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A Study on the Current State of Internal Control over Engineering Costs in a Natural Gas Company A

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Abstract: Against the backdrop of emerging new energy innovations and evolving macroeconomic and market conditions, China has vigorously advanced the transformation of energy enterprises under the national green energy strategy, marking a new phase for domestic economic and new energy development. For natural gas enterprises, scientific and effective cost management of construction projects is essential for ensuring engineering quality, cutting operational expenditures and improving comprehensive benefits. Deficiencies in project cost control may impede the development of core businesses and exert adverse effects on corporate operational performance and brand reputation. This study takes A Natural Gas Company as the research subject and investigates its whole-process internal control system of project costs, covering preliminary budget compilation, in-progress cost supervision and completion settlement management. It systematically summarizes the company's current management frameworks and control approaches, identifies prominent problems and associated negative impacts in cost supervision, and further explores the underlying causes of these issues. Corresponding optimization strategies are proposed, including the adoption of the earned value method, the introduction of intelligent monitoring technologies, the establishment of a supervision unit qualification access system, and standardized financial management for infrastructure construction, so as to enhance the efficiency of project cost control and project execution for the enterprise.

Keywords: Internal Control; Project Cost; Natural Gas Company; Construction Project; Cost Management

1. Introduction

The energy sector is presently undergoing profound transformation, propelled by robust national policies that support corporate transition and facilitate the shift from traditional electricity generation to renewable energy. The "Four Collaborations" green energy strategy delineates a clear direction for the development of new energy sources. Against this backdrop, energy enterprises primarily engaged in natural gas confront immense operational pressures and formidable challenges in transformation. Their infrastructure projects—such as pipeline construction and urban gas distribution systems—are characterized by substantial investment, extended timeframes, and multiple complex phases. The management and control over engineering costs are thus critically linked to the company's profitability and competitive standing. Concurrently, heightened national requirements for internal control within state-owned enterprises have prompted regulatory bodies to issue numerous standards mandating the integration of internal controls throughout the entire project lifecycle. Nevertheless, cost management in natural gas enterprises remains plagued by issues such as insufficient budget precision, absence of dynamic monitoring, and inadequate oversight, all of which hinder the full realization of internal control efficacy. Therefore, conducting relevant research holds significant practical importance. Taking Company A, a natural gas enterprise, as the case study, this paper explores the subject's theoretical and practical significance. Theoretically, there is a scarcity of specialized research on the engineering cost internal control of the natural gas enterprises in the academic community at present. This paper, through in-depth analysis of Company A, enriches the empirical research in this field and provides a reference case for subsequent studies. Practically, this paper sorts out the prominent problems in

the internal control of engineering costs of Company A, combines the actual situation of the enterprise to propose operational optimization schemes such as introducing the Earned Value Method, intelligent supervision, and the qualification access system for supervisors, which can not only help Company A improve its control level but also provide a reference for similar energy enterprises to improve their internal control systems, and promote the standardized and refined management of state-owned energy enterprises. The paper unfolds around the internal control of engineering costs of A Natural Gas Company, following the logic of "theoretical basis - current situation description - problem diagnosis - countermeasure suggestions". Firstly, it defines relevant concepts, sorts out the goals and methods of engineering cost internal control, and constructs a theoretical analysis framework; Secondly, combined with the basic situation of Company A, it describes and evaluates the current operation status of its internal control from three dimensions: design budget preparation, dynamic control of engineering costs, and completion settlement control; Thirdly, it analyzes the core problems and root causes of internal control such as engineering cost exceeding budget, construction collusion game, and lax supervision of qualification for supervisors; Finally, from the aspects of optimizing costs with the Earned Value Method, intelligent supervision, and qualification access system for supervisors, it proposes systematic improvement suggestions. The research is conducted using the methods of literature research, case analysis, and comparative analysis.

Internationally, academic inquiry into internal control over engineering costs commenced relatively early, culminating in a mature theoretical framework. Scholars universally emphasize dynamic control throughout project lifecycles, advocating for the integration of cost management into every phase of project execution. The COSO Committee's 1992 Integrated Framework for Internal Control, delineating five core elements, offers a systematic toolkit for cost governance. The Earned Value Management (EVM) methodology, initially deployed in U.S. Department of Defense projects in the 1960s and subsequently adopted across construction, energy, and other sectors, has become the predominant approach to cost and schedule control. Moreover, burgeoning research on the application of technologies such as Building Information Modeling (BIM), big data analytics, and artificial intelligence enhances cost forecasting and risk surveillance. However, focused studies specific to the natural gas industry remain comparatively scarce.

