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October 29, 2021

Illinois EPA – Division of Waste Management
1021 N. Grand Avenue
Springfield, IL 62702

Attention: Mr. Derek Rompot

Reference: **Construction Certification for**
Grand Tower Inactive Ash Basin Closure
Grand Tower, Jackson County, Illinois

Mr. Rompot:

Environmental Resources Management, Inc. (ERM) has completed the necessary installation, monitoring, inspection and testing for the construction of the Inactive Ash Basin Closure for the Grand Tower site. Construction of the Closure was performed by NorthStar, Inc. (Contractor). The closure work was approved by IEPA – Hydrogeology and Compliance Unit, Groundwater Section, Bureau of Water; Letter of Approval issued November 15, 2019 based on the submittals from ERM. All monitoring, testing and inspections were performed and documented based on the technical specifications and Construction Quality Assurance (CQA) Plan developed by ERM. This submittal contains material certifications, laboratory testing, field testing and as-built survey drawings for each component of the approved closure. Individual sections of this report describe the materials and testing / inspection procedures used for:

- Introduction and Regulatory Background
- Site Preparation and Subgrade Certification
- Cap System
- Post Construction Stormwater and Site Drainage
- Photograph Documentation

ENGINEER'S CERTIFICATION

The professional seal of Christopher W. Mettler, P.E. is affixed to this submittal to certify that the construction of the Grand Tower Inactive Ash Basin Closure has been completed in general accordance with the approved Plans, CQA Plan and Project Technical Specifications under the full-time observation of ERM personnel and ERM subconsultants.

If you should have any questions or require additional information concerning this submittal, please contact me at chris.mettler@erm.com or (704) 409-3439.



Sincerely,

Environmental Resources Management, Inc.
IL License #184004359

Chris Mettler, P.E.
IL Registration No. 062-070856
Associate Project Engineer

cc: Mrs. Lauren Martin – IEPA – Bureau of Water
Mr. Lynn Dunaway – IEPA – Bureau of Water
Mrs. Tabitha Bernhardt – IEPA –Bureau of Water
Mr. Keith Feemster – Rockland Capital
Mr. John Brodhead – Grand Tower Energy Center



Grand Tower Inactive Ash Basin Closure Construction Quality Assurance Certification

Grand Tower, Jackson County, Illinois

October 2021

Delivering sustainable solutions in a more competitive world

ERM

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SECTION 1
Introduction and Regulatory Background

On behalf of Grand Tower Energy Center (GTEC), Environmental Resources Management, Inc. (ERM) has prepared this report to document the completed closure activities for the Grand Tower Inactive Ash Basin Closure (the "Site") located on Power Plant Road north of Grand Tower, Jackson County, Illinois adjacent to the eastern bank of the Mississippi River. GTEC was sold by the Ameren Corporation to the current owners, Main Line Generation LLC, a subsidiary of Rockland Capital, in February 2014.

The GTEC facility has reportedly produced electricity at the Site since 1951, utilizing both coal and oil fired boilers prior to converting to natural gas in 2001. While operating coal fired boilers, GTEC developed a 21.7-acre coal combustion residual (CCR) impoundment for both fly ash and bottom ash residuals. The CCR impoundment has not received CCR materials since converting to natural gas in 2001. Currently, GTEC is a 478 Megawatt (MW) natural gas combined cycle facility. GTEC is located on 300 acres of land and was a merchant facility, which sold energy and capacity into the Midcontinent Independent System Operator (MISO) system until approximately December 2020 when the facility was idled.

On April 17, 2015, the U.S. Environmental Protection Agency (USEPA) published the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities final rule in the Federal Register. This rule regulates the disposal of CCR as a solid waste as part of the Resource Conservation and Recovery Act (RCRA) in 40 CFR Parts 257 and 261. This final rule applies to new and existing CCR landfills and CCR surface impoundments, and certain inactive CCR surface impoundments at coal-burning electric utility sites that are still producing electricity as of October 19, 2015. The CCR landfills and CCR surface impoundments in the rule are also referred to as "CCR units". The GTEC CCR impoundment is defined as an inactive ash basin since the impoundment has not received CCR materials since before 2001. The original rule exempted inactive ash basins from the majority of requirements if the basin planned to close prior to April 2018. This portion of the Rule (257.100) was amended on June 17, 2016 to include inactive ash basins in the regulatory requirements with a delayed compliance schedule.

1.1 - Project History and Approval by IEPA

Ameren Corporation, the GTEC owner prior to 2014, received a Notice of Violation (NOV) on June 27, 2012 in response to impacts associated with the ash basin on the Site. In October 2014, GTEC retained ERM to begin evaluating closure options for the inactive ash basin. ERM prepared a Technical Memorandum on March 3, 2015 that evaluated closure options for the inactive ash basin. Following these activities, ERM returned to the Site in November 2015 to perform field exploratory activities to validate the "Close-In-Place" option for the inactive ash basin. During this timeframe, ERM was interacting with the Illinois Environmental Protection Agency (IEPA) on a regular basis to discuss planned activities and permitting requirements moving forward. At this time, information was relayed to the IEPA that GTEC planned to close the inactive ash basin using a "Close-In-Place" method contingent upon results of exploratory

work, and in accordance with the Federal rule Part 257. At this time, IEPA did not have regulations in place that provided specific details related to the closure of CCR facilities (active or inactive).

In January 2017, an Application to Establish a Groundwater Management Zone (GMZ) was submitted to the IEPA. In June 2017, the IEPA issued a response to the GMZ Application with comments. ERM developed a work plan in response to the IEPA comments, and the work plan was approved by the IEPA in July 2017. The work plan involved the installation of additional monitoring wells and sampling, as well as subsequent quarterly sampling. The groundwater data collected was used to update the three-dimensional groundwater model associated with the GMZ. On November 8, 2018, the IEPA completed its review of the GTEC Annual Groundwater Monitoring Report dated August 9, 2018. This report provided a statistical assessment of groundwater sampling date that was obtained from existing and new wells constructed around the Site. Based on this assessment, six Appendix III or IV parameters, as defined in the federal rule Part 257, appear to be impacting groundwater around the ash basin. This report was approved vial email on November 8, 2018 by the IEPA.

In March 2019, ERM submitted an application to use a groundwater management zone (GMZ) for the ash basin. In response to IEPA comments, ERM revised the GMZ Application and resubmitted it in July 2019. The GMZ Application was formally approved by the IEPA on November 15, 2019. This approval initiated the corrective actions and final closure of the GTEC inactive ash basin.

On October 15, 2019, the National Pollution Discharge Elimination System (NPDES Permit No. ILR10BB17) permit for construction activities was approved by the IEPA. This permit was requested to manage stormwater discharge during the construction period associated with ash basin closure.

SECTION 2
Site Preparation and Construction

A pre-construction meeting was conducted at the Site on December 10, 2019. The meeting included the Construction Contractor and Engineer (ERM), the main Subcontractor (Northstar), and the Property Owner (Rockland Capital). During the on-site meeting, plans for the inactive ash basin closure were reviewed by the project team. All phases and schedules for the project were discussed in detail. Following the review of the project, a walkthrough was conducted and key features of the project were discussed with these parties.

Equipment mobilization also began on December 10, 2019 by Northstar. All equipment brought on-site was inspected for proper operation. Field office and construction crew break trailers were delivered to the Site on December 11, 2019. During mobilization activities, utilities were located and marked near the trailers. Any utilities within the footprint of construction activities were also located.

2.1 - Erosion and Sedimentation Control Measures

Site preparation included the installation of the erosion and sedimentation control devices permitted by IEPA, in accordance with the Erosion and Sediment Control Plan and the Site Stormwater Pollution Prevention Plan (SWPPP). Site perimeter erosion and sediment control measures were installed on December 13, 2019. Once the closure operations within the inactive ash basin footprint were underway, a sediment basin was installed. This sediment basin was designed to provide enough surface area and settling volume for CCR solids to settle from stormwater run-off within the basin. All stormwater was tested for turbidity and pH prior to discharge from the Site to comply with the discharge objectives. Early in the construction phase, ERM and Northstar observed that CCR solids would stay suspended in the stormwater run-off collected in the sediment basin for extended periods of time. Weather, including wind and precipitation, and construction activities affected the suspension of solids in stormwater within the run-off basin. In an effort to maintain compliance with the NPDES Permit issued for stormwater discharges from the Site, a pump and filter skid with 5, 10, 25 and 100-micron filter bags was set up as a means to pre-treat the stormwater prior to discharge. The basin and pump/filter skid combination helped to maintain the stormwater discharge requirements contained in the Site NPDES Permit for the duration of construction activities. The main stormwater discharge location was adjacent to existing Outfall 002 at the southern end of the surface impoundment.

2.2 – Initial Field Survey of Site

Prior to relocating any CCR materials, or the existing soils to be used for final cover, a field survey was completed by Shawnee Professional Services. The survey was completed to obtain existing Site topography to compare with the final as-built drawings.

2.3 – CCR Excavation and Final Placement

The initial CCR closure activities started in December 2019. These activities included excavating ditches and channels within the ash to facilitate the run-off of stormwater to the sediment basin area prior to filtering and discharge. Access roads through the existing surface impoundment

were established to facilitate CCR transport to the final closure footprint. Staging areas were also designated for equipment staging and ash dewatering.

Following the initial development activities, a perimeter investigation began in January 2020 to locate the limits of ash within the impoundment. This investigation included the excavation of 14 test pits to gain an understanding how the ash interacted with the perimeter berms, levees and Site fencing.

Large scale CCR excavation and transportation operations for consolidating the existing 21-acre footprint into the final closed 13-acre footprint began in February 2020. Equipment utilized by Northstar for CCR consolidation-related activities included two excavators, one long reach excavator, two D65 bulldozers, three 40-ton off road articulated dump trucks, and one 30-ton off road articulated dump truck. Upon starting the CCR consolidation-related activities, Northstar began developing site-specific dewatering techniques for CCR. Water contents varied across the Site, with some limited pockets having higher water content to the point of liquefaction, and other locations having low moisture content.

Typically, as excavation depth increased, the CCR water content also increased. The mixing of dry and wet CCR was tested. However, this method was ultimately determined not to be viable for dewatering the CCR because the amount of wet material exceeded the dry material. Through a series of dewatering tests on the CCR material, Northstar settled on a preferred method that was effective in efficiently dewatering the materials. The CCR material was placed in long rows or stacks within the basin after excavation, and allowed adequate time for the water to drain from the excavated material. Dewatering time typically ranged from three days to approximately two weeks depending on the type of CCR (fly ash or bottom ash) encountered, depth of excavation, and Site weather conditions. During freezing and wet periods experienced in the spring of 2020, CCR consolidation activities were slowed due to the limited ability to dewater the ash in the rows and stacks.

As work progressed, CCR material continued to be excavated and placed in the final footprint, and in June 2020, the final closure configuration started to take shape. By July 2020, the final 4:1 side slopes of the consolidated CCR pile began to be established. During the summer months as temperatures increased, dust mitigation practices were employed by using a water truck to spray the ash with water that accumulated in the sediment basin. This practice prevented the top layer of ash from drying out and generating dust.

The perimeter berm soils of the existing ash basin were planned to be used for final cover over the geosynthetic liner used in the cap. However, Northstar and ERM personnel discovered layers of CCR material in the western and southern portions of the perimeter berm, indicating that CCR material was used to some extent historically in the construction of the perimeter berms for the CCR surface impoundment. The newly discovered CCR material within the perimeter berms was segregated from the soil material needed for the cover soil, and placed within the ash stacks. The need for segregation resulted in a project phasing problem due to potential flooding from the Mississippi River. Prior to the discovery of CCR material in the perimeter berm, the entire closure was to be lined before removal of the perimeter berm soils needed for final cover. However, after the discovery of the CCR material in the perimeter berms, ERM and Northstar

needed to develop an alternative plan, which included the installation of the liner to a minimum elevation of the 100-year Mississippi River flood event (372 feet amsl) to maintain adequate protection of the consolidated ash from potential flooding during construction activities at the Site. Additionally, this alternative plan allowed for leaving the top of the consolidated CCR material closure area open to receive the final CCR material that was contained within the western and southern perimeter berms.

To accomplish this alternative plan, material selected for cover soil from the berms was segregated and stockpiled at a pre-determined location north of the CCR surface impoundment area to keep it clear from any CCR material still being handled. Side slopes on the northern, western and southern sides of the consolidated CCR pile were final graded and surveyed ahead of liner installation. In late August 2020, an anchor trench was dug around the perimeter of the consolidated ash stack and Phase 1 of the liner installation was completed. Further details associated with the liner installation is provided in Section 3 – Cap System, of this report.

After completion of the Phase 1 liner installation, Northstar continued to excavate the remaining CCR material from the original CCR surface impoundment footprint. Positive indication of CCR removal was based on encountering the underlying natural clayey soils within the excavation areas. The presence of the extensive underlying clayey soils is considered to be a favorable Site condition for reducing vertical migration of CCR constituents.

Due to grading of side slopes and phasing of the liner with the addition of an unknown quantity of additional ash from the perimeter berms, the top of the closure design was slightly modified to accommodate the additional excavated ash by creating a mounded area on top of the consolidated CCR pile. This mounded area is shown on the final survey, with all slopes meeting the 5% requirement to account for potential future settlement.

Following removal and final placement of the remaining CCR material from the western and southern perimeter berms, access roads that had been used during the project were removed and placed within the final closure footprint. These access roads were built from clay obtained from an original surface impoundment sub-cell divider berm, as well as from clay material from the perimeter berms. Over the course of construction activities, these access roads were impacted with CCR material. Because of these impacts, it was determined that all of the access road material would be placed under the liner in the closure area footprint.

Following the excavation, transport and final grading of the CCR materials from the surrounding portions of the Site, an as-built survey was conducted to quantify the CCR removed and placed within the closure area footprint. A total of approximately 230,000 cubic yards of CCR material was excavated and placed on top of an existing 370,000 cubic yards, resulting in approximately 600,000 cubic yards of material within the final closure area.

2.4 - Cover Soil Stockpiling and Final Placement

As previously mentioned, soil material was used from the western and southern perimeter berms for final cover over the liner system. However, CCR material was found interlayered with perimeter berm soils that needed to be segregated from the unimpacted soil. Consequently, the unimpacted soil was temporarily stockpiled in the northern portion of the Site, for use later in the

project. This process was completed using excavators, bulldozers and off-road articulating dump trucks. Throughout this process, care was taken to segregate CCR materials from soil materials that would later be used for cover in the project.

Final cover soils were placed over the geocomposite starting in late September 2020. The three-foot final cover soil layer was placed primarily using a load of cover soil and spreading it with a dozer over the geocomposite. Care was taken so that damage was not done to the liner system during placement of the final cover soil.

2.5 – Final Field Survey of Site

Following placement of the final cover soils, an as-built survey was completed by Shawnee Professional Services to quantify the amount of cover soils removed and stockpiled. The as-built survey is available in Appendix A.

SECTION 3
Cap System

ERM personnel were on-site during the installation of the Grand Tower Inactive Ash Basin liner system. The liner cap system included a textured 40-mil Linear Low Density Polyethylene (LLDPE) liner supplied by Agru-America, Inc. The liner was overlain by a double-sided, 6-ounce geocomposite to serve as a drainage layer above the liner system. This drainage system was connected to a perimeter anchor trench system filled with washed stone and perforated pipe to collect and disperse drainage waters. The entire cap system was then covered with a minimum three feet of unimpacted berm soil material to serve as protection for the liner system, as well as a rooting base for natural revegetation.

Installation of the LLDPE liner and geocomposite was performed by Hallaton Environmental Linings (Hallaton). A copy of the LLDPE roll certifications, resins and pre-shipping test results is included in Appendix B. Conformance sampling and testing of the LLDPE liner materials were performed in accordance with the approved specifications and the Construction Quality Assurance (CQA) Plan. A copy of the conformance testing results performed by Geotechnics is included in Appendix C. All materials used for the LLDPE liner system installation met or exceeded the requirements of the project specifications and CQA Plan.

3.1 - Anchor Trench

Prior to deployment of the liner and geocomposite materials, an anchor trench was installed around the perimeter of the consolidated CCR material footprint. The anchor trench was excavated to a minimum depth of 18 inches and a minimum width of 18 inches. Both the liner and geocomposite layers were extended into and through the anchor trench. Following installation of the liner and geocomposite materials, a four-inch perforated polyethylene (PE) drainage pipe was installed in the bottom of the trench. After installing the drain pipe, #57 stone was used to backfill the anchor trench to allow for drainage. After backfilling the trench with stone, the additional geocomposite material was folded back over and bonded together to protect the stone from intrusion of surrounding soils. Six anchor trench drains (outlets) were installed along the length of the anchor trench. The outlets included a four-inch diameter solid PE outlet pipe and rip-rap energy dissipater apron at the outlet. The anchor trench system was installed in general accordance with the plans approved by the IEPA.

3.2 - LLDPE Panel Deployment

Prior to placing LLDPE liner material, ERM personnel and Hallaton representatives inspected the surface of the subgrade for potentially harmful objects that could damage the liner (rocks, roots, etc.). If any such objects were discovered, Hallaton removed them to prevent damage to the liner. ERM and Hallaton accepted the subgrade by signing a subgrade certification form, a copy of which is included in Appendix D.

LLDPE panels were deployed using a boom and spear on a skid-steer loader. The sheets of LLDPE were removed from the roll using manpower and four wheel all-terrain vehicles. The LLDPE liner panels were deployed directly on top of the exposed ash. Each panel was inspected by Hallaton personnel during deployment, assigned a sequential panel number, and measured for

dimensions. A copy of the panel deployment records is included in Appendix E for reference. The LLDPE Liner As-Built Drawing showing the locations of each panel is presented in Appendix F for reference.

3.3 - LLDPE Panel Seaming

At the beginning of each work day during LLDPE liner installation, trial seams were performed (fusion and /or extrusion) to test the integrity of the welding machine and accuracy of the welding technician. Following completion of the trial seams, destructive testing specimens were cut from the trial seams and tested using Hallaton's tensiometer. In order to accept a trial seam, the failure mode for both peel adhesion and bonded shear strength needed to meet the minimum strength requirements contained in the design specifications. Subsequent trial seams were performed throughout the workday at a frequency of approximately one every four hours of seaming, or whenever a new welder or technician was used. A copy of the trial seam reports are included in Appendix G.

ERM personnel performed full-time oversight during seaming of the LLDPE panels. The majority of field seaming was accomplished using double hot wedge fusion welding equipment and techniques. Seaming of repair patches and small panels was performed using extrusion welding techniques. Each seam was assigned a sequential number in accordance with the project specifications. ERM also performed full-time monitoring of the non-destructive testing of field seams, air pressure testing for double hot wedge fusion welds, and vacuum box testing for extrusion welds. For reference, a copy of the Seam Inspection Reports documenting non-destructive testing results completed by Hallaton personnel is included in Appendix H.

Air pressure testing was conducted by injecting air into the channel between the double welds to a pressure of 30 pounds per square inch (psi). The air pressure test was performed for five minutes and was deemed as passing when the pressure between the welds dropped $\leq$ 10% ($\leq$ 3 psi) over the five-minute testing period. The vacuum box testing procedure included the application of soapy water along the weld and placing a clear vacuum box over the weld. A vacuum was then applied to the box, and the area inside of the vacuum box was visually inspected for air coming out of the welded seam, which would cause the soapy water to bubble.

The locations of all the LLDPE panels and subsequent seams are shown on the LLDPE Liner As-Built Drawing included in Appendix F.

3.4 - Destructive Testing

The destructive testing program for the project included sampling of one seam location for every 500 feet of linear seam installed. The location of each destructive sample was determined by ERM personnel, and is identified in the Geomembrane Seam Destructive Sample Log in Appendix I. The destructive samples are noted on the log by DS-#. Five, one-inch wide specimens were taken from each of the destructive testing sample locations and tested for peel and shear using Hallaton's tensiometer. The minimum testing requirements of 40 mil LLDPE for peel strength is 50 pounds per inch (ppi) for fusion welds, and 44 ppi for extrusion welds. The minimum testing requirements for shear is 60 ppi for both fusion and extrusion welds. Once passing results were achieved in the field, the remainder of the sample was sent to Geotechnics,

Inc. (Geotechnics) in Pittsburgh, Pennsylvania for laboratory destructive testing. Approximately 30,530 feet of seam was installed over the CCR mound, resulting in a minimum of 62 destructive samples being required. However, a total of 64 destructive samples were collected and laboratory tested over the course of the liner installation, which exceeded the minimum requirement. Two of the 64 samples (DS- 5 and DS-38) did not meet or exceed the laboratory destructive testing requirements in accordance with the technical specifications and CQA plan. Therefore, the failing sample locations were identified in the field, and the procedure outlined in the CQA plan was followed for the failed samples, which involved taking a sample 10 feet on either side of the original failing location to isolate the length of the failing seam. Once the additional two samples were taken, and sent to the lab for confirmation that they meet the CQA requirements, a cap strip was placed over the entire length between the two new samples. This was performed at both DS-5 and DS-38 sample locations. All other samples met or exceeded the laboratory destructive testing requirements, including the additional destructive samples from DS-5 and DS-38. A copy of the Laboratory Destructive Testing Results is included in Appendix J.

3.5 - Repairs

A total of 232 repairs were necessary for the 40-mil LLDPE liner installation. Of this total, 64 repairs were necessary for laboratory destructive sampling. The majority of the remaining repairs were necessary at the intersection of panel butt seams with another seam, or in areas containing wedge panels. During installation, ERM and Hallaton personnel visually inspected seams for integrity, marking out any locations that were in need of a repair. The locations where repairs were needed are shown on the LLDPE Liner As-Built Drawing in Appendix F. Documentation of the size and type of repair is described in the Field LLDPE Defect and Repair Testing Log in Appendix K. All repairs were completed by placing a piece of LLDPE liner over the affected area, and extrusion welding a bead around the perimeter of the repair. All repairs were washed with a soap and water solution, vacuum tested, and inspected for air leaks. These repairs, and subsequent field testing of the repairs, were performed in accordance with the project technical specifications and CQA Plan.

3.6 - Final Acceptance

Prior to placing the geocomposite for the drainage layer system above the LLDPE liner, Hallaton and ERM personnel inspected the entire LLDPE liner surface to look for any additional defects requiring repair. Also at this time, documentation was reviewed for compliance with the project specifications and CQA Plan. Once there were no further defects observed and documentation was deemed complete, the liner installation was accepted and placement of the geocomposite could proceed.

3.7 - Geocomposite Installation

ERM personnel performed full time oversight and inspection for the geocomposite materials and installation. A double–sided, six-ounce geocomposite was installed as a drainage layer over the LLDPE liner. This material was supplied by Skaps Industries, product number TN 270-2-6. A copy of the material certification is included in Appendix L, and conformance testing results are included in Appendix M.

Rolls of geocomposite were deployed manually and appropriately overlapped along the panel sides and ends. The panels of geocomposite were joined by zip-tying the geonets of the geocomposite together, then sewing the top layer of geotextile together, thus joining one panel to another panel using a polyester thread. In some cases, primarily along "butt seams", plastic zip-ties were used to join panels together along with heat bonding of the top layer of geotextile.

3.8 - Liner System and Anchor Trench As-Built Drawing

An as-built drawing was produced by Hallaton for the final liner installation, and is included in Appendix F. The as-built drawing includes all panel locations, seams, and destructive sample locations and repairs.

3.9 - Final Cover Soils

ERM personnel provided oversight and inspection for the placement of cover soils above the geocomposite drainage layer. A total of 70,800 cubic yards of cover soils were sourced from the perimeter berms, to achieve a minimum three-foot thick cover above the liner system. The cover soils were primarily composed of a mixture of clays and topsoil to promote vegetation as part of project stabilization criteria. Following placement of the cover soils, the surface was surveyed to document that a minimum of three of soil cover feet had been placed. During final cover placement operations, there was no observed damage to the underlying liner or geocomposite. A copy of the surveyed as-built certification drawing is included in Appendix A.

3.10 – Riprap Armoring

ERM personnel provided oversight for the placement of the final separator fabric and riprap on the 4:1 side slopes. IDOT aggregate RR3, RR4, RR5, RR6 and RR7 gradations were placed on the slopes from the anchor trench up to the 100-year flood elevation (372' amsl) in general accordance with the plans and specifications to maintain long-term protection from flooding events along the adjacent Mississippi River. The limits of the placed riprap is shown on the final surveyed as-built certification drawing, which is included in Appendix A.

3.11 – Construction Storm Water Management

Stormwater controls were in place throughout the construction phase of the CCR surface impoundment closure. Due to the presence of soil berms around the perimeter of the surface impoundment, precipitation that fell within the limits of the berms was unable to freely flow away from the Site. This required ERM and Northstar to manage and discharge all stormwater through the previously mentioned sediment basin and filter skid.

By design, storm water that infiltrates through the soil cover over the CCR mound and reaches the geocomposite drainage layer will flow through the geocomposite and collect in the anchor trench at the perimeter of the capped area. As the water from the drainage layer is collected in the anchor trench, it flows via gravity through the stone and perforated pipe to topographically low areas. At these low areas, anchor trench drains were installed using solid wall pipe to

convey the water collected in the anchor trenches away from the closure cap limits and into the bermed basin area around the capped area. Locations of the anchor trench drains are shown on the as-built drawings included in Appendix F.

