

Acme Coke  
11236 S. Torrence Ave.  
Chicago IL 60617



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#1 and 2 Chimney Inspections  
Dated: 1991

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(219) 996-6522

# Industrial Stack & Tower, Inc.

P.O. Box 448

Hebron, IN 46341

*Inspections · Repairs · Demolitions*

**ACME STEEL COMPANY  
CHICAGO, ILLINOIS**

**DETAILED INTERNAL & EXTERIOR INSPECTION**

**#1 COKE OVEN BATTERY COMBUSTION CHIMNEY**

**APRIL 22/23, 1991**

**PURCHASE ORDER NO. 218996191**



## Industrial Stack & Tower, Inc.

P.O. Box 448

Hebron, IN 46341

*Inspections · Repairs · Demolitions*

Acme Steel Company  
11236 S. Torrence Ave.  
Chicago, IL 60627-6440

May 8, 1991

Attention: Mr. Jim Bitner

Reference: Purchase Order 218996191  
Detailed External & Interior Inspection  
#1 Coke Oven Battery Combustion Chimney

Dear Mr. Bitner;

In accordance with the subject purchase order, a detailed external & interior video inspection of the #1 Coke Oven Battery Combustion Chimney was performed by this company.

These stack inspections were completed on April 22 and 23, 1991.

Enclosed, please find our Inspection Report and recommendations for future maintenance work on the Unit.

If there are any questions regarding this inspection, please feel free to contact us.

Respectfully yours,

A handwritten signature in cursive script that reads 'Richard D. Kreis'.

Richard D. Kreis, President  
INDUSTRIAL STACK & TOWER, INC.

sfk

enclosure



(219) 996-6522

## Industrial Stack & Tower, Inc.

P.O. Box 448

Hebron, IN 46341

*Inspections · Repairs · Demolitions*

Reference: Purchase Order 218996191  
Detailed External & Interior Inspection  
#1 Coke Oven Battery Combustion Chimney

### GENERAL INFORMATION:

A recent history examination of the #1 Battery Stack revealed that the exterior brick top was removed and rebuilt fourteen feet (14') above the concrete column in 1970.

In 1979, the concrete column was painted from the pollution testing catwalk to the top. Both catwalks were also renewed and painted.

The liner was replaced for the full height in 1981. However, the top of the stack had liner brick falling and the height of both the liner and wall were lowered, the lightning protection system was reworked and the same caps were reinstalled in 1982.

New aircraft warning lights were installed in 1983.

Reference: Purchase Order 218996191  
Detailed External & Interior Inspection  
#1 Coke Oven Battery Combustion Chimney

#### EXTERIOR INSPECTION REPORT:

We found the worst area to be the brickwork above the concrete stack column. There are ten (10) courses of brick on top of the steel reinforced concrete stack. This brickwork above the concrete allows work to be done to the very top of the chimney where most of the wear and corrosion take place. This brickwork can be removed and lowered to grade and the liner reworked in an on-line situation.

The lightning protection system has good points yet, but they are poorly mounted and set too high above the top of the stack. The grounding downleads were improperly connected and the downleads in the top area were badly worn. Industrial Stack & Tower was allowed to do an immediate repair to the lightning protection system while performing this inspection. This included a new twenty-five foot (25') lead covered downlead on the west exposure with new connections to the circuit cable and several new anchors. We also installed a new lead covered piece to the east downlead and made connections to the circuit cable and stack catwalk. This was done to insure lightning protection until future repairs are made to the top brickwork and catwalk.

There are several horizontal cracks to the mortar joints in the top area of the stack. These cracks are due to acid attack to the mortar and is an indication that the top brickwork not only needs to be removed and replaced, but that an acid proof mortar needs to be incorporated into the next repair.

We also found the liner cap to be very thin and in need of being replaced. The liner brick has been hitting the stack wall on the southwest and several brick are loose in the liner.

We found the aircraft warning lights to still be functional, but showing signs of corrosion and wear. The electrical feed to these lights is still in good condition. The top aircraft lights are very near the top of the stack since the height was lowered in 1982 showing that they have given very good service considering the circumstances. It is important to replace the aircraft warning light support bracket whenever the lites are replaced.

Reference: Purchase Order 218996191  
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EXTERIOR INSPECTION REPORT (CONTINUED):

The partial catwalk at the top of the stack has several major faults including broken welds and corroded steel and in a general unsafe condition. We recommend that due to the poor structural condition of this catwalk, it be restricted from use until a replacement can be erected.

