

K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

INSPECTION SUMMARY LETTER

August 31, 2005

WATER-NIS

Ms. Maria L. Race
Midwest Generation EME, LLC
One Financial Plaza
440 S. LaSalle Street, Suite 3500
Chicago, IL 60605

VIA U.S. MAIL

KPRG Project No. 16005

Re: Liner Inspection -- West and East Ash Pond at the Waukegan Generation Station

Dear Ms. Race:

KPRG and Associates, Inc. (KPRG) is pleased to provide Midwest Generation EME, LLC (Midwest Generation) with this summary letter report for the liner inspection performed for the West and East Ash Ponds (West Pond and East Pond) at the above referenced facility. The report provides KPRG's understanding of the project objective, a summary of inspection findings and conclusions/recommendations. Each is addressed separately below.

PROJECT OBJECTIVE

The East and West ash ponds have both been relined with white on black 60 millimeter (mil) high density polyethylene (HDPE) within the last two years; the East Pond in 2003 and the West Pond in 2004. A visual survey performed by Midwest Generation personnel identified a cause for concern with numerous wrinkles in the sides of the liner. Based on the recent installation date of the liner, Midwest Generation requested an independent third party review of the current condition of the liner. Therefore, the objective of the project was to review existing liner construction information and perform a visual inspection of the exposed liner to identify potential construction or performance concerns.

INSPECTION SUMMARY

On August 8, 2005, KPRG obtained copies of the construction files for both subject ponds. The file information included, but was not limited to, the initial construction bid specifications, As-Built diagrams, destructive testing results, non-destructive testing results, compaction testing for materials beneath the liner and quality assurance/quality control information for each liner panel used. This information was reviewed prior to the field inspection. On August 10, 2005, Mr. Chris Swires, Mr. David Pyles and Mr. Richard Gnat performed the field inspection. Prior to walking the area, a brief meeting was held with Midwest Generation personnel (Ms. Maria Race, Ms. Mary Connor and Mr. Chris Lux) to address some questions regarding the liner construction. The visual inspection of the ponds was limited due to ash and/or water within both ponds.

14665 West Lisbon Road, Suite 2B Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478

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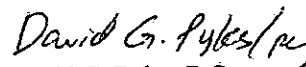
- The access ramps should be reconstructed to ensure there is no future mechanical damage to the liner. As a practice no material should be dumped directly on the liner without a protective course on the liner. This protective course can be comprised of a heavy geotextile installed under a layer of clean fill or a suitable thickness concrete mattress constructed on top of the liner.
- Perform regular inspections (semi-annual) of the anchor trench, particularly on the West Pond, to monitor any additional settling that may occur.
- Future design considerations should include a geotextile between the sand base and overlying crushed limestone to preclude aggregate migration through the sand due to pressure (i.e., from equipment traffic during pond clean out) which may cause the aggregate to be in direct contact with the underlying liner. Other protective base materials such as fabric form concrete can also be considered.

KPRG appreciates the continued opportunity for providing our technical services to Midwest Generation. If there are any questions, please contact me at 262-781-0475 or David Pyles at 630-325-1300.

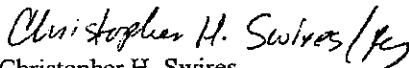
Sincerely,
KPRG and Associates, Inc.



Richard R. Gnat, P.G.
Principal



David G. Pyles, P.G.
Principal



Christopher H. Swires
Associate, EnviroCon Systems

Cc: Mary Connor, Midwest Generation Waukegan Station
Chris Lux, Midwest Generation Waukegan Station

ATTACHMENT 1
Photographs

Photographs documenting the existing conditions are provided in Attachment 1 along with aerial photographs of the area identifying where each picture was taken.

The following notes and observations based on the file review and visual inspection are provided:

- 1) The 60 mil HDPE liner has been installed in accordance with the plans and specifications. The liner resin and roll properties met those listed in the specification and met typical industry standards (Section 02700 Geomembrane). The trial weld, destructive test, and non-destructive test reports available met the project specifications and typical industry standards. The HDPE panel layout also met the project specifications and typical industry standards.
- 2) The project plans show a twelve (12) inch layer of sand on the pond floors capped by six (6) inch layer of limestone screenings. Typically a separation geotextile is placed between a sand and aggregate layer to prevent the migration of the aggregate down into the sand. The aggregate could eventually come into contact with the liner and potentially cause mechanical damage under heavy wheel loads. The plans do not delineate or identify any geotextile. The relative stability of the sand and limestone layers should be examined by hand excavation of a portion of an exposed pond floor in the East Pond while the area is accessible during current maintenance activities. It should also be checked when the West Pond is dewatered and the sediment excavated as part of routine maintenance.
- 3) Installation of HDPE liner during hot weather must include deploying excess material to compensate for the thermal contraction which takes place as the temperature decreases. This excess material is evident as wrinkles in the liner. The wrinkles associated with HDPE Liner are an aesthetic issue only. A liner that is installed without enough excess material may result in tension across the liner seams which can produce stress cracks at seams and/or may pull the liner away from mechanical attachment points or out of the perimeter anchor trench. Based on our research and experience, the liner wrinkles in the east and west pond liners are consistent with similar projects using 60 mil white on black HDPE liner. The wrinkles in the West Pond are probably exacerbated by the having the lower portion of the slope liner loaded with ash and may be isolated to the exposed top portion of the slope liner (refer to Photo 3 for typical wrinkling noted on the exposed liner for the West Pond). This isolation may cause a greater frequency and amplitude in the wrinkles. Please compare the wrinkles in east pond with and without an ash load on the lower portion of the slope (Photos 16 and 20, respectively).
- 4) Mechanical attachment of any liner to a concrete structure below the liquid level is a potential leak path. This potential leakage can be minimized by using a 2" x 1/4" batten bar with anchor bolts every six inches on center and a suitable closed cell gasket. If a high rate of leakage occurs the subgrade under the liner could be undermined leading to a failure of the liner system.

