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NGS CONCLAVE ON CONSTRUCTION MANAGEMENT

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EXECUTION OF 60 KTA PP PROJECT AT PATA

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Plan of the Presentation

	Part	Topic
☐	Part I:	Background: Project details
☐	Part II:	Project Execution Flow
☐	Part III:	Ordering
☐	Part V:	Delivery
☐	Part IV:	Construction
☐	Part V:	Pre commissioning and Commissioning

☐ **Questions & Answers / Discussions?**

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60 KTA POLYPROPYLENE UNIT AT PATA

Event	Date
Board approval:	5th Mar'2019
Licensor selection:	4th Sept'2020
Scheduled Mechanical completion:	31st Jan 2024
Mechanical completion:	31' Oct 2025
Commissioning:	4th Feb 2026

Licensor: M/s Grace technologies Inc
EPCM consultant: EIL
Environment clearance: 16th Oct' 2020.

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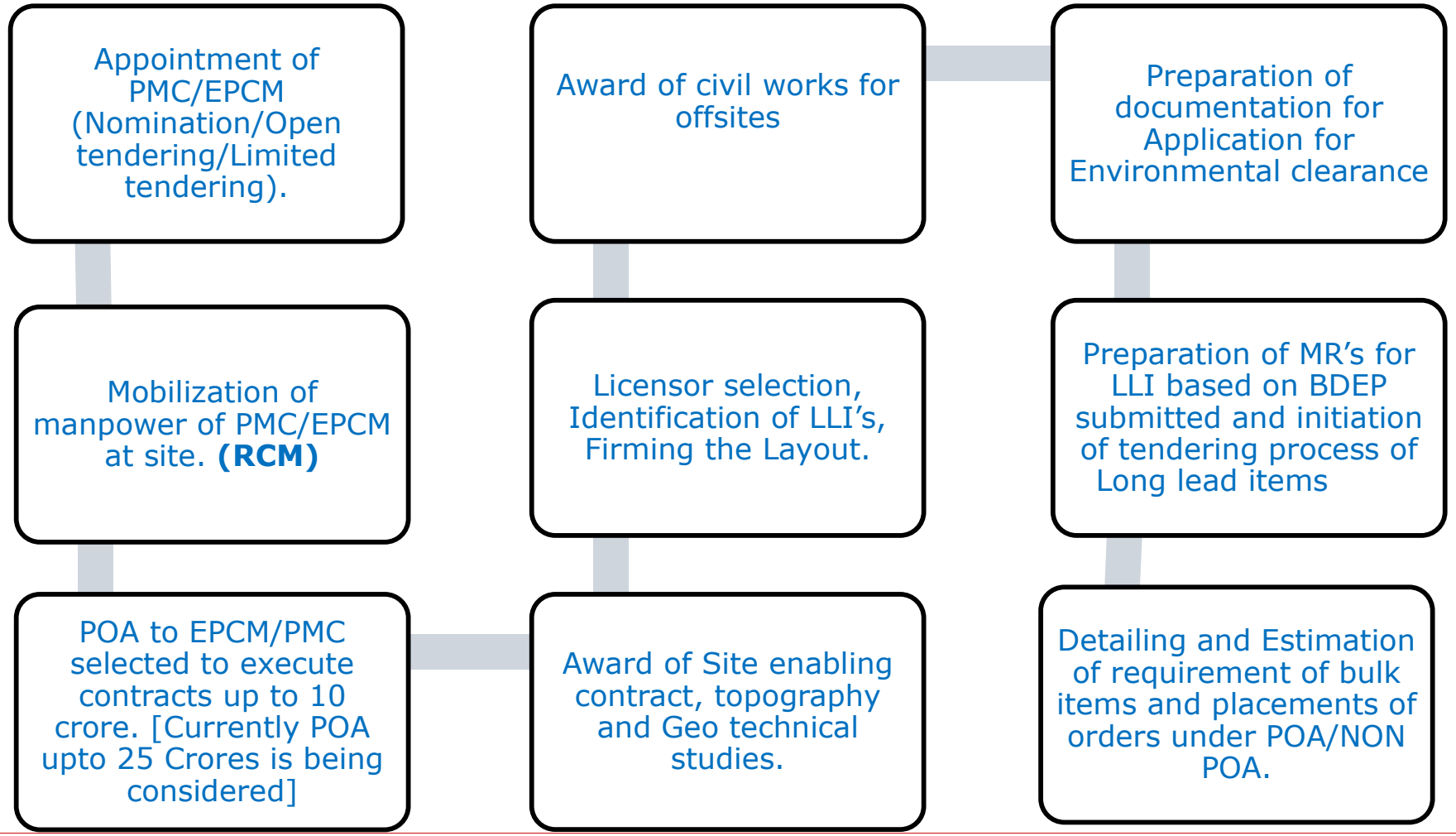
PROJECT EXECUTION FLOW



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PROJECT EXECUTION contd..

