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TANK BOOSTER PUMP STATION PROJECT LESSONS LEARNED



Presenter

Brian Toppel

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PRESENTATION AGENDA

- Communications- Flow of Information
- Schedules
 - Update Enforcement
- Field Management
 - RFI's
 - Submittals
 - Work Directives
 - Change Orders
 - Payment Applications



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PRESENTATION AGENDA

- Tank
 - Impact
 - Alternatives
- Summary



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The Importance of Communication in Construction



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The Importance of Communication in Construction

- Construction projects involve numerous stakeholders, including architects, engineers, contractors, suppliers, and clients. Each party has specific roles and responsibilities that must be coordinated seamlessly to ensure the project's success. Effective communication helps to:



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The Importance of Communication in Construction

- Ensure that everyone is on the same page regarding project goals, timelines, and expectations.
- Facilitate the accurate transfer of information, reducing the likelihood of errors and misunderstandings.
- Enhance collaboration and teamwork among different parties.
- Enable timely decision-making and problem-solving.
- Foster a positive working environment, boosting morale and productivity.



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Impacts of Poor Communication on Construction Projects

When communication issues arise in construction projects, the consequences can be significant and far-reaching. Some of the key impacts include:

1. Project Delays

Delays are one of the most common consequences of poor communication. Misunderstandings, lack of coordination, and incomplete information can lead to work stoppages, rework, and missed deadlines. This can result in a cascading effect, where delays in one area impact subsequent stages of the project, ultimately extending the overall timeline.



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Impacts of Poor Communication on Construction Projects

2. Cost Overruns

Inaccurate or incomplete communication can lead to errors in material orders, labor allocation, and equipment scheduling. These mistakes often require costly corrections and can inflate the project's budget. Additionally, delays caused by communication issues can increase indirect costs, such as extended site management and rental expenses.



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Impacts of Poor Communication on Construction Projects

3. Quality Compromise

Effective communication is essential for ensuring that construction meets the required standards and specifications. Poor communication can result in misunderstandings about design intent, materials, and construction methods, leading to subpar workmanship and compromised quality. This can have long-term implications for the building's safety, functionality, and durability.



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Impacts of Poor Communication on Construction Projects

4. Increased Safety Risks

Safety is a paramount concern in construction projects, and effective communication is crucial for maintaining a safe work environment. Communication issues can lead to misunderstandings about safety protocols, inadequate hazard reporting, and insufficient training. This increases the risk of accidents and injuries, potentially endangering workers' lives and leading to legal liabilities.



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Impacts of Poor Communication on Construction Projects

5. Damage to Stakeholder Relationships

Construction projects are collaborative endeavors that rely on positive relationships between stakeholders. Poor communication can create misunderstandings, mistrust, and conflicts, damaging these relationships. This can result in a lack of cooperation, reduced morale, and even disputes that may need legal resolution.



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Communication Specific Issues- LA Vista Tank

1. Lack of Team Chemistry

- Evidence of personality conflicts between KKI and Water Works



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Communication Specific Issues- LA Vista Tank

2. Aggressive Management of Specification Requirements

- Baseline Schedule acceptance
 - There were 5 Revisions to Baseline Schedule- 3rd Revisions should have been accepted
- Payment Application processing
 - Requiring percentage breakdowns beyond the normal standard practices. This held up payments.



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Communication Specific Issues- LA Vista Tank

3. Clear Direction

- Several directives were issued that were incomplete in scope and cost estimations



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Lessons Learned- Communication Issues

1. Don't let communication issues between individuals continue!
 - Review possible replacement of staff members**
2. Specifications are not all black and white and there are areas that are subject to determination.
 - If the intent of the specification is being met that is acceptable.**
3. Provide clear scope and price projections when issuing Work Directives



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PROJECT SCHEDULE



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PROJECT SCHEDULE- Baseline

- A baseline Construction Project Management (CPM) schedule is crucial for the successful execution and completion of construction projects. It serves as a foundational tool that guides project planning, execution, monitoring, and control.
- A well-constructed baseline CPM schedule helps to synchronize efforts among various teams, subcontractors, and stakeholders. By clearly defining each activity's timeline and dependencies, it ensures everyone is on the same page, reducing the risk of misunderstandings and conflicts.



