



**RECHARGE  
FRESH**  
Securing Our Water Future

***Earned Value Management for  
Large Construction Contracts  
DPU, Water Division***

***Capital Project Oversight Board Meeting*** ***December 5, 2016***

**Discussion Topics**



- **What is Earned Value Management (EVM)**
- **EVM Metrics and Calculations**
- **Sample EVM analysis (SESWTF Construction Contract)**

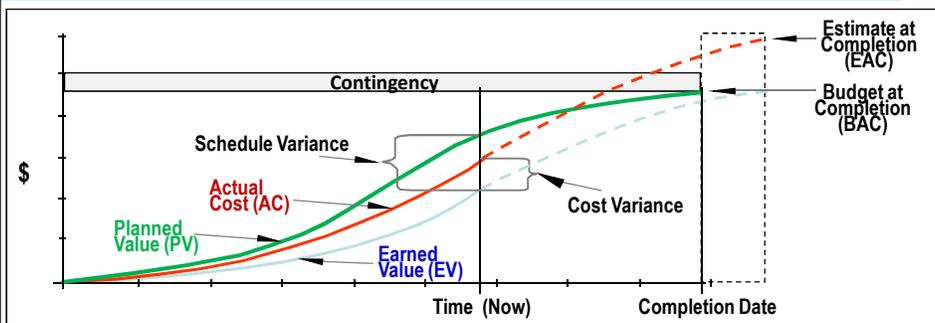


## What is Earned Value Management (EVM)?



- Enhanced PM technique to minimize cost & schedule risk.
- Aids objective monitoring of project performance and progress, through:
  - integrating measurements of scope, time and cost;
  - comparing physical accomplishments against planned work; and
  - comparing physical accomplishments against actual cost.
- Enables proactive project management, risk mitigation, and recovery planning.
- Essential features of EVM implementation include:
  - a project plan that identifies work to be accomplished;
  - a valuation of planned work, called Planned Value (PV); and
  - pre-defined “earning rules” to quantify the accomplishment of work, called Earned Value (EV).

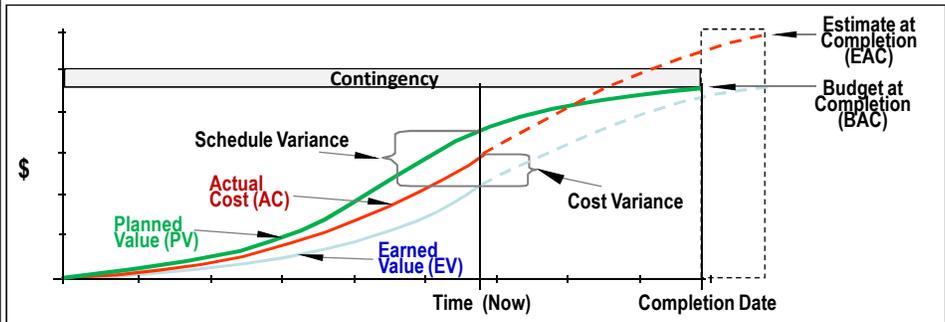
## EVM Metrics and Calculations



### DATA

- **Planned Value (PV)** – Budgeted cost of work scheduled.
- **Earned Value (EV)** – Budgeted cost of work performed. For construction contracts, same as Actual Cost except does not include change orders.
- **Actual Cost (AC)** – Actual cost of work performed including change orders.

