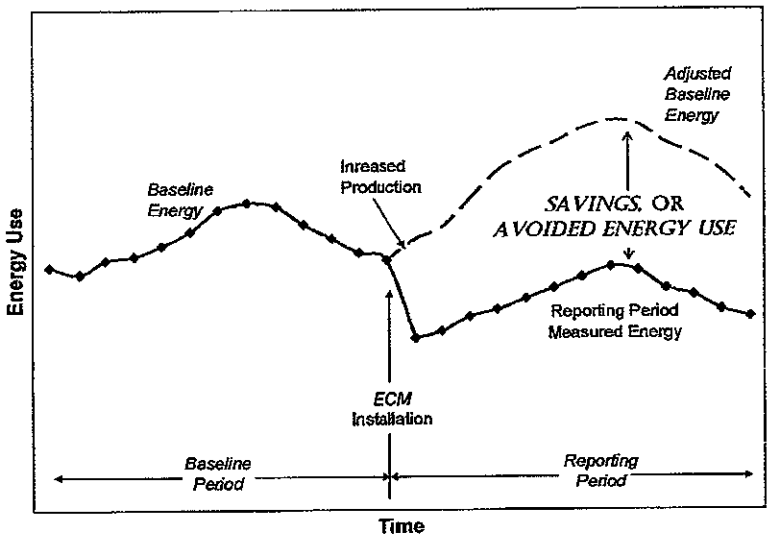
The balance of this document presents a flexible framework of basic procedures and four Options for achieving *M&V* processes which follow these fundamental principles. Where the framework is silent or inconsistent for any specific application, these *M&V* principles should be used for guidance.

[5] Words in italics have the special meanings defined in Chapter 9.

4.1 Introduction

Energy, water or demand *savings*[6] cannot be directly measured, since *savings* represent the absence of energy/water use or demand. Instead, *savings* are determined by comparing measured use or demand before and after implementation of a program, making suitable adjustments for changes in conditions.

Figure 1 Example Energy History



As an example of savings determination process, Figure 1 shows the energy-usage history of an industrial boiler before and after the addition of an *energy conservation measure (ECM)* to recover heat from its flue gases. At about the time of *ECM* installation, plant production also increased.

To properly document the impact of the *ECM,* its energy effect must be separated from the energy effect of the increased production. The "*baseline energy*" use pattern before *ECM* installation was studied to determine the relationship between energy use and production. Following *ECM* installation, this *baseline* relationship was used to estimate how much energy the plant would have used each month if there had been no *ECM* (called the "*adjusted-baseline energy*"). The *saving*, or '*avoided energy use*' is the difference between the *adjusted-baseline energy* and the energy that was actually metered during the *reporting period.*

Without the adjustment for the change in production, the difference between *baseline energy* and *reporting period* energy would have been much lower, under-reporting the effect of the heat recovery.

It is necessary to segregate the *energy* effects of a *savings* program from the effects of other simultaneous changes affecting the *energy* using systems. The comparison of before and after energy use or demand should be made on a consistent basis, using the following general Equation 1):

[6] Words in italics have the special meanings defined in Chapter 9.

Savings = (*Baseline-Period Use* or Demand - *Reporting-Period Use* or Demand)
± Adjustments 1)

The "Adjustments" term in this general equation is used to re-state the use or demand of the *baseline* and *reporting periods* under a common set of conditions. This adjustments term distinguishes proper *savings* reports from a simple comparison of cost or usage before and after implementation of an *energy conservation measure* (*ECM*). Simple comparisons of utility costs without such adjustments report only cost changes and fail to report the true performance of a project. To properly report "*savings*," adjustments must account for the differences in conditions between the *baseline* and *reporting periods*.

The balance of this Chapter defines basic methods in these measurement and adjustment processes. If these methods do not cover all matters that arise in your project, consult the Principles of *M&V* (Chapter 3) for further guidance.

4.2 Energy, Water and Demand Terminology

The processes of determining *savings* in energy are analogous to those for determining *savings* in water or demand. To simplify the descriptions in this document, the italicized word *energy* will commonly be used to mean energy and water use or demand. Similarly the word *Energy Conservation Measure* (*ECM*) will commonly be used to mean measures to improve efficiency or conserve energy or water, or manage demand.

4.3 The *M&V* Design and Reporting Process

The *M&V* design and reporting process parallels the *ECM* design and implementation process. The *M&V* processes should involve the following steps:

1. Consider the needs of the user of the planned *M&V* report(s). If the user is focused on overall cost control, Whole-Facility methods may be most suited. If user focus is on particular *ECMs*, Retrofit-Isolation techniques may be most suited (see Chapter 4.4).
2. While developing the ECM(s), select the IPMVP Option (see Chapters 4.7 - 4.11) that is most consistent with the scope of the ECMs, the needs for accuracy and the budget for M&V. Decide whether adjustment of all *energy* quantities will be made to the *reporting period* conditions or to some other set of conditions (see Chapter 4.6). Decide the length of the *baseline period* and the *reporting period* (Chapter 4.5) (These fundamental decisions may be written into the terms of an *energy-performance contract*.)
3. Gather relevant *energy* and operating data from the *baseline period* and record them in a way that can be accessed in the future.
4. Prepare an *M&V Plan* (Chapter 5) containing the results of steps 1 through 3 above. It should define the subsequent steps 5 through 9.
5. As part of the final *ECM* design and installation, also design, install, calibrate and commission any special measurement equipment that is needed under the *M&V Plan*.
6. After the *ECM* is installed, inspect the installed equipment and revised operating procedures to ensure that they conform to the design intent of the *ECM*. This process is commonly called "commissioning." (ORNL (1999) and ASHRAE Guideline 1-1996 define good practice in commissioning most building modifications.)
7. Gather *energy* and operating data from the *reporting period*, as defined in the *M&V Plan*.
8. Compute *savings* in *energy* and monetary units in accordance with the *M&V Plan*.
9. Report *savings* in accordance with the *M&V Plan* (see Chapter 6).

***Interactive Effects* - Example**

For an ECM, which reduces the power requirements of electric lights, the *measurement boundary* should include the power to the lights. However lowering lighting energy may also lower any mechanical cooling requirements and/or raise any heating requirements. Such heating and cooling energy flows attributable to the lights cannot usually be easily measured. They are *interactive effects* which may have to be estimated, rather than included within the measurement boundary.

Steps 7 through 9 are repeated periodically when a *savings* report is needed.

A third party may verify that the *M&V Plan* adheres to IPMVP, and possibly a performance contract. This third party may also verify that *savings* reports comply with the approved *M&V Plan* (see Chapter 8.6).

The remainder of this document adds details about how to determine and report *savings*.

4.4 Measurement Boundary

Savings may be determined for an entire *facility* or simply for a portion of it, depending upon the purposes of the reporting.

- If the purpose of reporting is to help manage only the equipment affected by the *savings* program, a *measurement boundary* should be drawn around that equipment. Then all significant *energy* requirements of the equipment within the boundary can be determined[7]. This approach is used in the Retrofit Isolation Options of Chapter 4.8.
- If the purpose of reporting is to help manage total *facility energy* performance, the meters measuring the supply of *energy* to the total *facility* can be used to assess performance and *savings*. The *measurement boundary* in this case encompasses the whole *facility*. The Whole Facility Option C, is described in Chapter 4.9.
- If *baseline* or *reporting period* data are unreliable or unavailable, *energy* data from a calibrated simulation program can take the place of the missing data, for either part or all of the *facility*. The *measurement boundary* can be drawn accordingly. The Calibrated Simulation Option D is described in Chapter 4.10.

Some of the energy requirements of the systems or equipment being assessed may arise outside a practical *measurement boundary*. Nevertheless, all *energy* effects of the *ECM*(s) should be considered. Those energy effects that are significant should be determined from measurements, the rest being estimated or ignored.

Any energy effects occurring beyond the notional *measurement boundary* are called '*interactive effects*'[8]. Find a way to estimate the magnitude of these *interactive effects* in order to determine *savings*. Alternatively they may be ignored as long as the *M&V Plan* includes discussion of each effect and its likely magnitude.

[7] Determination of *energy* may be by direct measurement of energy flow or by direct measurement of *proxies* of *energy* use that give direct indication of *energy* use.
[8] These *interactive effects* are sometimes called 'leakages.'

4.5 Measurement Period Selection

Care should be taken in selecting the period of time to be used as the *baseline period* and the *reporting period.* Strategies for each are discussed below.

4.5.1 Baseline Period

The *baseline period* should be established to:

- Represent all operating modes of the *facility.* This period should span a full operating cycle from maximum energy use to minimum.

Operating *Cycles* – Examples

- Building *energy* use is normally significantly affected by weather conditions, so a whole year's baseline data is needed to define a full operating *cycle.*
- The energy use of a compressed air system may only be governed by plant production levels, which vary on a weekly cycle. So one week's data would be all that is needed to define baseline performance.