Per the original drawings, the original hypalon liner was attached to the inlet and sump with a 2" x 1/4" - 304 stainless steel batten bar and expansion anchors or ram set nails. Re-use of any part of the old bolts and bar could raise the potential for leakage if the bolts and/or bar were damaged during the demolition of the original hypalon liner. Examination of the visible portion of the liner batten attachment confirms the statements

of Chris Lux that new stainless steel batten bar, stainless steel anchor bolts, and neoprene gasket were used in the installation of the HDPE Liner.

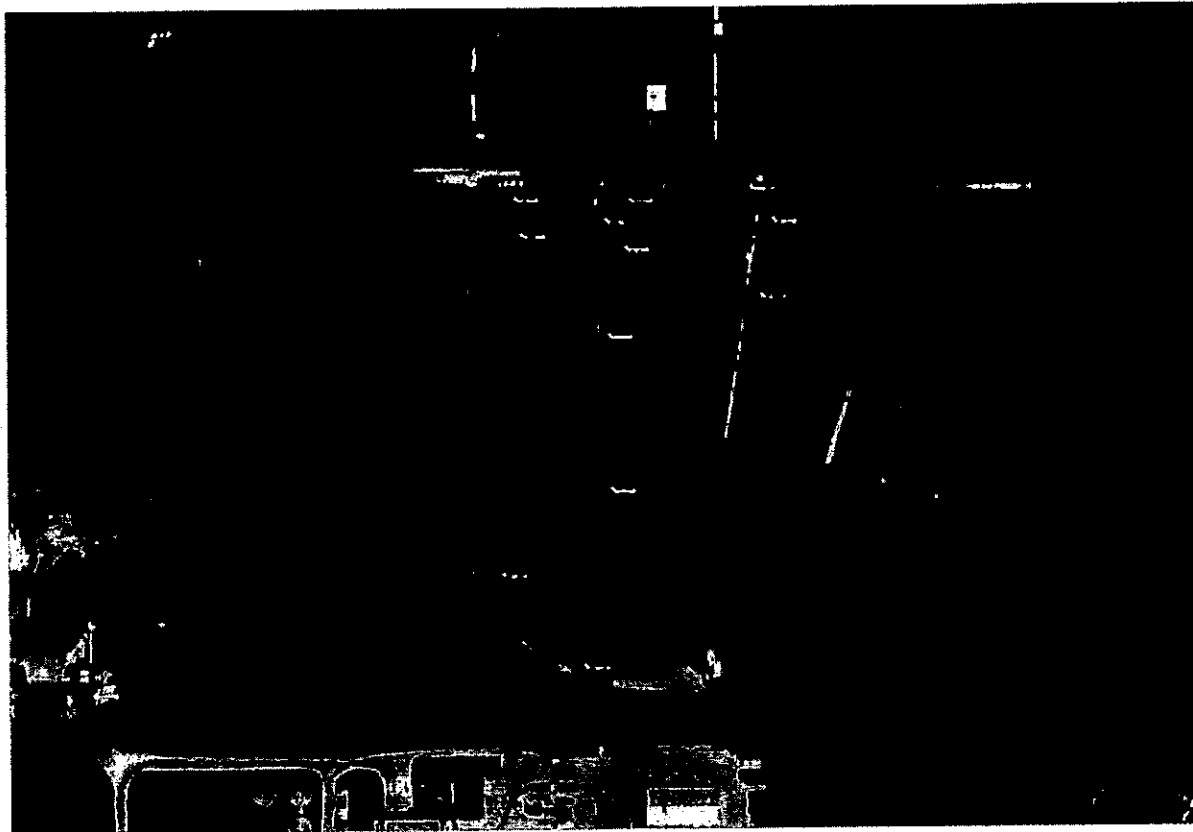
At the sump structures the new batten, however, should have been extended below the finish grade at the anchor trench location prevent erosion from rain water flowing under the liner of the slope next to the concrete sump structures (Photos 8, 9, and 10 – batten stopped short of finish grade). Adjoining pieces of batten should also be butted together to prevent gapping and subsequent leakage. The batten was not aligned or butted together at the change in plane on the sloped portion of the weir wall of the east pond sump (Photo 12).

