



**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)**

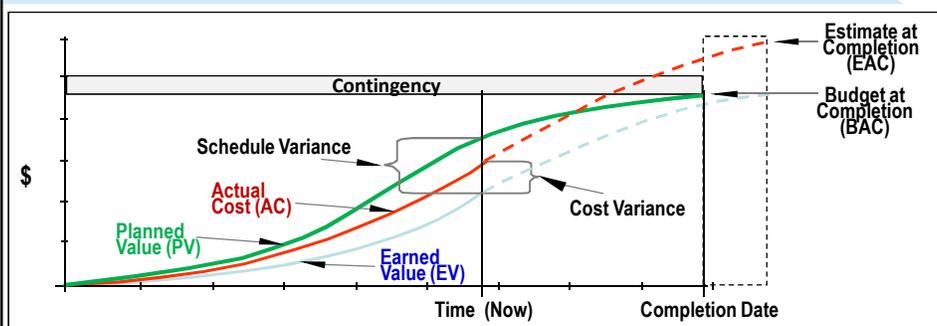


What is Earned Value Management (EVM)?



- 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).

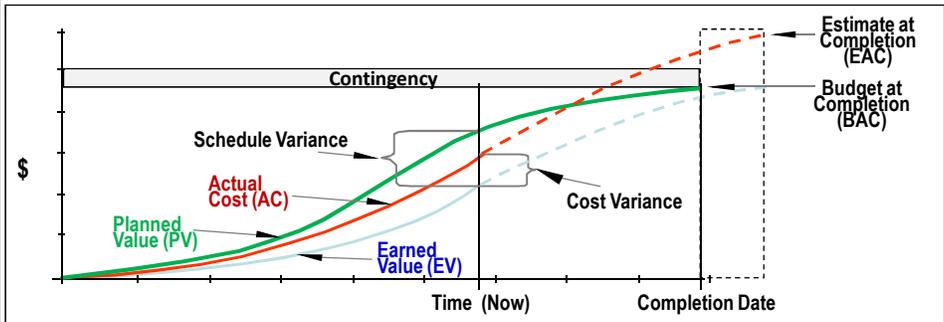
EVM Metrics and Calculations



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.

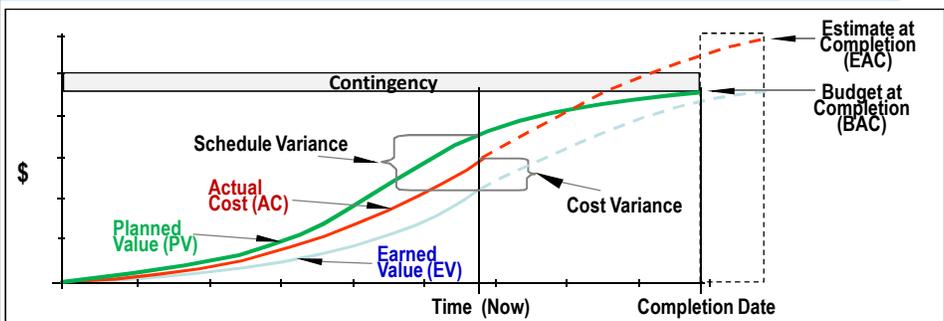
EVM Metrics and Calculations



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%

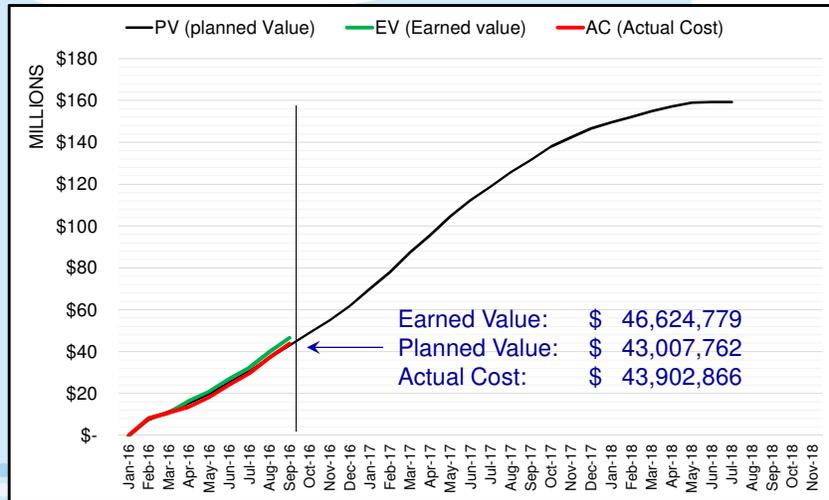
CONTRACT VALUE

- 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

www.RechargeFresno.com
1-888-FRESNOH2O