In China, scholarly achievements have flourished in recent years, presenting diverse perspectives. Li underscores the scientific formulation of municipal landscaping project budgets and lifecycle-wide control [1]; Wang highlights the pivotal role of internal control systems and specialized teams in cost governance within construction firms [2]; Peng advocates for the incorporation of risk management into auditing processes for construction enterprises [3]; Zhang proposes establishing dynamic risk warning mechanisms in subway engineering [4]; Wang develops a preventive risk management system tailored to electric power projects [5]; Li et al. explore optimization pathways for cost control in university construction projects [6]. Collectively, domestic research prioritizes industry application, yet studies specifically targeting natural gas enterprises are insufficiently developed, with limited systematic depth and rigor.

In summary, existing literature furnishes a valuable foundation for this study. While international research methodologies are robust, they lack localized adaptation; domestic investigations emphasize industry-specific cases but exhibit a paucity of systematic analysis within the natural gas sector, alongside a deficiency in the application of quantitative instruments and refined optimization strategies. Drawing upon these extant works and using Company A as an empirical case, this paper introduces innovative approaches such as Earned Value Management and intelligent supervision systems to fill the research void, thereby contributing meaningfully to both theoretical discourse and practical implementation.

2. Overview of Internal Control over Engineering Costs

According to the national standard GB/T50875-2013, engineering cost refers to the aggregate expenditures incurred during the construction process—that is, the entirety of costs either preliminarily estimated or ultimately settled during the actual building phase of a

project. From an investment perspective, it encompasses all fixed inputs, whether projected or expended, essential to achieving the project objectives, including production activities, fixed assets, intangible assets, and temporary working capital. The engineering budget comprises all necessary expenses, with project transaction prices primarily influenced by prevailing market conditions. Various contracting modalities base their pricing on cost accounting, wherein the total contract amount for a construction project is constituted by both direct and indirect expenditures. Enterprises are required, in accordance with regulatory mandates, to forecast costs through quota budgeting and acquisition of cost data; fundamentally, engineering cost epitomizes the comprehensive expenses of project execution.

2.1 Objectives and Approaches of Internal Control over Engineering Costs

2.1.1 Definition of internal control over engineering costs

Internal control over engineering costs embodies the deployment of systematic engineering principles to enforce comprehensive supervision and management of all expenditures during the construction phase. This process necessitates a rigorous analysis of the organizational architecture's capacity, precise identification of operational deficiencies, and a holistic exploration of cost control methodologies alongside latent risk factors. The enterprise's cost control apparatus must be activated preemptively, prior to budget overruns, employing internal controls to promptly detect emerging risks, oversee anomalies, rigorously enforce established cost restrictions, and address significant deviations. Continuous budget supervision ensures expenditure fluctuations remain within manageable limits, while preventative measures and expense optimization augment the robustness of the internal control framework. The management of engineering construction costs comprises three interrelated stages: strategic decision-making and initiation, construction execution, and completion and settlement. The preliminary decision-making and budget planning phase is fundamental, as feasibility analyses and preliminary designs critically delineate the financial scope; the construction phase concentrates on managing essential elements such as labor allocation, material procurement, equipment leasing, and fund disbursement, vigilantly restraining expenditures; the project closure phase prioritizes identification of overspending risks, timely rectification, dynamic monitoring of expenditure data, and precise intervention to curtail aberrant variances, thereby securing alignment with budgetary objectives [7].

2.1.2 Methods of internal control over engineering costs

Throughout the entire lifecycle of an engineering project—from its conceptual genesis to ultimate commissioning and utilization—there exist numerous pivotal stages including project registration, submission of planning schemes, feasibility study analyses, preliminary design and process engineering, preparatory activities (extending beyond mere initiation and commencement preparations), procurement of premium materials, human resources, and equipment, formulation and execution of detailed construction schedules, establishment of timelines, assurance of engineering quality, project acceptance, and final operational deployment [8]. To ensure smooth progression across these phases, it is necessary to utilize scientific and methodical internal cost management strategies. Despite the diversity in these project stages' particulars, the means by which they are controlled exhibit notable commonality. Principal tools and mechanisms employed in internal cost control include organizational structure management and personnel allocation, automated risk identification and mitigation systems, strict oversight of fund acquisition and utilization, rigorous internal financial control procedures, and the safeguarding of asset security.