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PROJECT SCHEDULE- Baseline

- A good baseline CPM construction schedule is indispensable for managing complex construction projects. It offers numerous benefits, including improved planning, time management, resource allocation, risk mitigation, progress tracking, and enhanced communication.



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PROJECT SCHEDULE- Monthly Updates

- Monthly updates of a CPM schedule are crucial for effectively managing a construction project.
- Regular monthly updates allow project managers to accurately track the progress of ongoing activities. By comparing the actual progress with the planned schedule, they can identify any delays or deviations and take corrective actions promptly.
- Having an updated CPM schedule enables project managers to make informed decisions based on the latest data. This helps in addressing issues proactively and minimizing the impact of potential risks on the project timeline.



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PROJECT SCHEDULE- TIME IMPACT ANALYSIS (TIA)

- A TIA is a separate schedule with added impact activities that are inserted into the schedule prior to when a delay occurs.
- TIA's are the mechanism in which a Contractor can demonstrate that the delay was the sole and unavoidable cause for increasing the length of time required to complete the Work on the critical path.
- If a TIA is not provided, the Owner should not award a time extension.



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PROJECT SCHEDULE- LA Vista Tank

Contract Time- 600 Calendar Days

- NTP- 9.15.21
- Contractual Completion Date- 5.8.23
- Baseline Schedule Completion Date- 5.12.23- (4) day Delay from NTP to Actual Contract Start.



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PROJECT SCHEDULE- LA Vista Tank

UPDATES

General Comments:

- No digital copies of the schedule appear to have been provided, nor were there any narratives submitted by the Contractor as required by the specifications.
- There were no Time Impact Analysis (TIA) performed for any of the Change Order that granted time extensions.



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PROJECT SCHEDULE- LA Vista Tank

- **April 22**

- Contractual Completion Date- 5.12.23
- Completion Per April 22 Update- 7.28.23
- (77) Calendar Days Behind Schedule
- Cause of Delay- High Performance Coatings Fab & Deliver
- **No Recovery Schedule Submitted as Required by Article 5.16.2 of the General Conditions and Section 03111- CPM Construction Schedule**



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PROJECT SCHEDULE- LA Vista Tank

- **May 22**

- Cannot Locate May 22 Update in Project Files



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PROJECT SCHEDULE- LA Vista Tank

- **June 22**

- Contractual Completion Date- 5.24.23
 - (8) Days added per CO's 1,2,3,5&7. No schedule backup provided
- Completion Per June 22 Update – 7.12.23
- (50) Calendar Days Behind Schedule
- Cause of Delay- Submittal approval (KJ) for Water Storage Tank.
- **No Recovery Schedule Submitted**



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PROJECT SCHEDULE- LA Vista Tank

- **July 22**

- Contractual Completion Date- 6.8.23
 - (10) Days added per CO's 13&15. No schedule backup provided.
- Completion Date Per July 22 Update – 7.21.23
- (43) Calendar Days Behind Schedule
- Cause of Delay- Field Coatings (Water Tank Submittal Final Approval Received on 7.5.23, (307) calendar days **10 Months** after Submittal process began on 9.1.21)
- **No Recovery Schedule Submitted**



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PROJECT SCHEDULE- LA Vista Tank

- **August 22**

- Contractual Completion Date- 6.8.23
- Completion Per August 22 Update – 7.7.23
- (29) Calendar Days Behind Schedule- (14) Day Recovery from the July 22 Update
- Cause of Delay- Water Storage Tank
- **No Recovery Schedule Submitted**



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PROJECT SCHEDULE- LA Vista Tank

- **September 22**

- Contractual Completion Date- 6.21.23
 - (22) Days added per CO#18. (Weather) No schedule backup provided.
- Completion August 22 Update – 8.4.23
- (44) Calendar Days Behind Schedule- (15) Days lost since the August 22 Update
- Cause of Delay- Water Storage Tank. Testing of Yard Piping
- **No Recovery Schedule Submitted**