The intermediate catwalk is rusting freely and pack rust has broken several welds. Previous repairs and painting didn't effectively eliminate the source of the pack rust so it has continued to expand and break welds and lift floor plates.

We found some cracking to the concrete exterior, most of which was running vertically. The horizontal pour joints are showing signs of moisture penetration, but rebar rusting and concrete spalling are not a problem as yet. Most of the previous repair attempts have not been very effective and the mortar is cracked and falling out. The cementous paint applied in the upper half of the stack seems to have helped the concrete surface against weathering.

The stack pedestal is in good condition for the age of the stack.



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#1 Coke Oven Battery Combustion Chimney

### RECOMMENDATIONS:

As per our conversation, only those repairs that are of most immediate concern without jeopardizing the structural integrity or the safety of any workmen in the area of the stack at ground elevation will be addressed at this time.

The top catwalk and brickwork on this stack should be removed and replaced within the next six (6) months. This would also include rebuilding the top area of the liner with a focus on trying to get the liner back into the middle of the stack column. After at least ten feet (10') of the stack wall and liner is rebuilt, the lightning protection points can be reinstalled with new circuit cable and point holders. The liner will need a new stainless cap. The stack wall cap can be reused.

We recommend new aircraft lights be installed in this upper area, but be kept as low as possible below the stack exhaust to minimize the corrosive atmosphere in this top area. Because we installed the new connectors to the lightning protection system, the extreme urgency to this repair has been eliminated, but these recommendations should receive some priority whenever monies become available.

The second phase of this repair would be to renew the intermediate catwalk. The existing floor plate should be removed and lowered to grade and any broken welds and accumulated pack rust should be cleaned. All welds points should be seal welded to stop moisture penetration between the steel lap points. The floor should be replaced with a grading material such as fiberglass which is strong but not corrodible.

The third phase of this repair would be to remove any fractures to the concrete and then clean and paint any exposed rebar. These holes and cracks should then be patched with a two (2) part epoxy mortar similar to Sika 122 or 124 depending upon the depth of the void, and adding course aggregate as necessary to any holes deeper than one and one-half inch (1 1/2").



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## GENERAL INFORMATION:

We saw evidence of fourteen feet (14') of the liner and wall having been replaced in 1979. This liner was replaced for its full height in 1981. There are ten (10) courses of brick above the outside wall now and the liner is just above this so it seems then feet (10') or so of the liner and wall was removed in 1982.

## INTERNAL INSPECTION REPORT:

The internal inspection did not reveal any significant faults to the liner and it is in good condition.

## RECOMMENDATIONS:

If, by lowering the height, the four or five feet (4' or 5') of brick on top of the liner is still against the wall on the southeast the liner will fail due to impacting in high wind situations.

The top portion of the liner should be redone as part of the exterior repair.





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**ACME STEEL COMPANY  
CHICAGO, ILLINOIS**

**DETAILED INTERNAL & EXTERIOR INSPECTION**

**#2 COKE OVEN BATTERY COMBUSTION CHIMNEY**

**APRIL 22/23, 1991**

**PURCHASE ORDER NO. 218996191**



(219) 996-6522

## Industrial Stack & Tower, Inc.

P.O. Box 448

Hebron, IN 46341

*Inspections · Repairs · Demolitions*

Acme Steel Company  
11236 S. Torrence Ave.  
Chicago, IL 60627-6440

May 20, 1991

Attention: Mr. Jim Bitner

Reference: Purchase Order 218998191  
Detailed External & Interior Inspection  
#2 Coke Oven Battery Combustion Chimney

Dear Mr. Bitner;

In accordance with the subject purchase order, a detailed external & interior video inspection of the #2 Coke Oven Battery Combustion Chimney was performed by this company.

These stack inspections were completed on April 22 and 23, 1991.

Enclosed, please find our Inspection Report and recommendations for future maintenance work on the Unit.

If there are any questions regarding this inspection, please feel free to contact us.

Respectfully yours,

Richard D. Kreis, President  
INDUSTRIAL STACK & TOWER, INC.

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# Industrial Stack & Tower, Inc.

P.O. Box 448

Hebron, IN 46341

*Inspections · Repairs · Demolitions*

**Reference:** Purchase Order 218996191  
Detailed External & Interior Inspection  
#2 Coke Oven Battery Combustion Chimney

## GENERAL INFORMATION:

This stack is 251'4" from the top of the liner to the top of the pedestal.

