Structural Investigation Report
Allied-Pulaski Site
Pulaski, Pulaski County, VA

12 April 1999

Prepared for
U.S. Environmental Protection Agency
Removal Response Section
Philadelphia, PA

SATA
Site Assessment Technical Assistance
1.0 INTRODUCTION

On 10 March 1999, the Roy F. Weston Inc., (WESTON), Site Assessment Technical Assistance (SATA) team was directed by U.S. Environmental Protection Agency (EPA) On-Scene Coordinator (OSC) Walter Lee to conduct a structural investigation at the Allied-Pulaski Site located in Pulaski, Pulaski County, Virginia. SATA Structural Engineer Roman Zdanowski conducted the inspection on 23 March 1999.

This report contains summaries of the basic construction and structural conditions of the major components of the Allied-Pulaski Site (a schematic plan of the site is provided as Attachment 1). The recommendations stated within this report were based on visual observations and a small number of actual measurements taken of member portions.

This report evaluates the current conditions and the structural stability of the buildings with respect to the immediate hazards present and short-term stability of the buildings. The main objectives of this inspection were to identify portions of the buildings, which cannot be effectively decontaminated due to either the conditions of the structure, or to safety concerns regarding performance of decontamination efforts.

Information regarding the site history and main objectives of the structural evaluation was obtained from Enforcement OSC Sarah Caspar and from SATA Site Leader Robert Burger during the site inspection on 23 March 1999.

2.0 STRUCTURAL INSPECTION RESULTS

2.1 General Site Characterization

The site is located at the former Allied Chemical Corporation/Pulaski Works in Pulaski, Pulaski County, Virginia. The site encompasses approximately 30 acres and is located in an area of mixed commercial and industrial properties. It is bordered by a shopping center to the north, by Peak Creek to the south, an automobile repair shop to the west, and a wooded property to the east. The Norfolk Railroad runs through the southern part of the property. The Allied Chemical Company/Pulaski Works was a facility where sulfuric acid was manufactured. The plant operated up until the late 1960s. Since that time, the property has been used sporadically for storage. Judging by the construction type, the buildings were built in the late 1800s with some modifications between the 1930s and 1950s. SATA Engineer Zdanowski inspected eight structures located on the site (see Attachment 1).
2.2 General Structures Characterization

2.2.1 Structure No. 1

Structure No. 1 is a free standing, one-story steel frame shed. The floor plan of the shed measures approximately 55 feet by 22 feet. Part of the exterior walls are lightweight corrugated asbestos sheets and brick walls, and the roof is lightweight corrugated asbestos sheets. The main structural roof frames are composed of wooden “Howe” type trusses on steel columns supporting structure and wooden purlins, which span the trusses and support the corrugated asbestos roof sheets. The floor is a concrete slab on grade.

Inspection Results

During the visual structural evaluation, failure of roof purlins and wall sheathing was observed. Rainwater penetration and lack of maintenance caused wet rot in the roof purlins resulting in a partial roof collapse (see Attachment 2, photo 1). There were no visible signs of corrosion or damage in the steel columns or deterioration in the wooden trusses.

2.2.2 Structure No. 2

Structure No. 2 is two brick-made buildings, divided by the joint brick-made bearing wall. The floor plan of the buildings measures approximately 60 feet by 80 feet. The main structural roof frames are composed of “Howe” type trusses on an external double-wythe running bond red brick bearing walls supporting the structure. The roof is made with corrugated asbestos sheet. The floor is a concrete slab on grade.

Inspection Results

During the visual structural building evaluation there was no evidence of any major structural defects in any of the inspected sections of the structure. The structure did not show visible signs of impending failure, except some cracking observed in the external walls (see Attachment 2, photo 2). Soil subsidence could have caused these secondary structural defects.

2.2.3 Structure No. 3

Structure No. 3 is a sulfide furnace building, which includes an approximately 100-foot high brick-made stack structure. The floor plan of the building measures approximately 80 feet by 60 feet. The main structural roof frames are composed of “Howe” type trusses on an external double-wythe running bond red brick bearing walls supporting the structure. The roof is made with corrugated asbestos sheet. The floor is a concrete slab on grade. A brick-made addition is attached to the northeast corner of the main building.
Inspection Results

During the visual structural evaluation of the brick-made stack attached to the sulfide furnace building, failure of main structural elements was observed. Cracks in the bearing walls resulted in a bent wall supporting the stack structure and cracks in the main stack structure make the stack unstable (see Attachment 2, photos 3, 5 and 6). Soil subsidence, weather conditions or poor design could have caused these major structural defects. Any activity conducted around the stack area is not safe for a working crew.

During the visual structural evaluation of the sulfide furnace building there was no evidence of any major structural defects in any of the inspected sections of the building. The structure did not show visible signs of impending failure. Secondary structural defects including cracks in external building bearing walls, were observed (see Attachment 2, photo 4). The collapsed brick-made walls of the addition attached to the northeast corner of the main building may cause a roof collapse of this structure (see Attachment 2, photo 7).