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PROJECT SCHEDULE- LA Vista Tank

• **October 22**

- Contractual Completion Date- 6.21.23
- Completion Per August 22 Update – 8.25.23
- (65) Calendar Days Behind Schedule- (21) Days lost from the September 22 Update
- Cause of Delay- Water Storage Tank. Testing of Yard Piping continued to push out.
- **Recovery Schedule Submitted**
 - **Revised Completion Date- 6.1.23**
 - **(20) Calendar Days Ahead of Schedule**
 - **(Toppel Reviewed Appeared Valid)**



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PROJECT SCHEDULE- LA Vista Tank

• **November 22**

- **TANK ISSUE**



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Lessons Learned- Schedule



1. Make Sure the Team has an Established Agreed upon Baseline, Schedule that meets the specifications with the understanding that the it is the Contractor's schedule

Don't Dictate the Schedule

2. When Reviewing Monthly Updates and the Project is significantly behind schedule, do not accept future updates until a recovery schedule is submitted.

Schedule recovery meetings (Pull Planning Sessions)

3. Time Impact Analysis (TIA's) must be submitted prior to awarding any Change Orders for Contract Time Extensions.



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FIELD MANAGEMENT



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FIELD MANAGEMENT- FLOW OF INFORMATION



- The main responsibility of the on-site Construction Manager is to be the facilitator of the Flow of Information



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FIELD MANAGEMENT- FLOW OF INFORMATION

Why Information Flow is Critical:



- **Coordination and Collaboration:**

- Construction projects involve numerous trades and specialists working simultaneously. Clear communication ensures everyone is on the same page and can coordinate their activities effectively.



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FIELD MANAGEMENT- FLOW OF INFORMATION

Why Information Flow is Critical:



• Accuracy and Timeliness:

- Accurate and timely information is essential for making informed decisions, planning tasks, and avoiding errors.



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FIELD MANAGEMENT- FLOW OF INFORMATION

Why Information Flow is Critical:



• Problem Solving:

- When issues arise, **clear communication channels** allow for quick identification, analysis, and resolution of problems



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FIELD MANAGEMENT- FLOW OF INFORMATION

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FIELD MANAGEMENT- FLOW OF INFORMATION

- **MAIN RESULTS OF BAD INFORMATION FLOW:**

- Incomplete, unclear, or delayed information can lead to misunderstandings and errors, resulting in rework and delays.
- Constantly dealing with communication breakdowns can be frustrating and demoralizing for workers, leading to reduced productivity and potentially impacting the overall project outcome.



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FIELD MANAGEMENT COMMUNICATION

• MAIN AREAS OF FIELD MANAGEMENT

- Request For Information (RFI's)
- Submittals
- Work Directives & Change Orders
- Payment Applications



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK



REQUEST FOR INFORMATION (RFI'S)



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• REQUEST FOR INFORMATION (RFI'S)

- Total RFI'S on the Project- **130**
- RFI's Prior to Termination- **128**
- RFI's Open After Termination- **4**



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• RFI'S- INDUSTRY STANDARD FOR NUMBER

• Project Duration:

- Projects lasting one year or less may have an average of around 270 RFIs, while those lasting five years or more can exceed 1,400.

• Project Size:

- Smaller projects, particularly those valued between \$5 million and \$50 million, may see a disproportionately high number of RFIs, with some analysis indicating around 17.2 RFIs per \$1 million of construction cost.

- LA Vista Tank Up CO#30- $\$8,986,710.73 = 155$ RFI's



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- **RFI'S- INDUSTRY STANDARD FOR NUMBER**

- **Unjustified RFIs:**

- A substantial portion of RFIs can be considered unjustified, meaning they could have been addressed by reviewing existing documents or didn't involve design changes, contributing to delays and costs.



