

关于包钢焦化厂干熄焦建设项目技术障碍的补充说明

包钢焦化厂拟对其 5-10 号焦炉配套建设三套干熄焦设施，并且委托我设计院作为核心技术咨询方参与项目可行性研究报告起草并提供其他所需的技术支持。我设计院认为干熄焦技术在提高能效，发展清洁生产等方面十分符合国家钢铁产业发展政策，但是介于目前国内的技术发展水平和有限几个干熄焦项目的运行情况，我们也提请包钢注意干熄焦技术所面临的如下技术障碍：

1. 干熄焦在我国仍处于推广阶段，保有量较小，尤其是处理能力过百的大型干熄焦设备没有运行经验，其稳定性未得到验证，包钢直接建设三套干熄焦存在一定的技术风险。
2. 干熄焦通过余热锅炉回收红焦显热，相对于燃油、燃煤锅炉存在一定的操作难度，因为余热锅炉回收的热量跟入炉焦炭的温度、入炉风量等有关系，由此导致蒸汽产汽量有波动，进而影响发电量。从已有的其他钢厂的 CDQ 运行经验来看，实际的发电量可能比设计发电量要低 15%-30%。
3. 干熄焦作为一项新技术、新工艺，为包钢首次采用，公司没有干熄焦操作工种，国内业没有相关技术的专业培训机构，这些都将在一定程度上增大项目的财务负担和运行风险。
4. 干熄焦建成投用后，保留原有湿熄焦工艺，在干熄焦设备维护维修时使用。干熄焦与湿熄焦两种熄焦工艺最大的差别就是红焦处理后的焦炭质量、含水率不同，这将对后续的高炉生产造成不利影响，将直接增加工序的管理复杂性和增加除尘系统的操作难度。
5. 干熄焦属人型的机电一体化设备，自动化程度高，但由于零部件繁多，其可靠性远不如湿熄焦工艺。

鉴于以上提出的各项干熄焦技术障碍，我们认为过硬的员工操作水平是关键。建议包钢加强对员工的外派培训，可采取到有干熄焦操作经验的国内其他兄弟企业或干熄焦技术较领先的国外公司两种方式，以及定期开展焦化厂的内部交流，不断提高员工的技术水平。



Opinion on Technical Barriers of Baotou Iron & Steel Company's Coke Dry Quenching Projects

Baotou Iron and Steel Company (BISCO) plan to install three sets of Coke Dry Quenching (CDQ) facility in No.5-10 coke ovens and commission our institution as one of the key technical adviser to prepare the feasibility study, and provide necessary follow-up technical supports. We hold the opinion that CDQ technology is in line with the principles outlined in National Iron and Steel Industry Development Policy especially due to its advantage of energy efficiency improvement and clean production. Regarding the technical development and CDQ practice in domestic iron and steel companies, we summarize the technical barriers faced by any domestic CDQ users and remind BISCO to pay special attention on the following:

1. CDQ is still at the early deployment phase in China with limited operational experience, especially for the size planed by BISCO which doesn't have reliable successful operational track record up to date.
2. The amount of heat recovery from CDQ and the resulted electricity generation are very sensitive to any small change of some technical indicators, i.e. coke temperature and wind flow while entering into the oven. From the operational record of limited number of CDQ units in operation in the peer steel companies in China, the actual electricity generation can be 15% to 30% short of the designed capacity.
3. Given the situation that this is the first time for BISCO to adopt CDQ and there is no specific technical training agency that can provide qualified training on CDQ in China, lacking of experienced technical staff becomes to be critical for BISCO to achieve smooth operation.
4. The traditional Coke Wet Quenching (CWQ) will be back-up for CDQ for any emergent shutdown. However, the quality and moisture content of red coke after CWQ and that after CDQ are different. This adds complexity of controlling oxygen reduction in iron making process in the blast furnace production.

5. Since CDQ is a large-scale mechnics-electronic automation system, many components cause complexity and make the system less reliable than the CWQ process. Any mis-operation of small components may cause shut-down of the whole system even cause some accidents.

For the reason analyzed above, increasing technical capability of staff whose will operate CDQ system is the key to overcome the above barriers. BISCO should send its staff to some peer iron and steel companies or international steel companies with CDQ installations to learn their CDQ operation experience, and also organize internal training event for experience sharing.

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