- Fairly represent all operating conditions of a normal operating cycle. For example, though a year may be chosen as the baseline period, if data is missing during the selected year for one month, comparable data for the same month in a different year should be used to ensure the baseline record does not under represent operating conditions of the missing month. .
- Include only time periods for which all fixed and variable energy-governing facts are known about the facility. Extension of baseline periods backwards in time to include multiple cycles of operation requires equal knowledge of all energy-governing factors throughout the longer baseline period in order to properly derive routine and non-routine adjustments (see Chapter 4.6) after ECM installation.
- Coincide with the period immediately before commitment to undertake the retrofit. Periods further back in time would not reflect the conditions existing before retrofit and may therefore not provide a proper *baseline* for measuring the effect of just the *ECM.*

ECM planning may require study of a longer time period than is chosen for the *baseline period.* Longer study periods assist the planner in understanding *facility* performance and determining what the normal *cycle* length actually is.

4.5.2 Reporting Period

The user of the *savings* reports should determine the length of the *reporting period.* The *reporting period* should encompass at least one normal operating *cycle* of the equipment or *facility*, in order to fully characterize the *savings* effectiveness in all normal operating modes.

Some projects may cease reporting *savings* after a defined "test" period ranging from an instantaneous reading to a year or two.

The length of any *reporting period* should be determined with due consideration of the life of the *ECM* and the likelihood of degradation of originally achieved *savings* over time.

Regardless of the length of the *reporting period*, metering may be left in place to provide real-time feedback of operating data to operating staff.

If reducing the frequency of savings measurement after initial proof of performance, other on site monitoring activities could be intensified to ensure savings remain in place.

IPMVP-adherent *savings* can only be reported for the *reporting period* that uses IPMVP-adherent procedures. If IPMVP-adherent savings are used as a basis for assuming future *savings*, future *savings* reports do not adhere to IPMVP.

4.5.3 Adjacent Measurement Periods (On/Off Test)

When an *ECM* can be turned on and off easily, *baseline* and *reporting periods* may be selected that are adjacent to each other in time. A change in control logic is an example of an *ECM* that can often be readily removed and reinstated without affecting the facility.

Such "On/Off tests" involve *energy* measurements with the *ECM* in effect, and then immediately thereafter with the *ECM* turned off so that pre-*ECM* (*baseline*) conditions return. The difference in energy use between the two adjacent measurement periods is the *savings* created by the *ECM*. Equation 1) of Chapter 4.1 can be used for computing *savings*, without an adjustments term if all *energy*-influencing factors are the same in the two adjacent periods.

This technique can be applied under both Retrofit Isolation and Whole-Facility Options. However *measurement boundaries* must be located so that it is possible to readily detect a significant difference in metered *energy* use when equipment or systems are turned on and off.

The adjacent periods used for the On/Off test should be long enough to represent stable operation. The periods should also cover the range of normal facility operations. To cover the normal range, the On/Off test may need to be repeated under different operating modes such as various seasons or production rates.

Take notice that *ECMs* which can be turned Off for such testing also risk being accidentally or maliciously turned Off when intended to be On.

4.6 Basis For Adjustments

The adjustments term shown in Equation 1) of Chapter 4.1 should be computed from identifiable physical facts about the energy governing characteristics of equipment within the *measurement boundary*. Two types of adjustments are possible:

- ***Routine Adjustments*** – for any *energy*-governing factors, expected to change routinely during the *reporting period*, such as weather or production volume. A variety of techniques can be used to define the adjustment methodology. Techniques may be as simple as a constant value (no adjustment) or as complex as a several multiple parameter non-linear equations each correlating *energy* with one or more independent variables. Valid mathematical techniques must be used to derive the adjustment method for each *M&V Plan*. See Appendix B for some guidance on assessing the validity of mathematical methods.

and

- ***Non-Routine Adjustments*** – for those energy-governing factors which are not usually expected to change, such as: the facility size, the design and operation of installed equipment, the number of weekly production shifts, or the type of occupants. These static factors must be monitored for change throughout the reporting period. See Chapter 8.2 for discussion of non-routine adjustments.

Static Factors

Examples of *static factors* needing *non-routine adjustments* are changes in the:

- amount of space being heated or air conditioned,
- type of products being produced or number of production shifts per day
- building envelope characteristics (new insulation, windows, doors, air tightness),
- amount, type or use of the *facility's* and the users' equipment,
- indoor environmental standard (e.g. light levels, temperature, ventilation rate), and
- occupancy type or schedule.

Therefore Equation 1) can be expressed more fully as:

Savings = (Baseline Energy – Reporting-Period Energy)
± Routine Adjustments ± Non-Routine Adjustments 1a)

The *adjustments* terms in Equation 1a) are used to express both pieces of measured energy data under the same set of conditions. The mechanism of the adjustments depends upon whether *savings* are to be reported on the basis of the conditions of the *reporting period*, or normalized to some other fixed set of conditions as discussed below[9].

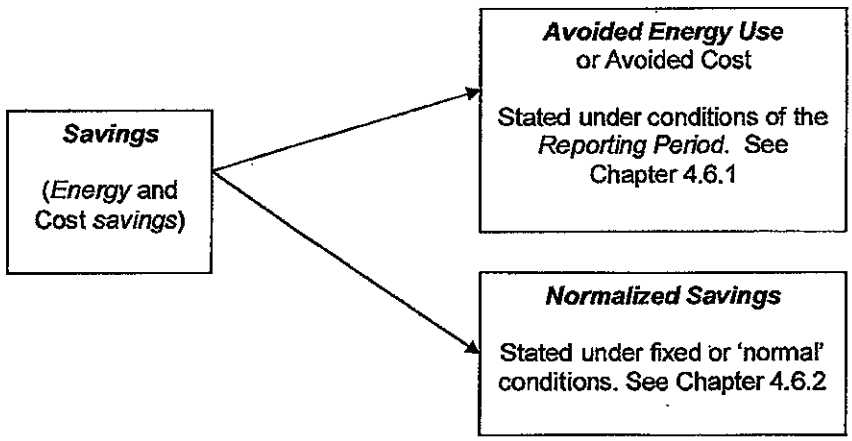


Figure 2 Two Types of Savings

[9] The following general methods can be applied to Options A, B and C described in the rest of the Chapter 4. Option D generally includes the adjustments within the simulation, though the set of conditions for adjustment must still be chosen.

4.6.1 Reporting-Period Basis or Avoided Energy Use

When *savings* are reported under the conditions of the *reporting period*, they can also be called *avoided energy use* of the *reporting period*. *Avoided energy use* quantifies *savings* in the *reporting period* relative to what *energy* use would have been without the *ECM*(s).

When reporting *savings* under *reporting-period* conditions, *baseline-period energy* needs to be adjusted to *reporting-period* conditions.

For this common style of *savings* reporting Equation 1a) can be restated as:

Avoided Energy Use (or *Savings*) =

(*Baseline Energy* ± *Routine Adjustments* to *reporting-period* conditions

± *Non-Routine Adjustments* to *reporting-period* conditions) - *Reporting-Period Energy*

This equation is often simplified to the following:

Avoided Energy Use (or *Savings*) =

Adjusted-Baseline Energy – *Reporting-Period Energy*

± *Non-Routine Adjustments* of *baseline energy* to *reporting-period* conditions 1b)

Where *Adjusted-Baseline Energy* is defined as the *baseline energy* plus any *routine adjustments* needed to adjust it to the conditions of the *reporting period*.

The *adjusted-baseline energy* is normally found by first developing a mathematical model which correlates actual *baseline energy* data with appropriate *independent variable(s)*in the *baseline period*. Each *reporting period's independent variable(s)* are then inserted into this *baseline* mathematical model to produce the *adjusted-baseline energy* use.

> ***Independent Variables***
>
> An *independent variable* is a parameter that is expected to change regularly and have a measurable impact on the *energy* use of a system or *facility*. For example, a common *independent variable* governing building energy use is outdoor temperature. Likewise in a manufacturing plant the number of units produced in a period is often an *independent variable* significantly affecting energy use. Another common *independent variable* is the number of seconds, hours or days in each metering period. See also Chapter 4.9.3.

4.6.2 Fixed Conditions Basis or *Normalized Savings*

Conditions other than those of the *reporting period* may be used as the basis for adjustment. The conditions may be those of the *baseline period*, some other arbitrary period, or a typical, average or 'normal' set of conditions.

Adjustment to a fixed set of conditions reports a style of *savings* which could be called "*normalized savings*" of the *reporting period*. In this method *energy* of the *reporting period* and possibly of the *baseline* period are adjusted from their actual conditions to the common fixed (or 'normal') set of conditions selected.