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- **RFI'S- INDUSTRY STANDARD FOR NUMBER**

- **Response Times:**

- The time it takes to respond to an RFI can also vary, with some studies reporting median response times of around 9.7 days.
- LA Vista Tank General Conditions 0700 Indicates responses within 30 Days



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• RFI'S- INDUSTRY STANDARD FOR NUMBER

- **Unanswered RFIs:**

- A concerning number of RFIs, nearly 22%, may not receive a response, potentially leading to construction issues and potential lawsuits.

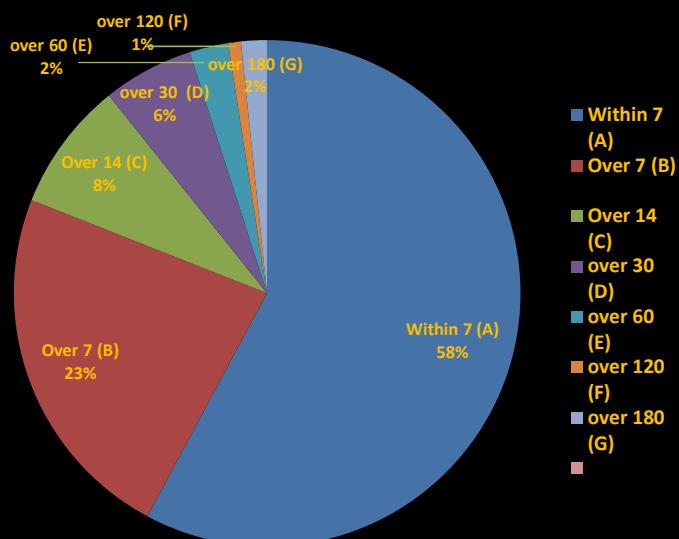


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Pie Chart of Owner/Owner's Consultant La Vista RFI Review Days

Based on 121 RFI's

Within 7	(A)	70
Over 7	(B)	28
Over 14	(C)	10
over 30	(D)	7
over 60	(E)	3
over 120	(F)	1
over 180	(G)	2



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SUBMITTALS



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- **SUBMITTALS- How Submittals Impact a Project:**

- **Ensuring Compliance and Quality:**

- Submittals provide a formal way for contractors to demonstrate that their proposed materials, products, and installation methods adhere to the project's specifications outlined in the contract documents.
- They help ensure that all elements of the project meet building codes, design tolerances, and quality standards, minimizing the risk of rework or costly repairs.
- By verifying that materials meet specifications, submittals help prevent the use of incorrect or substandard materials that could lead to delays or structural problems.



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- **SUBMITTALS- How Submittals Impact a Project:**

- **Enhancing Communication and Collaboration:**

- Submittals act as a formal communication channel between the contractor, architect, engineers, and other stakeholders, ensuring everyone is on the same page regarding materials, products, and installation methods.
- They help clarify design intent, resolve any ambiguities, and prevent misunderstandings that could lead to delays or rework.
- By facilitating clear and structured communication, submittals contribute to a more collaborative and efficient construction process.



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- **SUBMITTALS- How Submittals Impact a Project:**

- **Managing Risk and Minimizing Problems:**

- Submittals help identify potential issues or discrepancies early in the project lifecycle, allowing project teams to address them before they escalate into major problems.
- By reviewing submittals carefully, project teams can catch potential conflicts, design errors, or material shortages that could lead to delays or budget overruns.
- This proactive approach to risk management helps ensure that the project stays on track and within budget..



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **SUBMITTALS- How Submittals Impact a Project:**

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- **SUBMITTALS- How Submittals Impact a Project:**

- **Facilitating Planning and Scheduling:**

- Submittals provide detailed information about materials, products, and installation methods, allowing the project team to develop a more accurate schedule and budget.
- By identifying long-lead items or potential supply chain issues early on, submittals help project teams plan for potential delays and ensure that materials are available when needed.
- This proactive planning approach helps minimize disruptions to the project schedule and ensures that construction can proceed smoothly.