- 5) There is some evidence that the anchor trenches may have settled at the top of the slope. This settling can occur when the anchor trench backfill material is not compacted sufficiently (Photos 3, 4 and 22). This settling appears more prevalent on the west pond anchor trenches than on the east pond. Currently the settling is aesthetic issue only and may actually contribute to the wrinkles on the west pond slopes; however, periodic visual monitoring of the anchor trenches is needed to ensure there is no additional settling.
- 6) The stability of the slope subgrade below the liner does not appear to have suffered any major failures. The relative plane of every pond slope appears to be intact. When the subgrade below a lined slope fails, the failed material will create a bulge in the liner at the toe of the slope and there may be a void below the liner at the top of the slope. The only portion of the slopes in the two ponds that showed a slight bulge in the liner was on the west side of the center berm of the west pond (Photo 7). The slopes should be visually monitored to ensure the slope subgrade remains stable.
- 7) A liner tear was noted on the south side of the east pond associated with materials handling in the area with construction equipment. It is our understanding that Midwest Generation is aware of this liner breach and has a repair crew scheduled to address the situation.
- 8) A wedge weld pressure test seam cut in the southwest corner of the West Pond was not patched (Photo 21). This does not constitute a breach of the main portion of the liner but should be addressed by the repair crew when on site.

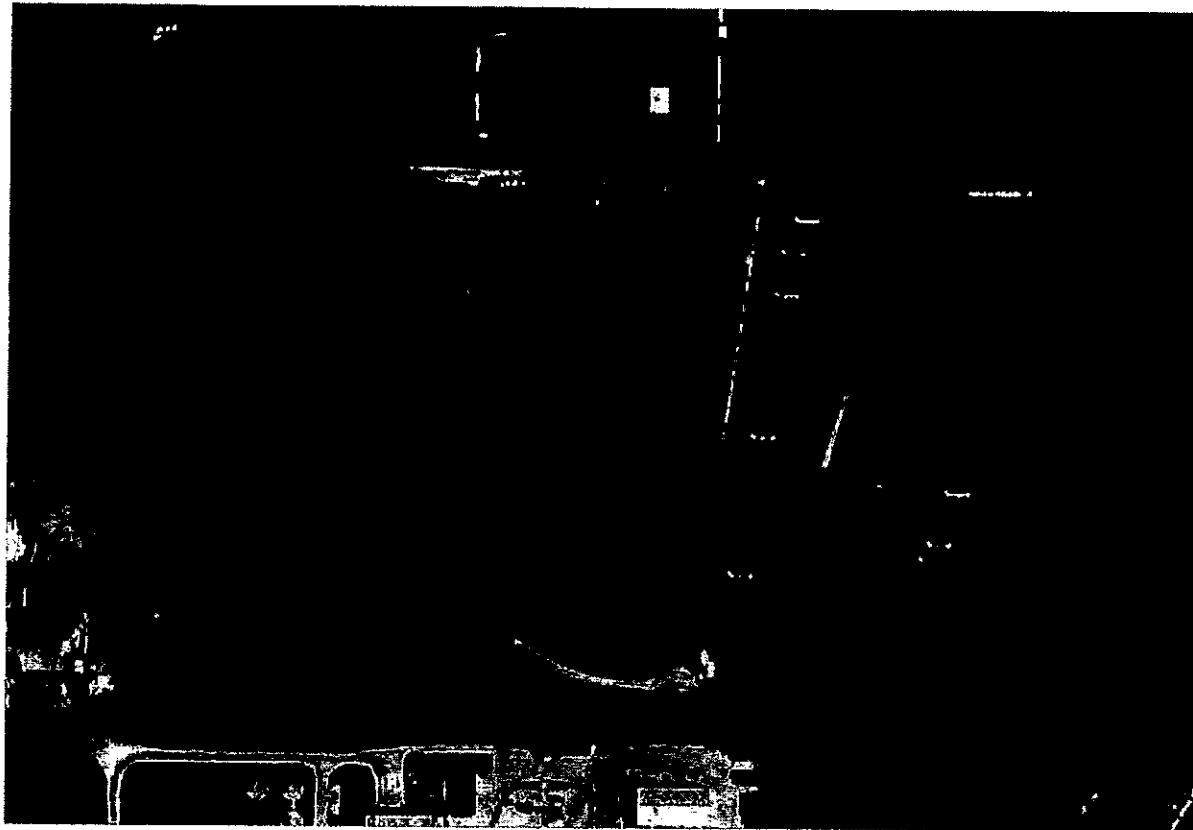
CONCLUSIONS/RECOMMENDATIONS

As a whole, with the exception of the area noted in item 7 above, the exposed liner material does not appear to have suffered any tears and/or cracking any separation or damage. There was no evidence of displacement due to gas and/or water below the liner. The liner appears to have been installed correctly and in accordance with the specifications and current industry standards. The following recommendations are provided:

- Have the liner breach noted in Item 7 above repaired by the installation contractor (it is our understanding that this is already being scheduled).
- During the above noted liner repair, have the contractor extend vertical battens near the structure on the north side of the ponds to below grade at the anchor trenches. Also repair the seam issue noted in Item 8 above.