Equation 1c) restates the more general Equation 1a) for such *normalized savings* reports:

Normalized Savings =

(*Baseline Energy* ± *Routine Adjustments* to fixed conditions

± *Non-Routine Adjustments* to fixed conditions)

- (*Reporting Period Energy* ± *Routine Adjustments* to fixed conditions

± *Non-Routine Adjustments* to fixed conditions) 1c)

The calculation of the *reporting period routine-adjustments* term usually involves the development of a mathematical model correlating *reporting-period energy* with the *independent variables* of the *reporting period*. This model is then used to adjust *reporting-period energy* to the chosen fixed conditions. Further, if the fixed set of conditions is not from the *baseline period*, a mathematical model of *baseline energy* is also used to adjust *baseline energy* to the chosen fixed conditions.

What Basis for Adjustment, or Which Type of '*Savings*?'

Factors to consider when choosing between *avoided energy use* and *normalized savings*:

"*Avoided Energy Use*" style of *savings* (Equation 1b)):

- are dependent upon the *reporting period*'s operating conditions. Even though *savings* can be properly adjusted for phenomena such as weather, the level of reported *savings* depends upon the actual weather.
- cannot be directly compared with *savings* predicted under *baseline* conditions.

"*Normalized savings*" style of *savings* (Equation 1c):

- are unaffected by *reporting-period* conditions since the fixed set of conditions are established once and not changed.
- can be directly compared with *savings* predicted under the same set of fixed conditions.
- can only be reported after a full *cycle* of *reporting-period energy* use, so that the mathematical correlation between *reporting-period energy* and operating conditions can be derived.

4.7 Overview Of IPMVP Options

The *energy* quantities in the several forms of Equation 1) can be measured by one or more of the following techniques:

- Utility or fuel supplier invoices, or reading utility meters and making the same adjustments to the readings that the utility makes.
- Special meters isolating an *ECM* or portion of a *facility* from the rest of the *facility*. Measurements may be periodic for short intervals, or continuous throughout the *baseline* or *reporting periods*.
- Separate measurements of parameters used in computing *energy* use. For example, equipment operating parameters of electrical load and operating hours can be measured separately and multiplied together to compute the equipment's energy use.

- Measurement of proven *proxies* for *energy* use. For example, if the energy use of a motor has been correlated to the output signal from the variable speed drive controlling the motor, the output signal could be a proven *proxy* for motor energy.
- Computer simulation that is calibrated to some actual performance data for the system or *facility* being modeled. One example of computer simulation is DOE-2 analysis for buildings (Option D only).

If the a.*energy* value is already known with adequate accuracy or when it is more costly to measure than justified by the circumstances, then measurement of *energy* may not be necessary or appropriate. In these cases, *estimates* may be made of some *ECM* parameters, but others must be measured (Option A only).

IPMVP provides four Options for determining *savings* (A, B, C and D). The choice among the Options involves many considerations including the location of the *measurement boundary* (see Chapter 4.4). If it is decided to determine *savings* at the *facility* level, Option C or D may be favored. However if only the performance of the *ECM* itself is of concern, a retrofit-isolation technique may be more suitable (Option A, B or D).

Table 1 summarizes the four Options that are detailed in Chapters 4.8 through 4.10. Examples of the use of the Options are contained in Appendix A. Section 4.11 offers guidance on selecting the proper Option for any specific project.

IPMVP Option	How Savings Are Calculated	Typical Applications
A. Retrofit Isolation: Key Parameter Measurement *Savings* are determined by field measurement of the key performance parameter(s) which define the *energy* use of the *ECM*'s affected system(s) and/or the success of the project. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the measured parameter, and the length of the *reporting period*. Parameters not selected for field measurement are *estimated*. *Estimates* can based on historical data, manufacturer's specifications, or engineering judgment. Documentation of the source or justification of the *estimated* parameter is required. The plausible *savings* error arising from *estimation* rather than measurement is evaluated.	Engineering calculation of *baseline* and *reporting period energy* from: o short-term or continuous measurements of key operating parameter(s); and o *estimated* values. *Routine* and *non-routine adjustments* as required.	A lighting retrofit where power draw is the key performance parameter that is measured periodically. Estimate operating hours of the lights based on building schedules and occupant behavior.
B. Retrofit Isolation: All Parameter Measurement *Savings* are determined by field measurement of the *energy* use of the *ECM*-affected system. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the *savings* and the length of the *reporting period*.	Short-term or continuous measurements of *baseline* and *reporting-period energy*, and/or engineering computations using measurements of proxies of *energy* use. Routine and non-routine adjustments as required.	Application of a variable-speed drive and controls to a motor to adjust pump flow. Measure electric power with a kW meter installed on the electrical supply to the motor, which reads the power every minute. In the *baseline period* this meter is in place for a week to verify *constant* loading. The meter is in place throughout the *reporting period* to track variations in power use.

Table 1 Overview of IPMVP Options

Table 1 Overview of IPMVP Options

IPMVP Option	How Savings Are Calculated	Typical Applications
C. Whole Facility *Savings* are determined by measuring energy use at the whole *facility* or sub-*facility* level. Continuous measurements of the entire *facility's energy* use are taken throughout the *reporting period.*	Analysis of whole *facility baseline* and *reporting period* (utility) meter data. *Routine adjustments* as required, using techniques such as simple comparison or regression analysis. *Non-routine adjustments* as required.	Multifaceted energy management program affecting many systems in a *facility*. Measure energy use with the gas and electric utility meters for a twelve month *baseline period* and throughout the *reporting period.*
D. Calibrated Simulation *Savings* are determined through simulation of the *energy* use of the whole *facility,* or of a sub-*facility*. Simulation routines are demonstrated to adequately model actual *energy* performance measured in the *facility*. This Option usually requires considerable skill in calibrated simulation.	Energy use simulation, calibrated with hourly or monthly utility billing data. (Energy end use metering may be used to help refine input data.)	Multifaceted energy management program affecting many systems in a facility but where no meter existed in the *baseline* period. Energy use measurements, after installation of gas and electric meters, are used to calibrate a simulation. *Baseline* energy use, determined using the calibrated simulation, is compared to a simulation of *reporting period* energy use.

4.8 Options A & B: Retrofit Isolation

Chapter 4.4 defines the concept of a *measurement boundary* encompassing the retrofitted equipment. Retrofit isolation allows the narrowing of the *measurement boundary* in order to reduce the effort required to monitor *independent variables* and *static factors*, when retrofits affect only a portion of the *facility*. However boundaries smaller than the total *facility* usually require additional meters at the *measurement boundary*. Narrow *measurement boundaries* also introduce the possibility of 'leakage' through unmeasured *interactive effects*.

Since measurement is of less than the total *facility*, the results of retrofit isolation techniques cannot be correlated to the *facility*'s total *energy* use shown on utility bills. *Facility* changes beyond the *measurement boundary* but unrelated to the *ECM* will not be reported by retrofit-isolation techniques but will be included in the utility's metered consumption or demand.

Two Options are presented for isolating the *energy* use of the equipment affected by an *ECM* from the energy use of the rest of the facility:

- Option A: Retrofit Isolation: Key Parameter Measurement (See Chapter 4.8.1)
- Option B: Retrofit Isolation: All Parameter Measurement (See Chapter 4.8.2)

Isolation metering is placed at the *measurement boundary* between equipment which the *ECM* affects and equipment which it does not affect.

Retrofit Isolation Example

A boiler is replaced with a more efficient one. A *measurement boundary* is drawn around just the boiler so that the assessment of the new boiler is unaffected by variations in the heating load of the whole facility.

Meters for fuel consumption and boiler heat output are all that are needed to assess the efficiencies of the two boilers over their full range of operations. *Savings* are reported for the boiler retrofit by applying the observed efficiency improvement to an estimated annual boiler load. The boiler efficiency test is repeated annually.

When drawing a *measurement boundary*, care should be taken to consider any energy flows affected by the *ECM* but beyond the boundary. A method must be derived for estimating such *interactive effects* (See Chapter 4.4). For example, a lighting load reduction often reduces HVAC system energy use, but the only reasonable *measurement boundary* would encompass just the electricity use of the lights, not their heating and cooling energy impacts. In this case the *ECM*'s effect on HVAC energy requirements is an *interactive effect*, which must be assessed. If the *interactive effect* is expected to be significant, engineering estimates could be made of the *interactive effect* as some fraction of the measured lighting-energy *savings*. Conventional heating and cooling calculations would be used to determine the appropriate fraction(s) for each season. However if the *measurement boundary* can be expanded to encompass *interactive effects*, there is no need to estimate them.

Apart from small estimated *interactive effects*, the *measurement boundary* defines the metering points and the scope of any *adjustments*, which may be used in the various forms of Equation 1). Only changes to *energy* systems and operating variables within the *measurement boundary* must be monitored to prepare the *adjustments* term(s) of Equation 1).