3.12 – Permanent Seeding of the CCR Closure

After the anchor trench drainage system, final cover soil placement over the liner system and final grading were completed, seeding and restoration were finished in December 2020, the latter of which was completed by Daylight Land Management. Final personnel and equipment demobilization was completed on December 17, 2020. See Appendix N for photo documentation of the established ground cover and vegetation.

3.13 – Other Site Work Completed During Construction

During closure of the CCR inactive impoundment, four features were decommissioned or removed due to their proximity to the closure work, including two (2) piezometers (P-A and P-B) as well as two (2) concrete outfall structures. Outfall 002 and a previously abandoned outfall structure that was still in place were both demolished and removed during construction.

SECTION 4
Post Construction Stormwater and Site Drainage

In accordance with approved design drawings, post construction water flows from the anchor trench drains and travels to the southwest corner of the Site. At this location, runoff is bounded by the partially remaining perimeter berms from the original basin. As part of CCR closure construction, a drainage channel was excavated through the partial perimeter berm at a width of 125 feet wide by 83 feet long. This channel construction was performed and covered under the U.S. Army Corps of Engineer Nationwide Permit No. 41 – Reshaping of Drainage Ditches. At the bottom of the excavated drainage trench, riprap and separator geotextile fabric were placed to control erosion and reduce the velocity of stormwater leaving the Site. The drainage channel work was completed in July 2021. After runoff leaves the drainage channel, it travels approximately 300 linear feet through a jurisdictional drainage ditch and then enters the Mississippi River.

4.1 - Final Site Stabilization and Project Completion

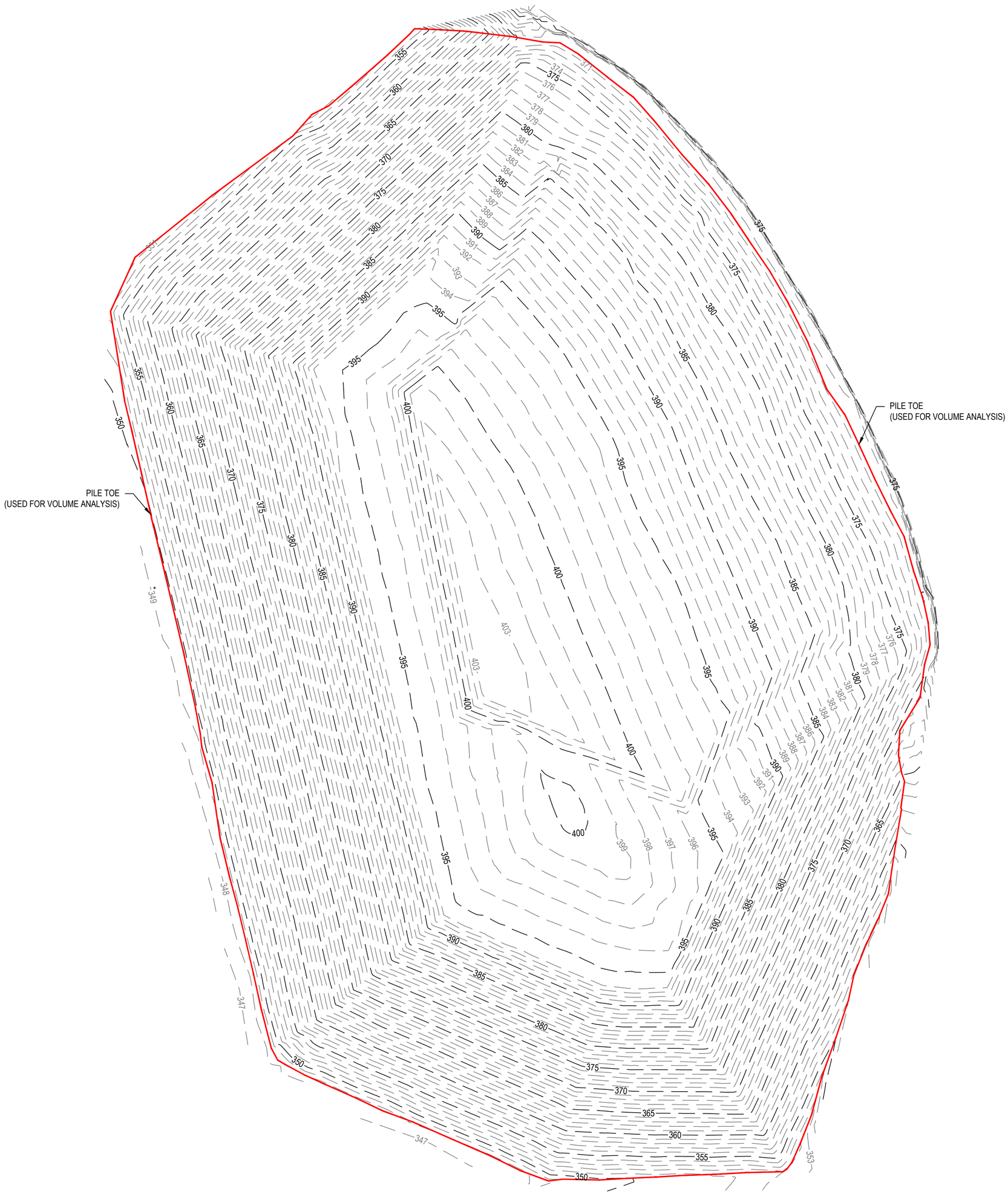
After final grading of the drainage channel was completed, seeding and restoration were completed in early August 2021 by Daylight Land Management. See Appendix N for photo documentation of the established ground cover and vegetation.

Appendix A - Survey Certification Drawings; Subgrade & Testing

TOP OF ASH
AS-BUILT TOPOGRAPHIC SURVEY

OF THE GRAND TOWER INACTIVE COAL COMBUSTION RESIDUALS IMPOUNDMENT

GRAND TOWER, JACKSON COUNTY, ILLINOIS.



SURVEYOR'S CERTIFICATION

STATE OF ILLINOIS
COUNTY OF JOHNSON

THIS IS TO STATE, AT THE REQUEST OF NORTHSTAR I&E, INC., I, DENNIS R. OWEN, JR, AN ILLINOIS PROFESSIONAL LAND SURVEYOR, MADE A SURVEY AS SHOWN HEREIN, AND THAT SAID SURVEY WAS PERFORMED TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATED THIS 17TH DAY OF DECEMBER, 2020 AT BENTON, ILLINOIS

DENNIS R. OWEN, JR. 035-003885 PROFESSIONAL LAND SURVEYOR STATE OF ILLINOIS BENTON, IL

DENNIS R. OWEN, JR. - ILLINOIS PROFESSIONAL LAND SURVEYOR NO. 3885
LICENSE EXPIRES: 11/30/2022
FIELDWORK COMPLETED: 11/09/2020
FIRM LICENSE #: 184-002344

SURVEYOR'S NOTES & REFERENCES

1) *PURPOSE OF SURVEY - TO CONDUCT A PROGRESS AS-BUILT SURVEY TOPOGRAPHIC SURVEY OF THE TOP OF THE ASH PLACED IN THE IMPOUNDMENT.*
2) *THIS LAND BASED PORTION OF THIS SURVEY WAS CONDUCTED USING REAL TIME KINEMATIC TECHNIQUES. THE EQUIPMENT USED INCLUDED TWO SPECTRA PRECISION SP80 RECEIVERS TRACKING GPS, GLONASS, GALILEO, AND BEIDOU CONSTELLATIONS.*
3) *NO HYDROGRAPHIC WORK WAS PERFORMED FOR THIS AS-BUILT.*
4) *ELEVATIONS ARE BASED ON NAVD '88.*
5) *EXISTING CONTROL AND BENCHMARKS ARE TIED INTO THE PREVIOUS PROJECT CONTROL BY KLINGER & ASSOCIATES SHOWN ON SHEET 1 - SITE OVERVIEW WERE USED IN THIS SURVEY.*

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

Requested By:	Drafted by:	D. OWEN
	Project Manager:	D. OWEN
	Date:	12/17/2020
	Reviewed by:	D. OWEN
	Scale:	1" = 60'
NORTHSTAR I&E, INC.	Job Number:	2019-473
	Sheet:	1 OF 1

Drawing Status
☐ Preliminary Drawing
■ Final Drawing

This Professional Service Conforms To The Current Illinois Minimum Standards of Practice Applicable To Topographic Surveys.

Revisions

#	Date	Note

TOP OF ASH AS-BUILT TOPOGRAPHIC SURVEY

OF THE GRAND TOWER INACTIVE COAL COMBUSTION RESIDUALS IMPOUNDMENT GRAND TOWER, JACKSON COUNTY, ILLINOIS

Path: S:\2019\JACKSON\2019-473 NORTHSTAR I & E INC\DELIVERABLES\DWG\2019-473 AS-BUILT TOP OF ASH.DWG

Shawnee Professional Services
Engineers, Surveyors, Acquisition, & Energy
www.ShawneePSI.com

104 SOUTH 4TH STREET
P.O. BOX 125
VIENNA, ILLINOIS 62995
(618) 658-6065

901 NORTH DuQUOIN STREET
P.O. DRAWER 130
BENTON, ILLINOIS 62812
(618) 439-9447

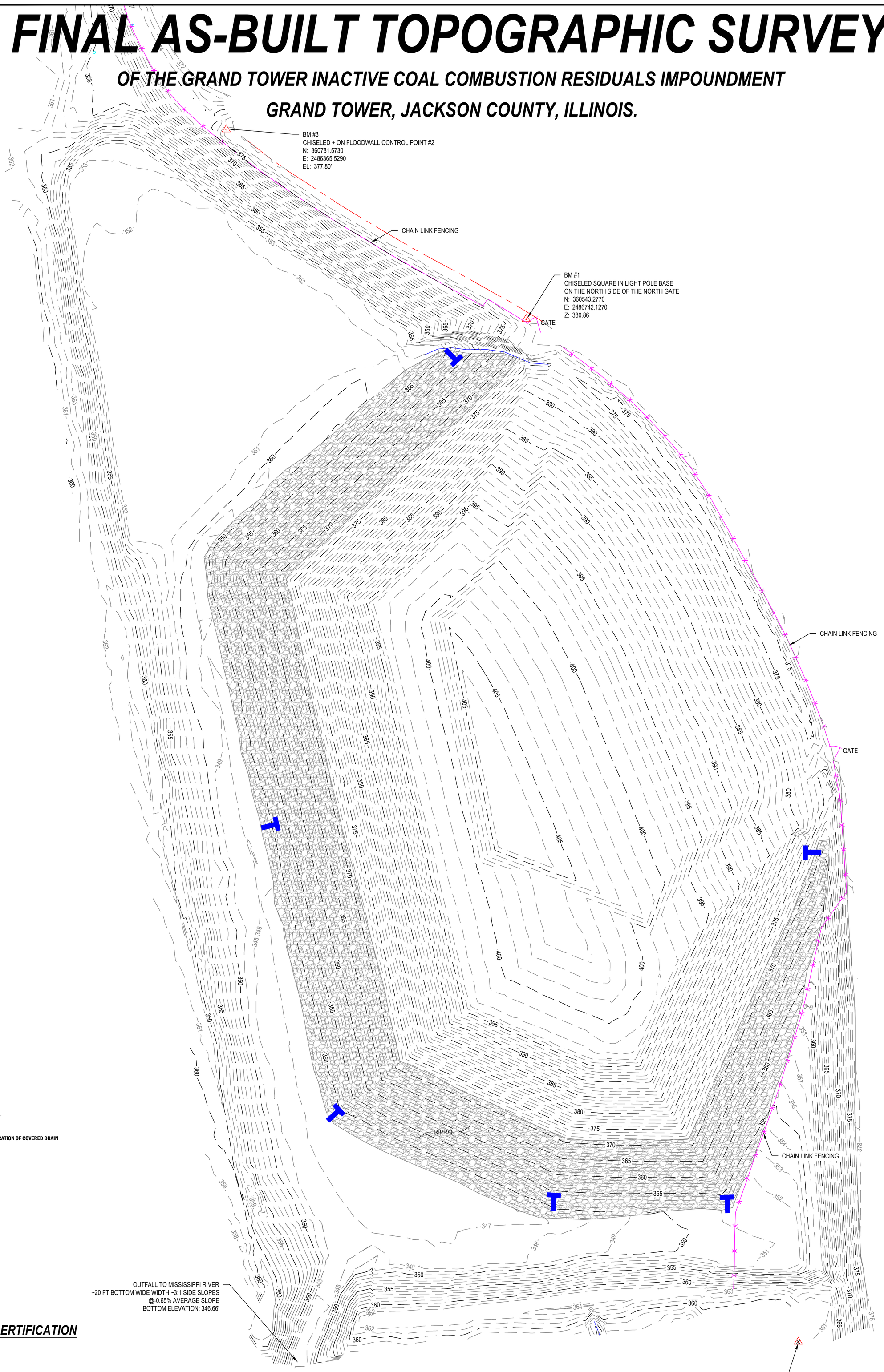
N W E S

BEARINGS ARE REFERENCED TO ILLINOIS STATE PLANE COORDINATES - WEST ZONE NAD 83

FINAL AS-BUILT TOPOGRAPHIC SURVEY

OF THE GRAND TOWER INACTIVE COAL COMBUSTION RESIDUALS IMPOUNDMENT

GRAND TOWER, JACKSON COUNTY, ILLINOIS.



** LEGEND **

AS-BUILT LOCATION OF COVERED DRAIN

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

SURVEYOR'S CERTIFICATION

STATE OF ILLINOIS
COUNTY OF FRANKLIN

THIS IS TO STATE, AT THE REQUEST OF ENVIRONMENTAL RESOURCES MANAGEMENT, INC., I, DENNIS R. OWEN, JR, AN ILLINOIS PROFESSIONAL LAND SURVEYOR, MADE A SURVEY AS SHOWN HEREIN, AND THAT SAID SURVEY WAS PERFORMED TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATED THIS 19TH DAY OF AUGUST, 2021 AT BENTON, ILLINOIS

DENNIS R. OWEN, JR. 035-003885 PROFESSIONAL LAND SURVEYOR STATE OF ILLINOIS BENTON, IL

DENNIS R. OWEN, JR. - ILLINOIS PROFESSIONAL LAND SURVEYOR NO. 3885
LICENSE EXPIRES: 11/30/2022
FIELDWORK COMPLETED: 8/13/2021
FIRM LICENSE #: 184-002344

SURVEYOR'S NOTES & REFERENCES

1) *PURPOSE OF SURVEY - TO PROVIDE A FINAL AS-BUILT SURVEY TOPOGRAPHIC SURVEY OF THE IMPOUNDMENT AREA AND DRAINAGE THEREFROM.*
2) *THIS LAND BASED PORTION OF THIS SURVEY WAS CONDUCTED USING REAL TIME KINEMATIC TECHNIQUES. THE EQUIPMENT USED INCLUDED TWO SPECTRA PRECISION SP80 RECEIVERS TRACKING GPS, GLONASS, GALILEO, AND BEIDOU CONSTELLATIONS.*
3) *NO HYDROGRAPHIC WORK WAS PERFORMED FOR THIS AS-BUILT.*
4) *ELEVATIONS ARE BASED ON NAVD '88.*
5) *EXISTING CONTROL AND BENCHMARKS ARE TIED INTO THE PREVIOUS PROJECT CONTROL BY KLINGER & ASSOCIATES SHOWN ON SHEET 1 - SITE OVERVIEW WERE USED IN THIS SURVEY.*

Requested By:	Drafted by:	D. OWEN
	Project Manager:	D. OWEN
	Date:	8/19/2021
	Reviewed by:	D. OWEN
	Scale:	1" = 60'
	Job Number:	2021-266
	Sheet:	1 OF 1

ENVIRONMENTAL RESOURCES MANAGEMENT, INC.

Drawing Status
☐ Preliminary Drawing
■ Final Drawing

This Professional Service Conforms To The Current Illinois Minimum Standards of Practice Applicable To Topographic Surveys.

Revisions

#	Date	Note

FINAL AS-BUILT TOPOGRAPHIC SURVEY

OF THE GRAND TOWER INACTIVE COAL COMBUSTION RESIDUALS IMPOUNDMENT GRAND TOWER, JACKSON COUNTY, ILLINOIS

Path: S:\2021\JACKSON\2021-266 ENVIRONMENTAL RESOURCES MANAGEMENT, INC\DELIVERABLES\DWG\2021-266 COMBINED FINAL AS-BUILT.DWG

Shawnee Professional Services
Engineers, Surveyors, Acquisition, & Energy
www.ShawneePSI.com

104 SOUTH 4TH STREET
P.O. BOX 125
VIENNA, ILLINOIS 62995
(618) 658-6065

901 NORTH DuQUOIN STREET
P.O. DRAWER 130
BENTON, ILLINOIS 62812
(618) 439-9447

N W E S

BEARINGS ARE REFERENCED TO ILLINOIS STATE PLANE COORDINATES - WEST ZONE NAD 83

Appendix B - Linear Low Density Polyethylene (LLDPE) Material Certifications

Grand Tower Energy Center CCR Closure
Hallaton c/o Northstar
1820 Power Plant Road
Grand Tower, IL 62942

SO#: 00004870

FG-LDMSDS040BBBEG	38 rolls @ 750	655,500 ft.²		4868

Roll #	Width	English Length	Area	Item	Count	Weight	Resin Lot #	MQC
	ft.	ft.	ft.²			lbs.		
GTF0048940001	23	750	17,250	**FG-LDMSDS040BBBEG**	1	**3644**	**DKJ810800**	4868
GTF0048940003	23	750	17,250	**FG-LDMSDS040BBBEG**	2	**3672**	**DKJ810800**	4868
GTF0048940005	23	750	17,250	**FG-LDMSDS040BBBEG**	3	**3588**	**DKJ810800**	4868
GTF0048940006	23	750	17,250	**FG-LDMSDS040BBBEG**	4	**3572**	**DKJ810800**	4868
GTF0048940008	23	750	17,250	**FG-LDMSDS040BBBEG**	5	**3580**	**DKJ810790**	4868
GTF0048940009	23	750	17,250	**FG-LDMSDS040BBBEG**	6	**3568**	**DKJ810790**	4868
GTF0048940010	23	750	17,250	**FG-LDMSDS040BBBEG**	7	**3564**	**DKJ810790**	4868
GTF0048940012	23	750	17,250	**FG-LDMSDS040BBBEG**	8	**3626**	**DKJ810790**	4868
GTF0048940013	23	750	17,250	**FG-LDMSDS040BBBEG**	9	**3616**	**DKJ810790**	4868
GTF0048940014	23	750	17,250	**FG-LDMSDS040BBBEG**	10	**3618**	**DKJ810790**	4868
GTF0048940015	23	750	17,250	**FG-LDMSDS040BBBEG**	11	**3624**	**DKJ810790**	4868
GTF0048940016	23	750	17,250	**FG-LDMSDS040BBBEG**	12	**3616**	**DKJ810790**	4868
GTF0048940017	23	750	17,250	**FG-LDMSDS040BBBEG**	13	**3622**	**DKJ810790**	4868
GTF0048940018	23	750	17,250	**FG-LDMSDS040BBBEG**	14	**3632**	**DKJ810790**	4868
GTF0048940019	23	750	17,250	**FG-LDMSDS040BBBEG**	15	**3636**	**DKJ810790**	4868
GTF0048940020	23	750	17,250	**FG-LDMSDS040BBBEG**	16	**3634**	**DKJ810790**	4868
GTF0048940021	23	750	17,250	**FG-LDMSDS040BBBEG**	17	**3638**	**DKJ810790**	4868
GTF0048940022	23	750	17,250	**FG-LDMSDS040BBBEG**	18	**3630**	**DKJ810790**	4868
GTF0048940023	23	750	17,250	**FG-LDMSDS040BBBEG**	19	**3636**	**DKJ810790**	4868
GTF0048940024	23	750	17,250	**FG-LDMSDS040BBBEG**	20	**3630**	**DKJ810790**	4868
GTF0048940025	23	750	17,250	**FG-LDMSDS040BBBEG**	21	**3626**	**DKJ810790**	4868
GTF0048940026	23	750	17,250	**FG-LDMSDS040BBBEG**	22	**3630**	**DKJ810790**	4868
GTF0048940027	23	750	17,250	**FG-LDMSDS040BBBEG**	23	**3640**	**DKJ810790**	4868
GTF0048940028	23	750	17,250	**FG-LDMSDS040BBBEG**	24	**3636**	**DKJ810790**	4868
GTF0048940030	23	750	17,250	**FG-LDMSDS040BBBEG**	25	**3622**	**DKJ810790**	4868
GTF0048940031	23	750	17,250	**FG-LDMSDS040BBBEG**	26	**3634**	**DKJ810790**	4868
GTF0048940032	23	750	17,250	**FG-LDMSDS040BBBEG**	27	**3624**	**DKJ810790**	4868
GTF0048940033	23	750	17,250	**FG-LDMSDS040BBBEG**	28	**3630**	**DKJ810790**	4868
GTF0048940034	23	750	17,250	**FG-LDMSDS040BBBEG**	29	**3626**	**DKJ810790**	4868
GTF0048940035	23	750	17,250	**FG-LDMSDS040BBBEG**	30	**3626**	**DKJ810790**	4868
GTF0048940036	23	750	17,250	**FG-LDMSDS040BBBEG**	31	**3640**	**DKJ810790**	4868
GTF0048940037	23	750	17,250	**FG-LDMSDS040BBBEG**	32	**3634**	**DKJ810790**	4868
GTF0048940038	23	750	17,250	**FG-LDMSDS040BBBEG**	33	**3630**	**DKJ810790**	4868
GTF0048940039	23	750	17,250	**FG-LDMSDS040BBBEG**	34	**3642**	**DKJ810790**	4868
GTF0048940040	23	750	17,250	**FG-LDMSDS040BBBEG**	35	**3648**	**DKJ810790**	4868
GTF0048940041	23	750	17,250	**FG-LDMSDS040BBBEG**	36	**4024**	**DKJ810790**	4868
GTF0048940042	23	750	17,250	**FG-LDMSDS040BBBEG**	37	**4016**	**DKJ810790**	4868
GTF0048940044	23	750	17,250	**FG-LDMSDS040BBBEG**	38	**3556**	**DKJ810790**	4868

655,500
total for order

agru america quality control dept

Maria Coffey-Manager
Quality Control Department

Grand Tower Energy Center CCR Closure
Hallaton c/o Northstar
1820 Power Plant Road
Grand Tower, IL 62942

SO#: **00004870**
Liner Type: **40LL micro**
Item: **FG-LDMSDS040BBBEG**
Current # of Rolls: **38**
Roll Count: **1-38** **(all)**
Report Date: **1/22/2020** **ENGLISH**