3. A Current Status of Internal Control over Engineering Costs at Company A

3.1 Overview of Company A

3.1.1 A natural gas company profile and organizational structure

Established in December 2012, Company A (a natural gas group) is a large state-owned enterprise directly governed by the Qingdao municipal government. With a paid-in capital exceeding 3.3 billion RMB and total assets surpassing 15 billion RMB, the group boasts formidable operational capacity through its ownership of 45 subsidiaries. Its comprehensive service network provides heating to approximately 2.56 million households,

supported by an extensive gas pipeline system exceeding 11,000 kilometers in length. The company's annual natural gas production capacity approaches 57,000 cubic meters, effectively meeting the winter heating demands of an area spanning 130 million square meters. Notably, it exclusively supplies over 85% of the urban district's heating demand and more than half of the heating demand in suburban areas, alongside being the sole natural gas supplier for the entire city—solidifying its role as the city's primary energy security pillar and a vital enabler of stable urban operations.

Company A's core business encompasses the supply of thermal energy, development of power infrastructure, operation of gas networks, and the commercialization of clean energy solutions. Its services extend across Qingdao's six urban districts, the West Coast New Area, Hongdao Development Zone, and peripheral areas such as Jimo and Jiaozhou. This broad reach not only ensures the energy needs of residents are consistently fulfilled but also promotes industrial modernization and invigorates regional economic development [9,10].

The organizational structure comprises a central headquarters and multiple branch offices. The headquarters is staffed with key executive positions, including the President, Supervisory Officer, and Chief Financial Officer. The Supervisory Officer, appointed by the parent group, is responsible for overseeing business operations and adherence to governance standards, while the General Manager coordinates and ensures the execution of the group's strategic objectives. Functional departments within the headquarters—such as comprehensive management, strategic planning, and financial supervision—operate with clearly defined roles and collaborative synergy. Furthermore, the group maintains eight branch offices located in regions including Chengyang District, Laoshan District, and Rizhao City. These branches house specialized teams focused on distinct areas: the Chengyang branch concentrates on clean energy initiatives, whereas other regional offices primarily manage localized pipeline operations and customer services. This multi-tiered, well-defined organizational framework facilitates expansive coverage while maintaining clear allocation of responsibilities and authority.

3.1.2 Internal control system of company A

The management framework of Company A is structured around two fundamental pillars, with the headquarters' comprehensive department serving as the central coordinating body overseeing the enterprise-wide operations and harmonizing management functions across various departments and subsidiaries. The internal control system permeates all divisions and branch offices, with detailed regulatory responsibilities explicitly delineated within formal job descriptions; hence, specific control duties of individual units are not elaborated here. Acting as the nerve center of internal control, the comprehensive department undertakes the pivotal role of supervisory command, ensuring rigorous oversight of daily business activities while maintaining seamless collaboration with all branch offices. Its core mandates include streamlining administrative processes and efficiently allocating logistical resources. In terms of human resources, it is charged with designing compensation structures, establishing professional development pathways, and implementing employee welfare programs. Concurrently, it manages labor relations, handles legal affairs, and archives critical corporate documentation. Beyond operational management, the comprehensive department is also entrusted with developing robust risk prevention protocols and safety measures, formulating contingency plans for emergencies, and promoting occupational health initiatives. When urgent supervisory directives arise, this department must respond swiftly, mobilizing and orchestrating human and material resources to coordinate and expedite task fulfillment. Presently, the comprehensive department's responsibilities have expanded into fostering cross-departmental collaboration, necessitating the establishment of efficient communication and coordination mechanisms with regional branches. Within a well-defined institutional framework, it integrates resources to assure the smooth and orderly advancement of the company's overall operations.

3.2 Current Status of Design Budget Cost Preparation and Control

When initiating new projects at Company A, the proposal department submits a feasibility study report, thereby activating the initial phase of the construction process and concurrently triggering the preparation of the project budget. The projection of engineering expenses must be incorporated into subsequent feasibility analyses,

while the budget preparation is governed by a multi-tiered regulatory framework. Government policies, industry standards, and regional management protocols collectively impose strict guidelines on the budget formulation, which must be conducted in strict adherence to prevailing laws, conforming to industry norms and accommodating specific local requirements.