Based on datasheets of LLI's and detailed engineering, Civil and structural works for unit is awarded.

HAZOP & 3D modelling of the Project in presence of Licensor. HAZOP and 3D modelling of LLI items

After award of first LLI, Ensuring award of CHA & registration of Contract with customs for Project rate of customs duty

Once the foreign vendor is ready for shipment, coordination with various stakeholders like CHA, Finance.

Ensuring contractual compliances like LC, CPBG, ABG

As and when LLI's are awarded, Essentiality certificate is applied for Project rate of Custom duty.

Coordination is must to avoid demurrage and delayed custom clearance..

Freezing of scope and Floating of tender for Composite works.

Award of Composite work. Planning to ensure sufficient gap between C&S works and Composite works for adequate work front.

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CHALLENGES: Ordering

Issues:

- A detailed pre-tender meeting involving critical packages always leads to fewer queries in the subsequent tendering process.
- Various vendors do submit their proposal for extension of time duration or change in BEC criteria.
- The extension of delivery time duration is normally 10-20% of the original proposed time citing reasons like work overload, infeasibility etc.
- Most LLI's for PP Pata Project were single bid

Probable Solutions:

Often Pre tender meeting is most overlooked part but if bidders queries are properly addressed, recorded and incorporated in draft tender, it can help in increasing competition as well as reduced pre bid queries and in turn reduced lead time in tender processing.

Draft BEC from PMC must be presented to Tender committee for their comments before formal process for approval is initiated.

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CHALLENGES: Ordering

1. **LICENSOR MANDATORY VENDORS**: Some critical items of the project need to be procured only through Licensor mandatory Vendor.

Past experience shows Procurement from these vendors is cumbersome:

Issues:

a) Take lot of deviations to GAIL's C&P procedure.
b) Some require advance payment before fabrication.
c) Email tendering as prerequisite
d) CPBG waiver
e) Estimate is less within 10 Crore.
f) GTE approval is required.

Probable Solutions:

1) Identification of these items is more critical.
2) Scope of supply to be included in the relevant MR or composite works contractor. Example: Static probes in Reactor package.

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CHALLENGES: Ordering

Issues:

- Inaccurate estimates lead to retendering as the bids of the sole bidder for long lead item was more than 60% of corresponding estimate.
- Delay in LC opening leading to delayed delivery of high value long lead items due to change in port of exit, part shipment.
- No provision for payment as per part shipment.
- Bidder quoting on the basis of experience of sister concern

Probable Solutions:

- In house estimates should be always compared to a recent order not more than 3-4 years old by PMC.
- Further the estimate must include inflation, movement in metal prices to have a realistic picture.
- Allowing transshipment and part shipment in tender itself.
- Sea port of Exit is generally filled by vendor in forms/formats but changed later on after placement of order. Provision for giving 2-3 options in sea-port of exit .
- For Nitrogen and unloading compressor, BEC approval was granted incorporating clause for sister concern.
- Awarding of custom clearance agency before award of LLI items.

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CHALLENGES: Post Ordering

PAYMENTS: Time is essence of Project so are Payments to Vendors. Timely payments ensure timely delivery which in turn ensures timely completion.

FOR FOREIGN VENDORS:

Issues:

a) Delay in LC opening.
b) Requirement of form 10F, TRC, No PE for opening LC and foreign payments.
c) Most of the time ABG formats don't match with GAIL's format.

Prior action is required:

1) Submission of 10F, TRC and NO PE one month before shipment.

2) Draft LC timeline to be shared with vendor for comments and subsequent resolution.

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CHALLENGES: Post ordering

PAYMENTS:

CPBG SUBMISSION & MATERIAL CODES

Requirement:

a) Timely submission of CPBG (within one month from the date of issuance of FOA).

b) Release of Purchase order on time for releasing payment

Issues:

1) Most of the bidders fail to submit CPBG within one month of issuance of FOA.
Example: Cases awarded under POA by EIL.

2) Material has reached site, however payments are stuck due to non submission of CPBG on time.

3) Absence of material codes leading to delayed release of Purchase order.