					ASTM D5994 (Modified)			ASTM D7466				ASTM D3895	ASTM D792	ASTM D1238	ASTM D4218	ASTM D5596							ASTM D1004		ASTM D4833	
Count	Roll #	(English)			Thickness (English)			Asperity (Top)	Asperity (Bottom)	Weight	Lot #	OIT (Standard)	Specific Gravity	Melt Flow Index	Carbon Black Content	Carbon Black Disp.	Tensile Str. @Break (MD)		Tensile Str. @Break (TD)		Elong. @Break (MD)	Elong. @Break (TD)	Tear Resistance (MD)	Tear Resistance (TD)	Puncture Resistance	Production Date
		Width	Length	Area	Min.	Max.	Ave.																			
		ft.	ft.	ft.²	mils	mils	mils	mils	mils	lbs.		min	g/cc	g/10 min.	%	(# in Cat. 1)	ppi	psi	ppi	psi	%	%	lbs.	lbs.	lbs.	
	Minimum Results (ea. Col.)				34	42	38	25	26	3556		162	0.932	0.32	2.3	10	124	2729	124	124	409	541	34	33	87	
1	GTF0048940001	23	750	17,250	34	47	40	26	28	3644	DKJ810800	164	0.932	0.34	2.4	10	127	3568	127	127	469	546	40	41	98	1/11/2020
2	GTF0048940003	23	750	17,250	37	42	40	28	31	3672	DKJ810800	164	0.932	0.34	2.4	10	127	3568	127	127	469	546	40	41	98	1/11/2020
3	GTF0048940005	23	750	17,250	36	45	40	28	30	3588	DKJ810800	164	0.932	0.34	2.4	10	127	3568	127	127	469	546	40	41	98	1/11/2020
4	GTF0048940006	23	750	17,250	36	45	40	28	30	3572	DKJ810800	164	0.932	0.34	2.4	10	127	3568	127	127	469	546	40	41	98	1/13/2020
5	GTF0048940008	23	750	17,250	36	42	40	29	32	3580	DKJ810790	162	0.934	0.32	2.4	10	124	3544	124	124	454	541	34	33	87	1/14/2020
6	GTF0048940009	23	750	17,250	37	42	40	28	31	3568	DKJ810790	162	0.934	0.32	2.4	10	124	3544	124	124	454	541	34	33	87	1/14/2020
7	GTF0048940010	23	750	17,250	37	44	40	27	29	3564	DKJ810790	162	0.934	0.32	2.6	10	124	3544	124	124	454	541	34	33	87	1/14/2020
8	GTF0048940012	23	750	17,250	36	47	40	27	29	3626	DKJ810790	162	0.934	0.32	2.5	10	124	3544	124	124	454	541	34	33	87	1/15/2020
9	GTF0048940013	23	750	17,250	36	42	39	25	27	3616	DKJ810790	162	0.934	0.32	2.5	10	124	3544	124	124	454	541	34	33	87	1/15/2020
10	GTF0048940014	23	750	17,250	37	44	40	27	30	3618	DKJ810790	162	0.934	0.32	2.6	10	142	3772	142	142	458	599	34	33	87	1/15/2020
11	GTF0048940015	23	750	17,250	35	47	39	26	26	3624	DKJ810790	162	0.934	0.32	2.6	10	142	3772	142	142	458	599	34	33	87	1/15/2020
12	GTF0048940016	23	750	17,250	36	42	39	26	26	3616	DKJ810790	162	0.934	0.32	2.7	10	142	3772	142	142	458	599	34	33	87	1/15/2020
13	GTF0048940017	23	750	17,250	34	42	38	27	26	3622	DKJ810790	162	0.934	0.32	2.7	10	142	3772	142	142	458	599	34	33	87	1/15/2020
14	GTF0048940018	23	750	17,250	36	43	39	27	29	3632	DKJ810790	162	0.934	0.32	2.6	10	142	3772	142	142	458	599	34	33	87	1/16/2020
15	GTF0048940019	23	750	17,250	36	42	39	26	31	3636	DKJ810790	162	0.934	0.32	2.6	10	130	2729	130	130	429	555	37	37	87	1/16/2020
16	GTF0048940020	23	750	17,250	37	46	39	27	30	3634	DKJ810790	162	0.934	0.32	2.6	10	130	2729	130	130	429	555	37	37	87	1/16/2020
17	GTF0048940021	23	750	17,250	36	46	40	27	31	3638	DKJ810790	162	0.934	0.32	2.6	10	130	2729	130	130	429	555	37	37	87	1/16/2020
18	GTF0048940022	23	750	17,250	37	45	40	28	31	3630	DKJ810790	162	0.934	0.32	2.3	10	130	2729	130	130	429	555	37	37	87	1/16/2020
19	GTF0048940023	23	750	17,250	36	43	39	29	30	3636	DKJ810790	162	0.934	0.32	2.3	10	130	2729	130	130	429	555	37	37	87	1/16/2020
20	GTF0048940024	23	750	17,250	37	42	40	28	31	3630	DKJ810790	162	0.934	0.32	2.3	10	147	4346	147	147	428	604	37	37	87	1/16/2020
21	GTF0048940025	23	750	17,250	36	42	39	27	31	3626	DKJ810790	162	0.934	0.32	2.3	10	147	4346	147	147	428	604	37	37	87	1/16/2020
22	GTF0048940026	23	750	17,250	36	45	40	27	30	3630	DKJ810790	162	0.934	0.32	2.7	10	147	4346	147	147	428	604	37	37	87	1/16/2020
23	GTF0048940027	23	750	17,250	36	43	39	27	31	3640	DKJ810790	162	0.934	0.32	2.7	10	147	4346	147	147	428	604	37	37	87	1/16/2020
24	GTF0048940028	23	750	17,250	37	45	40	27	30	3636	DKJ810790	162	0.934	0.32	2.4	10	147	4346	147	147	428	604	37	37	87	1/17/2020
25	GTF0048940030	23	750	17,250	38	44	40	27	30	3622	DKJ810790	162	0.934	0.32	2.8	10	139	4120	139	139	433	576	38	36	99	1/17/2020
26	GTF0048940031	23	750	17,250	38	44	40	28	30	3634	DKJ810790	162	0.934	0.32	2.8	10	139	4120	139	139	433	576	38	36	99	1/17/2020
27	GTF0048940032	23	750	17,250	37	44	40	28	31	3624	DKJ810790	162	0.934	0.32	2.3	10	139	4120	139	139	433	576	38	36	99	1/17/2020
28	GTF0048940033	23	750	17,250	38	45	40	28	31	3630	DKJ810790	162	0.934	0.32	2.3	10	139	4120	139	139	433	576	38	36	99	1/17/2020
29	GTF0048940034	23	750	17,250	39	43	41	28	31	3626	DKJ810790	162	0.934	0.32	2.4	10	139	4120	139	139	433	576	38	36	99	1/17/2020

agru america quality control dept

Maria Coffey-Manager
Quality Control Department

Grand Tower Energy Center CCR Closure
Hallaton c/o Northstar
1820 Power Plant Road
Grand Tower, IL 62942

SO#: **00004870**
Liner Type: **40LL micro**
Item: **FG-LDMSDS040BBBEG**
Current # of Rolls: **38**
Roll Count: **1-38** **(all)**
Report Date: **1/22/2020** **ENGLISH**

					ASTM D5994 (Modified)			ASTM D7466				ASTM D3895	ASTM D792	ASTM D1238	ASTM D4218	ASTM D5596							ASTM D1004		ASTM D4833	
Count	Roll #	(English)			Thickness (English)			Asperity (Top)	Asperity (Bottom)	Weight	Lot #	OIT (Standard)	Specific Gravity	Melt Flow Index	Carbon Black Content	Carbon Black Disp.	Tensile Str. @Break (MD)		Tensile Str. @Break (TD)		Elong. @Break (MD)	Elong. @Break (TD)	Tear Resistance (MD)	Tear Resistance (TD)	Puncture Resistance	Production Date
		Width	Length	Area	Min.	Max.	Ave.																			
		ft.	ft.	ft.²	mils	mils	mils	mils	mils	lbs.		min	g/cc	g/10 min.	%	(# in Cat. 1)	ppi	psi	ppi	psi	%	%	lbs.	lbs.	lbs.	
Minimum Results (ea. Col.)					34	42	38	25	26	3556		162	0.932	0.32	2.3	10	124	2729	124	124	409	541	34	33	87	
30	GTF0048940035	23	750	17,250	38	43	41	29	31	3626	DKJ810790	162	0.934	0.32	2.4	10	143	3470	143	143	442	597	38	36	99	1/17/2020
31	GTF0048940036	23	750	17,250	37	42	40	30	31	3640	DKJ810790	162	0.934	0.32	2.5	10	143	3470	143	143	442	597	38	36	99	1/17/2020
32	GTF0048940037	23	750	17,250	37	44	39	29	30	3634	DKJ810790	162	0.934	0.32	2.5	10	143	3470	143	143	442	597	38	36	99	1/17/2020
33	GTF0048940038	23	750	17,250	37	48	42	27	30	3630	DKJ810790	162	0.934	0.32	2.5	10	143	3470	143	143	442	597	38	36	99	1/18/2020
34	GTF0048940039	23	750	17,250	38	45	42	28	30	3642	DKJ810790	162	0.934	0.32	2.5	10	143	3470	143	143	442	597	38	36	99	1/18/2020
35	GTF0048940040	23	750	17,250	37	47	41	27	31	3648	DKJ810790	162	0.934	0.32	2.3	10	157	3954	157	157	409	602	43	42	101	1/18/2020
36	GTF0048940041	23	750	17,250	39	47	42	28	31	4024	DKJ810790	162	0.934	0.32	2.3	10	157	3954	157	157	409	602	43	42	101	1/18/2020
37	GTF0048940042	23	750	17,250	39	49	43	27	28	4016	DKJ810790	162	0.934	0.32	2.4	10	157	3954	157	157	409	602	43	42	101	1/18/2020
38	GTF0048940044	23	750	17,250	36	43	39	27	29	3556	DKJ810790	162	0.934	0.32	2.5	10	157	3954	157	157	409	602	43	42	101	1/18/2020

CoA Date: 09/24/2019

Certificate of Analysis

Shipped To: AGRU AMERICA INC:MULLINS
171 Highway 905
CONWAY SC 29526-6801
USA

Recipient: PALMER
Fax:

Delivery #: 80048015
PO #: 16555
Weight: 189050.000 LB
Ship Date: 09/24/2019
Package: BULK
Mode: Hopper Car
Car #: CEFX053704
Seal No: 189049

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DKJ810800

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.34	g/10min
Density	D1505	0.919	g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

T. KEVIN AYRES
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Shannon Blacknall at +1-832-813-4807

CoA Date: 09/24/2019

Certificate of Analysis

Shipped To: AGRU AMERICA INC:GEORGETOWN
500 GARRISON RD
GEORGETOWN SC 29440
USA

Recipient: PALMER
Fax:

Delivery #: 80048013
PO #: 106555
Weight: 188550.000 LB
Ship Date: 09/24/2019
Package: BULK
Mode: Hopper Car
Car #: GPLX077059
Seal No: 189048

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DKJ810790

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.32	g/10min
HLMI	ASTM D1238	14.99	g/10min
Pellet Count	ST-905	32	pelet/gram
Production date		20190912	
Density	D1505	0.919	g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

T. KEVIN AYRES
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Shannon Blacknall at +1-832-813-4807

Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes
Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC
Bartlesville, OK 74003
■ 918-977-4229 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com

October 31, 2017
Filename: Agru Oven and QUV Exposure Testing_103117.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 HDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Smooth geomembrane samples have been received from Agru and test results are reported below. The samples were tested for HP-OIT in their as-received condition, and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17.
The following geomembrane sheet samples were received from Agru in mid-June 2017 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick.
- 7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick.

Exposure and testing conditions, along with the test results are tabulated on the next page. GM-13 and GM-17 require minimum % HP-OIT retention after a 90-day oven exposure and after a 1600 hour UV irradiance exposure. These test results indicate these GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by these Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

NOTICES
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The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

Test Name	**Exposure Conditions**	**Test Method**
Oven Aging	90 days in an oven at 85 °C	ASTM D5721
UV Exposure	1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m^2 at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation.	ASTM D7238
HP-OIT	150 °C in an oxygen atmosphere at 500 psi	ASTM D5885

Oven Aging Results:

Sample	Initial HP-OIT (min)	HP-OIT after 90 days of oven aging. (min)	% HP-OIT Retained after 90 days of oven aging.	GRI-GM13 and GRI-GM17 minimum % HP-OIT retained after 90 days of oven aging.
K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick	1264	1123	89	GRI-GM13: 80 minimum
7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick	550	508	92	GRI-GM17: 60 minimum

UV Aging Results:

Sample	Initial HP-OIT (min)	HP-OIT after 1600 hrs of UV exposure. (min)	% HP-OIT Retained after 1600 hrs of UV exposure.	GRI-GM13 and GRI-GM17 minimum % HP-OIT retained after 1600 hrs of UV exposure.
K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick	1264	1024	81	GRI-GM13: 50 minimum
7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick	550	470	85	GRI-GM17: 35 minimum

Note: 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.

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GEOMEMBRANE TEST RESULTS

TRI Client: Agru America

Material: 40 mil. Microspike LLDPE Geomembrane
Roll Number: 303112-13
TRI Log #: E2375-24-04

Resin: Chevron Marlex 7104 LLDPE
Resin Lot #: CCN811900

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
2% Secant Modulus (ASTM D 5323)												
MD 2% Secant Modulus (psi)	34530	33311	37457	36861	40240						**36480**	2696
MD 2% Secant Modulus (lb/in)	1744	1782	1794	1773	1887						**1796**	54
TD 2% Secant Modulus (psi)	44698	44751	47500	37885	49374						**44842**	4360
TD 2% Secant Modulus (lb/in)	2007	2099	2109	1769	2355						**2068**	211

MD Machine Direction TD Transverse Direction

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

GEOMEMBRANE TEST RESULTS

TRI Client: Agru America
Project:GRI GM17 compliance 2010

Material: AGRU 40 mil Microspike LLDPE Geomembrane
Roll #: 319110.10 (Chevron 7104 LLDPE resin lot CAA810800)
TRI Log #: E2341-52-07

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Multi-axial Tensile (ASTM D 5617)													
Test Method A: Centerpoint Deflection Versus Pressure													
Thickness (mils)	43	43	40								**42**	2	
Maximum Stress (psi)	1765	1558	1643								**1655**	104	
% Elongation @ Rupture (%)	76.9	76.3	81.6								**78.3**	2.9	30 min
Failure Description	H-CAT N-EF	MDT N-EF	MDT N-EF										

MDT	A tear in the machine direction.
TDT	A tear in the transverse direction.
H	Circular or elliptical hole in the specimen.
H-CAT	Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye.
N-EF	No edge failure

MD Machine Direction TD Transverse Direction NA Not Available

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

agru america
quality control dept

Hallaton, Inc
FB CULLEY STATION
3711 DARLINGTON ROAD
NEWBURGH, IN 47630

SO#: 00001466

FG-HDMSDS060BBBEM	14 rolls @ 500	161,000 ft².
FG-LDMSDS040BBBEM	49 rolls @ 700	788,900 ft².
FC-COMPP-06-250-06	277 rolls @ 200	803,300 ft².

roll #	width	English length	area	Item		weight	resin lot #
	ft.	ft.	ft².			lbs.	
GTC0025560002	23	700	16,100	**FG-LDMSDS040BBBEM**	1	**3959**	**CJG810050**
GTC0025560003	23	700	16,100	**FG-LDMSDS040BBBEM**	2	**3947**	**CJG810050**
GTC0025560005	23	700	16,100	**FG-LDMSDS040BBBEM**	3	**3952**	**CJG810050**
GTC0025560006	23	700	16,100	**FG-LDMSDS040BBBEM**	4	**3942**	**CJG810050**
GTC0025560007	23	700	16,100	**FG-LDMSDS040BBBEM**	5	**3949**	**CJG810050**
GTC0025560010	23	700	16,100	**FG-LDMSDS040BBBEM**	6	**3951**	**CJG810050**
GTC0025560011	23	700	16,100	**FG-LDMSDS040BBBEM**	7	**3953**	**CJG810050**
GTC0025560012	23	700	16,100	**FG-LDMSDS040BBBEM**	8	**3946**	**CJG810050**
GTC0025560013	23	700	16,100	**FG-LDMSDS040BBBEM**	9	**3880**	**CJG810050**
GTC0025560014	23	700	16,100	**FG-LDMSDS040BBBEM**	10	**3782**	**CJG810050**
GTC0025560015	23	700	16,100	**FG-LDMSDS040BBBEM**	11	**3778**	**CJG810050**
GTC0025560016	23	700	16,100	**FG-LDMSDS040BBBEM**	12	**3787**	**CJG810050**
GTC0025560017	23	700	16,100	**FG-LDMSDS040BBBEM**	13	**3785**	**CJG810050**
GTC0025560018	23	700	16,100	**FG-LDMSDS040BBBEM**	14	**3774**	**CJG810050**
GTC0025560019	23	700	16,100	**FG-LDMSDS040BBBEM**	15	**3785**	**CJG810050**
GTC0025560020	23	700	16,100	**FG-LDMSDS040BBBEM**	16	**3780**	**CJG810050**
GTC0025560021	23	700	16,100	**FG-LDMSDS040BBBEM**	17	**3765**	**CJG810050**
GTC0025560022	23	700	16,100	**FG-LDMSDS040BBBEM**	18	**3770**	**CJG810050**
GTC0025560023	23	700	16,100	**FG-LDMSDS040BBBEM**	19	**3766**	**CJG810050**
GTC0025560024	23	700	16,100	**FG-LDMSDS040BBBEM**	20	**3756**	**CJG810050**
GTC0025560025	23	700	16,100	**FG-LDMSDS040BBBEM**	21	**3778**	**CJG810050**
GTC0025560026	23	700	16,100	**FG-LDMSDS040BBBEM**	22	**3776**	**CJG810050**
GTC0025560027	23	700	16,100	**FG-LDMSDS040BBBEM**	23	**3768**	**CJG810050**
GTC0025560028	23	700	16,100	**FG-LDMSDS040BBBEM**	24	**3773**	**CJG810050**
GTC0025560029	23	700	16,100	**FG-LDMSDS040BBBEM**	25	**3780**	**CJG810050**
GTC0025560030	23	700	16,100	**FG-LDMSDS040BBBEM**	26	**3784**	**CJG810050**
GTC0025560031	23	700	16,100	**FG-LDMSDS040BBBEM**	27	**3790**	**CJG810050**
GTC0025560032	23	700	16,100	**FG-LDMSDS040BBBEM**	28	**3788**	**CJG810050**
GTC0025560033	23	700	16,100	**FG-LDMSDS040BBBEM**	29	**3797**	**CJG810050**
GTC0025560034	23	700	16,100	**FG-LDMSDS040BBBEM**	30	**3771**	**CJG810050**
GTC0025560035	23	700	16,100	**FG-LDMSDS040BBBEM**	31	**3770**	**CJG810050**
GTC0025560036	23	700	16,100	**FG-LDMSDS040BBBEM**	32	**3775**	**CJG810050**
GTC0025560037	23	700	16,100	**FG-LDMSDS040BBBEM**	33	**3782**	**CJG810050**
GTC0025560038	23	700	16,100	**FG-LDMSDS040BBBEM**	34	**3784**	**CJG810050**
GTC0025560039	23	700	16,100	**FG-LDMSDS040BBBEM**	35	**3782**	**CJG810050**
GTC0025560040	23	700	16,100	**FG-LDMSDS040BBBEM**	36	**3772**	**CJG810050**
GTC0025560041	23	700	16,100	**FG-LDMSDS040BBBEM**	37	**3780**	**CJG810050**
GTC0025560042	23	700	16,100	**FG-LDMSDS040BBBEM**	38	**3780**	**CJG810050**
GTC0025560043	23	700	16,100	**FG-LDMSDS040BBBEM**	39	**3772**	**CJG810050**
GTC0025560044	23	700	16,100	**FG-LDMSDS040BBBEM**	40	**3760**	**CJG810050**
GTC0025560045	23	700	16,100	**FG-LDMSDS040BBBEM**	41	**3746**	**CJG810050**
GTC0025560046	23	700	16,100	**FG-LDMSDS040BBBEM**	42	**3742**	**CJG810050**
GTC0025560047	23	700	16,100	**FG-LDMSDS040BBBEM**	43	**3746**	**CJG810050**
GTC0025560048	23	700	16,100	**FG-LDMSDS040BBBEM**	44	**3757**	**CJG810050**
GTC0025560049	23	700	16,100	**FG-LDMSDS040BBBEM**	45	**3769**	**CJG810050**
GTC0025560050	23	700	16,100	**FG-LDMSDS040BBBEM**	46	**3760**	**CJG810050**
GTC0025560051	23	700	16,100	**FG-LDMSDS040BBBEM**	47	**3766**	**CJG810050**
GTC0025560052	23	700	16,100	**FG-LDMSDS040BBBEM**	48	**3775**	**CJG810050**
GTC0025560053	23	700	16,100	**FG-LDMSDS040BBBEM**	49	**3768**	**CJG810050**

788,900
total for order

agru america
quality control dept.

quality certificate

ROLL #: GTC0025560028 **LOT #:** CJG810050 **LINER TYPE:** 40 LL MICROSPIKE

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN:	**1.0** mm	**40** mil	Thickness:	**1.02** mm	**40** mil
	MAX:	**1.2** mm	**46** mil	Length:	**213.363** m	**700** feet
	AVE:	**1.1** mm	**43** mil	Width:	**7.01** m	**23** feet
OIT(Standard) ASTM D 3895						**166** minutes
Asperity ASTM D7466	Average	Top			**.74** mm	**29** mil
		Bottom			**.81** mm	**32** mil
Specific Gravity ASTM D792	Average Density					**.936** g/cc
MFI ASTM D1238 COND. E Grade: **7104**	Melt Flow Index 190C/2160 g - g/10 min					**.32**
Carbon Black Content ASTM D4218	Range					**2.5** %
Carbon Black Dispersion ASTM D5596	Category					**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Break	MD	**21** N/mm	**120** ppi		**2842** psi
		TD	**26** N/mm	**148** ppi		**3161** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @Break	MD				**457** %
		TD				**577** %
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD			**182.4** N	**41** lbs.
		TD			**182.4** N	**41** lbs.
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load				**449.2** N	**101** lbs.

Weight **3773** lbs.

Customer: Hallaton, Inc
FB CULLEY STATION
Destination: 3711 DARLINGTON ROAD
NEWBURGH, IN 47630

Production Date: **1/7/2019** SO#: **00001466**

Signature: _____

Maria Coffey
Quality Control Department

agru america
quality control dept.

quality certificate

ROLL #: GTC0025560030 **LOT #:** CJG810050 **LINER TYPE:** 40 LL MICROSPIKE

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN:	**1.0** mm	**40** mil	Thickness:	**1.02** mm	**40** mil
	MAX:	**1.1** mm	**45** mil	Length:	**213.363** m	**700** feet
	AVE:	**1.1** mm	**43** mil	Width:	**7.01** m	**23** feet
OIT(Standard) ASTM D 3895						**166** minutes
Asperity ASTM D7466	Average	Top			**.71** mm	**28** mil
		Bottom			**.84** mm	**33** mil
Specific Gravity ASTM D792	Average Density					**.936** g/cc
MFI ASTM D1238 COND. E Grade: **7104**	Melt Flow Index 190C/2160 g - g/10 min					**.27**
Carbon Black Content ASTM D4218	Range					**2.3** %
Carbon Black Dispersion ASTM D5596	Category					**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Break	MD	**30** N/mm		**170** ppi	**3691** psi
		TD	**28** N/mm		**158** ppi	**3460** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @Break	MD				**486** %
		TD				**584** %
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD			**182.4** N	**41** lbs.
		TD			**182.4** N	**41** lbs.
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load				**449.2** N	**101** lbs.

Weight **3784** lbs.

Customer: Hallaton, Inc
FB CULLEY STATION
Destination: 3711 DARLINGTON ROAD
NEWBURGH, IN 47630

Production Date: **1/7/2019** SO#: **00001466**

Signature: _____

Maria Coffey
Quality Control Department

CoA Date: 09/14/2018

Certificate of Analysis

Shipped To: AGRU AMERICA INC:GEORGETOWN
500 GARRISON RD
GEORGETOWN SC 29440
USA

Recipient: PALMER
Fax:

Delivery #: 89745860
PO #: 15060
Weight: 188300.000 LB
Ship Date: 09/14/2018
Package: BULK
Mode: Hopper Car
Car #: CHVX893095
Seal No: 112235

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: CJG810050

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.31	g/10min
HLMI	ASTM D1238	13.87	g/10min
Pellet Count	ST-905	32	pelet/gram
Production date		20180702	
Density	D1505	0.918	g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

T. KEVIN AYRES
QUALITY ASSURANCE SUPERINTENDENT

Vergil H. Rhodes, PE, CPlasT - Tech Svc & App Dev Engineer, Geomembranes
Highways 60 & 123, Bartlesville Research and Technology Center, Room 103 PTC
Bartlesville, OK 74003
■ 918-977-4229 ■ rhodevh@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com

October 31, 2017
Filename: Agru Oven and QUV Exposure Testing_103117.pdf

Nathan Ivy - Corporate Quality Control/Technical Manager
Agru America, Inc.
800 Rockmead #122
Kingwood, TX 77339
281-358-4741

Dear Mr. Ivy:

Please recall your request for testing of oven-exposed and UV-exposed geomembrane samples produced primarily from Marlex® 7104 LLDPE and Marlex® K307 HDPE. Agru blended other components with each of these polyethylenes to produce the geomembrane samples for testing. Smooth geomembrane samples have been received from Agru and test results are reported below. The samples were tested for HP-OIT in their as-received condition, and were also tested after oven and UV exposures of 90 days and 1600 hours of irradiance, respectively, in accordance with GRI-GM13 and GRI-GM17.
The following geomembrane sheet samples were received from Agru in mid-June 2017 and were reported to be primarily composed of each of the Chevron Phillips Chemical Company grades in the description below:

- K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick.
- 7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick.

Exposure and testing conditions, along with the test results are tabulated on the next page. GM-13 and GM-17 require minimum % HP-OIT retention after a 90-day oven exposure and after a 1600 hour UV irradiance exposure. These test results indicate these GM-13 and GM-17 minimum % HP-OIT retentions were exceeded by these Agru-supplied K307 and 7104 sheet samples, respectively.

If you have any questions, please feel free to contact me (contact information given above).

Sincerely,

Vergil Rhodes
Polyethylene Technical Service and Applications Development, Geomembrane

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The following oven aging and UV exposure test methods were conducted in accordance with the GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) requirements:

Test Name	**Exposure Conditions**	**Test Method**
Oven Aging	90 days in an oven at 85 °C	ASTM D5721
UV Exposure	1600 UV irradiance hours. Cycle: 20 hours UVA-340 at 75 °C followed by 4 hours dark with condensation at 60 °C. Irradiance was 0.78 W/m^2 at wavelength 340 nm. Note: This implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of dark/condensation.	ASTM D7238
HP-OIT	150 °C in an oxygen atmosphere at 500 psi	ASTM D5885

Oven Aging Results:

Sample	Initial HP-OIT (min)	HP-OIT after 90 days of oven aging. (min)	% HP-OIT Retained after 90 days of oven aging.	GRI-GM13 and GRI-GM17 minimum % HP-OIT retained after 90 days of oven aging.
K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick	1264	1123	89	GRI-GM13: 80 minimum
7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick	550	508	92	GRI-GM17: 60 minimum

UV Aging Results:

Sample	Initial HP-OIT (min)	HP-OIT after 1600 hrs of UV exposure. (min)	% HP-OIT Retained after 1600 hrs of UV exposure.	GRI-GM13 and GRI-GM17 minimum % HP-OIT retained after 1600 hrs of UV exposure.
K307 Lot #HHB620720, Agru Roll #G17D000534, black sheet, smooth, nominal 0.040" thick	1264	1024	81	GRI-GM13: 50 minimum
7104 Lot #CFJ810540, Agru Roll #G15B434055, black sheet, smooth, nominal 0.040" thick	550	470	85	GRI-GM17: 35 minimum

Note: 1600 hours of UV exposure in accordance with ASTM D7238 implies a total UV chamber residence time of 1920 hours, e.g., 1600 hours of irradiance and 320 hours of darkness with condensation.