Within the Shandong region, cost indices promulgated by the competent local authorities, alongside internal corporate benchmarks, constitute the fundamental basis for budget preparation. Rigorous compliance with these standards is indispensable to safeguarding accounting accuracy. Furthermore, critical documents such as geological survey results, construction drawings, and engineering schemes must be integrated into the budgeting process to ensure conformity with industry standards and the optimization of economic benefits. Careful consideration is also given to market prices for building materials and labor within the construction zone, as well as inflationary trends, to mitigate cost risks. In addressing innovative technologies, specialized materials, and potential unforeseen construction challenges, thorough risk assessments and preemptive measures are mandated—including the establishment of contingency funds. All related approvals, contractual documents, and supporting materials undergo meticulous verification to ensure the precision of the budget.

An examination of Company A's 2020 project initiation documentation reveals comprehensive budget coverage and meticulous data collection. Discrepancies between actual expenditure and budget estimates are minimal, reflecting effective cost control. Both newly commenced and completed projects have maintained expenditures within anticipated thresholds, with risk management protocols embedded in the design budget demonstrating tangible efficacy. No significant cost overruns have been reported. In summary, the company exhibits strong adherence to key control checkpoints during the design budget phase, yielding commendable governance outcomes. Nonetheless, opportunities remain to refine and enhance the precision and forward-looking nature of budget preparation at a granular level.

3.3 Current Status of Dynamic Control over Engineering Costs

In accordance with Company A's internal regulations governing project cost structures, engineering project costs are subject to dynamic management throughout the project lifecycle. The cost control department is mandated to maintain close communication with project principals, proactively assessing significant project changes and their potential financial impacts. This involves real-time monitoring of cost fluctuations, forecasting the risk of budget overruns, and concurrently submitting routine reports alongside exception alerts to ensure transparency of information.

During the advancement of natural gas projects, the audit and supervision mechanisms are established by an independent professional team tasked with overseeing ongoing construction activities. This team conducts comprehensive evaluations of the cost control framework, identifies and rectifies potential cost-related hazards, and implements mitigating measures to reduce economic risks. Upon verification, audit findings are compiled into formal reports submitted for review and approval by the project manager.

Per the company's *Guidelines for Dynamic Control of Project Costs*, the internal audit division must promptly intervene once actual expenditures approach or exceed budget estimates. Minor issues are addressed through streamlined measures aimed at cost reduction, whereas complex or critical construction problems must be escalated to senior management for thorough recalculations and strategic adjustments. Additionally, a structural control evaluation system is deployed to facilitate comprehensive cost oversight throughout the entire project duration.

To prevent abuse of authority, the company enforces the principle of segregation of duties, which, although essential, introduces challenges to interdepartmental cooperation. Key review stages require signatures from relevant personnel and superiors, with strict adherence to procedural protocols. In summary, Company A maintains a meticulous and rigorous approach to dynamic cost control; however, opportunities remain to simplify redundant processes and enhance operational efficiency.

4. A Principal Issues in Internal Control over Engineering Costs at Company A

4.1 Actual Engineering Costs Exceeding Budget

A sampled investigation of new projects undertaken by Company A from 2016 to 2021 reveals that over half of these projects experienced actual costs during the settlement phase surpassing their initial budgets, indicating deficiencies in budget accuracy. Although the overall budget formulations are relatively precise and the magnitude of cost overruns modest—often with actual expenditures falling between initial and final estimates—the recurrent nature of budget excesses warrants serious attention.

The efficacy of engineering cost management hinges critically on both the establishment and rigorous enforcement of institutional frameworks. While Company A's relevant management regulations have garnered recognition, their practical implementation exhibits notable shortcomings. Cost control outcomes fall short of expectations; budget adherence is lax, resulting in expenditures exceeding planned allocations. This erosion of financial discipline undermines corporate profitability, diminishes project returns, compromises investor gains, and detracts from stakeholder satisfaction, constituting a core challenge demanding urgent resolution [11].