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- **SUBMITTALS- How Submittals Impact a Project:**



In essence, construction submittals are an essential part of the project lifecycle, contributing to quality, communication, risk management, and overall project success. They help ensure that the final product meets the project's requirements and specifications while minimizing the risk of delays, rework, and cost overruns.



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- **SUBMITTALS**

- Total Submittals on the Project – **275**, Includes Resubmittals
- Contract Review Time per Article 8, Paragraph 8.14- **30 Days**
- Submittals with Review Beyond 30 Days- **31**



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• SUBMITTALS

• Critical Submittals

- CPM Schedule- **5 Revisions**
- Water Storage Tank Shop Drawings- **4 Revisions**
- Chemical Tank Seismic Calcs- **6 Revisions**
- High Performance Coatings- **3 Revisions**



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WORK DIRECTIVES



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- **Purpose or Work Directives**

- Work directives in construction projects, also known as construction change directives or field orders, are instructions issued to the contractor to make changes to the project scope, schedule, or contract terms.
- These directives are necessary when a change needs to be made quickly, and there isn't time for a formal change order process.



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- **Common Reasons for Issuing Work Directives**

- Unforeseen Site Conditions
- Owner-requested changes
- Safety Concerns
- Urgent Matters that Require Immediate Action



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

• FIELD DIRECTIVES- LA VISTA TANK

- Work Directives Issued- **15**
- Work Directives Issued for Tank Issue-**7**



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CHANGE ORDERS



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- **CHANGE ORDERS- LA VISTA TANK**

- Change Orders Issued Including Reinstatement - **35**
- Total Change Order Amount- **\$ 1,899,722.11**
- **TOTAL PERCENT OF CONTRACT**
- Base Contract- **\$8381,907.00**
- Current Contract Amount- **\$10,281,629.11**
- Percent of Contract- **23%**



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- **CHANGE ORDERS- PRIOR TO REINSTATEMENT**

- Change Orders Issued Prior to Reinstatement - **31**
- Total Change Order Amount- **\$ 639,571.04**
- **TOTAL PERCENT OF CONTRACT**
- Base Contract- **\$8,381,907.00**
- Contract Amount- **\$ 9,021,478.04**
- Percent of Contract- **7.6%**



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• CHANGE ORDERS- LESS TANK ISSUES

- Change Orders Issued Prior to Tank- **22**
- Total Change Order Amount- **\$ 212,291.11**

• TOTAL PERCENT OF CONTRACT

- Base Contract- **\$8,381,907.00**
- Contract Amount- **\$ 8,594,198.11**
- Percent of Contract- **2.5%**



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK



PAYMENT APPLICATIONS



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- **Importance of Progress Payments to Contractors:**

- **Cash Flow Management:**

- Progress payments ensure a steady stream of income as work progresses, helping contractors manage their finances and cover ongoing expenses like materials, labor, and subcontractors.



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- **Importance of Progress Payments to Contractors:**

- **Project Cost Management:**

- By receiving payments throughout the project, contractors can better track and manage project costs, potentially preventing overruns.



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **Reduced Financial Risk:**

- Progress payments minimize the financial risk associated with lengthy projects or large contracts, as contractors don't have to wait until the end to get paid.



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **Streamlined Project Tracking:**

- The regular payment schedule helps contractors monitor project progress and identify potential issues early on.



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- **Importance of Progress Payments to Contractors:**

- **Motivation and Confidence:**

- Consistent payments build confidence in the project and can boost morale for both the contractor and their team.



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **Improved Relationships:**

- Progress payments, along with transparent communication about project progress, can foster strong relationships between contractors and clients.



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- **Importance of Progress Payments to Contractors:**

- **Protecting Against Nonpayment:**

- Progress payments give contractors the opportunity to stop working on a project if they don't receive payments as agreed upon.



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **Meeting Contractual Obligations:**

- Progress payments help contractors meet their contractual obligations by providing the necessary funds to complete work on schedule.