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GEOMEMBRANE TEST RESULTS

TRI Client: Agru America

Material: 40 mil. Microspike LLDPE Geomembrane
Roll Number: 303112-13
TRI Log #: E2375-24-04

Resin: Chevron Marlex 7104 LLDPE
Resin Lot #: CCN811900

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
2% Secant Modulus (ASTM D 5323)												
MD 2% Secant Modulus (psi)	34530	33311	37457	36861	40240						**36480**	2696
MD 2% Secant Modulus (lb/in)	1744	1782	1794	1773	1887						**1796**	54
TD 2% Secant Modulus (psi)	44698	44751	47500	37885	49374						**44842**	4360
TD 2% Secant Modulus (lb/in)	2007	2099	2109	1769	2355						**2068**	211

MD Machine Direction TD Transverse Direction

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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GEOMEMBRANE TEST RESULTS

TRI Client: Agru America
Project:GRI GM17 compliance 2010

Material: AGRU 40 mil Microspike LLDPE Geomembrane
Roll #: 319110.10 (Chevron 7104 LLDPE resin lot CAA810800)
TRI Log #: E2341-52-07

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Multi-axial Tensile (ASTM D 5617)													
Test Method A: Centerpoint Deflection Versus Pressure													
Thickness (mils)	43	43	40								**42**	2	
Maximum Stress (psi)	1765	1558	1643								**1655**	104	
% Elongation @ Rupture (%)	76.9	76.3	81.6								**78.3**	2.9	30 min
Failure Description	H-CAT N-EF	MDT N-EF	MDT N-EF										

MDT	A tear in the machine direction.
TDT	A tear in the transverse direction.
H	Circular or elliptical hole in the specimen.
H-CAT	Circular or elliptical hole in an area where the material has significantly necked down or thinned. The large thinned area resembles a pupil of a cat eye.
N-EF	No edge failure

MD Machine Direction TD Transverse Direction NA Not Available

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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Appendix C - Linear Low Density Polyethylene (LLDPE) Liner Conformance Testing

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-002
LAB ID NO.: L20-010-002-001
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	36	39	39	38	38		
			36	38	39	38	39	**38**	1.10
DENSITY	D 1505	g/cc	0.9369	0.9366	0.9361			**0.9365**	0.0003
CARBON BLACK CONTENT	D 1603	%	2.31	2.28				**2.29**	0.013
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	91.6	94.4	89.9	87.6	96.1		
			94.4	101.7	100.0	94.7	88.8		
			84.7	92.0	96.4	97.0	103.1	**94.2**	5.02
TEAR RESISTANCE	D 1004	MD-lbs	32.0	33.4	38.6	34.0	33.2		
			32.0	37.7	35.7	36.4	34.9	**34.8**	2.17
		CD-lbs	34.7	36.9	35.0	34.3	33.9		
			32.0	30.4	32.2	34.9	36.8	**34.1**	1.97
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	132	118	112	108	128	**120**	9.26
		CD-ppi	136	120	120	116	124	**123**	6.77
ELONGATION AT BREAK		MD%	470	440	480	480	450	**460**	16.25
Lo = 2.0"		CD%	590	530	590	570	520	**560**	29.66

CHECKED BY: JLK DATE: 1/27/2020

T:\Synthetics\2020 Synthetics\010 - ERM - Grand Tower Inactive Ash Basin Closure\L20-010-002 LLDPE Microspike\[L20-010-002-001 LLDPE.xls]S L20-010-002- 1/27/2020

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-002
LAB ID NO.: L20-010-002-002
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940009

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	39	39	39	39	36		
			36	38	37	38	37	**38**	1.17
DENSITY	D 1505	g/cc	0.9371	0.9370	0.9369			**0.9370**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.39	2.34				**2.36**	0.026
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	101.1	96.1	94.0	98.4	97.0		
			99.8	89.2	91.0	96.2	97.8		
			104.4	101.8	100.7	94.0	96.2	**97.2**	3.96
TEAR RESISTANCE	D 1004	MD-lbs	34.2	32.0	31.7	34.3	31.6		
			33.4	34.3	32.5	30.4	32.4	**32.7**	1.26
		CD-lbs	31.0	31.5	30.0	31.0	32.6		
			33.4	32.0	31.9	37.3	34.8	**32.6**	2.04
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	124	140	117	118	122	**124**	8.16
		CD-ppi	132	130	123	133	128	**129**	3.39
ELONGATION AT BREAK		MD%	480	460	520	460	520	**490**	27.13
Lo = 2.0"		CD%	590	600	600	570	600	**590**	11.66

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-002
LAB ID NO.: L20-010-002-003
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940015

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	39	40	34	36	39		
			38	39	38	38	38	**38**	1.64
DENSITY	D 1505	g/cc	0.9370	0.9369	0.9367			**0.9369**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.36	2.36				**2.36**	0.001
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	98.9	87.7	89.1	96.2	94.4		
			101.8	100.4	91.0	94.9	86.9		
			87.1	89.2	94.0	96.1	100.2	**93.9**	4.95
TEAR RESISTANCE	D 1004	MD-lbs	30.3	36.5	35.0	37.0	37.1		
			36.0	31.1	31.7	33.2	34.6	**34.3**	2.40
		CD-lbs	34.1	36.0	30.0	32.0	35.1		
			34.8	32.7	31.0	32.4	33.7	**33.2**	1.80
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	128	118	122	128	128	**125**	4.01
		CD-ppi	137	126	125	120	130	**128**	5.53
ELONGATION AT BREAK		MD%	540	510	530	530	520	**530**	10.20
Lo = 2.0"		CD%	590	580	590	560	560	**570**	13.56

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-002
LAB ID NO.: L20-010-002-004
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940020

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	40	39	38	38	40		
			41	39	40	38	39	**39**	0.98
DENSITY	D 1505	g/cc	0.9373	0.9370	0.9370			**0.9371**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.39	2.39				**2.39**	0.001
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	100.8	104.1	104.8	101.3	96.2		
			94.0	91.7	96.8	99.1	88.9		
			84.4	87.0	92.0	96.2	99.8	**95.8**	5.90
TEAR RESISTANCE	D 1004	MD-lbs	33.4	31.9	32.0	33.0	34.0		
			34.3	32.8	31.9	32.6	33.5	**32.9**	0.82
		CD-lbs	34.6	32.3	32.8	33.2	34.7		
			34.5	34.8	32.4	33.3	34.2	**33.7**	0.94
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	128	115	146	156	142	**137**	14.25
		CD-ppi	144	128	128	116	126	**128**	9.08
ELONGATION AT BREAK		MD%	540	440	480	530	480	**490**	36.66
Lo = 2.0"		CD%	510	610	590	590	600	**580**	35.78

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-003
LAB ID NO.: L20-010-003-001
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940025

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	40	41	42	41	41		
			41	40	40	42	43	**41**	0.94
DENSITY	D 1505	g/cc	0.9351	0.9352	0.9354			**0.9352**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.52	2.51				**2.51**	0.006
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	89.7	90.6	85.2	84.9	89.0		
			84.5	87.4	91.2	85.9	84.4		
			91.0	92.3	99.2	89.6	90.1	**89.0**	3.77
TEAR RESISTANCE	D 1004	MD-lbs	30.2	30.5	33.2	32.0	34.0		
			35.3	34.2	31.2	33.6	34.8	**32.9**	1.72
		CD-lbs	34.0	34.2	35.0	35.6	34.8		
			34.0	30.2	32.0	30.1	34.6	**33.5**	1.88
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	165	169	154	159	165	**162**	5.35
		CD-ppi	138	126	124	159	153	**140**	14.19
ELONGATION AT BREAK		MD%	490	470	490	470	430	**470**	21.91
Lo = 2.0"		CD%	610	550	610	570	560	**580**	25.30

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-003
LAB ID NO.: L20-010-003-002
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940031

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	41	40	41	42	41		
			42	41	40	41	41	**41**	0.63
DENSITY	D 1505	g/cc	0.9357	0.9355	0.9354			**0.9355**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.43	2.49				**2.46**	0.026
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	91.6	87.3	87.0	90.0	87.8		
			85.0	85.1	87.9	88.0	85.3		
			87.5	94.3	86.0	83.8	89.9	**87.8**	2.68
TEAR RESISTANCE	D 1004	MD-lbs	33.7	33.0	31.0	30.9	32.6		
			30.4	32.5	31.0	30.7	33.2	**31.9**	1.15
		CD-lbs	32.2	34.5	34.0	35.2	34.6		
			35.0	31.8	32.3	32.0	34.9	**33.7**	1.33
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	130	135	197	133	146	**148**	25.13
		CD-ppi	133	125	121	120	138	**128**	7.13
ELONGATION AT BREAK		MD%	500	560	430	490	540	**500**	44.99
Lo = 2.0"		CD%	560	540	600	570	600	**580**	23.32

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-003
LAB ID NO.: L20-010-003-003
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940036

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	41	41	41	42	42		
			42	41	41	40	39	**41**	0.89
DENSITY	D 1505	g/cc	0.9354	0.9349	0.9352			**0.9352**	0.0002
CARBON BLACK CONTENT	D 1603	%	2.60	2.41				**2.51**	0.094
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	86.9	84.5	83.4	93.0	95.9		
			88.0	91.4	92.8	95.0	87.8		
			88.0	88.1	84.0	80.9	85.7	**88.4**	4.29
TEAR RESISTANCE	D 1004	MD-lbs	32.5	33.4	36.2	32.0	34.5		
			36.0	32.5	31.8	32.9	33.5	**33.5**	1.48
		CD-lbs	33.3	32.1	35.7	35.9	36.0		
			37.1	34.5	33.4	34.7	35.1	**34.8**	1.43
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	108	120	130	166	147	**134**	20.46
		CD-ppi	124	149	128	130	138	**134**	9.01
ELONGATION AT BREAK		MD%	450	510	510	430	480	**470**	32.00
Lo = 2.0"		CD%	560	640	560	560	600	**580**	32.00

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CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Basin Closure
PROJECT NO.: L20-010-003
LAB ID NO.: L20-010-003-004
MATERIAL: Agru 40 mil LLDPE Microspike
ROLL NO: GTF0048940041

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	43	43	42	41	41		
			42	41	41	40	41	**42**	0.92
DENSITY	D 1505	g/cc	0.9348	0.9346	0.9349			**0.9348**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.60	2.57				**2.58**	0.013
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	98.2	102.2	98.2	96.7	100.3		
			97.9	90.7	92.6	87.9	92.0		
			92.4	90.9	93.2	92.6	91.0	**94.5**	4.00
TEAR RESISTANCE	D 1004	MD-lbs	36.6	34.4	42.0	38.4	41.2		
			38.4	38.2	33.6	33.8	34.7	**37.1**	2.86
		CD-lbs	32.8	33.4	36.3	33.0	34.2		
			37.0	40.9	35.4	37.1	35.5	**35.6**	2.33
TENSILE PROPERTIES	D 6693								
STRENGTH AT BREAK		MD-ppi	145	132	155	142	145	**144**	7.15
		CD-ppi	138	131	127	138	142	**135**	5.42
ELONGATION AT BREAK		MD%	510	480	510	480	480	**490**	14.70
Lo = 2.0"		CD%	570	630	580	560	590	**590**	24.17

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Appendix D - Subgrade Acceptance Form

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 8/25/2020
Panels Installed: P-1 TO 33
Description of Area: 116'715 SQFT

JAVIER LP

Hallaton Signature Title

QA/QC Signature Title

GC/Other Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 8/26/2020
Panels Installed: P-34 TO 60
Description of Area: 122,394 SQFT

JAVIER LP

Hallaton Signature Title

QA/QC Signature Title

GC/Other Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 8/27/2020
Panels Installed: P-61 TO 91
Description of Area: 111,545 SQFT

JAVIER LP

Hallaton Signature Title

QA/QC Signature Title

GC/Other Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 8/29/2020
Panels Installed: P-92 TO 101
Description of Area: 30,613 SQFT

JAVIER LP

Hallaton Signature Title

QA/QC Signature Title

GC/Other Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/3/2020
Panels Installed: P-102 TO 107
Description of Area: 58,535 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/4/2020
Panels Installed: P-108 TO 112
Description of Area: 66,424 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/6/2020
Panels Installed: P-113 TO 131
Description of Area: 50,116 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/7/2020
Panels Installed: P-132 TO 141
Description of Area: 31,602 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/9/2020
Panels Installed: P-142 TO 163
Description of Area: 46,240 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

HALLATON
ENVIRONMENTAL LININGS
1206 SPARKS ROAD - SPARKS, MD 21152
(410) 583-7700 - Fax (410) 583-7720

Certificate of Subgrade Acceptance

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

Area to be Accepted:

Date Installed: 11/11/2020
Panels Installed: P-164 TO 168
Description of Area: 4,704 SQFT

ANTHONY SIPE	QCM
Hallaton Signature	Title
QA/QC Signature	Title
GC/Other	Title

Appendix E - Field LLDPE Deployment Records

HALLATON
ENVIRONMENTAL LININGS

Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
8/25/20	P1	8:19	SLOPE	940012	23	192	4416
8/25/20	P2	8:24	SLOPE	940012	23	194	4462
8/25/20	P3	8:35	SLOPE	940012	23	196	4508
8/25/20	P4	8:47	SLOPE	940030	23	200	4600
8/25/20	P5	8:54	SLOPE	940030	23	205	4715
8/25/20	P6	9:08	SLOPE	940030	23	208	4784
8/25/20	P7	9:25	SLOPE	940025	23	195	4485
8/25/20	P8	9:42	SLOPE	940025	23	147	3381
8/25/20	P9	9:51	SLOPE	940025	23	97	2231
8/25/20	P10	9:57	SLOPE	940030	23	47	1081
8/25/20	P11	10:03	SLOPE	940025	9	27	243
8/25/20	P12	10:26	SLOPE	940025	23	196	4508
8/25/20	P13	10:41	SLOPE	940044	23	169	3887
8/25/20	P14	10:52	SLOPE	940044	23	138	3174
8/25/20	P15	11:14	SLOPE	940044	23	108	2484
8/25/20	P16	11:26	SLOPE	940044	23	78	1794
8/25/20	P17	11:29	SLOPE	940044	23	47	1081
8/25/20	P18	11:36	SLOPE	940030	23	23	529
8/25/20	P19	12:49	SLOPE	940023	23	227	5221
8/25/20	P20	12:58	SLOPE	940023	23	222	5106
8/25/20	P21	1:18	SLOPE	940023	23	171	3933
8/25/20	P22	1:27	SLOPE	940023	23	53	1219
8/25/20	P23	1:44	SLOPE	940014	23	223	5129
8/25/20	P24	1:52	SLOPE	940014	23	224	5152
8/25/20	P25	2:04	SLOPE	940014	23	224	5152
8/25/20	P26	2:12	SLOPE	940037	23	224	5152
8/25/20	P27	2:21	SLOPE	940037	23	224	5152
8/25/20	P28	2:50	SLOPE	940037	23	224	5152
8/25/20	P29	3:00	SLOPE	940019	23	208	4784
8/25/20	P30	3:10	SLOPE	940019	23	166	3818

HALLATON
ENVIRONMENTAL LININGS

Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
8/25/20	P31	3:17	SLOPE	940019	23	121	2783
8/25/20	P32	3:26	SLOPE	940019	23	80	1840
8/25/20	P33	3:30	SLOPE	940019	23	33	759
8/26/20	P34	7:42	SLOPE	940024	23	125	2875
8/26/20	P35	7:50	SLOPE	940024	23	76	1748
8/26/20	P36	8:00	SLOPE	940024	23	172	3956
8/26/20	P37	8:05	SLOPE	940024	23	32	736
8/26/20	P38	8:09	SLOPE	940019	5	16	80
8/26/20	P39	8:12	SLOPE	940024	23	222	5106
8/26/20	P40	8:20	SLOPE	940035	23	220	5060
8/26/20	P41	8:32	SLOPE	940035	23	221	5083
8/26/20	P42	8:40	SLOPE	940035	23	221	5083
8/26/20	P43	8:47	SLOPE	940040	23	222	5106
8/26/20	P44	9:46	SLOPE	940040	23	222	5106
8/26/20	P45	9:55	SLOPE	940040	23	223	5129
8/26/20	P46	10:08	SLOPE	940013	23	223	5129
8/26/20	P47	10:15	SLOPE	940013	23	223	5129
8/26/20	P48	10:27	SLOPE	940013	23	225	5175
8/26/20	P49	10:45	SLOPE	940015	23	225	5175
8/26/20	P50	10:51	SLOPE	940015	23	224	5152
8/26/20	P51	11:00	SLOPE	940015	23	223	5129
8/26/20	P52	12:49	SLOPE	940020	23	223	5129
8/26/20	P53	12:55	SLOPE	940020	23	224	5152
8/26/20	P54	1:02	SLOPE	940020	23	224	5152
8/26/20	P55	1:10	SLOPE	940031	23	224	5152
8/26/20	P56	1:23	SLOPE	940031	23	224	5152
8/26/20	P57	1:42	SLOPE	940031	23	224	5152
8/26/20	P58	2:07	SLOPE	940010	23	224	5152
8/26/20	P59	2:12	SLOPE	940010	23	226	5198
8/26/20	P60	2:22	SLOPE	940010	23	226	5198

HALLATON
ENVIRONMENTAL LININGS

Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
8/27/20	P61	8:05	FLOOR	940022	23	176	4048
8/27/20	P62	8:10	FLOOR	940022	23	196	4508
8/27/20	P63	8:17	FLOOR	940022	23	212	4876
8/27/20	P64	8:24	FLOOR	940022	23	128	2944
8/27/20	P65	8:32	FLOOR	940044	23	99	2277
8/27/20	P66	8:42	FLOOR	940033	23	244	5612
8/27/20	P67	8:53	FLOOR	940033	23	261	6003
8/27/20	P68	11:00	SLOPE	940034	23	225	5175
8/27/20	P69	11:07	SLOPE	940033	23	177	4071
8/27/20	P70	11:15	SLOPE	940034	23	136	3128
8/27/20	P71	11:20	SLOPE	940034	23	94	2162
8/27/20	P72	11:27	SLOPE	940034	23	54	1242
8/27/20	P73	11:31	SLOPE	940034	13	35	455
8/27/20	P74	12:55	SLOPE	940034	23	130	2990
8/27/20	P75	1:06	SLOPE	940038	23	92	2116
8/27/20	P76	1:14	SLOPE	940034	23	59	1357
8/27/20	P77	1:26	SLOPE	940039	23	23	529
8/27/20	P78	1:30	SLOPE	940038	23	169	3887
8/27/20	P79	1:49	SLOPE	940038	23	205	4715
8/27/20	P80	2:05	SLOPE	940038	23	195	4485
8/27/20	P81	2:19	FLOOR	940001	23	30	690
8/27/20	P82	2:26	SLOPE	940001	23	225	5175
8/27/20	P83	2:32	SLOPE	940001	23	224	5152
8/27/20	P84	2:40	SLOPE	940001	23	224	5152
8/27/20	P85	2:47	SLOPE	940028	23	215	4945
8/27/20	P86	2:54	SLOPE	940028	23	209	4807
8/27/20	P87	3:02	SLOPE	940028	23	195	4485
8/27/20	P88	3:09	SLOPE	940006	23	185	4255
8/27/20	P89	3:15	SLOPE	940006	23	169	3887
8/27/20	P90	3:23	SLOPE	940006	23	151	3473

HALLATON
ENVIRONMENTAL LININGS

Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
8/27/20	P91	3:34	SLOPE	940006	23	128	2944
8/29/20	P92	7:50	SLOPE	940021	23	190	4370
8/29/20	P93	7:55	SLOPE	940021	23	182	4186
8/29/20	P94	8:05	SLOPE	940021	23	173	3979
8/29/20	P95	8:08	SLOPE	940021	23	157	3611
8/29/20	P96	8:13	SLOPE	940036	23	143	3289
8/29/20	P97	8:19	SLOPE	940036	23	126	2898
8/29/20	P98	8:24	SLOPE	940036	23	112	2576
8/29/20	P99	8:27	SLOPE	940036	23	97	2231
8/29/20	P100	8:31	SLOPE	940036	23	83	1909
8/29/20	P101	8:34	SLOPE	940036	23	68	1564
11/3/20	P102	1:51	NORTH TO SOUTH	940008	23	361	8303
11/3/20	P103	2:12	NORTH TO SOUTH	940008	23	380	8740
11/3/20	P104	2:20	NORTH TO SOUTH	940016	23	400	9200
11/3/20	P105	3:30	NORTH TO SOUTH	940017	23	432	9936
11/3/20	P106	3:45	NORTH TO SOUTH	940018	23	467	10741
11/3/20	P107	4:30	NORTH TO SOUTH	940039	23	505	11615
11/4/20	P108	7:38	NORTH TO SOUTH	940005	23	547	12581
11/4/20	P109	7:55	NORTH TO SOUTH	949932	23	589	13547
11/4/20	P110	8:18	NORTH TO SOUTH	940042	23	626	14398
11/4/20	P111	10:19	NORTH TO SOUTH	940003	23	572	13156
11/4/20	P112	10:34	NORTH TO SOUTH	940041	23	554	12742
11/6/20	P113	12:50	NORTH SLOPE	940041	23	157	3611
11/6/20	P114	1:06	NORTH SLOPE	940017	23	130	2990
11/6/20	P115	1:10	NORTH SLOPE	940012	23	93	2139
11/6/20	P116	1:13	NORTH SLOPE	940017	23	58	1334
11/6/20	P117	1:18	NORTH SLOPE	940017	20	22	440
11/6/20	P118	1:34	NE SLOPE	940026	23	117	2691
11/6/20	P119	1:44	NE SLOPE	940026	23	148	3404
11/6/20	P120	1:56	NE SLOPE	940026	23	169	3887

HALLATON
ENVIRONMENTAL LININGS

Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/6/20	P121	2:05	NE SLOPE	940026	23	147	3381
11/6/20	P122	2:15	NE SLOPE	940003	23	143	3289
11/6/20	P123	2:20	NE SLOPE	940005	23	128	2944
11/6/20	P124	2:27	NE SLOPE	940032	23	102	2346
11/6/20	P125	2:42	NE SLOPE	940026	23	70	1610
11/6/20	P126	2:55	NE SLOPE	940040	23	38	874
11/6/20	P127	3:00	NE SLOPE	940026	14	26	364
11/6/20	P128	3:20	NE SLOPE	940039	23	151	3473
11/6/20	P129	3:40	NE SLOPE	940016	23	157	3611
11/6/20	P130	3:55	NE SLOPE	560028	23	164	3772
11/6/20	P131	1:72	NE SLOPE	560028	23	172	3956
11/7/20	P132	7:10	NE SLOPE	560028	23	179	4117
11/7/20	P133	7:18	NE SLOPE	560028	23	158	3634
11/7/20	P134	7:24	NE SLOPE	940039	23	27	621
11/7/20	P135	7:30	NE SLOPE	940016	23	154	3542
11/7/20	P136	7:40	NE SLOPE	940018	23	37	851
11/7/20	P137	7:51	NE SLOPE	940009	23	197	4531
11/7/20	P138	8:00	NE SLOPE	940009	23	202	4646
11/7/20	P139	8:06	NE SLOPE	940009	23	208	4784
11/7/20	P140	8:20	NE SLOPE	255630	23	194	4462
11/7/20	P141	8:28	NE SLOPE	940009	23	18	414
11/9/20	P142	7:20	NE SLOPE	255630	23	215	4945
11/9/20	P143	7:26	NE SLOPE	255630	23	220	5060
11/9/20	P144	7:35	NE SLOPE	255630	23	207	4761
11/9/20	P145	7:40	NE SLOPE	940009	23	15	345
11/9/20	P146	8:01	NE SLOPE	940001	22	14	308
11/9/20	P147	8:05	NE SLOPE	940006	23	43	989
11/9/20	P148	8:12	NE SLOPE	940014	23	66	1518
11/9/20	P149	8:17	NE SLOPE	940036	23	68	1564
11/9/20	P150	8:22	NE SLOPE	940009	23	49	1127