The prevalence of overspending signifies that cost control protocols during the construction stage are insufficiently enforced, despite widespread internal acceptance of cost management principles and project managers' emphasis on fiscal oversight. Excluding the possibilities of unreasonable budget formulation—given the professionalism and thorough research underpinning the budgeting team—and external contingencies, the primary culprit lies in an excessively flexible dynamic cost control strategy lacking clear guiding principles. Consequently, project leaders rely heavily on subjective judgment to manage expenses, with budget conformance largely dependent on individual competence.

4.2 Collusive and Game-Theoretic Behaviors during Project Execution

Company A has experienced sluggish progress in achieving segregation of incompatible duties and in clearly delineating responsibilities. This, coupled with inadequate supervision from monitoring entities, provides fertile ground for illicit activities that not only erode the firm's interests but also jeopardize the rights of investors and other stakeholders. Public exposure of such malfeasance would critically damage the company's reputation.

Although the company's project management system is designed to maintain checks and balances, mediate stakeholder interests, and ensure organizational stability, covert collusion frequently manifests within transactional intricacies. During project advancement, certain participants clandestinely form alliances motivated by shared interests. Parties that should ideally exercise mutual restraint instead engage in unlawful cooperation, amounting to "collusive gamesmanship." This phenomenon stems principally from unreasonable distribution of responsibilities, incompatibility in role assignments, and compounded by lapses in individual ethics among personnel.

4.3 Insufficiently Stringent Controls over Supervisory Company Qualifications

Delays in project supervision and inspection under Company A's oversight are recurrently observed, rooted chiefly in monitoring entities' failure to adequately fulfill supervisory duties. This issue traces back to the variable quality and inadequate professional competence among contracted supervisory firms, which adversely impact project cost control.

The selection process for supervisory units lacks rigor, fundamentally due to Company A's underappreciation of the critical role supervision plays in project advancement. Historically, the supervisory sector has suffered neglect, with some enterprises treating monitoring engagement as mere procedural formality, thus undermining the execution of supervisory functions [12]. Despite recent efforts to strengthen and standardize supervisory responsibilities—moving beyond tokenism toward substantive oversight—Company A continues to adhere to outdated perceptions that internal governance supersedes third-party supervision, a stance reflective of flawed judgment.

In contrast, specialized third-party supervisors boast standardized, professional oversight teams operating independently from both contracting parties, thereby offering objective and impartial services that enhance construction efficiency, quality, and cost control. Therefore, Company A's lax rigor in selecting supervisory firms constitutes a significant impediment to optimizing its project cost management outcomes.

5. Recommendations for Enhancing Internal Control over Engineering Costs at Company A

5.1 Implementing Earned Value Management to Govern Engineering Costs

Earned Value Management (EVM) is frequently employed as a robust tool for evaluating project performance, enabling a comprehensive comparison between actual metrics of quality, cost, and completion efficiency against planned objectives. By diagnosing the root causes of variances, EVM furnishes a reliable foundation for subsequent cost control adjustments and fosters a structured approach to managing project expenditures. Facing persistent issues of budget overruns during construction phases, Company A has yet to adopt this invaluable methodology in its cost control arsenal.

The integration of EVM would empower Company A to systematically scrutinize discrepancies between budgeted and actual expenditures, thereby enhancing the objectivity and rigor of cost control evaluations. Central to EVM is the concept of "earned value," which acts as an intermediary metric linking budget estimates with actual spending. This framework quantifies the value of completed work based on cost parameters, enabling direct comparison between planned costs and actual outlays. It facilitates stringent management of task budgets, addresses the equitable distribution of additional expenses arising from scope variations, and contrasts the ratio of planned versus actual work completion.

Successful adoption of EVM necessitates meticulous preparatory measures, including the establishment of a meticulous cost tracking system, definition of daily measurable tasks, and precise recording of real-time expenditures. Project monitoring cycles must incorporate detailed forecasts of task volumes aligned with actual progress, alongside prudent initial allocation of resources and ongoing tracking of labor input per role. Furthermore, project managers must cultivate a profound comprehension of EVM principles and computational methodologies to instill a scientific and enlightened cost management ethos. Under stringent budgetary constraints, they are to safeguard project quality, avert rework and resource wastage, and adeptly implement dynamic cost control strategies. By progressively embedding Earned Value Management into the existing managerial framework, Company A can substantially mitigate cost overruns.