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CHALLENGES: Delivery

Issues:

- Supply of loose spools as a part of package equipment like Extruder.
- Vendor supplied loose spools to expedite delivery instead of pre-fabricated spools as part of package equipment.
- Custom clearance and EC.

Way forward:

- Never accept delivery of loose spools as it will only delay the erection as installation process.
- Provision shall be also there for billing breakup as part shipment necessitates change in payment milestones. Happened in case of LLI's like Extruder, PCS, Vent recovery compressor.

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CHALLENGES: Construction

BROWNFIELD PROJECT:

Requirement:
As per OISD -192, Safety Practices during construction mandates separation of construction area as well as operating plant area in terms of clear demarcation.

Barricading of the entire PP unit as well as mounded bullet area was carried out before starting works inside the unit are mounded bullet area.

Separate entry gate for contract workers

Barricading of PP unit and Mounded bullet area.

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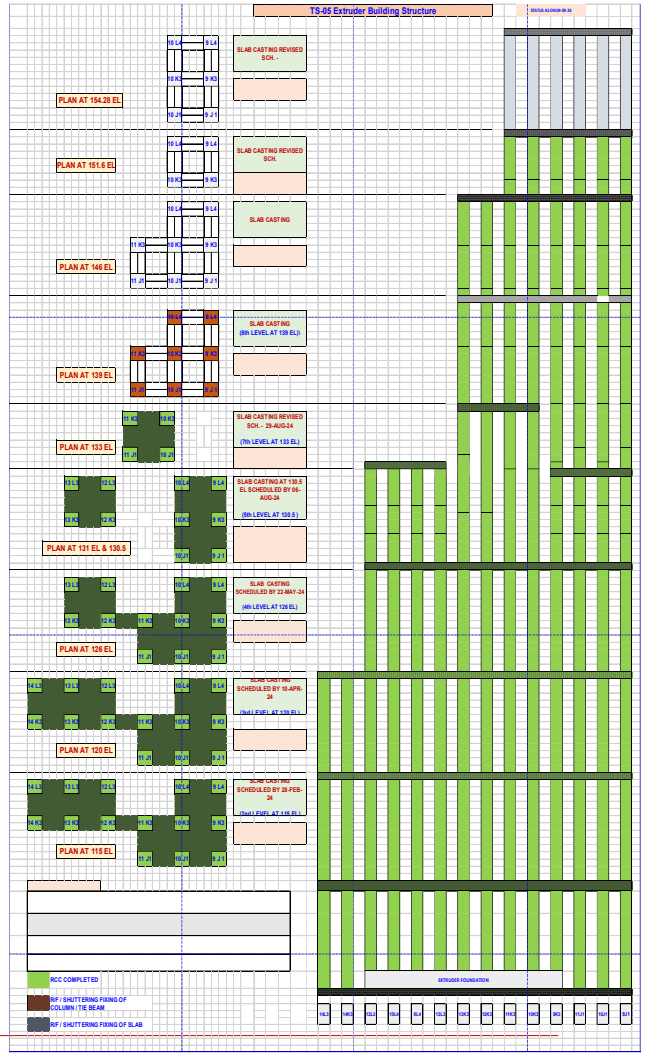
CONSTRUCTION CHALLENGES

Issue: TS#5 (Extruder structure) is the highest RCC structure in the PP Unit — 56.0 m of concrete across 12 slabs at different elevations. Conventional staging needed extra horizontal space for stability at each level, and each elevation's work-front could only open after the elevation above was cast and its staging removed — a sequential process that would have taken roughly one year.

Action taken: A cantilever-type staging arrangement was used above 30 m height, repeated at each successive elevation. This freed lower elevations for equipment and piping work in parallel with ongoing concreting above, saving more than six months of schedule



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CONSTRUCTION CHALLENGES

Issue: The TS#5 steel structure above the +58 m concrete level was originally planned for piecemeal erection at extreme height — a method that, based on the erection philosophy followed, could have taken several months to complete safely.

Action taken: Two large modules were fully fabricated at grade level and erected as complete units, each finished on the same day it was lifted, instead of building up piece by piece at height. This modular approach saved major schedule time versus the piecemeal plan.

TS-05

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CONSTRUCTION CHALLENGES

Issue: The product warehouse roof truss was fabricated as a single 32 m frame. During the lift, the long unsupported frame buckled at mid-span as it was raised into position.

Action taken: Loose temporary members — channels and angles — were bolted longitudinally and diagonally across the truss to stiffen it during lifting, preventing further buckling and allowing the truss to be placed successfully.