HALLATON
ENVIRONMENTAL LININGS

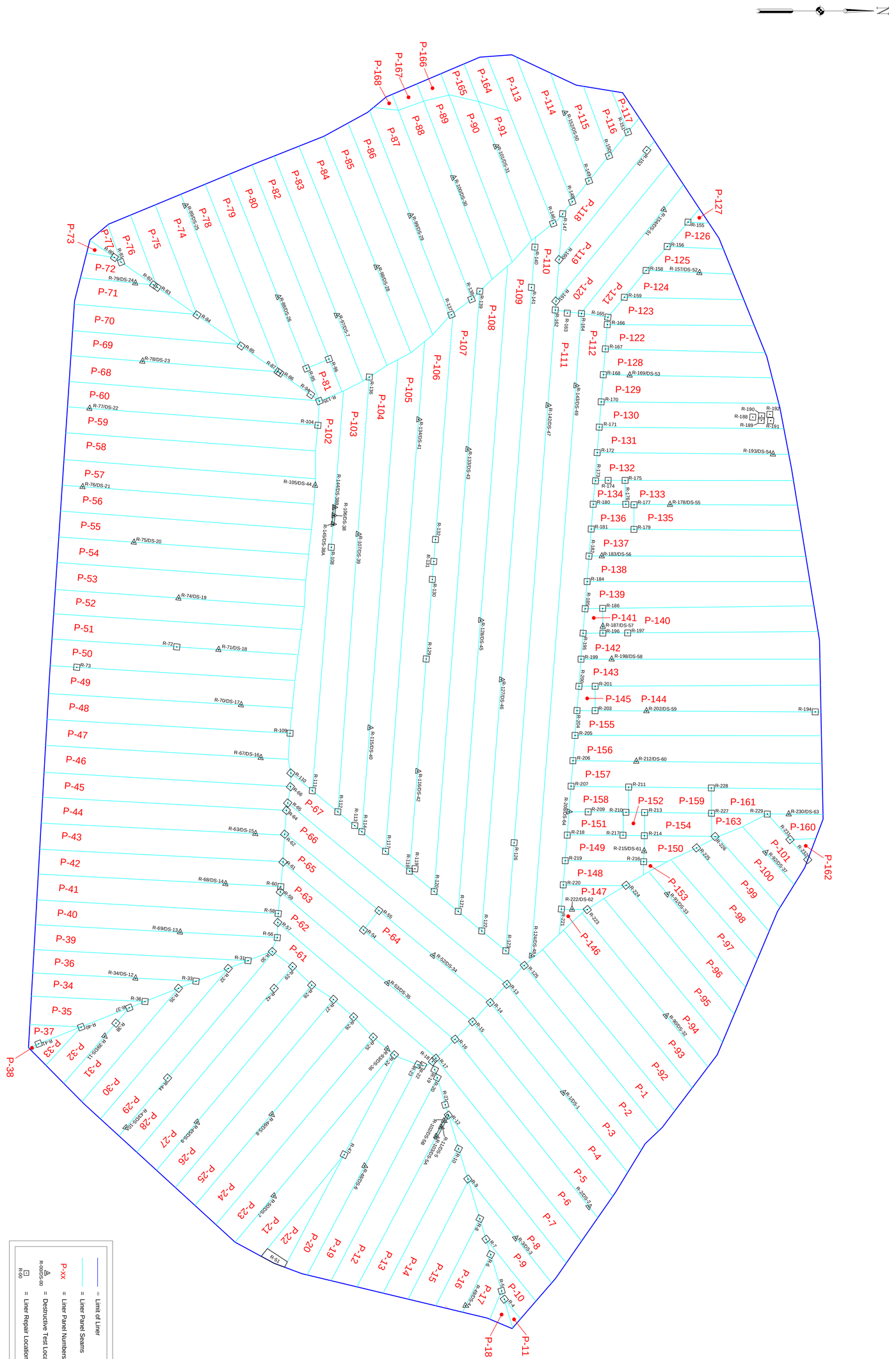
Panel Placement Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Project Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
40 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/9/20	P151	8:24	NE SLOPE	940023	23	50	1150
11/9/20	P152	8:19	NE SLOPE	940039	23	17	391
11/9/20	P153	8:31	NE SLOPE	940009	15	16	240
11/9/20	P154	8:35	NE SLOPE	940024	23	64	1472
11/9/20	P155	9:35	NE SLOPE	940027	23	225	5175
11/9/20	P156	9:48	NE SLOPE	940027	23	229	5267
11/9/20	P157	10:00	NE SLOPE	940027	23	227	5221
11/9/20	P158	10:08	NE SLOPE	940027	18	52	936
11/9/20	P159	10:21	NE SLOPE	940035	21	73	1533
11/9/20	P160	10:30	NE SLOPE	940015	23	42	966
11/9/20	P161	10:46	NE SLOPE	940042	23	101	2323
11/9/20	P162	11:20	NE SLOPE	940015	20	21	420
11/9/20	P163	12:45	NE SLOPE	740024	23	23	529
11/11/20	P164	7:35	SLOPE	940028	23	48	1104
11/11/20	P165	7:45	SLOPE	940028	23	31	713
11/11/20	P166	7:55	SLOPE	940037	23	21	483
11/11/20	P167	8:05	SLOPE	940028	23	13	299
11/11/20	P168	8:12	SLOPE	940028	7	15	105
	P169						
	P170						
	P171						
	P172						
	P173						
	P174						
	P175						
	P176						
	P177						
	P178						
	P179						
	P180						

Appendix F - LLDPE Liner As-built Drawings



Drawing Number:	RD-01
Job Number:	1984-23718
Scale:	1" = 50'
Date:	11/13/2019
Drawn By:	AS

HALLATON
ENVIRONMENTAL LININGS
Hallaton Inc / 1206 Sparks Road / MD 21152 / USA
www.hallaton.com

GRAND TOWER CCR
IMPOUNDMENT CLOSURE CONSTRUCTION
GRAND TOWER, ILLINOIS

GEOMEMBRANE RECORD DRAWING

REVISIONS

NO.	Date.	By.	Description.
NO.1	11/24/2020	AS	Repair corrections

Appendix G - Field LLDPE Trial Seam Reports

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
1	8/25/20	8:11	71	57	GC	775/700		68	68	72			86	84	86			P	JP	SM/SM
								73	68	72										
2	8/25/20	8:13	71	41	AH	770/750		81	79	81			86	84	86			P	JP	SM/SM
								73	75	69										
3	8/25/20	8:30	71	40	SS	775/700		72	68	78			83	83	84			P	JP	SM/SM
								73	69	73										
4	8/25/20	8:08	71	41	AH	770/650		71	78	76			80	80	82			P	JP	TX/TX
								73	75	71										
5	8/25/20	8:13	71	57	GC	775/600		74	73	72			78	76	76			P	JP	TX/TX
								72	67	70										
6	8/25/20	12:58	90	57	GC	715/790		64	63	64			70	72	70			P	JP	SM/SM
								67	65	64										
7	8/25/20	1:00	90	41	AH	710/850		68	68	67			71	72	75			P	JP	SM/SM
								65	69	65										
8	8/25/20	10:02	90	57	GC	775/670		64	65	68			75	72	72			P	JP	SM/TX
								67	63	64										
9	8/26/20	7:50	74	57	GC	775/700		74	70	72			85	82	79			P	JP	SM/SM
								72	70	73										
10	8/26/20	7:55	74	41	AH	770/750		73	77	84			86	84	86			P	JP	SM/SM
								82	80	76										
11	8/26/20	7:55	74	57	GC	775/600		72	71	72			77	76	80			P	JP	TX/TX
								72	72	69										

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	1	2	3	4	5	1	2	3	4	5			
12	8/26/20	7:58	74	41	AH	770/650		74	71	74			75	78	75			P	JP	TX/TX
								75	74	77										
13	8/26/20	9:13	76	40	SS	775/700		74	62	76			84	82	84			P	JP	SM/SM
								80	76	73										
14	8/26/20	12:48	82	57	GC	750/700		70	68	67			78	76	74			P	JP	SM/SM
								67	67	72										
15	8/26/20	12:47	82	40	SS	750/700		63	61	66			72	70	74			P	JP	SM/SM
								68	66	67										
16	8/26/20	12:50	82	41	AH	750/750		70	68	71			74	72	71			P	JP	SM/SM
								65	65	64										
17	8/26/20	12:50	82	40	SS	750/650		67	67	69			71	72	70			P	JP	TX/TX
								69	70	65										
18	8/26/20	12:51	82	57	GC	750/650		66	63	62			69	72	70			P	JP	TX/TX
								64	65	68										
19	8/26/20	12:55	82	41	AH	750/700		71	67	71			74	72	73			P	JP	TX/TX
								68	67	69										
20	8/26/20	4:48	80	X-34	JS		550/500	55	52	54			75	77	73			P	JP	TX/TX
21	8/27/20	7:55	75	41	AH	770/750		74	76	76			85	79	82			P	JP	SM/SM
								81	72	79										
22	8/27/20	7:53	75	57	GC	775/700		80	79	74			84	86	82			P	JP	SM/SM
								76	71	78										

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
23	8/27/20	7:55	75	57	GC	775/600		74	72	68			71	69	78			P	JP	TX/TX
								69	66	70										
24	8/27/20	7:58	75	41	AH	770/650		65	66	74			82	79	82			P	JP	TX/TX
								66	69	76										
25	8/27/20	9:07	77	40	SS	775/650		70	72	69			78	76	78			P	JP	SM/TX
								78	72	72										
26	8/27/20	9:03	77	40	SS	775/600		68	66	69			77	79	78			P	JP	TX/TX
								74	72	72										
27	8/27/20	12:50	83	41	AH	760/780		66	63	64			72	70	71			P	JP	SM/SM
								69	69	67										
28	8/27/20	12:52	83	57	GC	750/750		65	66	66			69	72	74			P	JP	SM/SM
								67	66	67										
29	8/27/20	12:56	83	57	GC	750/700		68	68	70			69	69	68			P	JP	TX/TX
								66	68	67										
30	8/27/20	3:40	83	40	SS	775/600		61	60	61			68	70	69			P	JP	TX/TX
								64	62	62										
31	8/28/20	8:04	77	X-34	JL		550/400	61	60	58			66	64	67			P	JP	TX/TX
32	8/29/20	7:45	74	57	GC	775/700		69	68	69			83	79	82			P	JP	SM/SM
								63	69	72										
33	8/29/20	7:45	74	41	AH	775/750		74	73	75			82	80	82			P	JP	SM/SM
								77	74	76										

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
34	8/29/20	7:48	74	57	GC	775/650		73	73	69			79	82	80			P	JP	TX/TX
								69	72	72										
35	8/29/20	7:50	74	41	AH	770/700		66	65	62			83	81	82			P	JP	TX/TX
								61	63	60										
36	8/29/20	10:22	82	X-34	JS		550/400	62	60	62			68	66	69			P	JP	TX/TX
37	8/31/20	8:38	73	X-34	JS		550/400	65	62	66			69	67	72			P	JP	TX/TX
38	8/31/20	12:25	83	X-34	JS		550/400	66	64	61			69	68	69			P	JP	TX/TX
39	9/1/20	7:48	68	X-34	JS		550/400	64	68	66			70	67	69			P	JP	TX/TX
40	9/4/20	1:16	76	X-34	JS		550/400	62	60	61			67	69	69			P	JP	TX/TX
41	9/4/20	4:13	79	X-34	JL		550/300	62	61	59			69	66	68			P	JP	TX/TX
42	11/3/20	1:40	62	M-73	VML	860/750		83	75	78			104	104	103			P	ML	SM/SM
								90	91	81										
43	11/3/20	1:50	62	M-73	VML	860/700		76	75	79			93	92	95			P	ML	SM/TX
								84	83	84										
44	11/3/20	2:04	62	M-68	RV	860/700		95	79	84			103	101	101			P	ML	SM/SM
								76	74	81										

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	1	2	3	4	5	1	2	3	4	5			
45	11/4/20	7:35	53	M-73	VML	800/800		92	88	103			128	129	138			P	ML	SM/SM
								99	98	93										
46	11/4/20	7:40	53	M-73	VML	800/750		89	90	97			95	92	98			P	ML	SM/TX
								88	86	98										
47	11/4/20	7:43	53	M-68	RV	800/750		88	85	88			122	120	121			P	ML	SM/SM
								89	92	91										
48	11/4/20	1:16	70	X-22	SG		550/550	87	88	85			82	87	94			P	ML	TX/TX
49	11/4/20	1:30	70	X-24	GB		500/400	75	76	75			81	79	77			P	ML	TX/TX
50	11/5/20	7:05	51	X-24	GB		500/400	86	80	93			83	85	87			P	ML	TX/TX
51	11/5/20	7:19	51	X-22	SG		550/550	82	86	84			98	97	98			P	ML	TX/TX
52	11/5/20	1:05	71	X-24	GB		500/400	76	87	101			82	82	83			P	ML	TX/TX
53	11/6/20	1:00	71	M-73	VML	800/800		94	93	92			103	101	100			P	ML	SM/SM
								90	91	86										
54	11/6/20	1:10	71	M-68	RV	800/750		78	81	81			98	96	98			P	ML	SM/SM
								84	78	82										
55	11/6/20	1:50	71	M-68	RV	800/700		100	77	96			106	107	104			P	ML	SM/TX
								90	93	93										

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
56	11/7/20	7:25	47	M-73	VML	800/750		105	98	96			117	119	117			P	ML	TX/TX
								94	92	96										
57	11/7/20	7:30	47	M-73	VML	800/800		108	112	99			116	115	115			P	ML	SM/SM
								76	70	76										
58	11/7/20	7:45	47	M-68	RV	800/750		91	90	99			126	119	123			P	ML	SM/SM
								89	88	89										
59	11/7/20	7:46	47	M-68	RV	800/700		102	100	93			99	103	103			P	ML	SM/TX
								95	89	91										
60	11/7/20	11:00	71	X-24	GB		500/400	83	82	84			74	81	82			P	ML	TX/TX
61	11/7/20	12:51	76	X-22	CM		550/550	74	69	73			77	75	77			P	ML	TX/TX
62	11/9/20	7:25	70	M-73	VML	800/800		89	95	93			104	105	104			P	ML	SM/SM
								72	81	81										
63	11/9/20	7:30	70	M-73	VML	800/750		92	94	94			103	99	104			P	ML	TX/TX
								91	92	87										
64	11/9/20	7:35	70	M-68	RV	800/750		79	83	79			108	107	106			P	ML	SM/SM
								84	82	89										
65	11/9/20	7:36	70	M-68	RV	800/700		72	82	80			102	103	106			P	ML	SM/TX
								83	89	86										
66	11/9/20	1:00	76	X-24	GB		500/400	80	92	90			105	100	94			P	ML	TX/TX

HALLATON ENVIRONMENTAL LININGS

Geomembrane Field Trial Seam Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN/OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	1	2	3	4	5	1	2	3	4	5			
67	11/9/20	1:16	76	X-22	SG		500/550	80	71	85			85	82	86			P	ML	TX/TX
68	11/10/20	7:12	66	X-22	SG		500/550	74	72	74			75	79	77			P	ML	TX/TX
69	11/11/20	7:50	46	X-22	SG		550/500	77	81	79			82	87	81			P	ML	TX/TX
70																				
71																				
72																				
73																				
74																				
75																				
76																				
77																				