ENVIRONMENTAL CONSULTATION & REMEDIATION		WEST ASH POND PHOTOGRAPH LOCATIONS	
K P R G <small>KPRG and Associates, Inc.</small>		MIDWEST GENERATION WAUKEGAN STATION	
		Scale: Not Appl.	Date: August 31, 2005
<small>14885 West Lisbon Road, Suite 28 Brookfield, Wisconsin 53005 Telephone 262-781-0478 Facsimile 262-781-0478</small> <small>414 Pease Drive, Suite 106 Westmont, Illinois 60090 Telephone 630-385-1300 Facsimile 630-385-1895</small> <small>1088 Kilmer Drive Oyster, Illinois 62451 Telephone 218-385-8874 Facsimile 218-385-8877</small>		KPRG Project No. 16005	FIGURE 1



ENVIRONMENTAL CONSULTATION & REMEDIATION		EAST ASH POND PHOTOGRAPH LOCATIONS	
K P R G KPRG and Associates, Inc. <small>14685 West Liberty Road, Suite 201 Brookfield, Wisconsin 53005 Telephone 262-781-0479 Facsimile 262-781-0478</small> <small>414 Plaza Drive, Suite 100 Woodmont, Illinois 60096 Telephone 630-385-1300 Facsimile 630-385-1063</small> <small>1058 Kikerney Drive Dyer, Indiana 46311 Telephone 216-848-8848 Facsimile 216-848-8827</small>		MIDWEST GENERATION WAUKEGAN STATION	
		Scale: Not Appl.	Date: August 31, 2005
		KPRG Project No. 16005	FIGURE 2

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Photo 1. West Pond, Inlet Flume.



Photo 2. West Pond, Access Ramp.



Photo 3. West Pond, Center Berm, West Wall. Note anchor trench settling.



Photo 4. West Pond, Center Berm, East Wall. Note anchor trench settling.

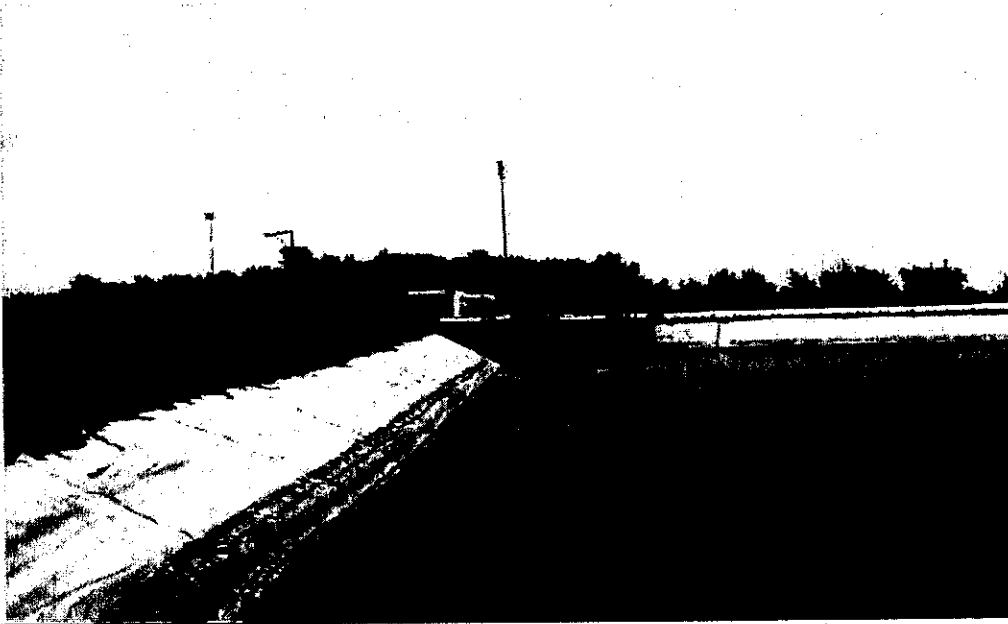


Photo 5. West Pond, Sump.



Photo 6. West Pond, Center Berm.