2.2.4 Structure No. 4

Structure No. 4 is a boiler house building (see Attachment 2, photo 8). The floor plan of the building measures approximately 80 feet by 125 feet, which includes the section of the electric power control room attached to the northeast side. The boiler house is a two-story steel frame superstructure. Exterior walls are non-bearing red brick masonry walls. Inside the building is a structurally independent, two-story structure constructed as a two-way reinforced concrete platform supported by concrete columns. The main structural roof frames are composed of "Fink" type steel trusses and steel purlins, which support corrugated asbestos roof sheets. The floor is a concrete slab on grade.

The electric power room control is a one-story structure. The main structural roof frames are composed of "Pratt" type steel trusses on external red brick bearing walls supporting the structure. The roof is made with steel reinforced concrete panels. The floor is a concrete slab on grade.

Inspection Results.

During the visual structural evaluation, missing areas of part of the steel truss main structural components were observed (see Attachment 2, photo 11). The missing facing in the truss may cause a partial roof collapse if heavy loads of snow, ice or both increase the loading capacity on this structural member. No other evidence of any major structural defects in any of inspected sections of the building was found. The structure did not show visible signs of impending failure. Failure of several secondary structural elements was observed. The failed structural elements include cracks in external non-bearing walls (see Attachment 2, photos 9, 10 and 12) which do not present any danger to the super structure stability at the present time.
2.2.5 Structure No. 5

Structure No. 5 contains the remaining elements of the buildings, which were demolished or burned. The remaining parts of this structure, the free standing walls, present a potential danger of collapse (see Attachment 2, photos 13 and 14).

2.2.6 Structure No. 6

Structure No. 6 is a one-story brick-made building. The floor plan of the building measures approximately 55 feet by 20 feet. The roof structure is supported by 2x8 timber joists and external brick-made load bearing walls. The floor is a concrete slab on grade.

Inspection Results

During the visual structural evaluation, failure of the roof structure was observed (see Attachment 2, photos 15 and 16). Lack of maintenance and water leaking through the roof system caused wet rot in the wooden roof members. This deterioration has caused partial roof damage and collapse.

2.2.7 Structure No. 7

Structure No. 7 is a brick-made building used probably as a storage area during the production process. The floor plan of the building measures approximately 10 feet by 30 feet. The external brick-made bearing walls support the arch type concrete/brick roof. The floor is a concrete slab on grade.

Inspection Results

During the visual structural evaluation, partial failure of the external bearing walls structure was observed (see Attachment 2, photo 17). The unsupported part of the roof structure presents an immediate danger of collapse.

2.2.8 Structure No. 8

Structure No. 8 is a one-story building probably used as a maintenance building (see Attachment 2, photo 18). The east section of the structure is a steel frame shed. Exterior walls are lightweight corrugated asbestos sheets on a steel supporting structure. The west part of the building is external brick-made no-bearing walls and a steel frame superstructure. The roof is made with corrugated asbestos sheet supported by the "I" type steel purlins. The floor is a concrete slab on grade.

Inspection Results

During the visual structural evaluation, there was no evidence of any major structural defects in any of the inspected sections of the building. The structure did not show
visible signs of impending failure. Failure of secondary structural elements was observed. The failed structural elements included a damaged roof and wall sheathing and supporting steel column weakness in the east section of the building (see Attachment 2, photos 19 and 20).

The failed structural elements do not present any danger to the superstructure stability at the present time.

3.0 RECOMMENDATIONS

- Based on the observations made during this inspection, structures No. 2 and No. 8 can be classified as safe to perform any tasks anticipated for this project however, the recommended demolition of structure No. 3 may cause damage to structure No. 2.

- Based on the observations made during this inspection, the following structures can be classified as safe to perform any tasks anticipated for this project after fulfilling the following recommendations to ensure safe conditions during removal operations:
  - Structure No. 1 - remove or secure part of the collapsed roof.
  - Structure No. 4 - secure truss or add missing lacing in the truss structure.
  - Structure No. 6 - remove or secure part of the collapsed roof.

- Due to the structural conditions of structures No. 1 and No. 6, and the costs of preparing the structure to safely perform the removal work, demolition as a cost-effective method is strongly recommended for removal of contaminated materials.

- Based on the observations made during this inspection, structures No. 3, No. 5 and No. 7 can be classified as unsafe and structurally unsound to perform any tasks if anticipated for this project. Demolition is recommended for removal of contaminated materials.

- The existing site drainage system should be investigated, sealed or demolished to prevent runoff water discharge into Peek Creek.

It is strongly suggested that a demolition cost estimate for all existing structures be calculated and compared to the cost of the above mentioned cleanup or demolition recommendations.