Appendix H - Field LLDPE Seam Log and Non Destructive Testing

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/25/20	P-1/2	8:55	AH	41	670	750	BOS	EOS	192	30	30	4:28	4:33	AH	8/26/20
8/25/20	P-2/3	8:56	GC	57	775	700	BOS	EOS	195	30	30	4:29	4:34	AH	8/26/20
8/25/20	P-3/4	9:25	AH	41	670	750	BOS	EOS	198	30	30	4:30	4:35	AH	8/26/20
8/25/20	P-4/5	9:52	AH	41	670	750	BOS	EOS	202	30	30	4:31	4:36	AH	8/26/20
8/25/20	P-5/6	9:27	GC	57	775	700	BOS	EOS	206	30	30	4:32	4:37	AH	8/26/20
8/25/20	P-6/7	9:57	GC	57	775	700	BOS	EOS	207	30	30	4:40	4:45	AH	8/26/20
8/25/20	P-7/8	10:31	GC	57	775	700	BOS	EOS	170	30	30	4:41	4:46	AH	8/26/20
8/25/20	P-8/9	10:26	AH	41	770	750	BOS	EOS	122	30	30	4:42	4:47	AH	8/26/20
8/25/20	P-9/10	10:41	AH	41	770	750	BOS	EOS	72	30	30	4:43	4:48	AH	8/26/20
8/25/20	P-10/11	10:58	AH	41	770	750	BOS	EOS	18	30	30	4:44	4:49	AH	8/26/20
8/25/20	P-12/13	11:04	AH	41	770	750	BOS	EOS	182	30	30	5:18	5:23	AH	8/26/20
8/25/20	P-13/14	12:39	AH	41	770	750	BOS	EOS	153	30	30	5:17	5:22	AH	8/26/20
8/25/20	P-14/15	11:20	GC	57	775	750	BOS	EOS	123	30	30	5:09	5:14	AH	8/26/20
8/25/20	P-15/16	12:46	GC	57	775	750	BOS	EOS	93	30	30	5:07	5:12	AH	8/26/20
8/25/20	P-16/17	1:04	GC	57	775	750	BOS	EOS	62	30	30	4:55	5:00	AH	8/26/20
8/25/20	P-17/18	1:14	GC	57	775	750	BOS	EOS	35	30	30	4:53	4:58	AH	8/26/20
8/25/20	P-12/19	1:05	AH	41	770	750	BOS	EOS	210	30	30	5:27	5:32	AH	8/26/20
8/25/20	P-19/20	1:45	AH	41	770	750	BOS	EOS	221	30	30	5:28	5:33	AH	8/26/20
8/25/20	P-7/19	4:08	GC	57	775	600	BOS	11'>BOS	11	30	30	5:27	5:32	AH	8/26/20
8/25/20	P-7/19	4:12	GC	57	775	600	11'>BOS	EOS	5	30	30	5:27	5:32	AH	8/26/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/25/20	P-7/12	4:12	GC	57	775	600	BOS	25'>BOS	25	30	30	5:27	5:32	AH	8/26/20
8/25/20	P-7/12	4:16	GC	57	775	600	25'>BOS	EOS	8	30	30	5:18	5:23	AH	8/26/20
8/25/20	P-8/13	4:17	GC	57	775	600	BOS	EOS	32	30	30	5:17	5:22	AH	8/26/20
8/25/20	P-8/14	4:21	GC	57	775	600	BOS	EOS	30	30	30	5:17	5:22	AH	8/26/20
8/25/20	P-9/15	4:24	GC	57	775	600	BOS	EOS	34	30	30	5:07	5:12	AH	8/26/20
8/25/20	P-9/16	4:27	GC	57	775	600	BOS	EOS	21	30	30	5:06	5:11	AH	8/26/20
8/25/20	P-10/16	4:29	GC	57	775	600	BOS	EOS	12	30	30	5:05	5:10	AH	8/26/20
8/25/20	P-10/17	4:31	GC	57	775	600	BOS	EOS	32	30	30	4:53	4:58	AH	8/26/20
8/25/20	P-10/18	4:33	GC	57	775	600	BOS	EOS	13	30	30	4:53	4:58	AH	8/26/20
8/25/20	P-11/18	4:35	GC	57	775	600	BOS	EOS	20	30	30	4:50	4:55	AH	8/26/20
8/25/20	P-19/20	1:45	AH	41	710	850	BOS	EOS	222	30	30	5:28	5:33	AH	8/28/20
8/25/20	P-20/21	4:49	GC	57	715	790	BOS	EOS	106	30	30	7:55	8:00	AH	8/28/20
8/25/20	P-20/22	5:01	GC	57	715	790	BOS	EOS	109	30	30	7:55	8:00	AH	8/28/20
8/25/20	P-21/22	1:45	GC	57	715	790	BOS	EOS	106	30	30	7:55	8:00	AH	8/28/20
8/25/20	P-21/23	2:00	GC	57	715	790	BOS	EOS	222	30	30	8:09	8:14	AH	8/28/20
8/25/20	P-23/24	2:30	GC	57	715	790	BOS	EOS	223	30	30	8:10	8:15	AH	8/28/20
8/25/20	P-24/25	2:20	AH	41	710	850	BOS	EOS	223	30	30	9:23	9:28	RH	8/29/20
8/25/20	P-25/26	2:47	AH	41	710	850	BOS	EOS	224	30	28	9:24	9:29	RH	8/29/20
8/25/20	P-26/27	3:00	GC	57	715	790	BOS	EOS	223	30	28	9:40	9:45	RH	8/29/20
8/25/20	P-27/28	3:35	GC	57	715	790	BOS	18'>BOS	18	30	28	9:50	9:55	RH	8/29/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/25/20	P-27/28	3:36	GC	57	715	790	18'>BOS	EOS	206	30	30	9:57	10:02	RH	8/29/20
8/25/20	P-28/29	3:14	AH	41	710	850	BOS	143'>BOS	143	30	30	10:00	10:05	RH	8/29/20
8/25/20	P-28/29	3:22	AH	41	710	850	143'>BOS	EOS	80	30	30	11:00	11:05	RH	8/29/20
8/25/20	P-29/30	3:38	AH	41	710	850	BOS	EOS	183	30	30	10:14	10:19	RH	8/29/20
8/25/20	P-30/31	4:10	AH	41	710	850	BOS	EOS	140	30	29	10:26	10:31	RH	8/29/20
8/25/20	P-31/32	4:31	AH	41	710	850	BOS	13'>BOS	13	30	30	10:41	10:46	RH	8/29/20
8/25/20	P-31/2	4:33	AH	41	710	850	13'>BOS	EOS	86	30	30	10:41	10:46	RH	8/29/20
8/25/20	P-32/33	4:42	AH	41	710	850	BOS	EOS	58	30	29	10:48	10:53	RH	8/29/20
8/26/20	P-34/35	8:44	AH	41	770	750	BOS	EOS	99	30	30	11:07	11:12	RH	8/29/20
8/26/20	P-35/37	9:00	AH	41	770	750	BOS	EOS	54	30	30	10:53	10:58	RH	8/29/20
8/26/20	P-33/38	9:12	AH	41	770	750	BOS	EOS	16	30	30	11:05	11:10	RH	8/29/20
8/26/20	P-34/36	8:24	AH	41	770	750	BOS	EOS	148	30	30	11:08	11:13	RH	8/29/20
8/26/20	P-36/39	8:22	GC	57	775	700	BOS	EOS	197	30	30	11:11	11:16	RH	8/29/20
8/26/20	P-39/40	8:48	GC	57	775	700	BOS	EOS	220	30	30	11:21	11:26	RH	8/29/20
8/26/20	P-29/39	9:25	AH	41	770	650	BOS	EOS	21	30	30	10:11	10:16	RH	8/29/20
8/26/20	P-29/36	9:28	AH	41	770	650	BOS	EOS	22	30	28	10:13	10:18	RH	8/29/20
8/26/20	P-30/36	9:32	AH	41	770	650	BOS	EOS	27	30	28	10:22	10:27	RH	8/29/20
8/26/20	P-30/34	9:35	AH	41	770	650	BOS	EOS	17	30	30	10:25	10:30	RH	8/29/20
8/26/20	P-31/34	9:38	AH	41	770	650	BOS	EOS	36	30	30	10:31	10:36	RH	8/29/20
8/26/20	P-31/35	9:40	AH	41	770	650	BOS	EOS	8	30	30	10:17	10:22	RH	8/29/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/26/20	P-32/35	9:41	AH	41	770	650	BOS	EOS	44	30	29	10:44	10:49	RH	8/29/20
8/26/20	P-33/37	9:45	AH	41	770	650	BOS	EOS	42	30	30	10:53	10:58	RH	8/29/20
8/26/20	P-37/38	9:50	AH	41	770	650	BOS	EOS	11	30	30	10:55	11:00	RH	8/29/20
8/26/20	P40/41	9:16	GC	57	775	700	BOS	EOS	220	30	30	11:30	11:35	RH	8/29/20
8/26/20	P-41/42	9:41	SS	40	775	700	BOS	EOS	221	30	29	11:36	11:41	RH	8/29/20
8/26/20	P-42/43	9:15	SS	40	775	700	BOS	EOS	221	30	30	11:45	11:50	RH	8/29/20
8/26/20	P-43/44	10:08	SS	40	775	700	BOS	EOS	220	30	30	11:58	12:03	RH	8/29/20
8/26/20	P-44/45	10:00	GC	57	775	700	BOS	EOS	222	30	29	12:10	12:15	RH	8/29/20
8/26/20	P-45/46	10:39	GC	57	775	700	BOS	EOS	222	30	30	7:35	7:40	RH	8/31/20
8/26/20	P-46/47	10:19	AH	41	770	750	BOS	EOS	222	30	30	7:39	7:44	RH	8/31/20
8/26/20	P-47/48	10:52	AH	41	770	750	BOS	EOS	223	30	30	7:43	7:48	RH	8/31/20
8/26/20	P-48/49	10:59	SS	40	775	700	BOS	EOS	224	30	30	7:48	7:53	RH	8/31/20
8/26/20	P-49/50	11:12	GC	57	775	700	BOS	196'>BOS	196	30	30	7:59	8:01	RH	8/31/20
8/26/20	P-49/50	11:32	GC	57	775	700	196'>BOS	EOS	28	30	30	8:04	8:09	RH	8/31/20
8/26/20	P-50/51	11:21	AH	41	770	750	BOS	109'>BOS	109	30	29	8:08	8:13	RH	8/31/20
8/26/20	P-50/51	11:39	AH	41	770	750	109'>BOS	EOS	115	30	30	8:14	8:19	RH	8/31/20
8/26/20	P-51/52	1:19	AH	41	750	750	BOS	EOS	222	30	30	8:17	8:22	RH	8/31/20
8/26/20	P-52/53	1:19	GC	57	750	700	BOS	EOS	223	30	30	8:18	8:23	RH	8/31/20
8/26/20	P-53/54	1:17	SS	40	750	700	BOS	EOS	223	30	29	8:20	8:25	RH	8/31/20
8/26/20	P-54/55	1:46	SS	40	750	700	BOS	EOS	224	30	30	8:41	8:46	RH	8/31/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/26/20	P-55/56	1:50	GC	57	750	700	BOS	EOS	223	30	30	8:43	8:48	RH	8/31/20
8/26/20	P-56/57	1:53	AH	41	750	750	BOS	EOS	224	30	30	8:50	8:55	RH	8/31/20
8/26/20	P-57/58	2:16	GC	57	750	700	BOS	EOS	224	30	30	8:54	8:59	RH	8/31/20
8/26/20	P-58/59	2:20	AH	41	750	750	BOS	EOS	225	30	30	8:59	9:01	RH	8/31/20
8/26/20	P-59/60	2:27	SS	40	750	700	BOS	EOS	225	30	30	9:05	9:10	RH	8/31/20
8/27/20	P-61/62	8:29	AH	41	770	750	BOS	EOS	187	30	30	9:17	9:22	RH	8/29/20
8/27/20	P-62/63	8:55	AH	41	770	750	BOS	EOS	204	30	30	9:13	9:18	JS	8/29/20
8/27/20	P-63/64	8:50	GC	57	775	700	BOS	EOS	127	30	30	9:08	9:13	JS	8/29/20
8/27/20	P-64/65	8:45	GC	57	775	650	BOS	EOS	22.5	30	28	11:54	11:59	JS	8/29/20
8/27/20	P-63/65	9:00	GC	57	775	700	BOS	EOS	93	30	30	11:53	11:58	JS	8/29/20
8/27/20	P-64/66	9:17	GC	57	775	700	BOS	EOS	128	30	30	9:02	9:07	JS	8/29/20
8/27/20	P-65/66	9:30	GC	57	775	700	BOS	EOS	107	30	28	11:55	12:00	JS	8/29/20
8/27/20	P-66/67	9:28	AH	41	770	750	BOS	EOS	251	30	30	8:55	9:00	JS	8/29/20
8/27/20	P-60/68	1:04	AH	41	770	750	BOS	EOS	225	30	30	9:07	9:12	RH	8/31/20
8/27/20	P-68/69	11:17	GC	57	775	700	BOS	EOS	199	30	30	9:19	9:24	RH	8/31/20
8/27/20	P-69/70	11:34	AH	41	770	750	BOS	EOS	156	30	30	9:21	9:26	RH	8/31/20
8/27/20	P-70/71	1:00	AH	41	760	780	BOS	EOS	114	30	30	9:30	9:35	RH	8/31/20
8/27/20	P-71/72	1:20	AH	41	760	780	BOS	EOS	73	30	30	9:37	9:42	RH	8/31/20
8/27/20	P-72/73	1:33	AH	41	760	780	BOS	EOS	35	30	30	9:48	9:53	RH	8/31/20
8/27/20	P-68/79	4:00	SS	40	775	600	BOS	7'>BOS	7	30	29	9:10	9:15	RH	8/31/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/27/20	P-68/79	4:01	SS	40	775	600	7'>BOS	EOS	30	30	30	9:13	9:18	RH	8/31/20
8/27/20	P-69/79	4:04	SS	40	775	600	BOS	EOS	6	30	30	9:18	9:23	RH	8/31/20
8/27/20	P-69/78	4:05	SS	40	775	600	BOS	EOS	39	30	29	9:19	9:24	RH	8/31/20
8/27/20	P-70/74	4:09	SS	40	775	600	BOS	EOS	41	30	30	9:23	9:28	RH	8/31/20
8/27/20	P-71/73	4:13	SS	40	775	600	BOS	EOS	39	30	30	9:32	9:37	RH	8/31/20
8/27/20	P-71/76	4:16	SS	40	775	600	BOS	EOS	6	30	30	9:35	9:40	RH	8/31/20
8/27/20	P-72/76	4:17	SS	40	775	600	BOS	EOS	33	30	30	9:44	9:49	RH	8/31/20
8/27/20	P-72/77	4:21	SS	40	775	600	BOS	EOS	11	30	30	9:45	9:50	RH	8/31/20
8/27/20	P-73/77	4:22	SS	40	775	600	BOS	EOS	23	30	30	9:49	9:54	RH	8/31/20
8/27/20	P-74/75	1:16	GC	57	750	750	BOS	EOS	110	30	30	9:59	10:04	RH	8/31/20
8/27/20	P-75/76	1:55	AH	41	760	780	BOS	EOS	75	30	30	9:56	10:01	RH	8/31/20
8/27/20	P-76/77	1:48	AH	41	760	780	BOS	EOS	40	30	30	9:53	9:58	RH	8/31/20
8/27/20	P-74/78	1:35	GC	57	750	750	BOS	EOS	149	30	30	10:02	10:07	RH	8/31/20
8/27/20	P-78/79	1:58	GC	57	750	750	BOS	EOS	187	30	30	10:06	10:11	RH	8/31/20
8/27/20	P-79/81	2:19	AH	41	750	780	BOS	EOS	29	30	30	10:16	10:21	RH	8/31/20
8/27/20	P-80/81	2:14	AH	41	770	650	BOS	EOS	22.5	30	30	10:15	10:20	RH	8/31/20
8/27/20	P-79/80	2:24	AH	41	750	780	BOS	EOS	194	30	30	10:13	10:18	RH	8/31/20
8/27/20	P-81/82	2:30	GC	57	750	750	BOS	EOS	29	30	30	10:24	10:29	RH	8/31/20
8/27/20	P-80/82	2:33	GC	57	750	750	BOS	EOS	193	30	30	10:18	10:23	RH	8/31/20
8/27/20	P-82/83	3:00	GC	57	750	750	BOS	EOS	224	30	30	10:26	10:31	RH	8/31/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/27/20	P-83/84	2:50	AH	41	760	780	BOS	EOS	223	30	30	10:29	10:34	RH	8/31/20
8/27/20	P-84/85	3:20	AH	41	760	780	BOS	EOS	219	30	30	10:31	10:36	RH	8/31/20
8/27/20	P-85/86	3:48	AH	41	760	780	BOS	EOS	211	30	30	10:38	10:43	RH	8/31/20
8/27/20	P-86/87	3:30	GC	57	750	750	BOS	EOS	202	30	30	10:40	10:45	RH	8/31/20
8/27/20	P-87/88	3:56	GC	57	750	750	BOS	EOS	190	30	30	10:42	10:47	RH	8/31/20
8/27/20	P-88/89	4:21	GC	57	750	750	BOS	EOS	177	30	30	10:49	10:54	RH	8/31/20
8/27/20	P-89/90	4:15	AH	41	760	780	BOS	EOS	160	30	30	10:48	10:53	RH	8/31/20
8/27/20	P-90/91	4:34	AH	41	760	780	BOS	EOS	138	30	30	10:50	10:55	RH	8/31/20
8/27/20	P-2/67	9:35	SS	57	775	600	BOS	EOS	22.5	30	30	8:54	8:59	RH	8/29/20
8/27/20	P-3/66	9:36	SS	57	775	600	BOS	EOS	22.5	30	30	8:57	9:02	RH	8/29/20
8/27/20	P-4/64	9:38	SS	57	775	600	BOS	EOS	22.5	30	30	9:03	9:08	RH	8/29/20
8/27/20	P-5/63	9:40	SS	57	775	600	BOS	EOS	22.5	30	30	9:12	9:17	RH	8/29/20
8/27/20	P-6/62	9:45	SS	57	775	600	BOS	EOS	22.5	30	30	9:16	9:21	RH	8/29/20
8/27/20	P-7/61	9:44	SS	57	775	600	BOS	EOS	5	30	30	7:20	7:25	AH	8/28/20
8/27/20	P-19/61	9:48	SS	57	775	600	BOS	EOS	18	30	30	7:20	7:25	AH	8/28/20
8/27/20	P-20/61	9:51	SS	57	775	600	BOS	EOS	22	30	30	7:25	7:30	AH	8/28/20
8/27/20	P-23/61	9:54	SS	57	775	600	BOS	EOS	22.5	30	30	8:15	8:20	AH	8/28/20
8/27/20	P-24/61	9:56	SS	57	775	600	BOS	EOS	22.5	30	30	9:22	9:27	RH	8/29/20
8/27/20	P-25/61	9:58	SS	57	775	600	BOS	EOS	22.5	30	30	9:37	9:42	RH	8/29/20
8/27/20	P-26/61	10:00	SS	57	775	600	BOS	EOS	22.5	30	30	9:37	9:42	RH	8/29/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
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Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/27/20	P-27/61	10:02	SS	57	775	600	BOS	EOS	22.5	30	29	9:51	9:56	RH	8/29/20
8/27/20	P-28/61	10:04	SS	57	775	600	BOS	EOS	22.5	30	28	9:52	9:57	RH	8/29/20
8/27/20	P-39/61	9:59	AH	41	770	700	BOS	EOS	12	30	30	11:19	11:24	RH	8/29/20
8/27/20	P-40/61	10:03	AH	41	770	700	BOS	EOS	11	30	30	11:22	11:27	RH	8/29/20
8/27/20	P-40/62	10:04	AH	41	770	700	BOS	EOS	9	30	30	11:31	11:36	RH	8/29/20
8/27/20	P-41/62	10:05	AH	41	770	700	BOS	EOS	16	30	30	11:32	11:37	RH	8/29/20
8/27/20	P-41/63	10:07	AH	41	770	700	BOS	EOS	5	30	30	11:41	11:46	RH	8/29/20
8/27/20	P-42/63	10:07	AH	41	770	700	BOS	EOS	21	30	29	11:41	11:46	RH	8/29/20
8/27/20	P-43/65	10:10	AH	41	770	700	BOS	EOS	22	30	29	11:44	11:49	RH	8/29/20
8/27/20	P-44/66	10:13	AH	41	770	700	BOS	EOS	20	30	30	12:00	12:05	RH	8/29/20
8/27/20	P-45/66	10:16	AH	41	770	700	BOS	EOS	7	30	30	12:01	12:06	RH	8/29/20
8/27/20	P-45/67	10:17	AH	41	770	700	BOS	EOS	14	30	30	12:01	12:06	RH	8/29/20
8/29/20	P-1/92	8:23	GC	57	775	700	BOS	EOS	191	30	30	12:13	12:18	RH	8/31/20
8/29/20	P-92/93	8:52	GC	57	775	700	BOS	EOS	186	30	30	12:15	12:20	RH	8/31/20
8/29/20	P-93/94	8:24	AH	41	775	750	BOS	EOS	176	30	30	12:19	12:24	RH	8/31/20
8/29/20	P-94/95	8:25	AH	41	775	750	BOS	EOS	165	30	30	12:24	12:29	RH	8/31/20
8/29/20	P-95/96	9:25	AH	41	775	750	BOS	EOS	150	30	30	12:26	12:31	RH	8/31/20
8/29/20	P-96/97	9:47	AH	41	775	750	BOS	EOS	134	30	30	12:30	12:35	RH	8/31/20
8/29/20	P-97/98	10:10	AH	41	775	750	BOS	EOS	119	30	30	12:34	12:39	RH	8/31/20
8/29/20	P-98/99	9:28	GC	57	775	700	BOS	EOS	104	30	30	12:38	12:43	RH	8/31/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
8/29/20	P-99/100	9:44	GC	57	775	700	BOS	EOS	90	30	30	12:41	12:46	RH	8/31/20
8/29/20	P-100/101	9:57	GC	57	775	700	BOS	EOS	75	30	30	12:46	12:51	RH	8/31/20
8/31/20	P-46/67	10:10	JS	X-34	550	400	BOS	EOS	12	EXTRUSION				RH	9/1/20
11/3/20	P-102/103	2:45	VML	M-73	860	750	BOS	202'>BOS	202	30	30	3:55	4:00	AG	11/3/20
11/3/20	P-102/103	3:06	VML	M-73	860	750	212'>BOS	EOS	140	30	30	5:09	5:14	AG	11/3/20
11/3/20	P-103/104	3:08	RV	M-68	860	700	BOS	EOS	384	30	30	4:00	4:05	AG	11/3/20
11/3/20	P-104/105	3:42	VML	M-73	860	750	BOS	BOS	415	30	30	5:15	5:20	AG	11/3/20
11/3/20	P-105/106	3:53	RV	M-68	860	700	BOS	EOS	449	30	30	5:18	5:23	AG	11/3/20
11/3/20	P-106/107	4:45	RV	M-68	860	700	BOS	196'>BOS	196	30	30	9:15	9:20	AG	11/4/20
11/3/20	P-106/107	5:04	RV	M-68	860	700	196'BOS	210'>BOS	14	30	30	9:30	9:35	AG	11/4/20
11/3/20	P-106/107	5:06	RV	M-68	860	700	219'>BOS	229'>BOS	10	30	30	9:38	9:43	AG	11/4/20
11/3/20	P-106/107	5:08	RV	M-68	860	700	229'>BOS	290'>BOS	61	30	30	9:40	9:45	AG	11/4/20
11/3/20	P-106/107	5:14	RV	M-68	860	700	290'>BOS	395'>BOS	105	30	30	9:44	9:49	AG	11/4/20
11/3/20	P-106/107	5:25	RV	M-68	860	700	395'>BOS	EOS	85	30	30	9:46	9:51	AG	11/4/20
11/3/20	P-67/105	5:08	VML	M-73	860	700	BOS	EOS	27	30	30	10:12	10:17	AG	11/4/20
11/3/20	P-67/104	5:11	VML	M-73	860	700	BOS	6'>BOS	6	30	30	10:52	10:57	AG	11/4/20
11/3/20	P-67/104	5:12	VML	M-73	860	700	6'>BOS	EOS	21	30	30	10:48	10:53	AG	11/4/20
11/3/20	P-67/103	5:14	VML	M-73	860	700	BOS	EOS	27	30	30	10:12	10:17	AG	11/4/20
11/3/20	P-67/102	5:18	VML	M-73	860	700	BOS	EOS	27	30	30	10:10	10:15	AG	11/4/20
11/3/20	P-67/106	4:55	VML	M-73	860	700	BOS	EOS	23	30	30	10:59	11:04	AG	11/4/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
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Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/3/20	P-67/107	5:00	VML	M-73	860	700	BOS	EOS	23	30	30	11:00	11:05	AG	11/4/20
11/4/20	P-107/108	9:51	RV	M-68	800	750	BOS	EOS	524	30	30	11:19	11:24	AG	11/4/20
11/4/20	P-108/109	8:22	RV	M-68	800	750	BOS	EOS	569	30	30	9:57	10:02	AG	11/4/20
11/4/20	P-109/110	8:40	VML	M-73	800	800	BOS	12'>BOS	12	30	30	11:25	11:30	AG	11/4/20
11/4/20	P-109/110	8:42	VML	M-73	800	800	14'>BOS	43'>BOS	29	30	30	11:31	11:36	AG	11/4/20
11/4/20	P-109/110	8:45	VML	M-73	800	800	45'>BOS	EOS	565	30	30	11:33	11:38	AG	11/4/20
11/4/20	P-110/111	11:05	VML	M-73	800	800	BOS	469'>BOS	469	30	29	12:55	1:00	AG	11/4/20
11/4/20	p-111/12	12:50	VML	M-73	800	800	469'>BOS	EOS	96	30	30	1:04	1:09	AG	11/4/20
11/4/20	P-111/112	11:10	RV	M-68	800	750	BOS	EOS	568	30	30	12:57	1:02	AG	11/4/20
11/4/20	P-67/108	10:18	VML	M-73	800	800	BOS	EOS	27	30	30	11:05	11:10	AG	11/4/20
11/4/20	P-67/109	10:22	VML	M-73	800	800	BOS	EOS	27	30	30	11:07	11:12	AG	11/4/20
11/4/20	P-67/110	10:25	VML	M-73	800	800	BOS	EOS	27	30	30	11:10	11:15	AG	11/4/20
11/4/20	P-67/111	1:10	VML	M-73	800	750	BOS	EOS	22	30	30	1:17	1:22	AG	11/4/20
11/4/20	P-46/102	1:39	SG	X-22	550	550	BOS	EOS	9	EXTRUSION				LZ	11/4/20
11/4/20	P-47/102	1:41	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-48/102	1:58	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-49/102	2:09	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-50/102	2:20	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-51/102	2:33	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-52/102	2:47	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/4/20	P-53/102	2:56	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-54/102	3:08	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-55/102	3:18	SG	X-22	550	550	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-56/102	2:59	GB	X-24	500	400	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-57/102	2:48	GB	X-24	500	400	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-58/102	2:37	GB	X-24	500	400	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-59/102	2:26	GB	X-24	500	400	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/4/20	P-60/102	2:15	GB	X-24	500	400	BOS	EOS	22.5	EXTRUSION				LZ	11/4/20
11/5/20	P-81/102	8:11	GB	X-24	500	400	BOS	EOS	23	EXTRUSION				LZ	11/5/20
11/5/20	P-82/102	8:32	GB	X-24	500	400	BOS	EOS	3	EXTRUSION				LZ	11/5/20
11/5/20	P-82/103	8:35	GB	X-24	500	400	BOS	EOS	19	EXTRUSION				LZ	11/5/20
11/5/20	P-83/103	8:43	GB	X-24	500	400	BOS	EOS	6	EXTRUSION				LZ	11/5/20
11/5/20	P-83/104	8:57	GB	X-24	500	400	BOS	EOS	16	EXTRUSION				LZ	11/5/20
11/5/20	P-84/103	9:01	GB	X-24	500	400	BOS	EOS	11	EXTRUSION				LZ	11/5/20
11/5/20	P-84/105	9:07	GB	X-24	500	400	BOS	EOS	11	EXTRUSION				LZ	11/5/20
11/5/20	P-85/105	9:15	GB	X-24	500	400	BOS	EOS	18	EXTRUSION				LZ	11/5/20
11/5/20	P-85/106	9:23	GB	X-24	500	400	BOS	EOS	5	EXTRUSION				LZ	11/5/20
11/5/20	P-86/106	9:27	GB	X-24	500	400	BOS	EOS	23	EXTRUSION				LZ	11/5/20
11/5/20	P-87/107	9:47	GB	X-24	500	400	BOS	EOS	23	EXTRUSION				LZ	11/5/20
11/5/20	P-88/107	9:58	GB	X-24	500	400	BOS	EOS	10	EXTRUSION				LZ	11/5/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/5/20	P-88/108	10:07	GB	X-24	500	400	BOS	EOS	12	EXTRUSION				LZ	11/5/20
11/5/20	P-89/108	9:11	GB	X-24	500	400	BOS	EOS	22	EXTRUSION				LZ	11/5/20
11/5/20	P-89/109	10:22	GB	X-24	500	400	BOS	EOS	2	EXTRUSION				LZ	11/5/20
11/5/20	P-90/109	10:24	GB	X-24	500	400	BOS	EOS	24	EXTRUSION				LZ	11/5/20
11/5/20	P-91/109	10:45	GB	X-24	500	400	BOS	EOS	7	EXTRUSION				LZ	11/5/20
11/5/20	P-91/110	10:50	GB	X-24	500	400	BOS	EOS	17	EXTRUSION				LZ	11/5/20
11/5/20	P-111/1	7:40	SG	X-22	550	550	BOS	EOS	5	EXTRUSION				LZ	11/5/20
11/5/20	P-112/1	7:45	SG	X-22	550	550	BOS	EOS	17	EXTRUSION				LZ	11/5/20
11/5/20	P-112/92	7:55	SG	X-22	550	550	BOS	EOS	15	EXTRUSION				LZ	11/5/20
11/6/20	P-92/113	2:43	VML	M-73	800	800	BOS	EOS	112	30	30	7:06	7:11	AG	11/7/20
11/6/20	P-113/114	1:32	VML	M-73	800	800	BOS	EOS	146	30	30	7:08	7:13	AG	11/7/20
11/6/20	P-114/115	1:55	VML	M-73	800	800	BOS	EOS	113	30	30	4:13	4:18	AG	11/6/20
11/6/20	P-115/116	2:14	VML	M-73	800	800	BOS	EOS	73	30	30	7:15	7:20	AG	11/7/20
11/6/20	P-116/117	2:25	VML	M-73	800	800	BOS	EOS	42	30	30	7:24	7:29	AG	11/7/20
11/6/20	P-113/118	4:15	RV	M-68	800	750	BOS	EOS	18	30	30	7:32	7:37	AG	11/7/20
11/6/20	P-114/118	4:17	RV	M-68	800	750	BOS	EOS	25	30	30	7:35	7:40	AG	11/7/20
11/6/20	P-115/118	4:20	RV	M-68	800	750	BOS	EOS	25	30	30	7:37	7:42	AG	11/7/20
11/6/20	P-116/118	4:22	RV	M-68	800	750	BOS	EOS	25	30	30	7:44	7:49	AG	11/7/20
11/6/20	P-117/118	4:24	RV	M-68	800	750	BOS	EOS	24	30	30	7:45	7:50	AG	11/7/20
11/6/20	P-118/119	2:00	RV	M-68	800	750	BOS	115'>BOS	115	30	30	7:49	7:54	SG	11/7/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/6/20	P-118/119	2:14	RV	M-68	800	750	117'>BOS	EOS	17	30	30	7:54	7:59	SG	11/7/20
11/6/20	P-119/120	2:23	RV	M-68	800	750	BOS	EOS	164	30	30	7:59	8:04	SG	11/7/20
11/6/20	P-120/121	2:49	RV	M-68	800	750	BOS	EOS	153	30	30	4:23	4:28	AG	11/6/20
11/6/20	P-121/123	3:55	RV	M-68	800	750	BOS	EOS	19	30	30	8:14	8:19	SG	11/7/20
11/6/20	P-121/124	3:58	RV	M-68	800	750	BOS	EOS	30	30	30	8:15	8:20	SG	11/7/20
11/6/20	P-121/125	4:00	RV	M-68	800	750	BOS	EOS	30	30	30	8:17	8:22	SG	11/7/20
11/6/20	P-121/126	4:04	RV	M-68	800	750	BOS	EOS	30	30	30	8:25	8:30	SG	11/7/20
11/6/20	P-121/127	4:08	RV	M-68	800	750	BOS	EOS	26	30	30	8:27	8:32	SG	11/7/20
11/6/20	P-127/126	3:05	RV	M-68	800	750	BOS	EOS	26	30	30	8:32	8:37	SG	11/7/20
11/6/20	P-126/125	3:13	RV	M-68	800	750	BOS	EOS	55	30	30	8:36	8:41	SG	11/7/20
11/6/20	P-125/124	3:29	RV	M-68	800	750	BOS	EOS	85	30	30	4:25	4:30	AG	11/6/20
11/6/20	P-124/123	2:58	VML	M-73	800	800	BOS	EOS	118	30	30	8:38	8:43	SG	11/7/20
11/6/20	P-123/122	3:18	VML	M-73	800	800	BOS	EOS	134	30	30	8:46	8:51	SG	11/7/20
11/6/20	P-122/128	3:34	VML	M-73	800	800	BOS	EOS	147	30	30	8:48	8:53	SG	11/7/20
11/6/20	P-128/129	3:58	VML	M-73	800	800	BOS	EOS	154	30	30	4:30	4:35	AG	11/6/20
11/6/20	P-129/130	4:19	VML	M-73	800	800	BOS	EOS	160	30	30	8:49	8:54	SG	11/7/20
11/6/20	P-130/131	4:33	RV	M-68	800	750	BOS	EOS	168	30	29	8:57	9:02	SG	11/7/20
11/7/20	P-118/110	9:46	RV	M-68	800	700	BOS	EOS	28	30	30	10:25	10:30	SG	11/7/20
11/7/20	P-119/110	9:51	RV	M-68	800	700	BOS	EOS	39	30	30	10:27	10:32	SG	11/7/20
11/7/20	P-120/110	9:54	RV	M-68	800	700	BOS	EOS	10	30	30	10:38	10:43	SG	11/7/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/7/20	P-120/111	10:09	VML	M-73	800	750	BOS	EOS	19	30	30	10:39	10:44	SG	11/7/20
11/7/20	P-121/112	10:12	VML	M-73	800	750	BOS	EOS	23	30	30	10:46	10:51	SG	11/7/20
11/7/20	P-123/112	10:04	RV	M-68	800	700	BOS	EOS	6	30	30	10:49	10:54	SG	11/7/20
11/7/00	P-122/112	10:04	RV	M-68	800	700	BOS	EOS	22	30	30	10:52	10:57	SG	11/7/20
11/7/20	P-128/112	10:07	RV	M-68	800	700	BOS	EOS	22	30	30	10:56	11:01	SG	11/7/20
11/7/20	P-129/112	10:09	RV	M-68	800	700	BOS	EOS	22	30	30	10:59	11:04	SG	11/7/20
11/7/20	P-130/112	10:11	RV	M-68	800	700	BOS	EOS	22	30	30	11:05	11:10	SG	11/7/20
11/7/20	P-131/112	10:13	RV	M-68	800	700	BOS	EOS	22	30	30	11:08	11:13	SG	11/7/20
11/7/20	P-131/132	9:34	VML	M-73	800	800	BOS	EOS	176	30	30	9:55	10:00	SG	11/7/20
11/7/20	P-132/134	7:58	VML	M-73	800	800	BOS	11'>BOS	11	30	30	9:15	9:20	SG	11/7/20
11/7/20	P-132/134	8:00	VML	M-73	800	800	BOS	EOS	26	30	30	9:16	9:21	SG	11/7/20
11/7/20	P-132/133	8:02	VML	M-73	800	800	BOS	EOS	156	30	30	9:06	9:11	SG	11/7/20
11/7/20	P-133/134	7:43	VML	M-73	800	750	BOS	EOS	22	30	30	9:36	9:41	SG	11/7/20
11/7/20	P-134/136	8:30	VML	M-73	800	800	BOS	EOS	28	30	30	9:37	9:42	SG	11/7/20
11/7/20	P-133/136	8:33	VML	M-73	800	800	BOS	EOS	8	30	30	9:38	9:43	SG	11/7/20
11/7/20	P-133/135	8:35	VML	M-73	800	800	BOS	EOS	151	30	30	9:20	9:25	SG	11/7/20
11/7/20	P-135/136	7:52	VML	M-73	800	750	BOS	EOS	22	30	30	9:44	9:49	SG	11/7/20
11/7/20	P-136/137	8:56	VML	M-73	800	800	BOS	EOS	38	30	29	9:46	9:51	SG	11/7/20
11/7/20	P-135/137	9:02	VML	M-73	800	800	BOS	EOS	157	30	30	9:51	9:56	SG	11/7/20
11/7/20	P-137/138	8:45	RV	M-68	800	750	BOS	EOS	199	30	30	9:23	9:28	SG	11/7/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/7/20	P-138/139	8:12	RV	M-68	800	750	BOS	EOS	205	30	29	10:02	10:07	SG	11/7/20
11/7/20	P-139/141	9:12	RV	M-68	800	750	BOS	EOS	17	30	30	10:12	10:17	SG	11/7/20
11/7/20	P-139/140	9:16	RV	M-68	800	750	BOS	EOS	193	30	30	10:05	10:10	SG	11/7/20
11/7/20	P-132/112	10:15	RV	M-68	800	700	BOS	EOS	22	30	30	11:13	11:18	SG	11/7/20
11/7/20	P-134/112	10:17	RV	M-68	800	700	BOS	EOS	22	30	30	11:17	11:22	SG	11/7/20
11/7/20	P-136/112	10:19	RV	M-68	800	700	BOS	EOS	22	30	30	11:21	11:26	SG	11/7/20
11/7/20	P-137/112	10:21	RV	M-68	800	700	BOS	EOS	22	30	29	11:25	11:30	SG	11/7/20
11/7/20	P-138/112	10:23	RV	M-68	800	700	BOS	EOS	22	30	30	11:28	11:33	SG	11/7/20
11/7/20	P-139/112	10:25	RV	M-68	800	700	BOS	EOS	22	30	30	11:32	11:37	SG	11/7/20
11/7/20	P-141/112	10:27	RV	M-68	800	700	BOS	EOS	22	30	30	11:36	11:41	SG	11/7/20
11/7/20	P-140/141	9:25	VML	M-73	800	750	BOS	EOS	22	30	30	9:31	9:36	SG	11/7/20
11/9/20	P-141/142	7:40	VML	M-73	800	800	BOS	EOS	18	30	30	9:00	9:05	TB	11/9/20
11/9/20	P-140/142	7:42	VML	M-73	800	800	BOS	19'>BOS	19	30	30	8:54	8:59	TB	11/9/20
11/9/20	P-140/142	7:45	VML	M-73	800	800	21'>BOS	EOS	173	30	30	11:00	11:05	SG	11/9/20
11/9/20	P-142/143	7:54	RV	M-68	800	750	BOS	EOS	218	30	30	11:06	11:11	SG	11/9/20
11/9/20	P-143/145	9:22	VML	M-73	800	800	BOS	EOS	14	30	30	11:11	11:16	SG	11/9/20
11/9/20	P-143/144	9:42	VML	M-73	800	800	BOS	EOS	207	30	30	11:15	11:20	SG	11/9/20
11/9/20	P-144/145	8:12	VML	M-73	800	750	BOS	EOS	22	30	30	11:22	11:27	SG	11/9/20
11/9/20	P-145/155	9:52	VML	M-73	800	800	BOS	EOS	15	30	30	11:24	11:29	SG	11/9/20
11/9/20	P-144/155	9:54	VML	M-73	800	800	BOS	EOS	207	30	30	11:31	11:36	SG	11/9/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/9/20	P-155/156	10:45	RV	M-68	800	750	BOS	EOS	228	30	30	11:43	11:48	SG	11/9/20
11/9/20	P-156/157	10:16	RV	M-68	800	750	BOS	EOS	229	30	30	11:45	11:50	SG	11/9/20
11/9/20	P-157/158	11:21	RV	M-68	800	700	BOS	EOS	52	30	30	12:38	12:43	SG	11/9/20
11/9/20	P-157/159	11:26	RV	M-68	800	700	BOS	EOS	73	30	30	3:19	3:24	LZ	11/9/20
11/9/20	P-159/158	10:38	VML	M-73	800	750	BOS	EOS	22	30	30	2:54	2:59	LZ	11/9/20
11/9/20	P-157/161	11:33	RV	M-68	800	750	BOS	EOS	100	30	30	3:20	3:25	LZ	11/9/20
11/9/20	P-161/159	11:49	VML	M-73	800	750	BOS	EOS	22	30	30	3:09	3:14	LZ	11/9/20
11/9/20	P-158/151	10:55	VML	M-73	800	800	BOS	14'>BOS	14	30	30	2:45	2:50	LZ	11/9/20
11/9/20	P-158/151	10:56	VML	M-73	800	800	14'>BOS	EOS	36	30	30	2:46	2:51	LZ	11/9/20
11/9/20	P-159/152	11:02	VML	M-73	800	800	BOS	EOS	16	30	30	2:50	2:55	LZ	11/9/20
11/9/20	P-152/151	8:35	VML	M-73	800	750	BOS	EOS	22	30	30	2:18	2:23	LZ	11/9/20
11/9/20	P-159/154	11:04	VML	M-73	800	800	BOS	EOS	57	30	30	3:02	3:07	LZ	11/9/20
11/9/20	P-154/152	9:00	VML	M-73	800	750	BOS	EOS	22	30	30	2:15	2:20	LZ	11/9/20
11/9/20	P-161/163	12:55	VML	M-73	800	800	BOS	EOS	42	30	30	3:05	3:10	LZ	11/9/20
11/9/20	P-163/154	12:48	VML	M-73	800	750	BOS	EOS	22	30	30	3:04	3:09	LZ	11/9/20
11/9/20	P-151/149	9:07	RV	M-68	800	750	BOS	EOS	50	30	30	2:23	2:28	LZ	11/9/20
11/9/20	P-152/149	9:11	RV	M-68	800	750	BOS	EOS	18	30	30	2:11	2:16	LZ	11/9/20
11/9/20	P-154/150	9:13	RV	M-68	800	750	BOS	EOS	66	30	30	2:03	2:08	LZ	11/9/20
11/9/20	P-150/149	8:48	VML	M-73	800	750	BOS	EOS	22	30	30	2:05	2:10	LZ	11/9/20
11/9/20	P-149/148	8:51	RV	M-68	800	750	BOS	EOS	68	30	30	1:33	1:38	LZ	11/9/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/9/20	P-150/153	8:59	RV	M-68	800	750	BOS	EOS	25	30	30	1:50	1:55	LZ	11/9/20
11/9/20	P-153/148	8:44	VML	M-73	800	750	BOS	EOS	15	30	30	1:52	1:57	LZ	11/9/20
11/9/20	P-148/147	8:43	RV	M-68	800	750	BOS	EOS	52	30	30	1:30	1:35	LZ	11/9/20
11/9/20	P-147/146	8:37	RV	M-68	800	750	BOS	EOS	26	30	30	1:25	1:30	LZ	11/9/20
11/9/20	P-161/160	11:32	VML	M-73	800	800	BOS	EOS	51	30	30	1:44	1:49	LZ	11/9/20
11/9/20	P-160/162	11:40	VML	M-73	800	800	BOS	EOS	32	30	30	3:45	3:50	LZ	11/9/20
11/9/20	P-142/112	12:50	RV	M-68	800	700	BOS	EOS	22	30	30	1:13	1:18	LZ	11/9/20
11/9/20	P-143/112	12:52	RV	M-68	800	700	BOS	EOS	22	30	30	3:34	3:39	LZ	11/9/20
11/9/20	P-145/112	12:54	RV	M-68	800	700	BOS	EOS	22	30	30	3:33	3:38	LZ	11/9/20
11/9/20	P-155/112	1:15	RV	M-68	800	700	BOS	EOS	22	30	30	3:28	3:33	LZ	11/9/20
11/9/20	P-156/112	1:17	RV	M-68	800	700	BOS	EOS	22	30	30	3:27	3:32	LZ	11/9/20
11/9/20	P-157/112	1:19	RV	M-68	800	700	BOS	EOS	22	30	30	3:25	3:30	LZ	11/9/20
11/9/20	P-158/112	1:31	RV	M-68	800	700	BOS	EOS	16	30	30	2:22	2:27	LZ	11/9/20
11/9/20	P-151/112	1:32	RV	M-68	800	700	BOS	EOS	22	30	30	2:24	2:29	LZ	11/9/20
11/9/20	P-149/112	1:34	RV	M-68	800	700	BOS	EOS	22	30	30	2:28	2:33	LZ	11/9/20
11/9/20	P-148/112	1:53	RV	M-68	800	700	BOS	EOS	22	30	30	2:35	2:40	LZ	11/9/20
11/9/20	P-147/112	1:56	RV	M-68	800	700	BOS	EOS	22	30	30	2:37	2:42	LZ	11/9/20
11/9/20	P-146/112	1:58	RV	M-68	800	700	BOS	EOS	22	30	30	2:39	2:44	LZ	11/9/20
11/9/20	P-146/92	1:44	SG	X-22	500	550	BOS	EOS	6	EXTRUSION				LZ	11/9/20
11/9/20	P-146/93	1:46	SG	X-22	500	550	BOS	EOS	22	EXTRUSION				LZ	11/9/20