Chapter 4.5 discusses measurement periods, generally. Parameters may be continuously measured or periodically measured for short periods. The expected amount of variation in the parameter will govern the decision of whether to measure continuously or periodically. Where a parameter is not expected to change it may be measured immediately after *ECM* installation and checked occasionally throughout the *reporting period*. The frequency of this checking can be determined by beginning with frequent measurements to verify that the parameter is *constant*. Once proven *constant*, the frequency of measurement may be reduced. To maintain control on *savings* as measurement frequency drops, more frequent inspections or other tests might be undertaken to verify proper operations.

Continuous metering provides greater certainty in reported *savings* and more data about equipment operation. This information can be used to improve or optimize the operation of the equipment on a real-time basis, thereby improving the benefit of the *ECM* itself. Results from several studies have shown five to fifteen percent annual energy *savings* can be achieved through careful use of continuous data logging (Claridge et al. 1994, 1996; Haberl et al. 1995).

If measurement is not continuous and meters are removed between readings, the location of the measurement and the specifications of the measurement device should be recorded in the M&V Plan, along with the procedure for calibrating the meter being used. Where a parameter is expected to be constant, measurement intervals can be short and occasional. Electric motors in

an industrial plant provide a common example of *constant* power flow, assuming they have a *constant* load. However motor-operating periods may vary with the type of product being produced from day to day. Where a parameter may change periodically, the occasional measurements of the parameter (operating hours in this motor example) should happen at times representative of the normal system behavior.

Where a parameter may vary daily or hourly, as in most building heating or cooling systems, continuous metering may be simplest. For weather dependent loads, measurements may be taken over a long enough period to adequately characterize the load pattern through all parts of its normal annual cycle (i.e. each season, and weekday/weekend) and repeated as necessary through the *reporting period*. Examples of such day-type profiling can be found in Katipamula and Haberl (1991), Akbari et al. (1988), Hadley and Tomich (1986), Bou Saada and Haberl (1995a, 1995b) and Bou Saada et al. (1996).

Where multiple versions of the same *ECM* installation are included within the *measurement boundary*, statistically valid samples may be used as valid measurements of the total parameter. Such situations may arise, for example, where total lighting power draw cannot be read at the electrical panel due to the presence of non-lighting loads on the same panel. Instead a statistically significant sample of fixtures is measured before and after retrofit to assess the change in power draw. These sample data may be used as the 'measurements' of total lighting power draw. Appendix B-3 discusses the statistical issues involved in sampling.

Portable meters may be used if only short-term metering is needed. The costs of portable meters can be shared with other objectives. However, permanently installed meters also provide feedback to operating staff or automated control equipment for optimization of systems. Added meters may also enable billing of individual users or departments in the facility.

Retrofit isolation techniques are best applied where:

- Only the performance of the systems affected by the *ECM* is of concern, either due to the responsibilities assigned to the parties in an *energy performance contract*, or due to the *savings* of the *ECM* being too small to be detected in the time available using Option C.
- *Interactive effects* of the *ECM* on the *energy* use of other *facility* equipment can be reasonably estimated, or assumed to be insignificant.
- Possible changes to the *facility*, beyond the *measurement boundary*, would be difficult to identify or assess.
- The *independent variables*, which affect *energy* use, are not excessively difficult or expensive to monitor.
- Sub-meters already exist to isolate *energy* use of systems.
- Meters added at the *measurement boundary* can be used for other purposes such as operational feedback or tenant billing.
- Measurement of parameters is less costly than Option D simulations or Option C *non-routine adjustments*.
- Long term testing is not warranted.
- There is no need to directly reconcile savings reports with changes in payments to energy suppliers.

The unique characteristics of each of the retrofit-isolation techniques are discussed in Chapters 4.8.1 and 4.8.2, below. Common measurement issues arising when using retrofit-isolation techniques are discussed in Chapter 4.8.3. ASHRAE (2002) provides more technical details on a similar method.

4.8.1 Option A: Retrofit Isolation: Key Parameter Measurement

Under Option A, Retrofit Isolation: Key Parameter Measurement, *energy* quantities in Equation 1) can be derived from a computation using a combination of measurements of some parameters and *estimates* of the others. Such *estimates* should only be used where it can be shown that the combined uncertainty from all such *estimates* will not significantly affect the overall reported *savings*. Decide which parameters to measure and which to *estimate* by considering each parameter's contribution to the overall uncertainty of the reported *savings*. The *estimated values* and analysis of their significance should be included in the *M&V Plan* (Chapter 5). *Estimates* may be based on historical data such as recorded operating hours from the *baseline*, equipment manufacturer's published ratings, laboratory tests, or typical weather data.

If a parameter, such as hours of use is known to be *constant* and not expected to be impacted by the *ECM*, then its measurement in the *reporting period* is sufficient. The *reporting period* measurement of such constant parameter can also be considered a measurement of its *baseline* value.

Wherever a parameter, known to vary independently, is not measured in the facility during both the *baseline* and *reporting periods*, the parameter should be treated as an *estimate*.

Engineering calculations or mathematical modeling may be used to assess the significance of the errors in estimating any parameter in the reported *savings*. For example if a piece of equipment's operating hours are to be estimated, but may range from 2,100 to 2,300 hours per year, the calculated *savings* at 2,100 and 2,300 hours should be computed and the difference evaluated for its significance to the expected *savings*. The combined effect of all such possible *estimations* should be assessed before determining whether sufficient measurement is in place. See also Appendix B-5.1.

The selection of which factor(s) to measure may also be considered relative to the objectives of the project or the duties of a contractor undertaking some *ECM*-performance risk. Where a factor is significant to assessing performance, it should be measured. Other factors beyond the contractor's control can be estimated.

If a *savings* computation involves subtracting a measured parameter from an *estimated* parameter, the result is an *estimate*. For example if a parameter is measured in the *reporting period* and subtracted from an unmeasured value for the same parameter in the *baseline period*, the resultant difference is only an *estimate*.

What to Measure?

Consider the example of a lighting project where *reporting period* power draw is measured, but *baseline* power is not measured. Therefore power draw should be treated as an *estimate*. in designing an Option A procedure.

As a result, operating hours must be measured if the procedure is to adhere to IPMVP Option A.

An example application of Option A is an *ECM* involving the installation of high-efficiency light fixtures, without changing lighting periods. *Savings* can be determined using Option A by metering the lighting-circuit power draw before and after retrofit while *estimating* the operating period. Other variations on this type of *ECM*, shown in Table 2 below, show the circumstances where *estimates* adhere to the guidance of Option A.

Table 2 Example Lighting

Situation	Measurement vs. Estimation Strategy		Adherent to Option A?
	Operating Hours	Power Draw	
ECM reduces operating hours	Measure	*Estimate*	Yes
	Estimate	Measure	No
ECM reduces power draw	*Estimate*	Measure	Yes
	Measure	*Estimate*	No
ECM reduces both power draw and operating hours:			
Baseline power uncertain, operating hours known	*Estimate*	Measure	Yes
	Measure	*Estimate*	No
Power known but operating hours uncertain	Measure	*Estimate*	Yes
	Estimate	Measure	No
Power and operating hours poorly known	Measure	*Estimate*	No – Use Option B
	Estimate	Measure	

When planning an Option A procedure, consider both the amount of variation in *baseline energy* and the *ECM*'s *energy* impact before establishing which parameter(s) to measure. The following three examples show the range of scenarios that may arise.

- *ECM* reduces a *constant* load without changing its operating hours. Example: industrial-plant lighting fixtures are replaced with more efficient ones, but the operating hours of the lights do not change. To reasonably measure the effect of the project, fixture power levels should be measured in the *baseline* and *reporting periods*, while operating hours are *estimated* in the energy calculations.
- *ECM* reduces operating hours while load is unchanged. Example: automatic controls shut down air compressors during unoccupied periods. To reasonably measure the effect of the project, compressors' operating time should be measured in both the *baseline* and *reporting periods*, while compressors' power can be estimated in the energy calculations.
- *ECM* reduces both equipment load and operating hours. Example: Resetting of temperature on a hot-water radiation system reduces overheating and induces occupants to close windows, thereby reducing boiler load and operating periods. When both load and operating periods are variable and uncertain, Option A cannot be used.

Generally, conditions of variable load or variable operating hours require more rigorous measurement and computations.

4.8.1.1 Option A: Calculations

General Equation 1) in Chapter 4.1 is used in all IPMVP adherent computations. However under Option A, there may be no need for *adjustments*, *routine* or *non-routine*, depending upon the location of the *measurement boundary*, the nature of any *estimated values*, the length of the *reporting period*, or the amount of time between *baseline* measurements and *reporting-period* measurements.