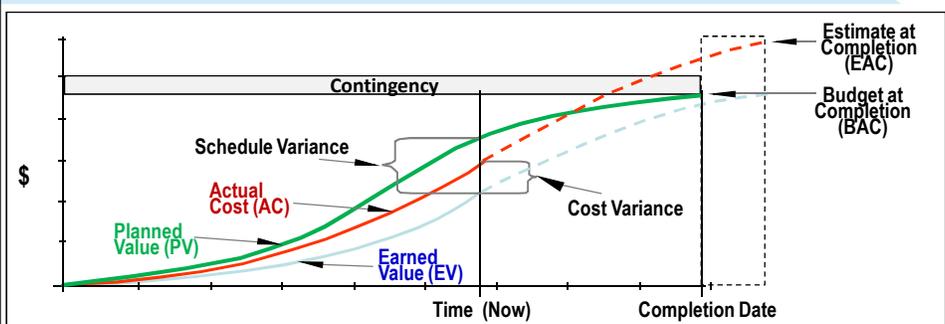
## EVM Metrics and Calculations



### VARIANCES (Favorable is positive, Unfavorable is negative)

- **Cost Variance (CV)** = Earned Value – Actual Cost
- **Schedule Variance (SV)** = Earned Value – Planned Value
- **Variance at Completion (VAC)** = Budget at Completion (BAC) – Estimate at Completion (EAC)

## EVM Metrics and Calculations



### PERFORMANCE INDICES (Favorable is > 1.0, Unfavorable is < 1.0)

- **Cost Performance Index (CPI)** = Earned Value / Actual Cost
- **Schedule Performance Index (SPI)** = Earned Value / Planned Value

## Sample EVM Analysis (SESWTF Construction Contract)



### OVERVIEW

- Conventional surface water treatment facility
- Initial capacity = 54 MGD, Re-rate to 80 MGD

### SCHEDULE

- Notice to proceed: 12/31/15
- Original duration: 1000 days
- *Addl days: 0 change, 0 rain*
- Final completion: 09/25/18
- Time elapsed: 27.5%

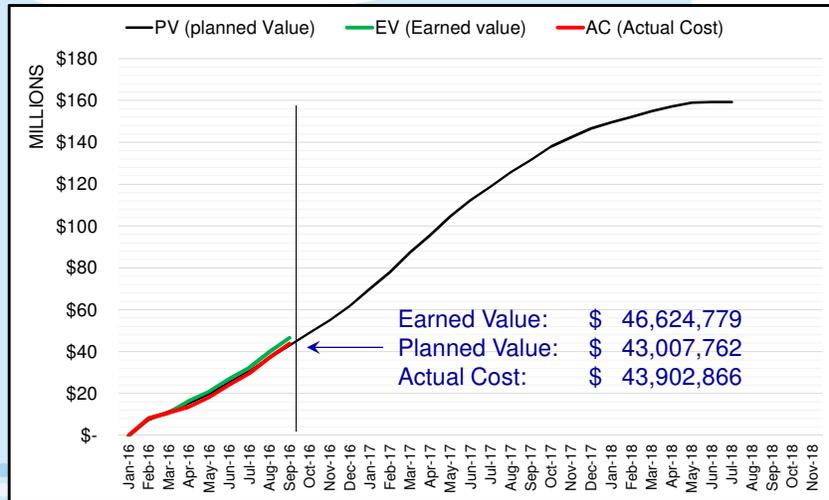
### CONTRACT VALUE

- Original contract: \$158,766,000
- Suppl budget: \$ 1,000,000
- Change orders: \$ 757,659
- Current contract: \$ 159,523,659
- Actual cost: \$ 43,902,866
- Percent spent: 27.7%