A recent history examination of the #2 Battery Stack revealed that in 1979, both the catwalks were reworked and painted and the concrete stack itself was painted with a cementous paint above the intermediate catwalk. Also the top fourteen feet (14') of the brickwork was replaced.

Both the aviation lights had been replaced in 1983 and the one that wasn't replaced in 1990 is still in okay condition. In fact, the one that wasn't replaced is in better condition than the two lights on the #1 Battery Stack. This is due to the close proximity in which the lights are to the top of the #1 Battery Stack.

The most recent repairs were done to this stack during 1990. This included one (1) new aviation warning light at the top catwalk, two (2) new cap sections replaced and some tuckpointing to the bed joints in the top brickwork.

Reference: Purchase Order 218996191  
Detailed External & Interior Inspection  
#2 Coke Oven Battery Combustion Chimney

#### EXTERIOR INSPECTION REPORT:

We found the #2 Battery Stack to be in better condition than the #1 Battery Stack. The liner is against the stack wall on the southwest and this is serious and can cause the liner to break up, but there isn't much that can be done unless the liner moves away from the wall in the top fourteen feet (14') of brick which could be removed and the liner rebuilt more into the center of the stack.

The liner cap is in a very worn condition except for two (2) new sections which were replaced last year.

As you can see on the video, there are several horizontal mortar joints which are lifting and were tuckpointed in 1990 on the east, west and south.

The upper catwalk is in fair condition, but is mounted on plates which are anchored into the brickwork. This being a partial catwalk and close to the top of the stack, it is a questionable engineering design because there isn't adequate weight to the brickwork above the catwalk elevation to insure it won't cantilever and lift the brickwork above. The horizontal mortar joints which are lifting indicate that in the near future (eighteen (18) months or so), the top brickwork needs to be removed and the catwalk reinstalled. At this time, the liner can possibly be rebuilt into the middle of the stack if it isn't hitting at the top of the concrete column.

The concrete column is in decent condition with fewer vertical cracks, but we did find several places where moisture penetration at the horizontal pour joints had allowed the rebar to corrode. This is what has caused several of the spalled concrete patches you saw in the video.

The intermediate catwalk is in fair condition and if they would have removed the pack rust and seal welded attachment points before painting, it would be in good condition.

The stack base pedestal area is in good condition considering the age of the stack. Most of the target wall pedestal cooling vents are not drawing in cool air. These vents are in the concrete pedestal and open into the air space between the target wall and the concrete pedestal. The air then travels up and enters the air space between the liner and concrete column at the base of the liner through brick size openings which are left in the lining. This area of the liner is below the area protected by the top portion of the target wall.

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#2 Coke Oven Battery Combustion Chimney

**RECOMMENDATIONS:**

Within the next twelve (12) months, the top brick portion of the stack needs to be removed and the upper catwalk lowered. I would install the catwalk on the concrete portion of the stack.

If the liner isn't against the concrete column on the south then you could rebuild both the liner and the stack wall fourteen feet (14') above the column. If the decision is made to rebuild this brick, acid-proof mortar should be used.

If the liner is against the column, then leave the liner at the concrete column elevation (or just above) and when it finally does start to breakup, the liner can be replaced. As you know, this will require a bypass stack and \$500,000 to \$650,000 expenditure.

When the liner is replaced, taper it down to a seven foot (7') inside diameter which will give you good clearance in the air space and more than enough draft considering your underfires are not using blast furnace gas. If funds become available this project should be done as soon as possible.

The same twelve (12) month period is the time before the outside brickwork could become a safety hazard to personnel below. I also recommend that you have any loose and spalling concrete areas removed and properly patched.

The next time the stack is worked on the steel plate on both catwalks should be replaced with grating so dirt buildup and moisture retention will be minimized.

The air vents at the stack base should be cleaned of all the brick, mortar, and dirt so proper air flow is established. The vents into the pedestal are a hard thing to fix, but it can sometimes be done by rodding them out and vacuuming out the accumulated dirt.



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## INTERNAL INSPECTION REPORT:

The interior video revealed a good liner and we found no significant faults to it except in the top area where it is against the column.

## RECOMMENDATIONS:

There isn't much that can be done if the brick liner is against the column below the fourteen feet (14') of brickwork at the top. This liner could last many years against the column, or it could start to break up at any time. It depends on the wind direction and intensity.

I would recommend that you have it looked at as often as possible so that you can be properly advised if it starts to collapse.