HALLATON ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/9/20	P-146/94	2:06	SG	X-22	500	550	BOS	EOS	5	EXTRUSION				LZ	11/9/20
11/9/20	P-147/94	2:12	SG	X-22	500	550	BOS	EOS	17	EXTRUSION				LZ	11/9/20
11/9/20	P-147/95	2:19	SG	X-22	500	550	BOS	EOS	22	EXTRUSION				LZ	11/9/20
11/9/20	P-148/96	2:39	SG	X-22	500	550	BOS	EOS	15	EXTRUSION				LZ	11/9/20
11/9/20	P-153/97	2:45	SG	X-22	500	550	BOS	EOS	22	EXTRUSION				LZ	11/9/20
11/9/20	P-150/98	3:00	SG	X-22	500	550	BOS	EOS	22	EXTRUSION				LZ	11/9/20
11/9/20	P-150/99	3:15	SG	X-22	500	550	BOS	EOS	22	EXTRUSION				LZ	11/9/20
11/9/20	P-163/100	3:30	GB	X-24	500	400	BOS	EOS	23	EXTRUSION				LZ	11/9/20
11/9/20	P-163/101	3:41	GB	X-24	500	400	BOS	EOS	22	EXTRUSION				LZ	11/9/20
11/9/20	P-160/101	2:26	RV	M-68	800	700	BOS	EOS	28	30	30	3:44	3:49	LZ	11/9/20
11/9/20	P-162/101	2:29	RV	M-68	800	700	BOS	EOS	24	30	30	3:50	3:55	LZ	11/9/20
11/11/20	P-113/164	8:30	SG	X-22	550	500	BOS	EOS	55	EXTRUSION				RV	11/11/20
11/11/20	P-164/165	8:58	SG	X-22	550	500	BOS	EOS	40	EXTRUSION				RV	11/11/20
11/11/20	P-165/166	9:20	SG	X-22	550	500	BOS	EOS	27	EXTRUSION				RV	11/11/20
11/11/20	P-166/167	9:41	SG	X-22	550	500	BOS	EOS	19	EXTRUSION				RV	11/11/20
11/11/20	P-167/168	11:39	SG	X-22	550	500	BOS	EOS	10	EXTRUSION				RV	11/11/20
11/11/20	P-91/164	10:21	SG	X-22	550	500	BOS	EOS	26	EXTRUSION				RV	11/11/20
11/11/20	P-90/165	10:35	SG	X-22	550	500	BOS	EOS	26	EXTRUSION				RV	11/11/20
11/11/20	P-89/166	11:10	SG	X-22	550	500	BOS	EOS	23	EXTRUSION				RV	11/11/20
11/11/20	P-88/167	11:25	SG	X-22	550	500	BOS	EOS	23	EXTRUSION				RV	11/11/20

HALLATON
ENVIRONMENTAL LININGS

Seaming and Non Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness : 40 mil

WELD DATE	SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test or V-Box					
										PSI		Time		Tech	Date
										Start	Finish	Start	Finish		
11/11/20	P-87/168	12:43	SG	X-22	550	500	BOS	EOS	18	EXTRUSION				RV	11/11/20

Appendix I - Field LLDPE Seam Destructive Sample Log

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
1	P-3/4	8/26/20	41	AH	670/750		72	74	75	72	70	77	74	76	78	77	P	JP
							71	70	71	72	75							
2	P-5/6	8/26/20	57	GC	775/700		73	68	72	69	68	69	68	69	71	68	P	JP
							72	74	71	72	70							
3	P-8/9	8/26/20	41	AH	770/750		69	67	65	67	69	72	69	70	72	68	P	JP
							75	74	70	72	67							
4	P-16/17	8/26/20	57	GC	775/750		73	73	73	72	76	74	76	72	74	70	P	JP
							73	76	75	74	73							
5	P-12/13	8/26/20	41	AH	770/750		76	74	73	69	68	77	75	78	77	74	P	JP
							68	71	68	72	71							
5A	P-12/13	9/4/20	41	AH	770/750		71	72	70	73	72	75	73	76	75	73	P	JP
							74	73	73	70	72							
5B	P-12/13	9/4/20	41	AH	770/750		76	72	70	72	73	76	75	77	76	74	P	JP
							72	74	73	71	70							
6	P-20/21	8/29/20	41	AH	710/850		73	83	80	82	76	80	84	83	80	84	P	JP
							83	73	74	73	75							
7	P-21/23	8/29/20	57	GC	715/790		69	72	72	71	68	81	81	83	82	83	P	JP
							78	80	77	78	78							
8	P-8/25	8/29/20	41	AH	710/850		74	75	74	72	74	78	79	82	80	78	P	JP
							79	77	79	76	79							
9	P-26/27	8/29/20	57	GC	715/790		72	71	69	72	74	80	79	78	79	78	P	JP
							79	79	73	70	77							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	50	Peel:	44
Shear:	60	Shear:	60
Tensiometer #:	13		

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
							Peel (ppi) IN/OUT					Shear (ppi)						
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	1	2	3	4	5	1	2	3	4	5		
10	P-28/29	8/29/20	41	AH	710/850		73	68	73	71	76	77	78	80	79	77	P	JP
							78	76	77	76	79							
11	P-31/32	8/29/20	41	AH	710/850		71	76	70	72	70	77	76	79	78	78	P	JP
							72	70	75	73	70							
12	P-34/36	8/29/20	41	AH	770/750		70	66	71	68	69	76	77	76	76	78	P	JP
							74	74	72	70	73							
13	P-39/40	8/29/20	57	GC	775/700		73	73	71	72	70	77	73	74	78	76	P	JP
							72	61	69	72	65							
14	P-41/42	8/29/20	40	SS	775/700		70	69	65	78	72	79	80	75	77	76	P	JP
							73	78	72	64	69							
15	P-43/44	8/31/20	40	SS	775/700		77	82	83	78	75	85	92	86	90	85	P	JP
							84	86	84	85	82							
16	P-46/47	8/31/20	41	AH	770/750		78	80	74	80	76	84	82	86	83	86	P	JP
							83	81	87	73	82							
17	P-48/49	8/31/20	40	SS	775/700		73	77	76	75	73	89	88	84	87	85	P	JP
							82	83	75	85	82							
18	P-50/51	8/31/20	41	AH	770/750		74	74	75	79	77	78	79	78	77	79	P	JP
							80	82	73	77	78							
19	P-52/53	8/31/20	57	GC	750/700		79	74	79	77	75	84	83	84	84	82	P	JP
							82	75	74	72	78							
20	P-54/55	8/31/20	40	SS	750/700		73	76	75	76	74	80	83	82	81	80	P	JP
							76	79	71	74	72							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
21	P-56/57	8/31/20	41	AH	750/750		65	78	76	76	74	83	82	83	84	80	P	JP
							80	76	81	82	78							
22	P-59/60	8/31/20	40	SS	750/700		69	67	69	62	66	83	85	84	83	83	P	JP
							73	77	72	70	72							
23	P-68/69	8/31/20	57	GC	775/700		74	72	77	72	75	84	83	82	83	84	P	JP
							73	71	72	74	73							
24	P-71/72	8/31/20	41	AH	760/780		72	73	69	73	68	75	77	76	77	73	P	JP
							72	72	75	74	76							
25	P-74/78	8/31/20	57	GC	750/750		77	72	75	75	70	81	79	80	82	78	P	JP
							76	71	76	74	76							
26	P-79/80	8/31/20	41	AH	750/780		68	72	70	71	75	75	78	76	80	77	P	JP
							70	69	71	72	70							
27	P-82/83	8/31/20	57	GC	750/750		74	76	79	73	79	84	80	83	82	81	P	JP
							79	80	73	77	74							
28	P-84/85	8/31/20	41	AH	760/780		71	68	70	71	70	69	69	70	71	68	P	JP
							69	71	67	69	68							
29	P-86/87	8/31/20	57	GC	750/750		65	70	63	74	68	77	78	76	78	79	P	JP
							68	63	72	64	66							
30	P-88/89	8/31/20	57	GC	750/750		67	69	68	65	69	75	73	73	77	75	P	JP
							71	64	68	67	72							
31	P-90/91	8/31/20	41	AH	775/750		71	63	68	70	72	72	74	73	73	72	P	JP
							66	65	71	72	68							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:	Extrusion:
Peel:	50	44
Shear:	60	60
Tensiometer #:	13	

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
32	P-93/94	9/1/20	41	AH	775/750		71	72	64	67	75	71	70	72	70	73	P	JP
							67	66	68	68	72							
33	P-96/97	9/1/20	41	AH	775/750		66	67	69	69	67	72	70	76	73	72	P	JP
							72	73	64	66	64							
34	P-64/66	8/29/20	57	GC	775/700		71	70	70	72	69	78	80	79	77	78	P	JP
							73	72	72	74	73							
35	P-62/63	8/29/20	41	AH	770/750		72	74	70	72	76	79	77	75	77	77	P	JP
							69	73	72	69	70							
36	P-61/23	8/31/20	40	SS	775/600		68	68	70	67	69	69	74	68	79	72	P	JP
							69	73	67	69	69							
37	P-100/101	9/1/20	57	GC	775/700		71	70	70	71	74	72	71	70	75	73	P	JP
							66	68	71	68	72							
38	P-102/103	11/3/20	73	VML	860/750		86	74	80	82	74	98	101	97	97	100	P	AG
							89	80	74	85	84							
39	P-103/104	11/3/20	68	RV	860/700		88	77	84	90	87	99	98	98	100	99	P	AG
							83	88	81	87	80							
40	P-104/105	11/3/20	73	VML	860/750		90	91	76	77	85	99	100	105	104	103	P	AG
							69	69	84	88	86							
41	P-105/106	11/3/20	68	RV	860/700		81	91	69	75	77	98	98	99	99	99	P	AG
							80	78	88	85	84							
42	P-106/107	11/3/20	68	RV	860/700		79	82	80	80	81	96	98	98	100	99	P	AG
							77	88	68	88	72							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	50	Peel:	44
Shear:	60	Shear:	60
Tensiometer #:	13		

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
43	P-107/108	11/4/20	68	RV	800/750		82	88	80	84	84	98	99	100	99	100	P	AG
							84	89	94	86	84							
44	P-57/102	11/4/20	X-24	GB		500/400	68	73	75	70	74	78	79	80	78	81	P	AG
45	P-108/109	11/4/20	68	RV	800/750		82	68	70	89	86	97	97	95	96	99	P	AG
							82	81	81	76	69							
46	P-109/110	11/4/20	73	VML	800/800		95	89	90	85	94	102	99	100	102	98	P	AG
							75	95	74	92	85							
47	P-110/111	11/4/02	73	VML	800/800		82	78	89	86	87	103	103	103	102	101	P	AG
							90	85	81	88	89							
48	P-111/112	11/4/20	68	RV	800/750		85	84	71	64	78	106	106	107	107	103	P	AG
							73	73	87	77	84							
49	P-111/112	11/4/20	68	RV	800/750		75	90	78	88	87	102	101	102	103	104	P	AG
							83	79	74	82	78							
38B	P-102/103	11/3/20	73	VML	860/750		80	72	72	80	78	96	97	99	99	100	P	AG
							86	88	90	88	87							
38A	P-102/103	11/3/20	73	VML	860/750		93	93	90	86	94	101	99	100	102	100	P	AG
							81	80	76	77	76							
50	P-114/115	11/6/20	73	VML	800/800		97	88	83	88	101	113	117	117	119	116	P	AG
							78	90	95	83	86							
51	P-121/120	11/6/20	68	RV	800/750		85	85	83	79	77	114	113	115	117	113	P	AG
							87	80	77	88	98							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	50	Peel:	44
Shear:	60	Shear:	60
Tensiometer #:	13		

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
52	P-124/125	11/6/20	68	RV	800/750		87	91	83	83	96	114	115	114	117	117	P	AG
							97	94	84	89	91							
53	P-129/128	11/6/20	73	VML	800/800		95	92	93	75	89	118	120	122	121	120	P	AG
							90	92	102	98	98							
54	P-132/131	11/7/20	73	VML	800/800		80	79	83	85	82	97	96	97	88	94	P	AG
							96	94	95	96	91							
55	P-135/133	11/7/20	73	VML	800/800		81	85	91	82	87	108	111	111	113	113	P	AG
							100	102	93	87	93							
56	P-138/137	11/7/20	68	RV	800/750		81	96	84	95	83	115	115	115	117	117	P	AG
							76	93	86	91	83							
57	P-141/140	11/7/20	73	VML	800/750		84	85	85	88	102	101	100	88	101	98	P	AG
							84	91	94	91	98							
58	P-143/142	11/9/20	68	RV	800/750		80	82	81	89	86	97	100	97	98	94	P	ML
							74	81	76	82	78							
59	P-155/144	11/9/20	73	VML	800/800		78	67	77	80	92	94	99	98	98	96	P	ML
							80	77	90	85	81							
60	P-157/156	11/9/20	68	RV	800/750		89	78	85	77	87	94	95	98	89	95	P	ML
							79	88	70	81	80							
61	P-149/150	11/9/20	73	VML	800/750		85	97	72	98	98	99	93	91	88	91	P	ML
							98	91	73	90	92							
62	P-146/147	11/9/20	68	RV	800/750		90	71	76	74	87	99	97	99	101	103	P	ML
							74	83	84	80	76							

HALLATON ENVIRONMENTAL LININGS

Geomembrane Seam Destructive Test Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Start Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T

40 Mil Thickness

Project Seam Requirements

Fusion:		Extrusion:	
Peel:	50	Peel:	44
Shear:	60	Shear:	60
Tensiometer #:	13		

DS#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID
			Machine	Operator	Temp/ Speed ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)						
							1	2	3	4	5	1	2	3	4	5		
63	P-160/161	11/9/20	73	VML	800/800		77	83	86	87	77	98	99	97	102	97	P	ML
							88	87	90	91	83							
64	P-112/158	11/9/20	68	RV	800/700		74	75	74	74	71	79	71	73	80	77	P	ML
							78	73	75	74	70							
65																		
66																		
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69																		
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73																		

Appendix J - LLDPE Destructive Testing Results

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-1

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	92.9	SE1	<10
2	106.0	SE1	<10
3	101.6	SE1	<10
4	88.2	SE1	<10
5	105.4	SE1	<10
AVERAGE	**98.8**		
STD. DEV.	7.08		
INSIDE TRACK (WELD "B")			
1	81.8	SE1	<10
2	83.1	SE1	<10
3	74.2	SE1	<10
4	85.5	SE1	<10
5	87.6	SE1	<10
AVERAGE	**82.4**		
STD. DEV.	4.58		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.6	SE1
2	113.2	SE1
3	111.4	SE1
4	93.9	SE1
5	109.9	SE1
AVERAGE	**106.4**	
STD. DEV.	7.04	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-2

