UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON. D.C. 20460
May 22, 1978

OFFICE OF ENFORCEMENT

MEMORANDUM

SUBJECT: Wheeling-Pittsburgh Steel Corporation, Monessen Coke Battery No. 1; Evaluation of Corporation Proposed Rehabilitation and NSR Applicability Determination

FROM: Deputy Assistant Administrator for General Enforcement

TO: Steve Wassersug, Director Enforcement Division Region III

We have evaluated the subject rehabilitation proposal to determine whether the rehabilitation and associated expenditures are sufficient for the battery, after rehabilitation, to be in compliance with the applicable Pennsylvania Department of Environmental Resources (DER) regulations. It is anticipated that these regulations will presently be submitted to this Agency for approval/disapproval, pursuant to Section 110 of the Clean Air Act, as a State Implementation Plan revision.

The attached document discusses the bases for the following conclusions:

1. The proposed rehaLlitation proposal will not achieve compliance with the DER regulations;

2. Rehabilitation adequate to achieve compliance with the DER regulations will result in the expenditure of $18 - 23 million in capital costs;

3. Rehabilitation expenditures-in the amount necessary to achieve compliance with the DER regulations will exceed fifty percent of the capital cost of a comparable new facility; and

4. Rehabilitation sufficient to achieve compliance with the DER regulations will result in the application of the Interpretative Ruling, 41 Fed. Reg. 55524, December 21, 1976.

/s/
Richard D. Wilson

Attachment

Evaluation of Wheeling-Pittsburgh Rehabilitation
Proposal and NSR Applicability Determination

Issue I: Whether the Corporation's proposed rehabilitation of Monessen No. 1 Coke Battery (“M #1") is sufficient to achieve compliance with the Pennsylvania Department of Environmental Resources (DER) coke regulations? What amount and type of rehabilitation is necessary to achieve compliance?

Response: A major, through-wall full rehabilitation, including replacement of ail overbrick work, most regenerator brickwork, full offtake replacement, probably a second collector main, and all new doors, jambs, buckstays, and tie rods, is necessary to meet the DER requirements for coke charging, door leakage, pushing, and topside leakage. Although stack emissions are likely to occur in excess of §123.41(l) and (2) and 123.15 (3 min per hr/20% opacity and 0.04 gr/dscf, respectively), compliance can be achieved through retrofit of gas cleaning equipment. A complete rehabilitation is not necessarily needed to comply with the stack standard.

Discussion: The physical condition of M #1 is among the poorest of U.S. batteries observed by EPA staff. Buckstays bend with severe curvatures; flame from doors, flues, and offtakes make the battery unsafe; and jambs, offtakes, and other steel parts and the interior brickwork are severely damaged. The topside is malaligned badly, and the collector main is very damaged. Very green coke is pushed from all ovens. This conclusion is shared by EPA (B. Bloom, A. Ferdas, T. Maslany), DER (K. Bowman, L. Wonders, R. Clark), U.S. Steel Engineers and Consultants ("UEC report") and U.S.W. local people.

The current W-P plan calls for:

1. Basic Block

- Replacement of 10 end flues brickwork (and not the 18 central flues bn each oven)
- Replacement of all offtakes with ones of present design
- Topside repaving
- Combustion system improvements
- About,50% new charge new hole castings
- End regenerator brickwork repair only
- New buckstays and tie rods (50%)
- New door liners (16" rather than 12" thickness)
- Better steam ejector system
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2. Machinery Work

- Pusher machine lever door seal
- New door work pusher side machinery (screw Latches to mate with new door latches for better door sealing)
- Alignment of machinery tracks

The W-P does not call for work on the:

- Stack
- Wharf
- Quench tower
- Coal bunker
- Coal or coke handling systems

- Center oven walls, roofs, regenerators, and floors

- Half of the topside port castings

It does not provide for:

- New door or jamb designs
- Coal properties monitoring
- A second collector main
- A stack gas cleaner
-

DER standards are stringent for emissions from doors, charging, pushing, and topside, leakage. Compliance with these standards requires excellent battery physical condition, as well as the installation of proper equipment and operating and maintenance (O&M) practices. Very little room for compensatable error is provided by the DER regulations.

DER regulations specify that pushing emissions, for instance, must not exceed 20% opacity. No pushing system captures 100% of the generated smoke; therefore, all systems need non-green coke to meet the standard. Although, W-P proposes no center wall repairs, the need for such work for pushing emissions compliance is evident from the following:

1) The UEC report says poor oven heating througnout all walls is occurring (p. 5).