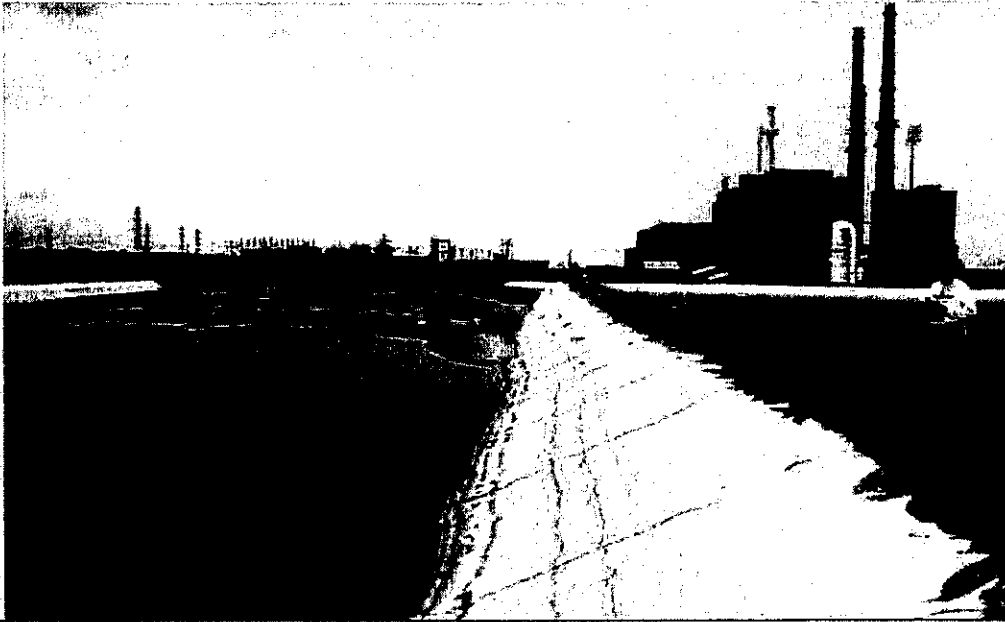


Photo 7. West Pond, Center Berm. Note slight bulge in liner at water and sediment interface.

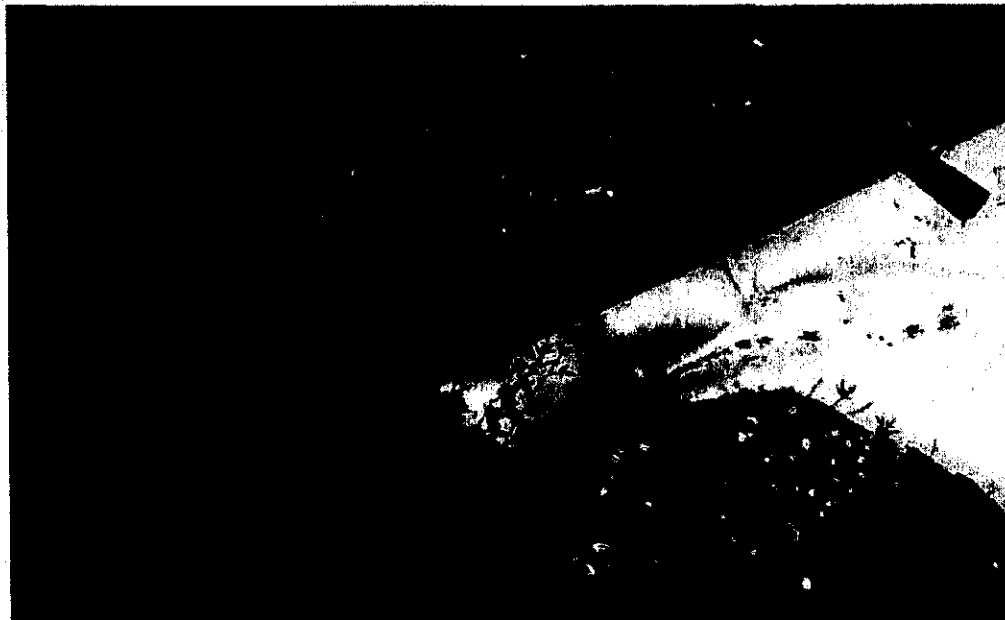


Photo 8. West Pond, Sump. Note missing vertical batten.



Photo 9. West Pond, Sump.