Similarly *baseline* or *reporting-period energy* measurements involve measurement of only one parameter under Option A, and estimation of the other. Therefore Equation 1) may simplify down to:

Option A *Savings* = *Estimated Value* x (*Baseline-Period*, measured parameter
– *Reporting-period*, measured parameter) 1d)

4.8.1.2 Option A: Installation Verification

Since some values may be *estimated* under Option A, great care is needed to review the engineering design and installation to ensure that the *estimates* are realistic, achievable, and based on equipment that should truly produce *savings* as intended.

At defined intervals during the *reporting period*, the installation should be re-inspected to verify continued existence of the equipment and its proper operation and maintenance. Such re-inspections will ensure continuation of the potential to generate predicted *savings* and validate *estimated parameters*. The frequency of these re-inspections is determined by the likelihood of performance changes. Such likelihood can be established through initial frequent inspections to establish the stability of equipment existence and performance.

An example of a situation needing routine re-inspection is a lighting retrofit. You can determine *savings* by sampling of the performance of fixtures and counting the number of operating fixtures. In this case, the continued existence of the fixtures and operation of the lamps is critical to the *savings* determination. Similarly, where the settings of controls are assumed, but subject to tampering, regular recordings of control settings or actual equipment functions can limit the uncertainty of the *estimated values*.

4.8.1.3 Option A: Cost

Savings determinations under Option A can be less costly than under other Options, since the cost of *estimating* a parameter is often significantly less than the cost of measurement. However in some situations where *estimation* is the only possible route, a good *estimate* may be costlier than if direct measurement were possible. Cost planning for Option A should consider all elements: analysis, *estimation*, meter installation, and the ongoing cost to read and record data.

4.8.1.4 Option A: Best Applications

In addition to the retrofit isolation best applications in Chapter 4.8, above, Option A is best applied where:

- *Estimation* of key parameters may avoid possibly difficult *non-routine adjustments* when future changes happen within the *measurement boundary*.
- The uncertainty created by *estimations* is acceptable.
- The continued effectiveness of the *ECM* can be assessed by simple routine inspection of *estimated* parameters.
- *Estimation* of some parameters is less costly than measurement of them in Option B or simulation in Option D.
- The key parameter(s) used in computing *savings* can be readily identified. Key parameters are parameters used to judge a project's or contractor's performance.

4.8.2 Option B: Retrofit Isolation: All Parameter Measurement

Option B, Retrofit Isolation: All Parameter Measurement, requires measurement of all Equation 1) *energy* quantities, or all parameters needed to compute *energy*.

The *savings* created by most types of *ECMs* can be determined with Option B. However, the degree of difficulty and costs increase as metering complexity increases. Option B methods will generally be more difficult and costly than those of Option A. However, Option B will produce more certain results where load and/or *savings* patterns are variable. These additional costs may be justifiable if a contractor is responsible for all factors affecting *energy savings*.

4.8.2.1 Option B: Calculations

General Equation 1) in Chapter 4.1 is used in all IPMVP adherent computations. However under Option B, there may be no need for *adjustments*, *routine* or *non-routine*, depending upon the location of the *measurement boundary*, the length of the *reporting period*, or the amount of time between *baseline* and *reporting period* measurements. Therefore, for Option B, Equation 1 may simplify down to:

Option B *Savings* = *Baseline Energy* - *Reporting-Period Energy* 1e)

4.8.2.2 Option B: Best Applications

In addition to the retrofit-isolation methods in Chapter 4.8, above, Option B is best applied where:

- Meters added for isolation purposes will be used for other purposes such as operational feedback or tenant billing.
- Measurement of all parameters is less costly than simulation in Option D.
- *Savings* or operations within the *measurement boundary* are variable.

4.8.3 Retrofit Isolation Measurement Issues

Retrofit isolation usually requires the addition of special meters, on either a short term or permanent basis. These meters may be installed during an *energy* audit to help characterize *energy* use before design of the *ECM*. Or meters may be installed to measures *baseline* performance for an *M&V Plan*.

You can measure temperature, humidity, flow, pressure, equipment runtime, electricity or thermal energy, for example, at the *measurement boundary*. Follow good measurement practices to enable calculation of *energy savings* with reasonable accuracy and repeatability. Measurement practices are continually evolving as metering equipment improves. Therefore, use the latest measurement practices to support your *savings* (see also Chapter 8.11).

The following sections define some key measurement issues to consider when using retrofit-isolation techniques.

4.8.3.1 Electricity Measurements

To measure electricity accurately we measure the voltage, amperage and power factor, or true rms[10] wattage with a single instrument. However measurement of amperage and voltage alone can adequately define wattage in purely resistive loads, such as incandescent lamps and resistance heaters without blower motors. When measuring power, make sure that a resistive load's electrical wave-form is not distorted by other devices in the *facility*.

Measure electric demand at the same time that the power company determines the peak demand for its billing. This measurement usually requires continuous recording of the demand at the sub-meter. From this record, the sub-meter's demand can be read for the time when the power company reports that the peak demand occurred on its meter. The power company may reveal the time of peak demand either on its invoices or by special report.

Electric-demand measurement methods vary amongst utilities. The method of measuring electric demand on a sub-mter should replicate the method the power company uses for the relevant billing meter. For example, if the power company calculates peak demand using fixed

[10] Rms (root mean squared) values can be reported by solid state digital instruments to properly account for the net power when wave distortions exist in alternating current circuits.

15 minute intervals, then the recording meter should be set to record data for the same 15 minute intervals. However if the power company uses a moving interval to record electric demand data, the data recorder should have similar capabilities. Such moving interval capability can be emulated by recording data on one minute fixed intervals and then recreating the power company's intervals using post-processing software. However, care should be taken to ensure that the facility does not contain unusual combinations of equipment that generate high one minute peak loads which may show up differently in a moving interval than in a fixed interval. After processing the data into power company intervals, convert it to hourly data for archiving and further analysis.

4.8.3.2 Calibration

Meters should be calibrated as recommended by the equipment manufacturer, and following procedures of recognized measurement authorities. Primary standards and no less than third-order-standard traceable calibration equipment should be utilized wherever possible. Sensors and metering equipment should be selected based in part on the ease of calibration and the ability to hold calibration. An attractive solution is the selection of equipment that is self-calibrating.

Selected calibration references are provided in Chapter 10.3.

4.9 Option C: Whole Facility

Option C: Whole Facility, involves use of utility meters, whole-*facility* meters, or sub-meters to assess the energy performance of a total *facility*. The *measurement boundary* encompasses either the whole *facility* or a major section. This Option determines the collective *savings* of all *ECMs* applied to the part of the *facility* monitored by the *energy* meter. Also, since whole-*facility* meters are used, *savings* reported under Option C include the positive or negative effects of any non-*ECM* changes made in the *facility*.

Option C is intended for projects where expected *savings* are large compared to the random or unexplained energy variations which occur at the whole-*facility* level. If savings are large compared to the unexplained variations in the *baseline-energy* data, then identifying *savings* will be easy. Also the longer the period of *savings* analysis after *ECM* installation, the less significant is the impact of short-term unexplained variations[11]. Typically *savings* should exceed 10% of the *baseline energy* if you expect to confidently discriminate the *savings* from the *baseline* data when the *reporting period* is shorter than two years.

Identifying *facility* changes that will require *non-routine adjustments* is the primary challenge associated with Option C, particularly when *savings* are monitored for long periods. (See also Chapter 8.2 on *non-routine baseline adjustments*.) Therefore, you should perform periodic inspections of all equipment and operations in the *facility* during the *reporting period*. These inspections identify changes in the *static factors* from *baseline* conditions. Such inspections may be part of regular monitoring to ensure that the intended operating methods are still being followed.

ASHRAE (2002) provides more detailed specifications for a similar method.

4.9.1 Option C: Energy Data Issues

Where utility supply is only measured at a central point in a group of *facilities*, sub-meters are needed at each *facility* or group of *facilities* for which individual performance is assessed.

[11] See Appendix B-5. ASHRAE (2002) provides quantitative methods for assessing the impact of variations in the *baseline* data as the *reporting period* lengthens.

Several meters may be used to measure the flow of one *energy* type into a facility. If a meter supplies *energy* to a system that interacts with other *energy* systems, directly or indirectly, this meter's data should be included in the whole-*facility savings* determination.

Meters serving non-interacting *energy* flows, for which *savings* are not to be determined, can be ignored. Separately metered outdoor-lighting circuits is one example.

Determine *savings* separately for each meter or sub-meter serving a *facility* so that performance changes can be assessed for separately metered parts of the *facility*. However, where a meter measures only a small fraction of one *energy* type's total use, it may be totaled with the larger meter(s) to reduce data-management tasks. When electrical meters are combined this way, it should be recognized that small consumption meters often do not have demand data associated with them so that the totalized consumption data will no longer provide meaningful load factor information.