An additional detailed engineering investigation of the structural integrity of the retaining walls is recommended. Observed damage, including cracks, in this structure (see Attachment 2, photos 21 and 22) may cause massive soil relocation into the site area and destroy the stability of the industrial structures located behind the retaining walls.

The contractor should prepare a demolition/cleanup action plan containing the following:
- Material Handling Plan
- Asbestos Management Plan
- Spill Response Plan
- Dust Control Plan
- Monitoring and Sampling Plan
- Health and Safety Plan

A Structural Engineer should review the work plan and conduct a detailed field inspection prior to and during the demolition/cleanup operations.

ATTACHMENTS: 1 - Site Sketch of Allied-Pulaski Site
2 - Photographs
January 20, 1999

Mr. Jeffrey Tuttle (3HS41)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Allied-Pulaski Site
Pulaski, Virginia

Dear Mr. Tuttle:

The Allied-Pulaski Site Trip Report, dated December 9, 1998, for the Allied-Pulaski Site, located in Pulaski, Virginia, has been reviewed. The U.S. Fish and Wildlife Service offers the following comments for consideration by the Biological Technical Assistance Group (BTAG).

The Allied-Pulaski Site is located at the former Allied Chemical Corporation/Pulaski Works, which manufactured sulfuric acid until approximately 1978. The site encompasses approximately 30 acres and is located in an area of mixed commercial and industrial properties. Several brick buildings exist on site, including a Boiler House, Sulfide Furnace, and Ore Dump. A capped lagoon area containing several slag piles is also located on site. Runoff from the site enters several drainage ditches that flow directly into Peak Creek and eventually into Clayter Lake on the New River. A preliminary site assessment performed in 1990 found waste piles that were uncovered and exposed to physical and chemical weathering, allowing for potential off-site migration of contaminants. A meeting and sampling assessment was performed in 1998 to better characterize the potential migration of contaminants from the site. The current report presents the results from this assessment.

The current assessment included the collection of sediment from drainage ditches, wetland areas and ponds. Because these areas may contain aquatic ecological receptors for at least part of the year, sediment concentrations were screened against sediment BTAG screening values, to evaluate potential ecological risk. Metals have the highest potential for risk at the site. For sediment samples collected from the west sediment pond (AS07), east sediment pond (AS08), east culvert (AS09), and west culvert (AS10) the following metal concentrations exceeded BTAG screening values: cadmium, chromium, copper, lead, silver, and zinc. For sediment samples collected from the wetland area by the sulfide furnace (AS04), the following metal concentrations exceeded BTAG screening values: cadmium, chromium, copper, lead, mercury, and zinc. These exceedances suggest that these metals may pose ecological risk to aquatic...
receptors inhabiting these areas. Sediment samples collected from the east culvert (AS09) and west culvert (AS10) were also analyzed for pesticides and PCBs. Because BTAG screening values are generally not available for these compounds, it is difficult to evaluate ecological risk. Because most pesticides and PCBs were not detected, with reasonably low detection limits, the potential for ecological risk seems to be low for these compounds. However, sediment collected from the west culvert had a DDT concentration that slightly exceeded the BTAG screening value, suggesting the potential for risk. Even though PCBs were not detected, detection limits were sufficiently high (above BTAG values) so that risk cannot be determined for this compound. Because PCBs and DDT bioaccumulate through the food chain to higher order predators, these compounds may need further evaluation to adequately determine their ecological risk.

To evaluate potential risk from surface water that was collected from the central culvert (AW01), concentrations were compared to surface water BTAG screening values. These comparisons found potential ecological risk from several pesticides (hepatachlor, dieldrin, endrin, and DDT), and metals (aluminum, cadmium, copper, iron, lead, and zinc). For mercury and silver, detection limits were higher than BTAG screening values, thus their potential ecological risk could not be determined.

These data were evaluated under the conservative assumption that aquatic organisms could be exposed to these concentrations. Because no samples were collected from Peak Creek, the potential risk to aquatic organisms in Peak Creek could not be determined. The high concentrations of certain constituents in the drainage ditches suggest that migration to the creek is likely. If additional sampling is performed, sediment and surface water samples should be collected in the drainage ditches just before entering Peak Creek, and in Peak Creek, both upstream and downstream of the outfall. These data can be used to determine contaminant migration and exposure pathways for the site.

This preliminary screen suggests that there is potential for ecological risk at and near the site. This preliminary screen does not address the potential for many of these compounds to bioaccumulate in the tissue of fish, birds and mammals. A more thorough ecological risk assessment is needed to address this issue and to further identify potential ecological risk at the site. A useful tool for evaluation is site specific toxicity tests using sediment and surface water collected at the site.

Thank you for the opportunity to review this document. If you have questions or need additional information, please contact John McCloskey of this office at (804) 693-6694, extension 108.

Sincerely,

Karen L. Mayne
Supervisor