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **LA Vista Tank Payment Issues**

- Progress Payment Applications were not processed in a timely manner due to what appears to be excessive revisions required by the CM



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FIELD MANAGEMENT COMMUNICATION: LA VISTA TANK

- **Importance of Progress Payments to Contractors:**

- **LA Vista Tank Payment Issues**

- Payments to the Contractor stopped when the Tank Issue was discovered causing financial hardship for the Contractor and its' trade partners.
 - Result Contractor could no longer work on the project and a claims were filed.



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Lessons Learned- Field Management

1. Establish Good Flow of Information

- Key to Success**

2. Timely Processing of RFI's and Submittals

- Reduce the 30-Day Review Time on RFI's**
- Identify Critical Submittals and Assist in any Issues with Approvals**
- Tank Submittals took over 10-Months**



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Lessons Learned- Field Management

3. Work Directives

- Issue Directives that are Complete**

4. Payment Applications

- Timely Payments are Critical for Project Success**
- If Contractor is Owed, Payment Needs to be Released**

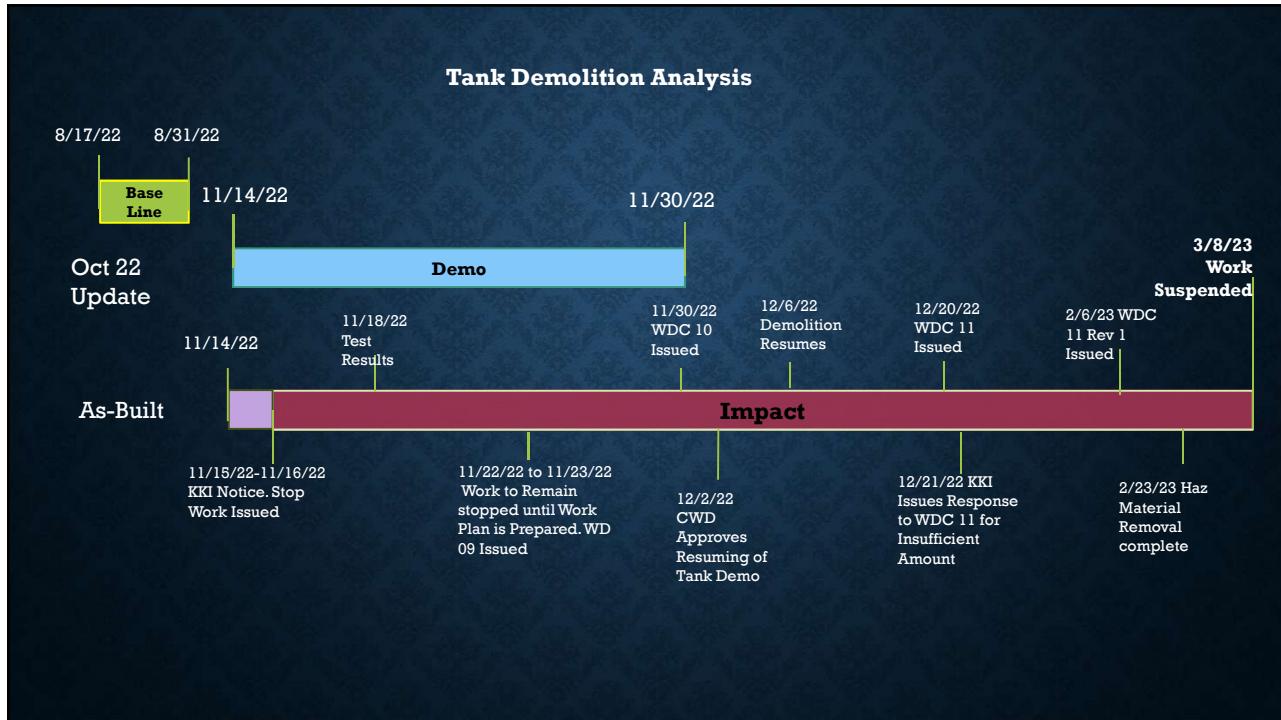


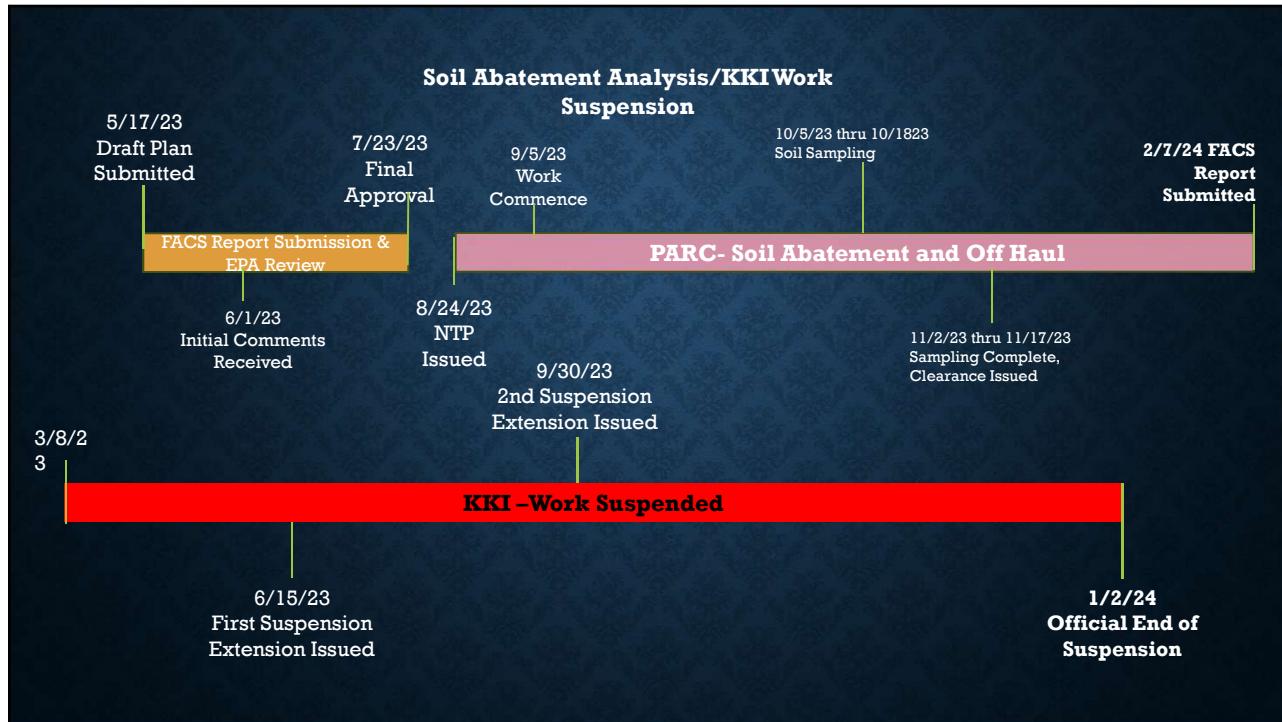
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LA VISTA TANK- EXSISTING TANK



EXISTING TANK ISSUE





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LESSONS LEARNED- TANK

1. When a critical issue comes up, all resources should be immediately allocated to solve the issue as soon as possible.
 - a) Review the Use of Extraordinary Measures Section 5.16.5
2. Only issue a Work Directive that contains recommendations from a consultant that specializes in that specific area.
3. Determine the full scope, obtain a ROM at a minimum before issuing a directive



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LESSONS LEARNED- TANK

4. Avoid issuing multiple directives for the same issue. There were (7) Directives Issued for the Tank
5. Issue payments for Work Directives when sufficient backup is given
6. Settle claims as soon as possible. Neither party benefits from a long-drawn-out process

Don't get into a Letter War!



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LA VISTA TANK- LESSONS LEARNED



LESSONS LEARNED SUMMARY



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LESSONS LEARNED- SUMMARY

1. Know the Contract, but be amiable to contractor meeting the intent of the contract
2. Establish Effective Communication – Flow of Information
3. Keep Contractor Working
 1. Negotiate Claims Early
 2. Extraordinary Measures
4. **Contractor Problems are Owner Problems!**