If several different meters are read on separate days, then each meter having a unique billing period should be separately analyzed. The resultant *savings* can be combined after analysis of each individual meter, if the dates are reported.

If any of the energy data are missing from the *reporting period*, a *reporting-period* mathematical model can be created to fill in missing data. However the reported *savings* for the missing period should identify these *savings* as "missing data."

4.9.2 Option C: Energy Invoices Issues

Energy data for Option C are often derived from utility meters, either through direct reading of the meter, or from utility invoices. Where utility bills are the source of data, it should be recognized that a utility's need for regular meter reading is not usually as great as the needs of *M&V*. Utility bills sometimes contain estimated data, especially for small accounts. Sometimes it cannot be determined from the bill itself whether the data came from an estimate or an actual meter reading. Unreported estimated meter readings create unknown errors for estimated month(s) and and also for the subsequent month of the actual meter reading. However the first invoice with an actual reading after one or more estimates will correct the previous errors in energy quantities. *Savings* reports should note when estimates are part of the utility data.

When an electrical utility estimates a meter reading, no valid data exist for the electrical demand of that period.

Energy may be supplied indirectly to a facility, through on-site storage facilities, such as for oil, propane or coal. In these situations, the energy supplier's shipment invoices do not represent the facility's actual consumption during the period between shipments. Ideally a meter downstream of the storage facility measures energy use. However where there is no downstream meter, inventory-level adjustments for each invoice period should supplement the invoices.

4.9.3 Option C: *Independent Variables*

Regularly changing parameters affecting a *facility's energy* use, are called *independent variables* (see also box in Chapter 4.6.1). Common *independent variables* are weather, production volume and occupancy. Weather has many dimensions, but for whole-facility analysis, weather is often just outdoor dry-bulb temperature. Production has many dimensions, depending upon the nature of the industrial process. Production is typically expressed in mass units or volumetric units of each product. Occupancy is defined in many ways, such as hotel-room occupancy, office-building occupancy hours, occupied days (weekdays/weekends), or restaurant-meal sales.

Mathematical modeling can assess *independent variables* if they are cyclical. *Regression analysis* and other forms of mathematical modeling can determine the number of *independent*

variables to consider in the *baseline* data (See Appendix B-2). Parameters, which have a significant effect on the *baseline energy* use, should be included in the *routine adjustments* when determining *savings*[12] using Equation 1a), b) or c).

Independent variables should be measured and recorded at the same time as the *energy* data. For example, weather data should be recorded daily so they can be totaled to correspond with the exact monthly energy-metering period, which may be different from the calendar month. Use of simple monthly mean temperature data for a non-calendar month energy metering period introduces unnecessary error into the analysis.

4.9.4 Option C: Calculations and Mathematical Models

For Option C, the *routine adjustments* term of Equation 1a) is calculated by developing a valid mathematical model of each meter's *energy*-use pattern. A model may be as simple as an ordered list of twelve measured monthly *energy* quantities without any adjustments. However a model often includes factors derived from *regression analysis*, which correlate *energy* to one or more *independent variables* such as outdoor temperature, *degree days*, metering period length, production, occupancy, and/or operating mode. Models can also include a different set of regression parameters for each range of conditions, such as summer or winter in buildings with seasonal *energy*-use variations. For example, in schools where the building's *energy* use differs between the school year and the vacation period, you may need separate regression models for the different usage periods (Landman and Haberl 1996a; 1996b).

Option C should use complete years (12, 24, or 36 months) of continuous data, during the *baseline period,* and continuous data during the *reporting periods* (Fels 1986). Models, which use other numbers of months, (9, 10, 13, or 18 months, for example) can create statistical bias by under or over-representing normal modes of operation.

Meter data can be hourly, daily or monthly whole-*facility* data. Hourly data should be combined into daily data to limit the number of *independent variables* required to produce a reasonable *baseline* model, without significantly increasing the uncertainty in computed *savings* (Katipamula 1996, Kissock et al. 1992). Variation in the daily data often results from the weekly *cycle* of most facilities.

Many mathematical models are appropriate for Option C. To select the one most suited to the application, consider statistical-evaluation indices, such as R^2 and t (see Appendix B-2.2)[13]. Appendix B-2.2 or published statistical literature can help you demonstrate the statistical validity of your selected model.

4.9.5 Option C: Metering

Whole-*facility energy* measurements can use the utiltity's meters. Utility-meter data is considered 100% accurate for determining *savings* because this data defines the payment for *energy*. Utility-meter data is usually required to meet commercial accuracy regulations for sale of *energy* commodities.

The *energy* supplier's meter(s) may be equipped or modified to provide an electical pulse output that can be recorded by the *facility's* monitoring equipment. The *energy*-per-pulse constant of the pulse transmitter should be calibrated against a known reference such as similar data recorded by the utility meter.

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[12] All other parameters affecting *energy* use (i.e. "*static factors*" see box in Chapter 4.6) should be measured and recorded in the *baseline* and *reporting periods* so that *non-routine adjustments* can be made if needed (see Chapter 8.8)

[13] Additional information concerning these selection procedures can be found in Reynolds and Fels (1988), Kissock et al. (1992, 1994) and in the ASHRAE Handbook of Fundamentals (2005) Chapter 32. ASHRAE (2002) also provides several statistical tests to validate the usefulness of derived regression models.

Separate meters installed by the *facility* owner can measure whole-*facility energy*. The accuracy of these meters should be considered in the *M&V Plan*, together with a way of comparing its readings with the utility meter readings.

4.9.6 Option C: Cost

Option C's cost depends on the source of the *energy* data, and the difficulty of tracking *static factors* within the *measurement boundary* to enable *non-routine adjustments* during the *reporting period*. The utility meter or an existing sub-meter works well if the meter's data is properly recorded. This choice requires no extra metering cost.

The cost of tracking changes in *static factors* depends on the *facility's* size, the likelihood of *static-factor* change, the difficulty of detecting changes, and the surveillance procedures already in place.

4.9.7 Option C: Best Applications

Option C is best applied where:

- The *energy* performance of the whole *facility* will be assessed, not just the *ECMs*.
- There are many types of *ECMs* in one *facility*.
- The *ECMs* involve activities whose individual *energy* use is difficult to separately measure (operator training, wall or window upgrades, for example).
- The *savings* are large compared to the variance in the *baseline* data, during the *reporting period* (See Appendix B-1.2).
- When Retrofit-Isolation techniques (Option A or B) are excessively complex. For example, when *interactive effects* or interactions between *ECMs* are substantial.
- Major future changes to the facility are not expected during the *reporting period*.
- A system of tracking *static factors* can be established to enable possible future *non-routine adjustments*.
- Reasonable correlations can be found between *energy* use and other *independent variables*.

4.10 Option D: Calibrated Simulation

Option D, Calibrated Simulation, involves the use of computer simulation software to predict *facility energy* for one or both of the terms in Equation 1). A simulation model must be "calibrated" so that it predicts an *energy* pattern that approximately matches actual metered data.

Option D may be used to assess the performance of all *ECMs* in a *facility*, akin to Option C. However, the Option D simulation tool allows you to also estimate the *savings* attributable to each *ECM* within a multiple-*ECM* project.

Option D may also be used to assess just the performance of individual systems within a *facility*, akin to Options A and B. In this case, the system's *energy* use must be isolated from that of the rest of the facility by appropriate meters, as discussed in Chapters 4.4 and 4.8.

Option D is useful where:

- *Baseline energy* data do not exist or are unavailable. Such situation may arise for:
  - A new facility containing *energy*-efficiency measures needing to be assessed separately from the rest of the facility, or
  - A centrally metered campus of *facilities* where no individual *facility* meter exists in the *baseline period*, but where individual meters will be available after *ECM* installation.

- *Reporting-period energy* data are unavailable or obscured by factors that are difficult to quantify. Sometimes it is too difficult to predict how future *facility* changes might affect *energy* use. Industrial-process changes or new equipment often make the computation of *non-routine adjustments* so inaccurate that Options A, B or C would create excessive error in the *savings* determination.
- It is desired to determine the *savings* associated with individual *ECMs*, but measurements with Options A or B are too difficult or costly.

If the *reporting-period energy* is predicted by the simulation software, the determined *savings* persist only if the simulated operating methods continue. Periodic inspections will identify changes from *baseline* conditions and modeled equipment performance (see also Chapter 4.8.1.2). Simulation runs should be adjusted accordingly.

Option D is the primary *M&V* approach for assessing *energy* efficiency inclusions in new *facility* designs. The section of IMPVP Volume III Part I entitled "Concepts and Options for Determining *Savings* In New Construction" provides detailed guidance on a variety of *M&V* techniques for new buildings. Volume III Part I particularly addresses the challenges of establishing a *baseline* for a less efficient building than what was actually built.