PP Product Warehouse

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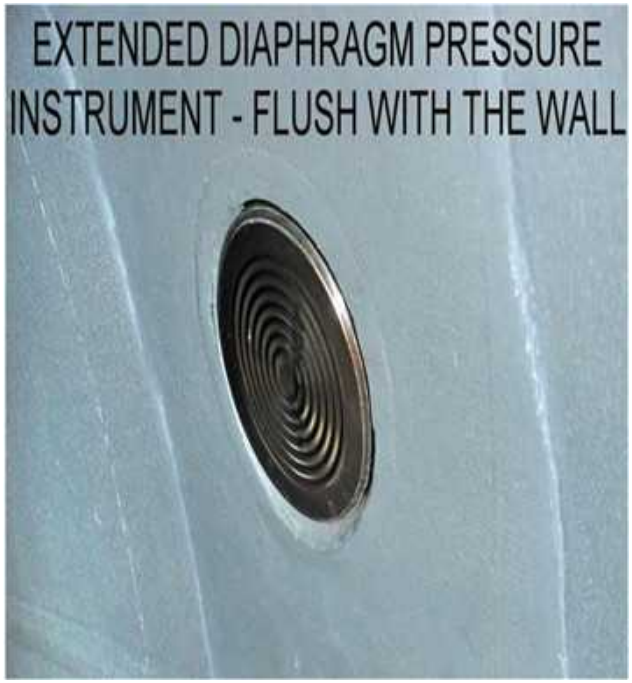
CONSTRUCTION CHALLENGES

Issue: Extended diaphragm-seal type pressure transmitters could not meet the licensor's requirement because the vessel nozzle projected too far — creating a risk of excess polymer deposition and inaccurate pressure measurement.



Action taken: The excess nozzle projection was trimmed on site, in line with the diaphragm's extended length, under the direct supervision of the vessel vendor.

Recommendation: *to review vessel nozzle projection against diaphragm extension with Instrumentation and Licensor, and correct nozzle length under vessel-vendor supervision during fabrication.*

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CONSTRUCTION CHALLENGES

Issue: 40 skin thermocouples with collar-less thermowells could not be installed because of an approximately 1 mm mismatch between thermowell OD and reactor nozzle ID. Both the thermocouples and the reactor were supplied by the same vendor, M/s VTV.

Action taken: The vendor was summoned to review the mismatch on site and carried out machining of the nozzle inside wall, restoring clearance for proper thermowell insertion into all 40 reactor nozzles.

Support rungs and ladders are not part of BEDP. There is high chance of polymer growth around these support rungs.

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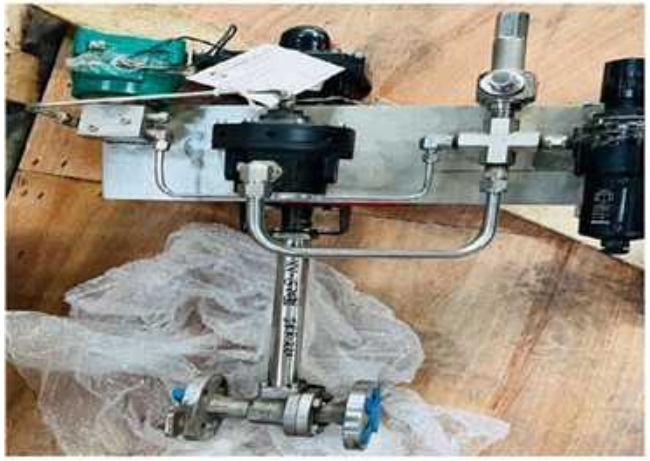
CONSTRUCTION CHALLENGES

Issue: Tubing and fittings for the Kill System, Donor Supply and Slurry Catalyst Supply distribution systems were procured through the Composite Contractor from an EIL-approved vendor. Based on field experience, licensor M/s Grace — and GAIL— specifically insisted on Swagelok-make tubing and fittings.



Long stem valves not suitable for Teal service

Action taken: The contract specification read "Swagelok and equivalent," and the procured material was a verified Swagelok-equivalent product from an EIL-approved vendor. To protect the project completion timeline, the already-procured tubing and fittings were retained for execution at site.

RECOMMENDATION: *Obtain licensor concurrence on any specific makes at the initial project stage and state them explicitly in procurement documents, to avoid rework, delay and deviation later in execution.*

TEAL lines are small bore, any ingress of debris or foreign particles will be difficult to remove and could cause issues during pre-commissioning and commissioning. Ensure they are properly capped and preserved.