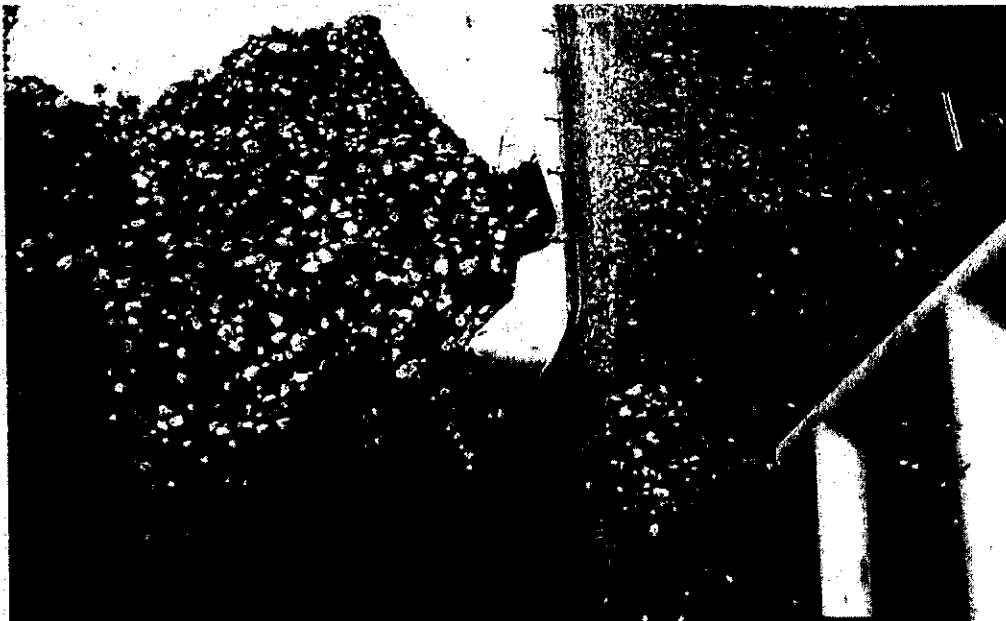


Photo 10. West Pond, Sump. Note missing vertical batten and evidence of water erosion on back side of liner.



Photo 11. East Pond, Sump.



Photo 12. East Pond, Sump.



Photo 13. East Pond, Center Berm, West Wall.

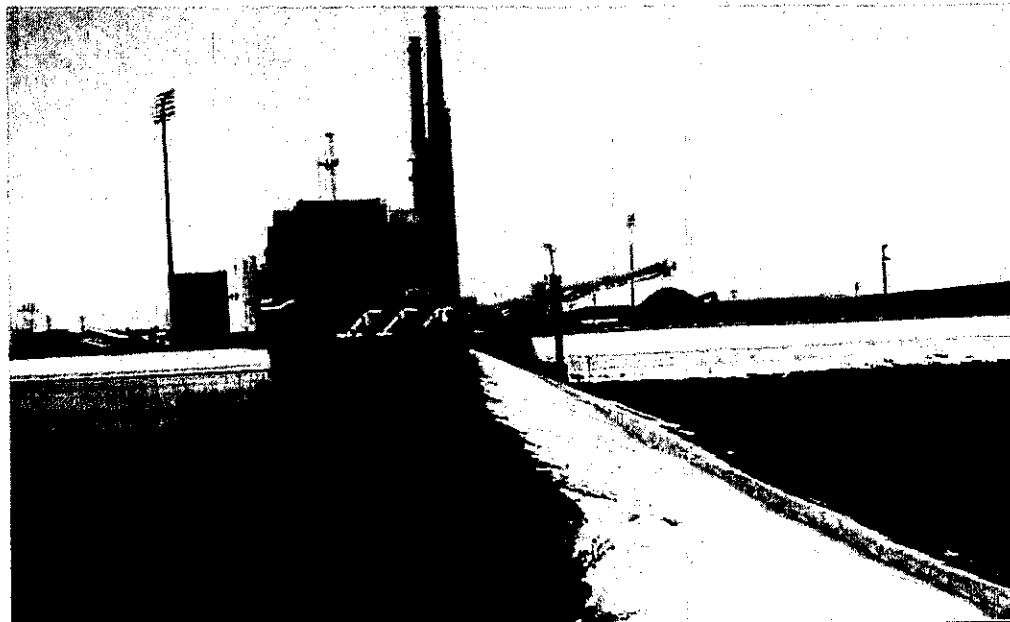


Photo 14. East Pond, Center Berm, West Wall.