2) Exhibit III of the report states at least 20% of all center wall flues were observed to be damaged in December 1977, a period of reduced coking time. Damage by plugging or fire, unrestored, will cause green coke. Section 1 of M #l had 33% of its center walls damaged; Section 2 had 100% of the center walls damaged.

3) EPA has repeadedly observed green coke pushed from central oven sections (e.g., Bloom, March 16, 1976).

4) Heavy roof carbon obscured the view of UEC to potential central wall cracks; such cracks are presumed by UEC to exist.

5) The UEC report notes M #1 regenerators "need a look" when the battery is brought cold. The meaning of this is that further work, is likely be needed to repair the heating system. Failure to plan for such work to meet the pushing standard, will result in the battery's failure after partial rehabilitation.

The DER charging standard allows no more than 75 seconds of any visible emissions for four consecutive charges. This standard demands near perfection of:

(a) Battery condition,
(a) O&M practices,
(c) Larry car and steam system design, and
(d) Coal preparation.

All these factors must be favorably controlled to meet the Pennsylvania standard. Factor (a) means, in turn:

(a) Excellent charge hole alignment for minimizing air infiltration during charging (and hence maintenance of negative pressure during charging).

(b) Fully open offtake piping.

W-P's proposal not to repair center walls will most likely result in poor battery condition, and thus; failure to meet (a) and (b) by:

1) Allowing for the shifting of old (not to be replaced) center wall brick work after the cooling and reheating required by the rehabilitation (see W-P's Pa DER EHB record citations, below).

2) Not replacing offtakes with ones of better desilqn of liquor sprays (for deplugging of offtake openings).

3) Not accepting UEC's recommendation to add a second collector main, concurrent with W-P's apparent decision not to double draft the end oven on This W-P decision is in the face of this UEC statement: "....because of rigid regulation pertaining to atmosphere emission, it is recommended that consideration be made for the installation of a second collector main" (p. 10).

4) A great deal of topside battery brickwork shifting has already occurred ("2-3 inch heaving", p. 4, UEC report). Repavement of the topside will not correct the underlying problem.

5) Not planning to replace all tie rods, which provide a basic insurance against lateral brickwork movement. This means nonalignment of charge ports will occur again.

The topside offtake standard requires less than four offtakes leak at any time at M #1. Although W-P plans to replace offtakes, it is not planning for a new design. Horizontal offtake caps are needed for W-P to have a high possibility of achieving compliance since wet sealing clay tends to run off of the slanted cap design now used by W-P.

Doors will continue, after rehabilitation, to be in violation of the Pennsylvania standard because W-P is not intending to use any new door or jamb design engineered to meet the regulation. In fact, W-P only intends to put new thicker 16" liners in its doors for pushing, not door emissions control (i.e., to retain heat).

Yet, for door sealing to occur, many technical steps in a chain must be taken to make self-sealing Koppers doors, in fact, seal well. This conclusion derives from U.S. Steel research on door sealing. W-P only intends partial implementation of the USSC results, although told by UEC(p. 12) of the R&D package's availability. Although this recommendation may be self-serving to USSC, W-P's ignoring the USSC R&D program implies that W-P is not likely to achieve the 10% door standard.

In fact, this same conclusion is independently implied by the EPA ORD/Battelle R&D effort which concluded (Phase I report by ORD) that jamb thermal distortion was central to door/jamb sealing problems.

W-P is not planning on new door knife edges, although the UEC report recommends such. Nor are new design knife edges (e.g., the NiCuTi type CF&I is to install to try to meet a 7% standard) being discussed or proposed by W-P. W-P proposes no new doors of either old or new design.

We are aware that W-P has made these points repeatedly through its own witnesses before the DER hearing board* in the context of its appeal of the 1972 DER order requiring rapid compliance with the Pennsylvania requirements (Section 123.41 and interim standards).

5) Witness K. Deal (of Armco Steel, a W-P consultant) p. 5540 of the EHB record (1974) said a partial rehabilitation plus retrofittable equipment could not meet the requirements.

- Deal said (p. 3081) that an end flue rehabilitation was not as good as a full rehabilitation because the joint between the basic block and the end flues would undergo expansion and contraction and hence would need constant attention (there are 148 such joints at M #1).