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CONSTRUCTION CHALLENGES

Issue:

- Licensor data called for Class 1 internal cleaning of the Reactor, columns and other vessels,
- Columns CC-5260 and reactor 201-R-B-4301 — arrived at site without proper internal cleaning or painting.
- Nitrogen preservation was ineffective since nozzles were routinely opened during piping.

- **Action taken:** Specialist vendors were engaged to blast-clean vessels and columns from the inside.
- In three phases, two columns, nine vessels and one reactor were cleaned and painted internally per licensor guidelines — removing and later re-installing column internals/trays after coating cure and acceptance, using special tools for confined-space blasting where diameters restricted man-entry.

RECOMMENDATION: *Enforce licensor cleaning/BDEP requirements at fabrication and procurement stage; equipment received with internal surfaces already painted would minimize site rework.*

Rust and debris inside columns and reactors.

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CONSTRUCTION CHALLENGES

Issue: The licensor checklist explicitly called for deletion of baffle plates in vessels VV-4040A/B and no mesh inside vessel VV-4312, to minimize resin accumulation. However, the equipment was received from the vendor already fitted with baffle plates and mesh.

- **Action taken:** Respective vendors were summoned and modifications were carried out in their presence — including removal of the already-installed vessels from the Tech Structure, cutting and flushing internally, and re-installation in position. This added time but contributed to a smooth commissioning at the later stage.

Possibility of Resin accumulation on screen. Observations during Licensor construction review.

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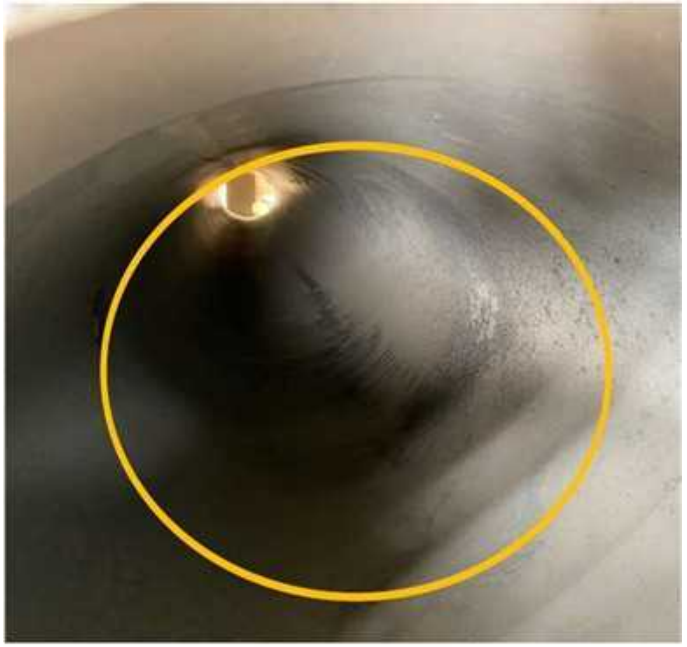
Pre commissioning

Issue: Cycle gas compressor suction and discharge piping required special (Class 1) cleaning, but the Composite Contractor's mobilized Class-1 vendor had no tooling capable of blasting and painting lines below 6 inch — leaving small-bore lines such as LPD and HPV uncovered.

- **Solution:** Lines 4 inch and below were routed for chemical cleaning instead: welds were made with minimum protrusion (inside flush) on specs B21A, B29A, B28K etc., hydrotested, dried, then blasted and painted. Golden joints tied these chemically-cleaned lines into headers already completed with Class-1 cleaning — closing the coverage gap across all line sizes.



Debris is CG line

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Key takeaways:

1. Planning for Tie-ins as you are dependent on the complex shutdown for tie-ins. The window must be utilized effectively.
2. Civil and structural works are the most critical civil activities, as all mechanical, piping, and E&I works depend on them. Delay in C&S works impact the whole project schedule.
3. Liquidation of Licensor's queries from 40% construction review is critical for going ahead with commissioning.
4. Cleaning of reactors, vessels, columns, and lines is a mandatory prerequisite for downstream unit commissioning which are often on the critical path just before start-up.
5. O&M support from Pata provided experienced manpower for commissioning, reducing dependency on new hires.
6. Material synergy from existing site inventory reduces procurement lead time for commissioning consumables.
7. Shared use of existing workshops, calibration labs, and testing facilities from the brownfield complex.

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Overall view:

Dedication

When you share your wealth with others, your own wealth shrinks.
When you share your knowledge with others, your own knowledge increases.
~ Chanakyā

Thank You!