## Sample EVM Analysis (SESWTF Construction Contract)

Month	CPI		SPI		PV (planned Value)		EV (Earned value)		AC (Actual Cost)	
	(EV/AC)	(EV/PV)	(month)	(cumulative)	(month)	(cumulative)	(month)	(cumulative)	(month)	(cumulative)
Jan-16	1.00	0.00	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Feb-16	1.00	1.11	\$ 7,383,510	\$ 7,383,510	\$ 8,219,894	\$ 8,219,894	\$ 8,219,894	\$ 8,219,894	\$ 8,219,894	\$ 8,219,894
Mar-16	1.00	0.96	\$ 3,995,985	\$ 11,379,495	\$ 2,853,995	\$ 10,873,889	\$ 2,653,995	\$ 10,873,889	\$ 10,873,889	\$ 10,873,889
Apr-16	1.21	1.07	\$ 4,077,976	\$ 15,457,471	\$ 5,667,104	\$ 16,540,993	\$ 2,837,287	\$ 13,711,176	\$ 13,711,176	\$ 13,711,176
May-16	1.16	1.06	\$ 4,377,028	\$ 19,834,499	\$ 4,425,808	\$ 20,966,801	\$ 4,425,808	\$ 18,136,984	\$ 18,136,984	\$ 18,136,984
Jun-16	1.12	1.07	\$ 5,316,473	\$ 25,150,972	\$ 6,038,326	\$ 27,005,127	\$ 6,038,326	\$ 24,175,310	\$ 24,175,310	\$ 24,175,310
Jul-16	1.09	1.06	\$ 5,325,104	\$ 30,476,076	\$ 5,373,468	\$ 32,378,595	\$ 5,418,258	\$ 29,593,568	\$ 29,593,568	\$ 29,593,568
Aug-16	1.07	1.08	\$ 6,550,654	\$ 37,026,730	\$ 7,601,260	\$ 39,979,855	\$ 7,623,655	\$ 37,217,223	\$ 37,217,223	\$ 37,217,223
Sep-16	1.06	1.08	\$ 5,981,032	\$ 43,007,762	\$ 6,644,924	\$ 46,624,779	\$ 6,685,643	\$ 43,902,866	\$ 43,902,866	\$ 43,902,866
Oct-16	#DIV/0!	0.0	\$ 6,014,692	\$ 49,022,454						
Nov-16	#DIV/0!	0.0	\$ 5,955,140	\$ 54,977,594						
Dec-16	#DIV/0!	0.0	\$ 6,860,063	\$ 61,837,657						
Jan-17	#DIV/0!	0.0	\$ 8,155,953	\$ 69,993,610						
Feb-17	#DIV/0!	0.0	\$ 8,047,207	\$ 78,040,817						
Mar-17	#DIV/0!	0.0	\$ 9,528,224	\$ 87,569,041						
Apr-17	#DIV/0!	0.0	\$ 8,212,484	\$ 95,781,525						
May-17	#DIV/0!	0.0	\$ 8,889,557	\$ 104,671,082						
Jun-17	#DIV/0!	0.0	\$ 7,594,962	\$ 112,266,044						
Jul-17	#DIV/0!	0.0	\$ 6,567,484	\$ 118,833,528						
Aug-17	#DIV/0!	0.0	\$ 6,848,411	\$ 125,681,939						
Sep-17	#DIV/0!	0.0	\$ 5,898,178	\$ 131,580,117						
Oct-17	#DIV/0!	0.0	\$ 6,455,717	\$ 138,035,834						
Nov-17	#DIV/0!	0.0	\$ 4,447,368	\$ 142,483,202						
Dec-17	#DIV/0!	0.0	\$ 4,194,490	\$ 146,677,692						
Jan-18	#DIV/0!	0.0	\$ 2,848,111	\$ 149,525,803						
Feb-18	#DIV/0!	0.0	\$ 2,589,191	\$ 152,114,994						
Mar-18	#DIV/0!	0.0	\$ 2,848,111	\$ 154,963,105						
Apr-18	#DIV/0!	0.0	\$ 2,174,921	\$ 157,138,026						
May-18	#DIV/0!	0.0	\$ 1,898,740	\$ 159,036,766						
Jun-18	#DIV/0!	0.0	\$ 198,505	\$ 159,235,271						
Jul-18	#DIV/0!	0.0		\$ 159,235,271						

## Sample EVM Analysis (SESWTF Construction Contract)



**PERFORMANCE INDICES** (Favorable is > 1.0, Unfavorable is < 1.0)

Cost Performance Index, CPI = Earned Value / Actual Cost = 1.06

Schedule Performance Index, SPI = Earned Value / Planned Value = 1.08



## Questions

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