5.2 Introducing Intelligent Supervisory Mechanisms

The current regulatory framework within natural gas enterprises remains disconnected from contemporary societal realities, exhibiting systemic deficiencies. Rather than undertaking exhaustive and resource-intensive organizational overhauls, the adoption of intelligent supervisory technologies promises a far more efficient enhancement of engineering cost management. Presently, artificial intelligence is revolutionizing oversight and corporate governance, catalyzing a transition from labor-intensive, manual supervision towards digitally driven, data-centric management paradigms. Company A can leverage these intelligent technologies to optimize critical processes such as equipment maintenance, procurement workflows, and investment administration.

Given the elevated complexity and heightened susceptibility to collusive behaviors during pre-pipeline earthworks, initial efforts in deploying intelligent applications should prioritize this phase before gradually extending into broader domains of internal control beyond engineering costs. An intelligent monitoring system, integrating devices such as cameras and drones with advanced image recognition and cloud computing technologies, can supplant conventional manual inspections by enabling automated risk detection, rapid alert generation, and autonomous analytical decision-making.

Such smart supervisory technologies have already been successfully implemented in multiple regions. Company A may adopt cost-effective yet highly efficient intelligent oversight solutions, utilizing comprehensive smart monitoring platforms to thwart project collusion. By synergizing blockchain technology with systematic risk management frameworks, these platforms establish transparent and decentralized communication channels among stakeholders, fostering professionalism in financial due diligence, safety surveillance, and related functions. This enables the integration of preemptive and proactive risk mitigation philosophies throughout the project lifecycle. Embracing intelligent supervisory platforms

corresponds closely with Company A's internal control and cost management realities, marking a pivotal step toward embracing comprehensive intelligent oversight.

5.3 Establishing a Qualification Admission System for Supervisory Companies

The incomplete coverage of supervisory responsibilities within Company A primarily stems from the absence of a robust qualification admission mechanism for supervisory enterprises, coupled with insufficient emphasis on the selection of supervisory units. This deficiency undermines the efficacy of project supervision. As pivotal stakeholders in project management, supervisory agencies must satisfy several foundational criteria to attain qualification certification. These prerequisites include recognition as a legally registered corporate entity, possession of a valid engineering supervision practice license, demonstrable years of relevant operational experience, a core business focus on supervisory services, a cooperative disposition, and impeccable financial standing and commercial credibility [13]. These benchmarks constitute essential selection standards recognized by Company A. Beyond relying solely on existing industry rating systems, the company may develop a comprehensive and nuanced evaluation framework tailored to its specific needs. This bespoke appraisal system should incorporate indicators reflecting the supervisory firms' operational methodologies and implementation rigor, applying systematic scoring procedures. The resulting assessments would serve as critical references in the strategic selection of supervisory partners, thereby ensuring enhanced oversight efficacy and project governance integrity.

6. Conclusion

This paper investigates the internal control over engineering costs at Company A by integrating existing internal control theories with an in-depth analysis of the company's current practices. Although Company A establishes a relatively sound system of internal controls concerning engineering costs, with standardized and well-defined operational procedures and no major deficiencies identified, several critical issues remain that require prompt attention and improvement. To address these challenges, this study proposes practical and actionable optimization strategies.

One prominent weakness lies in the company's insufficient dynamic cost management, which has directly led to frequent project cost overruns. To enhance real-time cost monitoring and control, the introduction of Earned Value Management is strongly recommended. Additionally, collusive behaviors during project execution have been observed, yet current risk prevention measures are inadequate. The adoption of intelligent monitoring technologies would therefore significantly strengthen the company's capacity to detect and mitigate such risks. Furthermore, the process of qualifying engineering supervision firms exhibits considerable gaps, compromising supervisors' ability to effectively oversee projects and thereby weakening cost control outcomes. Establishing rigorous qualification standards for supervisory agencies is therefore essential.

The company also faces delays in project settlement, signaling deficient control over related processes and a lack of procedural rigor. These shortcomings contribute to postponed project completion and reduced operational efficiency. Strengthening external regulatory frameworks governing financial compliance in infrastructure projects is advisable to enhance discipline and timeliness. Collectively, these proposed improvements offer a comprehensive framework to upgrade internal control over engineering costs within Company A. With suitable adaptations, this framework can be extended across its subsidiaries, promoting cohesive and effective cost management throughout the group. Moreover, the findings and recommendations provide valuable insights applicable to cost control practices in the broader energy sector and other industries, thereby enriching the empirical literature on internal cost regulation in engineering projects.

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