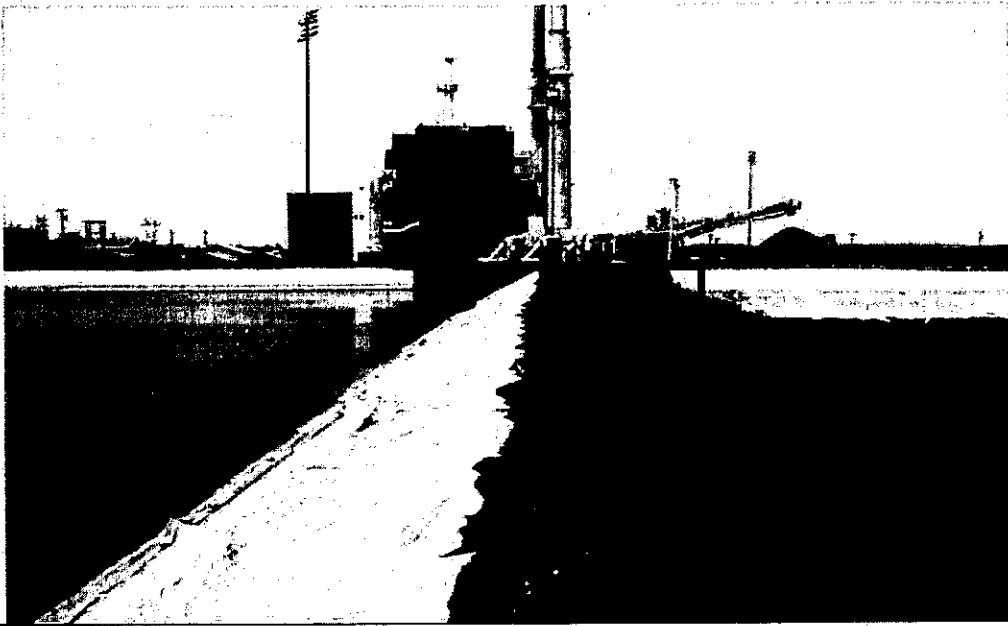


Photo 15. West Pond.

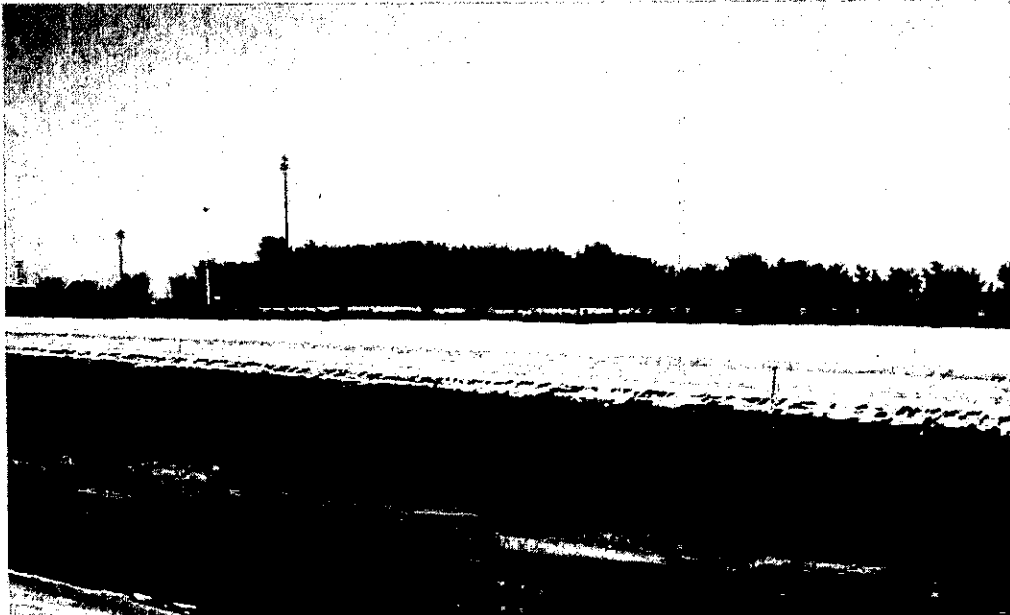
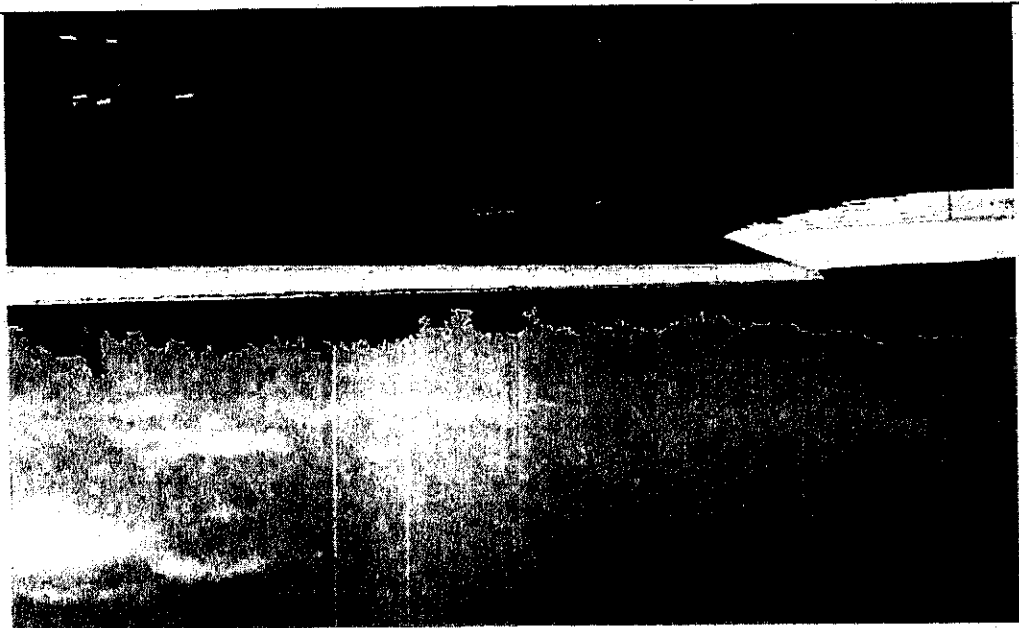


Photo 16. East Pond.