Accurate computer modeling and calibration to measured *energy* data are the major challenges associated with Option D. To control the costs of this method while maintaining reasonable accuracy, the following points should be considered when using Option D:

- Simulation analysis should be conducted by trained personnel who are experienced with both the software and the calibration techniques.
- Input data should represent the best available information including as much as possible of available actual performance data from key components in the facility
- The simulation inputs need to be adjusted so its results match both the demand and consumption data from monthly utility bills, within acceptable tolerances (i.e. "calibrated"). Close agreement between predicted and actual annual total *energy* is usually insufficient demonstration that the simulation adequately predicts the *energy* behavior of the facility (See Chapter 4.10.2).
- Option D requires careful documentation. Simulation printouts, survey data and the metering or monitoring data used to define input values and calibrate the simulation model should be kept in paper and electronic files. The version number should be declared of publicly available software, so that another person can review the computations.

ASHRAE (2002) provides more technical details on a similar method and on calibrating simulation models to utility bills.

Buildings types which are not easily simulated include those with:

- large atriums,
- a significant fraction of the space underground or ground coupled,
- unusual exterior shapes,
- complex shading configurations, or
- a large number of distinct zones of temperature control.

Some building *ECMs* cannot be simulated without great difficulty, such as:

- addition of radiant barriers in attics, and
- some complex HVAC system changes.

4.10.1 Option D: Types of Building Simulation Programs

Information on building simulation programs in common use in different parts of the world can be found in Chapter 6.3 of ASHRAE (2002) and Appendix C herein.

Whole-building-simulation programs usually use hourly calculation techniques. However 'modified bin methods' and simplified HVAC system models may also be used if the building's heat losses, heat gains, internal loads, and HVAC systems are simple. Other types of special-purpose programs may be used to simulate *energy* use and operation of devices or industrial processes.

Any software used must be well documented and well understood by the user.

4.10.2 Option D: Calibration

Savings determined with Option D are based on one or more complex estimates of *energy* use. The accuracy of the *savings* depends on how well the simulation models actual equipment performance, and how well calibrated it is to metered *energy* performance.

Calibration is achieved by verifying that the simulation model reasonably predicts the *energy* patterns of the *facility* by comparing model results to a set of calibration data. These calibration data include measured *energy* data, *independent variables* and *static factor*.

Calibration of building simulations is usually done with 12 monthly utility bills. These bills should be from a period of stable operation. In a new building, it may take a number of months before full occupancy and before the staff learns the best ways to operate the facility. The calibration data should be documented in the *M&V Plan* along with a description of its sources.

Detailed operating data from the *facility* help to develop the calibration data. These data might include operating characteristics, occupancy, weather, loads and equipment efficiency. Some variables may be measured for short intervals (day, week or month) or extracted from existing operating logs. The accuracy of meters should be verified for critical measurements. If resources permit, building ventilation and infiltration should be measured because these quantities often vary widely from expectations. One-time measurements will improve simulation accuracy without much additional cost. On/off tests can measure lighting, receptacle loads and motor control centers. These tests can be performed over a weekend using a data logger or building automation system to record whole-*facility energy* use, usually at one-minute intervals, Sometimes, inexpensive portable loggers, which are synchronized to a common time, are also effective for short-term measurement (Benton et al. 1996, Houcek et al. 1993, Soebarto 1996).

Following collection of as much calibration data as possible, the steps in calibrating the simulation are as listed below.

1. Assume other necessary input parameters, and document them.
2. Whenever possible, gather actual weather data from the calibration period, especially if weather conditions varied significantly from standard-year weather data used in the basic simulations. However, obtaining and preparing actual weather data for use with a simulation may be time-consuming and expensive. If developing an actual weather data file is too difficult, then adjust an average weather file to resemble actual weather data using valid statistical methods.
3. Run the simulation and verify that it predicts operating parameters such as temperature and humidity.
4. Compare the simulated *energy* results with the metered *energy* data from the calibration period, on an hourly or monthly basis.
5. Evaluate patterns in the differences between simulation results and calibration data. Bar charts, monthly percent difference time-series graphs, and monthly x-y scatter plots help to identify the error patterns. ASHRAE (2002), Chapter 6.3, gives more information on

calibration accuracy. The calibration accuracy should be established in the *M&V Plan* to accommodate the *M&V* budget.

6. Revise input data in step 1 and repeat steps 3 and 4 to bring predicted results within the calibration specifications in 5, above. Collect more actual operating data from the facility to meet the calibration specification if necessary.

The creation and calibration of a simulation can be time consuming. Use monthly rather than hourly *energy* data to limit the effort needed for calibration.

4.10.3 Option D: Calculations

Following calibration of a simulation model, Equation 1) can be applied using two versions of the calibrated model: one with the *ECMs* and one without them). Both versions would use the same set of operating conditions. Equation 1) then becomes:

Savings = *Baseline energy* from the calibrated model without *ECMs*
– *Reporting-period energy* from the calibrated model with *ECMs* 1f)

This Option D version of Equation 1) presumes that the calibration 'error' equally affects both models.

If actual *energy* data are available for either the *baseline* or *reporting periods*, the associated calibrated model term in Equation 1f) may be replaced by the actual measured *energy*. However, you must adjust your calculations for the calibration error for each month in the calibration period. Equation 1f) then becomes, for the case of using actual calibration-period data from the *reporting period*:

Savings = *Baseline energy* from the calibrated model without *ECMs*
- Actual calibration-period *energy* (with *ECMs*)
+/- Calibration error in the corresponding calibration reading 1g)

4.10.4 Option D: Ongoing *Savings* Reporting

If multi-year performance evaluation is required, Option D may be used for the first year after the *ECMs* are installed. In later years, Option C may be less costly than Option D if you use as the *baseline* the meter data from the first year of steady operation after installation. Then Option C is used to determine whether *energy* use changes from the first year of operation after the *ECM* was installed. In this situation, the first year of steady operation's *energy* use would be used: a) to calibrate an Option D simulation model, and b) to establish an Option C *baseline* for measuring additional *savings* (or losses) in the second year and beyond.

4.10.5 Option D: Best Applications

Option D is usually used where no other Option is feasible.

Option D is best applied where:

- Either *baseline energy* data or *reporting-period energy* data, but not both, are unavailable or unreliable.
- There are too many *ECMs* to assess using Options A or B.
- The *ECMs* involve diffuse activities, which cannot easily be isolated from the rest of the *facility*, such as operator training or wall and window upgrades.
- The performance of each *ECM* will be estimated individually within a multiple-*ECM* project, but the costs of Options A or B are excessive.
- Interactions between *ECMs* or *ECM interactive effects* are complex, making the isolation techniques of Options A and B impractical.
- Major future changes to the facility are expected during the *reporting period,* and there is no way to track the changes and/or account for their impact on *energy* use.
- An experienced *energy*-simulation professional is able to gather appropriate input data to calibrate the simulation model.
- The *facility* and the *ECMs* can be modeled by well documented simulation software.
- Simulation software predicts metered calibration data with acceptable accuracy.
- Only one year's performance is measured, immediately following installation and commissioning of the *energy*-management program.

4.11 Option Selection Guide

The selection of an IMPVP Option is a decision that is made by the designer of the *M&V* program for each project, based on the full set of project conditions, analysis, budgets and professional judgment. Figure 3 outlines common logic used in Option selection.