- Witness V. Echols (then W-P's Follansbee coke plant manager) said (p. 5246) an end flue rehabilitation would lead to violation of the Pennsylvania order's interim standards by reason of shifting center wall brickwork causing brick particles to fall into center wall flues, thus causing flue plugging.

- Echols (p. 5075) said floor cracks would lead to combustion stack emissions.

The intent of this and other W-P testimony at that hearing was that failure to give it time, not provided in the DER order, to fully rehabilitate M #1 would lead to noncompliance; that M #l is in such poor shape (note that was in 1973, 5 years ago) that they needed extra time to plan for a total rehabilitation.

*Wheeling-Pittsburgh Steel Corporation vs. Commonwealth of Pennsylvania, the Pennsylvania Department of Environmental Resources, Docket No. 73-548-B.

Now W-P wishes to partiallv rehabilitate, in order to maintain production for 8-10 years (UEC report, p. 9). Yet, UEC states (p. 9) that in its current condition, M #l could produce for 2-5 more years even though it is in poor condition for air pollution control. W-P performed an end flue rehabilitation in 1969-1970, which did not lead to compliance.

Conclusion on Issue I

W-P's rehabilitataion is insufficient of brickwork, door, jamb and offtake scope or type to offer any reasonable expectation of Pennsylvania code compliance for each of four separately applicable standards. Full rehabilitation as well as the installation of proper control equipment and operation and maintenance practices is require to assure compliance with air requirements of the DER code. This is an engineering judgement based upon the foregoing analysis. At other coke batteries in the U.S., batteries of such similar poor condition as M #l, have required full rehabilitation to meet stringent air pollution requirements.

Issue II: Whether the necessary rehabilitation of M#1 will constitute a reconstruction, and thus subject the batery to the IR?

Response: The needed rehabilitation is at least 51%-69% of the cost of a comparable entirely new facility. The reconstruction rule is, therefore, met and the battery is classified a reconstruction and subject to the IR.

Discussion: The cost estimates for a comparable new facility, based on the basic coke battery block (including the oven and regenerator brickwork, the doors, jambs, structural steel, piping, combustion gas and air boxes, benches, steam and liquor systems, excluding the by-product plant, the quench tower, coal bunker, wharf, track, machinery, and the stack), the W-P proposal and the estimated necessary rehabilitation are:

(1) Full replacement of all the basic block rehabilitation...$35 million

(2) W-P proposal...$11 million

(3) A full rehabilitation saving some elements of M #l...$18-23 million.

This cost is $35 million ($MM) and derives from interviews with Wilputte, Dravo, and Koppers staff people. This is a figure quoted for a 74 oven, 4m battery of M #l's design.

EPA's policy is to include the basic block as the fundamental unit of production to which it applies the 50% reconstruction rule (see 40 CFR 60.15). The basic block is the source of emissions.

W-P's plan proposal will cost $11.3,MM, according to W-P:

- $9MM for a series of parts replacements and the end flue rehabilitation.

- $2.3MM for repairs and replacments which W-P claims, improperly, are for "battery repairs", as opposed to "pollution" work. This distinction for coke batteries is not possible since excellent physical condition is needed for both high production and air pollution control.

The W-P figure can be argued up or down $1MM by stating it should or sbould not include certain elements. By excluding certain machinery work costs, W-P's list costs between $10-12MM. This is 29-34% of the estimated basic block new facility cost.

Excluded from W-P's plan, but needed for air pollution compliance, are these items and costs:

| | | |
|---|---|---|
| • 2nd collector main | -- | $1.3MM* |
| • Center wall and over roof rehabilitation - new brickwork | -- | $4.OMM-$8.OMM** |
| • Regenerator rehabilitation | -- | $1.7mm*** |
| • New doors and jambs | -- | $0.3MM**** |
| • New offtakes | -- | $0.2MM |

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* Koppers estimate, Steve Resko, May 15, 1978, telephone

** Estimated by noting the first five flues' costs (5 C.S. and 5 P.S.) $4.6MM and W-P would still have to do 18 additional central flues

*** Koppers stated regenerated work would be about 5% of basic block replacement costs or 5% of $35MM.

**** $1200/door, $1000 jamb, 150 doors

Thus, this summary results in the following figures:

| | | |
|---|---|---|
| 1. | The W-P plan | $11.3MM |
| 2. | To meet Pennsylvania standards | $16.0-$21.OMM for basic block brick rehabilitation |
| | | $17.80$22.8MM for basic block brickwork and collector main and door/ jamb additions |
| 3. | To fully replace basic block | $35MM |