Photo 18, East Pond.



Photo 17, East Pond.



KPRG Project 16005

Photo Documentation



Photo 19. East Pond.

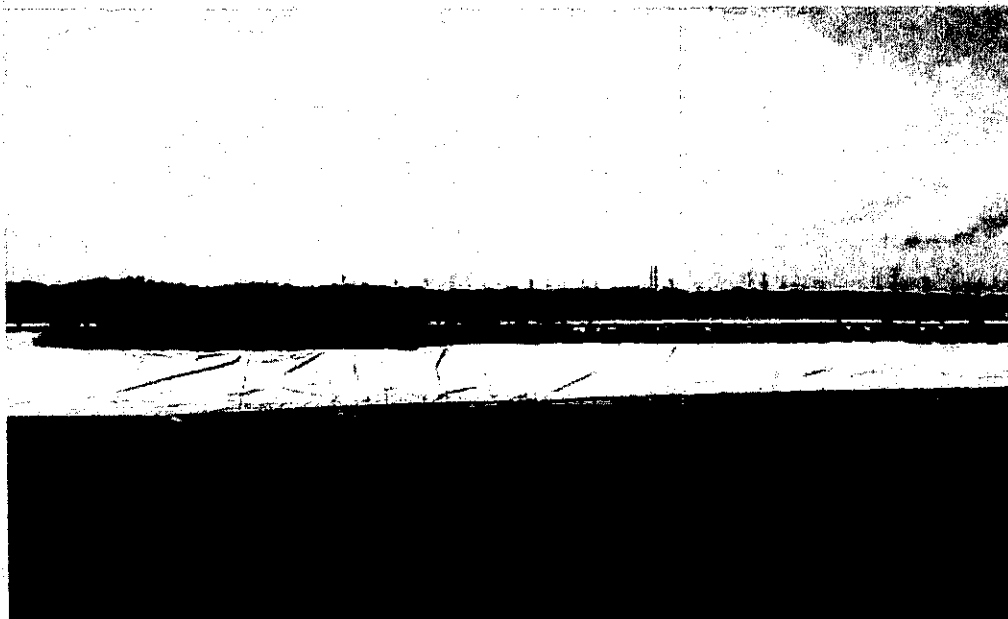


Photo 20. East Pond.



Photo 21. West Pond. Note unrepaired test seam cut.

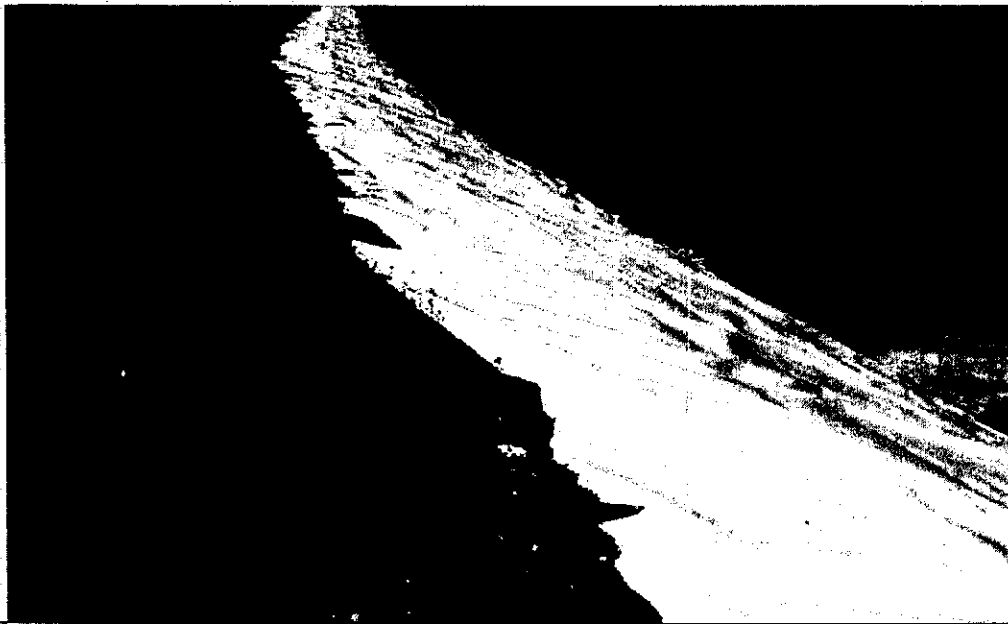


Photo 22. West Pond. Note anchor trench settling.