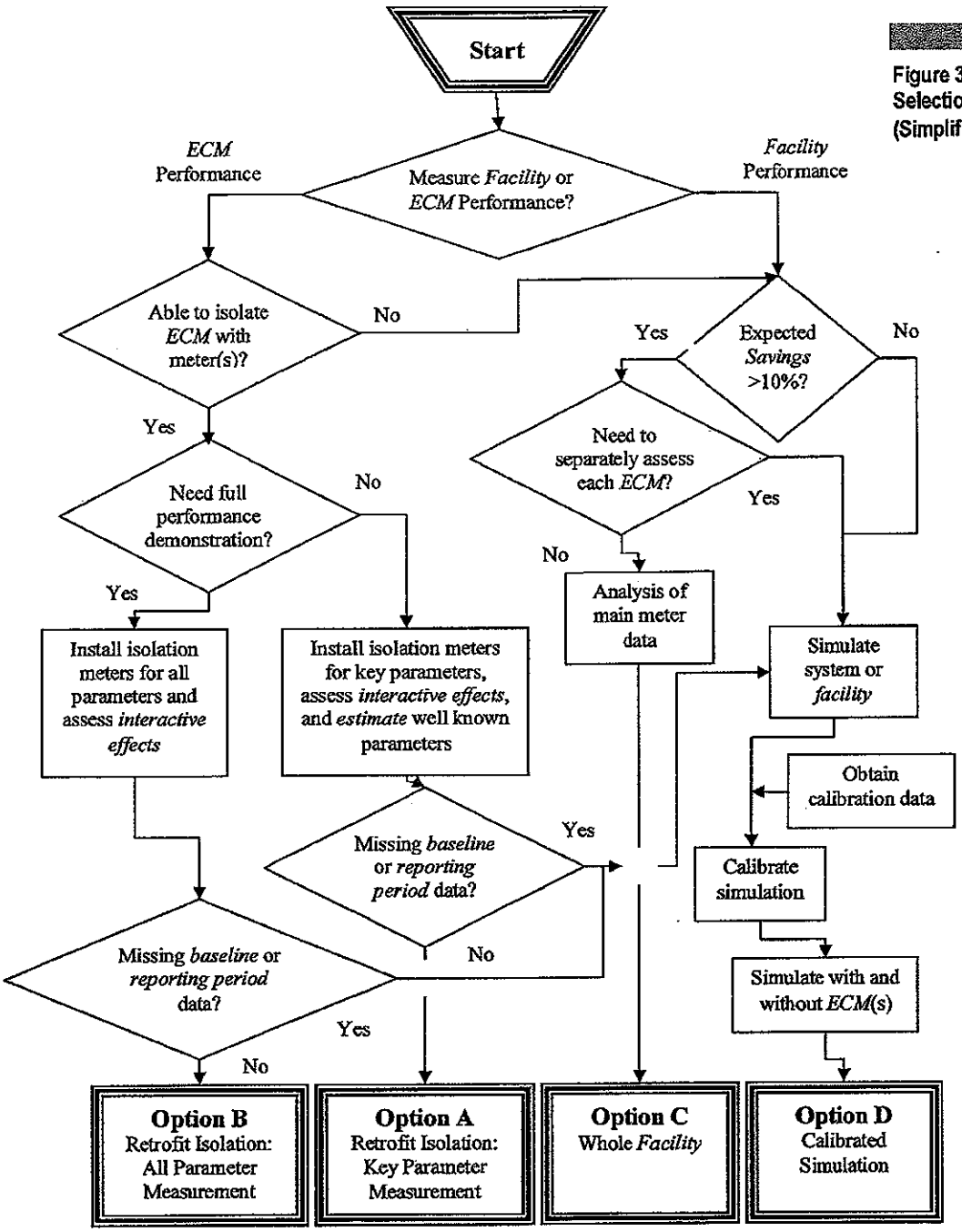

Figure 3 Option Selection Process (Simplified)

It is impossible to generalize on the best IPMVP Option for any type of situation. However some key project characteristics suggest commonly favored Options as shown in Table 3 below.

Table 3 Suggested (not the only) Options - Marked by X

ECM Project Characteristic	Suggested Option			
	A	B	C	D
Need to assess *ECMs* individually	X	X		X
Need to assess only total facility performance			X	X
Expected *savings* less than 10% of utility meter	X	X		X
Multiple *ECMs*	X		X	X
Significance of some *energy* driving variables is unclear		X	X	X
Interactive effects of ECM are signficant or unmeasurable			X	X
Many future changes expected within *measurement boundary*	X			X
Long term performance assessment needed	X		X	
Baseline data not available				X
Non-technical persons must understand reports	X	X	X	
Metering skill available	X	X		
Computer simulation skill available				X
Experience reading utility bills and performing regression analysis available			X	

State of West Virginia
DRUG FREE WORKPLACE CONFORMANCE AFFIDAVIT
***West Virginia Code* §21-1D-5**

STATE OF _____

COUNTY OF _____, **TO-WIT:**

I, _____, after being first duly sworn, depose and state as follows:

1. I am an employee of _____; and,
(Company Name)

2. I do hereby attest that _____
(Company Name)

maintains a valid written drug free workplace policy and that such policy is in compliance with ***West Virginia Code*** §21-1D-5.

The above statements are sworn to under the penalty of perjury.

_____
(Company Name)

By: _____

Title: _____

Date: _____

Taken, subscribed and sworn to before me this _____ day of _____.

By Commission expires _____

(Seal)

_____
(Notary Public)

THIS AFFIDAVIT MUST BE SUBMITTED WITH THE BID IN ORDER TO COMPLY WITH WV CODE PROVISIONS. FAILURE TO INCLUDE THE AFFIDAVIT WITH THE BID SHALL RESULT IN DISQUALIFICATION OF THE BID.

Rev March 2009

RFQ No. _____

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:
"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (***West Virginia Code*** §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: _____

Authorized Signature: _____ Date: _____

State of _____

County of _____, to-wit:

Taken, subscribed, and sworn to before me this ___ day of _____, 20___.

My Commission expires _____, 20___.

AFFIX SEAL HERE **NOTARY PUBLIC** _____

Agency_____
REQ.P.O#_____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, _____ _____ of _____, _____, as Principal, and _____ _____of _____, _____, a corporation organized and existing under the laws of the State of ____ _____ with its principal office in the City of _____, as Surety, are held and firmly bound unto the State of West Virginia, as Obligee, in the penal sum of _____ ($_____) for the payment of which, well and truly to be made, we jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns.

The Condition of the above obligation is such that whereas the Principal has submitted to the Purchasing Section of the Department of Administration a certain bid or proposal, attached hereto and made a part hereof, to enter into a contract in writing for

_____

_____

_____

NOW THEREFORE,

(a) If said bid shall be rejected, or
(b) If said bid shall be accepted and the Principal shall enter into a contract in accordance with the bid or proposal attached hereto and shall furnish any other bonds and insurance required by the bid or proposal, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void, otherwise this obligation shall remain in full force and effect. It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be affixed hereunto and these presents to be signed by their proper officers, this _____day of _____, 20____.

Principal Corporate Seal

_____
(Name of Principal)

By_____
(Must be President or Vice President)

_____
(Title)

Surety Corporate Seal

_____
(Name of Surety)

_____
Attorney-in-Fact

IMPORTANT – Surety executing bonds must be licensed in West Virginia to transact surety insurance. Raised corporate seals must be affixed, a power of attorney must be attached.

BID BOND PREPARATION INSTRUCTIONS

AGENCY (A)
RFQ/RFP# (B)

(A)	WV State Agency (Stated on Page 1 "Spending Unit") Request for Quotation Number (upper right corner of page #1)
(C)	Your Company Name
(D)	City, Location of your Company
(E)	State, Location of your Company
(F)	Surety Corporate Name
(G)	City, Location of Surety
(H)	State, Location of Surety
(I)	State of Surety Incorporation
(J)	City of Surety Incorporation
(K)	Minimum amount of acceptable bid bond is 5% of total bid. You may state "5% of bid" or a specific amount on this line in words.
(L)	Amount of bond in figures
(M)	Brief Description of scope of work
(N)	Day of the month
(O)	Month
(P)	Year
(Q)	Name of Corporation
(R)	Raised Corporate Seal of Principal
(S)	Signature of President or Vice President
(T)	Title of person signing
(U)	Raised Corporate Seal of Surety
(V)	Corporate Name of Surety
(W)	Signature of Attorney in Fact of the Surety
NOTE:	Dated, Power of Attorney with Raised Surety Seal must accompany this bid bond.

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, **(C)** of **(D)**, **(E)**, as Principal, and **(F)** of **(G)**, **(H)**, a corporation organized and existing under the laws of the State of **(I)** with its principal office in the City of **(J)**, as Surety, are held and firmly bound unto The State of West Virginia, as Obligee, in the penal sum of **(K)** ($**(L)**) for the payment of which, well and truly to be made, we jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns.

The Condition of the above obligation is such that whereas the Principal has submitted to the Purchasing Section of the Department of Administration a certain bid or proposal, attached hereto and made a part hereof to enter into a contract in writing for **(M)**

NOW THEREFORE.

(a) If said bid shall be rejected, or

(b) If said bid shall be accepted and the Principal shall enter into a contract in accordance with the bid or proposal attached hereto and shall furnish any other bonds and insurance required by the bid or proposal, and shall in all other respects perform the agreement created by the acceptance of said bid then this obligation shall be null and void, otherwise this obligation shall remain in full force and effect. It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated

The Surety for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of time within which the Obligee may accept such bid: and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be affixed hereto and these presents to be signed by their proper officers, this **(N)** day of **(O)**, 20**(P)**.

Principal Corporate Seal

(R)

(Q)
(Name of Principal)

By **(S)**
(Must be President or Vice President)

(T)
Title

(U)
Surety Corporate Seal

(V)
(Name of Surety)

(W)
Attorney-in-Fact

IMPORTANT – Surety executing bonds must be licensed in West Virginia to transact surety insurance. Raised Corporate Seals must be affixed and a Power of Attorney must be attached.