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	77.5	SE1	<10
2	82.3	SE1	<10
3	86.5	SE1	<10
4	94.9	SE1	<10
5	85.2	SE1	<10
AVERAGE	**85.3**		
STD. DEV.	5.72		
INSIDE TRACK (WELD "B")			
1	78.4	SE1	<10
2	76.4	SE1	<10
3	67.1	SE1	<10
4	94.0	SE1	1<10
5	94.4	SE1	<10
AVERAGE	**82.1**		
STD. DEV.	10.62		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	120.7	SE1
2	117.9	SE1
3	122.8	SE1
4	123.5	SE1
5	120.4	SE1
AVERAGE	**121.1**	
STD. DEV.	1.98	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-003
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-3

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.6	SE1	<10
2	105.4	SE1	<10
3	93.9	SE1	<10
4	91.3	SE1	<10
5	89.6	SE1	<10
AVERAGE	**94.0**		
STD. DEV.	5.93		
INSIDE TRACK (WELD "B")			
1	85.3	SE1	<10
2	79.6	SE1	<10
3	85.5	SE1	<10
4	77.9	SE1	<10
5	77.6	SE1	<10
AVERAGE	**81.2**		
STD. DEV.	3.51		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	100.6	SE1
2	107.1	SE1
3	99.1	SE1
4	96.9	SE1
5	99.1	SE1
AVERAGE	**100.6**	
STD. DEV.	3.48	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-004
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-4

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.4	SE1	<10
2	82.5	SE1	<10
3	92.2	SE1	<10
4	85.2	SE1	<10
5	88.1	SE1	<10
AVERAGE	**88.7**		
STD. DEV.	4.65		
INSIDE TRACK (WELD "B")			
1	94.7	SE1	<10
2	99.9	SE1	<10
3	95.3	SE1	<10
4	98.5	SE1	<10
5	86.0	SE1	<10
AVERAGE	**94.9**		
STD. DEV.	4.84		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	119.6	SE1
2	118.4	SE1
3	115.4	SE1
4	118.4	SE1
5	115.2	SE1
AVERAGE	**117.4**	
STD. DEV.	1.77	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-005
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-5

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	91.6	SE1	<10
2	101.8	SE1	<10
3	103.4	SE1	<10
4	35.3	SE1	<10
5	97.6	SE1	<10
AVERAGE	**85.9**		
STD. DEV.	25.65		
INSIDE TRACK (WELD "B")			
1	80.0	SE1	<10
2	74.5	SE1	<10
3	81.2	SE1	<10
4	75.9	SE1	<10
5	75.9	SE1	<10
AVERAGE	**77.5**		
STD. DEV.	2.61		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	102.4	SE1
2	102.4	SE1
3	104.1	SE1
4	104.4	SE1
5	106.9	SE1
AVERAGE	**104.0**	
STD. DEV.	1.65	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-006
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-6

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	106.1	SE1	<10
2	105.6	SE1	<10
3	102.9	SE1	<10
4	106.2	SE1	<10
5	109.4	SE1	<10
AVERAGE	**106.0**		
STD. DEV.	2.07		
INSIDE TRACK (WELD "B")			
1	95.1	SE1	<10
2	89.7	SE1	<10
3	83.8	SE1	<10
4	92.4	SE1	<10
5	92.7	SE1	<10
AVERAGE	**90.7**		
STD. DEV.	3.87		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	116.9	SE1
2	108.3	SE1
3	113.5	SE1
4	112.5	SE1
5	119.2	SE1
AVERAGE	**114.1**	
STD. DEV.	3.75	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-007
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-7

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	90.1	SE1	<10
2	92.9	SE1	<10
3	87.0	SE1	<10
4	92.1	SE1	<10
5	99.5	SE1	<10
AVERAGE	**92.3**		
STD. DEV.	4.13		
INSIDE TRACK (WELD "B")			
1	75.6	SE1	<10
2	79.7	SE1	<10
3	89.9	SE1	<10
4	76.4	SE1	<10
5	98.7	SE1	<10
AVERAGE	**84.1**		
STD. DEV.	8.92		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	111.6	SE1
2	106.2	SE1
3	106.9	SE1
4	101.1	SE1
5	109.0	SE1
AVERAGE	**107.0**	
STD. DEV.	3.48	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-008
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-8

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	101.5	SE1	<10
2	102.6	SE1	<10
3	103.3	SE1	<10
4	100.6	SE1	<10
5	102.5	SE1	<10
AVERAGE	**102.1**		
STD. DEV.	0.94		
INSIDE TRACK (WELD "B")			
1	89.9	SE1	<10
2	87.7	SE1	<10
3	89.6	SE1	<10
4	80.9	SE1	<10
5	82.1	SE1	<10
AVERAGE	**86.0**		
STD. DEV.	3.80		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	109.6	SE1
2	107.9	SE1
3	106.9	SE1
4	101.9	SE1
5	108.7	SE1
AVERAGE	**107.0**	
STD. DEV.	2.70	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-009
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-9

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	83.9	SE1	<10
2	94.9	SE1	<10
3	86.0	SE1	<10
4	83.8	SE1	<10
5	99.3	SE1	<10
AVERAGE	**89.6**		
STD. DEV.	6.34		
INSIDE TRACK (WELD "B")			
1	88.6	SE1	<10
2	86.5	SE1	<10
3	89.3	SE1	<10
4	87.3	SE1	<10
5	83.6	SE1	<10
AVERAGE	**87.1**		
STD. DEV.	1.99		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	120.6	SE1
2	121.4	SE1
3	117.8	SE1
4	120.1	SE1
5	124.0	SE1
AVERAGE	**120.8**	
STD. DEV.	2.01	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-010
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-10

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	92.4	SE1	<10
2	97.5	SE1	<10
3	99.1	SE1	<10
4	100.3	SE1	<10
5	100.0	SE1	<10
AVERAGE	**97.9**		
STD. DEV.	2.90		
INSIDE TRACK (WELD "B")			
1	85.6	SE1	<10
2	95.1	SE1	<10
3	96.4	SE1	<10
4	91.9	SE1	<10
5	89.6	SE1	<10
AVERAGE	**91.7**		
STD. DEV.	3.88		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	106.0	SE1
2	107.6	SE1
3	106.0	SE1
4	100.7	SE1
5	105.2	SE1
AVERAGE	**105.1**	
STD. DEV.	2.33	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-011
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-11

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	99.0	SE1	<10
2	97.8	SE1	<10
3	95.6	SE1	<10
4	99.4	SE1	<10
5	98.5	SE1	<10
AVERAGE	**98.1**		
STD. DEV.	1.34		
INSIDE TRACK (WELD "B")			
1	86.6	SE1	<10
2	79.6	SE1	<10
3	80.9	SE1	<10
4	80.3	SE1	<10
5	85.2	SE1	<10
AVERAGE	**82.5**		
STD. DEV.	2.83		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	113.9	SE1
2	109.8	SE1
3	110.6	SE1
4	113.9	SE1
5	116.4	SE1
AVERAGE	**112.9**	
STD. DEV.	2.41	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-012
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-12

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	100.9	SE1	<10
2	98.6	SE1	<10
3	97.7	SE1	<10
4	91.1	SE1	<10
5	98.9	SE1	<10
AVERAGE	**97.4**		
STD. DEV.	3.34		
INSIDE TRACK (WELD "B")			
1	84.6	SE1	<10
2	88.5	SE1	<10
3	81.6	SE1	<10
4	85.9	SE1	<10
5	79.6	SE1	<10
AVERAGE	**84.0**		
STD. DEV.	3.14		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.8	SE1
2	105.5	SE1
3	104.2	SE1
4	108.1	SE1
5	104.5	SE1
AVERAGE	**105.2**	
STD. DEV.	1.55	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-013
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-13

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	92.9	SE1	<10
2	87.0	SE1	<10
3	88.7	SE1	<10
4	89.5	SE1	<10
5	83.2	SE1	<10
AVERAGE	**88.3**		
STD. DEV.	3.18		
INSIDE TRACK (WELD "B")			
1	89.0	SE1	<10
2	88.9	SE1	<10
3	75.9	SE1	<10
4	86.6	SE1	<10
5	86.4	SE1	<10
AVERAGE	**85.4**		
STD. DEV.	4.86		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	120.1	SE1
2	114.4	SE1
3	114.1	SE1
4	112.5	SE1
5	112.1	SE1
AVERAGE	**114.6**	
STD. DEV.	2.87	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-014
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-14

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.9	SE1	<10
2	78.9	SE1	<10
3	86.6	SE1	<10
4	79.9	SE1	<10
5	82.4	SE1	<10
AVERAGE	**82.7**		
STD. DEV.	3.09		
INSIDE TRACK (WELD "B")			
1	83.9	SE1	<10
2	85.9	SE1	<10
3	84.3	SE1	<10
4	83.7	SE1	<10
5	86.4	SE1	<10
AVERAGE	**84.8**		
STD. DEV.	1.10		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	111.7	SE1
2	110.4	SE1
3	108.9	SE1
4	107.3	SE1
5	109.4	SE1
AVERAGE	**109.5**	
STD. DEV.	1.47	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-015
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-15

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.5	SE1	<10
2	104.8	SE1	<10
3	91.7	SE1	<10
4	102.0	SE1	<10
5	101.2	SE1	<10
AVERAGE	**97.8**		
STD. DEV.	6.07		
INSIDE TRACK (WELD "B")			
1	92.7	SE1	<10
2	89.8	SE1	<10
3	88.6	SE1	<10
4	90.7	SE1	<10
5	93.4	SE1	<10
AVERAGE	**91.0**		
STD. DEV.	1.79		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	123.1	SE1
2	116.4	SE1
3	113.5	SE1
4	116.4	SE1
5	117.3	SE1
AVERAGE	**117.3**	
STD. DEV.	3.15	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-016
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-16

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	87.9	SE1	<10
2	89.4	SE1	<10
3	86.0	SE1	<10
4	87.5	SE1	<10
5	86.6	SE1	<10
AVERAGE	**87.5**		
STD. DEV.	1.17		
INSIDE TRACK (WELD "B")			
1	98.1	SE1	<10
2	83.3	SE1	<10
3	98.7	SE1	<10
4	92.9	SE1	<10
5	96.7	SE1	<10
AVERAGE	**93.9**		
STD. DEV.	5.69		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.0	SE1
2	106.6	SE1
3	105.5	SE1
4	102.2	SE1
5	109.5	SE1
AVERAGE	**106.2**	
STD. DEV.	2.37	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-017
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-17

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	96.0	SE1	<10
2	85.1	SE1	<10
3	90.4	SE1	<10
4	89.7	SE1	<10
5	93.2	SE1	<10
AVERAGE	**90.9**		
STD. DEV.	3.65		
INSIDE TRACK (WELD "B")			
1	90.9	SE1	<10
2	84.4	SE1	<10
3	90.7	SE1	<10
4	86.6	SE1	<10
5	88.4	SE1	<10
AVERAGE	**88.2**		
STD. DEV.	2.47		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	109.6	SE1
2	107.9	SE1
3	108.7	SE1
4	104.9	SE1
5	107.2	SE1
AVERAGE	**107.7**	
STD. DEV.	1.60	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-018
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-18

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	102.4	SE1	<10
2	100.2	SE1	<10
3	96.0	SE1	<10
4	98.8	SE1	<10
5	100.3	SE1	<10
AVERAGE	**99.5**		
STD. DEV.	2.11		
INSIDE TRACK (WELD "B")			
1	86.1	SE1	<10
2	75.2	SE1	<10
3	79.3	SE1	<10
4	78.9	SE1	<10
5	82.4	SE1	<10
AVERAGE	**80.4**		
STD. DEV.	3.66		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	109.7	SE1
2	108.9	SE1
3	109.9	SE1
4	109.1	SE1
5	106.9	SE1
AVERAGE	**108.9**	
STD. DEV.	1.07	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-019
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-19

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	93.6	SE1	<10
2	92.1	SE1	<10
3	92.2	SE1	<10
4	88.5	SE1	<10
5	92.6	SE1	<10
AVERAGE	**91.8**		
STD. DEV.	1.73		
INSIDE TRACK (WELD "B")			
1	85.6	SE1	<10
2	87.1	SE1	<10
3	98.9	SE1	<10
4	90.9	SE1	<10
5	96.3	SE1	<10
AVERAGE	**91.8**		
STD. DEV.	5.14		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	109.4	SE1
2	106.6	SE1
3	107.3	SE1
4	105.7	SE1
5	106.6	SE1
AVERAGE	**107.1**	
STD. DEV.	1.25	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-020
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-20

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	100.4	SE1	<10
2	95.9	SE1	<10
3	99.1	SE1	<10
4	86.0	SE1	<10
5	90.1	SE1	<10
AVERAGE	**94.3**		
STD. DEV.	5.47		
INSIDE TRACK (WELD "B")			
1	83.6	SE1	<10
2	95.2	SE1	<10
3	96.4	SE1	<10
4	92.6	SE1	<10
5	79.9	SE1	<10
AVERAGE	**89.5**		
STD. DEV.	6.58		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	106.5	SE1
2	104.6	SE1
3	104.3	SE1
4	106.3	SE1
5	110.1	SE1
AVERAGE	**106.4**	
STD. DEV.	2.07	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-021
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-21

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	92.2	SE1	<10
2	96.9	SE1	<10
3	84.6	SE1	<10
4	92.4	SE1	<10
5	95.5	SE1	<10
AVERAGE	**92.3**		
STD. DEV.	4.26		
INSIDE TRACK (WELD "B")			
1	98.7	SE1	<10
2	91.3	SE1	<10
3	90.9	SE1	<10
4	87.9	SE1	<10
5	93.2	SE1	<10
AVERAGE	**92.4**		
STD. DEV.	3.58		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	105.9	SE1
2	108.2	SE1
3	105.7	SE1
4	102.3	SE1
5	105.5	SE1
AVERAGE	**105.5**	
STD. DEV.	1.88	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-022
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-22

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	93.4	SE1	<10
2	90.7	SE1	<10
3	89.6	SE1	<10
4	82.2	SE1	<10
5	74.3	SE1	<10
AVERAGE	**86.0**		
STD. DEV.	6.94		
INSIDE TRACK (WELD "B")			
1	72.9	SE1	<10
2	76.4	SE1	<10
3	73.9	SE1	<10
4	74.8	SE1	<10
5	73.7	SE1	<10
AVERAGE	**74.3**		
STD. DEV.	1.19		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	112.2	SE1
2	113.3	SE1
3	109.3	SE1
4	109.9	SE1
5	110.6	SE1
AVERAGE	**111.1**	
STD. DEV.	1.48	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-023
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-23

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	78.9	SE1	<10
2	81.6	SE1	<10
3	82.6	SE1	<10
4	80.4	SE1	<10
5	75.9	SE1	<10
AVERAGE	**79.9**		
STD. DEV.	2.34		
INSIDE TRACK (WELD "B")			
1	89.4	SE1	<10
2	75.4	SE1	<10
3	73.1	SE1	<10
4	83.6	SE1	<10
5	79.6	SE1	<10
AVERAGE	**80.2**		
STD. DEV.	5.83		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	105.9	SE1
2	105.9	SE1
3	106.1	SE1
4	109.6	SE1
5	103.1	SE1
AVERAGE	**106.1**	
STD. DEV.	2.07	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-024
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-24

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	104.3	SE1	<10
2	95.8	SE1	<10
3	98.0	SE1	<10
4	95.0	SE1	<10
5	84.7	SE1	<10
AVERAGE	**95.6**		
STD. DEV.	6.33		
INSIDE TRACK (WELD "B")			
1	90.1	SE1	<10
2	88.8	SE1	<10
3	89.7	SE1	<10
4	81.0	SE1	<10
5	83.5	SE1	<10
AVERAGE	**86.6**		
STD. DEV.	3.68		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	119.6	SE1
2	125.8	SE1
3	124.2	SE1
4	120.6	SE1
5	119.1	SE1
AVERAGE	**121.9**	
STD. DEV.	2.66	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-025
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-25

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	88.8	SE1	<10
2	85.4	SE1	<10
3	82.7	SE1	<10
4	93.0	SE1	<10
5	87.5	SE1	<10
AVERAGE	**87.5**		
STD. DEV.	3.45		
INSIDE TRACK (WELD "B")			
1	89.3	SE1	<10
2	85.9	SE1	<10
3	83.3	SE1	<10
4	91.6	SE1	<10
5	87.5	SE1	<10
AVERAGE	**87.5**		
STD. DEV.	2.84		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	114.8	SE1
2	110.5	SE1
3	112.3	SE1
4	111.7	SE1
5	116.6	SE1
AVERAGE	**113.2**	
STD. DEV.	2.21	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-026
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-26

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.6	SE1	<10
2	90.6	SE1	<10
3	99.4	SE1	<10
4	108.1	SE1	<10
5	110.3	SE1	<10
AVERAGE	**100.8**		
STD. DEV.	7.44		
INSIDE TRACK (WELD "B")			
1	86.9	SE1	<10
2	83.4	SE1	<10
3	86.4	SE1	<10
4	81.3	SE1	<10
5	92.0	SE1	<10
AVERAGE	**86.0**		
STD. DEV.	3.63		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	109.9	SE1
2	110.8	SE1
3	111.9	SE1
4	98.9	SE1
5	115.5	SE1
AVERAGE	**109.4**	
STD. DEV.	5.58	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-027
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-27

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	83.6	SE1	<10
2	81.7	SE1	<10
3	85.5	SE1	<10
4	84.9	SE1	<10
5	85.1	SE1	<10
AVERAGE	**84.2**		
STD. DEV.	1.39		
INSIDE TRACK (WELD "B")			
1	78.9	SE1	<10
2	79.1	SE1	<10
3	86.4	SE1	<10
4	82.1	SE1	<10
5	82.5	SE1	<10
AVERAGE	**81.8**		
STD. DEV.	2.74		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	102.9	SE1
2	106.9	SE1
3	105.1	SE1
4	103.3	SE1
5	102.5	SE1
AVERAGE	**104.1**	
STD. DEV.	1.64	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-028
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-28

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	97.6	SE1	<10
2	98.4	SE1	<10
3	102.3	SE1	<10
4	102.1	SE1	<10
5	102.4	SE1	<10
AVERAGE	**100.6**		
STD. DEV.	2.11		
INSIDE TRACK (WELD "B")			
1	85.9	SE1	<10
2	86.1	SE1	<10
3	81.0	SE1	<10
4	86.7	SE1	<10
5	92.7	SE1	<10
AVERAGE	**86.5**		
STD. DEV.	3.72		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.9	SE1
2	108.9	SE1
3	109.4	SE1
4	103.4	SE1
5	105.9	SE1
AVERAGE	**107.1**	
STD. DEV.	2.20	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-029
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-29

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.1	SE1	<10
2	86.0	SE1	<10
3	82.1	SE1	<10
4	81.8	SE1	<10
5	88.4	SE1	<10
AVERAGE	**84.7**		
STD. DEV.	2.48		
INSIDE TRACK (WELD "B")			
1	94.2	SE1	<10
2	90.0	SE1	<10
3	87.1	SE1	<10
4	86.1	SE1	<10
5	84.0	SE1	<10
AVERAGE	**88.3**		
STD. DEV.	3.53		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	110.6	SE1
2	108.2	SE1
3	109.2	SE1
4	107.3	SE1
5	109.1	SE1
AVERAGE	**108.9**	
STD. DEV.	1.10	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-030
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-30

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.1	SE1	<10
2	84.0	SE1	<10
3	83.8	SE1	<10
4	86.7	SE1	<10
5	88.8	SE1	<10
AVERAGE	**86.5**		
STD. DEV.	2.26		
INSIDE TRACK (WELD "B")			
1	84.4	SE1	<10
2	81.9	SE1	<10
3	78.1	SE1	<10
4	81.2	SE1	<10
5	84.1	SE1	<10
AVERAGE	**81.9**		
STD. DEV.	2.28		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.9	SE1
2	102.3	SE1
3	106.1	SE1
4	104.0	SE1
5	101.4	SE1
AVERAGE	**103.5**	
STD. DEV.	1.61	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-031
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-31

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	93.6	SE1	<10
2	102.9	SE1	<10
3	96.0	SE1	<10
4	98.2	SE1	<10
5	102.0	SE1	<10
AVERAGE	**98.5**		
STD. DEV.	3.52		
INSIDE TRACK (WELD "B")			
1	84.9	SE1	<10
2	85.5	SE1	<10
3	84.7	SE1	<10
4	84.8	SE1	<10
5	80.7	SE1	<10
AVERAGE	**84.1**		
STD. DEV.	1.73		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.5	SE1
2	109.1	SE1
3	106.2	SE1
4	104.6	SE1
5	107.2	SE1
AVERAGE	**106.1**	
STD. DEV.	1.96	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-032
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-32

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	98.9	SE1	<10
2	104.1	SE1	<10
3	98.6	SE1	<10
4	104.4	SE1	<10
5	102.5	SE1	<10
AVERAGE	**101.7**		
STD. DEV.	2.50		
INSIDE TRACK (WELD "B")			
1	82.0	SE1	<10
2	86.0	SE1	<10
3	87.5	SE1	<10
4	75.9	SE1	<10
5	84.2	SE1	<10
AVERAGE	**83.1**		
STD. DEV.	4.05		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.9	SE1
2	108.1	SE1
3	104.2	SE1
4	109.2	SE1
5	108.0	SE1
AVERAGE	**107.5**	
STD. DEV.	1.71	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-033
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-33

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	104.8	SE1	<10
2	100.4	SE1	<10
3	102.5	SE1	<10
4	89.9	SE1	<10
5	98.0	SE1	<10
AVERAGE	**99.1**		
STD. DEV.	5.13		
INSIDE TRACK (WELD "B")			
1	86.4	SE1	<10
2	93.5	SE1	<10
3	88.9	SE1	<10
4	79.1	SE1	<10
5	81.0	SE1	<10
AVERAGE	**85.8**		
STD. DEV.	5.24		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	108.2	SE1
2	109.2	SE1
3	108.4	SE1
4	107.0	SE1
5	106.6	SE1
AVERAGE	**107.9**	
STD. DEV.	0.95	

CHECKED BY: BRB DATE: 9/4/2020

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-034
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-34

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	80.8	SE1	<10
2	92.7	SE1	<10
3	87.2	SE1	<10
4	87.3	SE1	<10
5	91.6	SE1	<10
AVERAGE	**87.9**		
STD. DEV.	4.19		
INSIDE TRACK (WELD "B")			
1	85.5	SE1	<10
2	91.8	SE1	<10
3	84.2	SE1	<10
4	81.0	SE1	<10
5	85.3	SE1	<10
AVERAGE	**85.6**		
STD. DEV.	3.51		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.3	SE1
2	110.4	SE1
3	109.9	SE1
4	110.9	SE1
5	109.0	SE1
AVERAGE	**109.5**	
STD. DEV.	1.27	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-035
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-35

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	91.2	SE1	<10
2	92.5	SE1	<10
3	95.8	SE1	<10
4	101.6	SE1	<10
5	95.3	SE1	<10
AVERAGE	**95.3**		
STD. DEV.	3.59		
INSIDE TRACK (WELD "B")			
1	87.0	SE1	<10
2	81.2	SE1	<10
3	80.7	SE1	<10
4	80.5	SE1	<10
5	80.5	SE1	<10
AVERAGE	**82.0**		
STD. DEV.	2.52		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	110.4	SE1
2	106.6	SE1
3	109.0	SE1
4	104.6	SE1
5	108.6	SE1
AVERAGE	**107.8**	
STD. DEV.	2.03	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-036
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-36

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	84.3	SE1	<10
2	77.4	SE1	<10
3	76.0	SE1	<10
4	80.7	SE1	<10
5	84.2	SE1	<10
AVERAGE	**80.5**		
STD. DEV.	3.41		
INSIDE TRACK (WELD "B")			
1	96.8	SE1	<10
2	97.0	SE1	<10
3	92.2	SE1	<10
4	81.0	SE1	<10
5	98.0	SE1	<10
AVERAGE	**93.0**		
STD. DEV.	6.33		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	99.2	SE1
2	102.5	SE1
3	102.0	SE1
4	100.0	SE1
5	103.0	SE1
AVERAGE	**101.3**	
STD. DEV.	1.48	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-004
LAB ID NO.: L20-010-004-037
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-37

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	86.6	SE1	<10
2	84.0	SE1	<10
3	95.7	SE1	<10
4	93.9	SE1	<10
5	83.6	SE1	<10
AVERAGE	**88.8**		
STD. DEV.	5.07		
INSIDE TRACK (WELD "B")			
1	94.7	SE1	<10
2	95.0	SE1	<10
3	89.9	SE1	<10
4	79.4	SE1	<10
5	91.7	SE1	<10
AVERAGE	**90.1**		
STD. DEV.	5.70		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	106.0	SE1
2	104.9	SE1
3	106.6	SE1
4	108.0	SE1
5	107.1	SE1
AVERAGE	**106.5**	
STD. DEV.	1.04	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-005
LAB ID NO.: L20-010-005-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-5A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	99.8	SE1	<10
2	85.8	SE1	<10
3	104.6	SE1	<10
4	91.8	SE1	<10
5	96.1	SE1	<10
AVERAGE	**95.6**		
STD. DEV.	6.47		
INSIDE TRACK (WELD "B")			
1	84.7	SE1	<10
2	83.2	SE1	<10
3	76.5	SE1	<10
4	89.2	SE1	<10
5	78.6	SE1	<10
AVERAGE	**82.4**		
STD. DEV.	4.50		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	120.7	SE1
2	113.3	SE1
3	113.9	SE1
4	105.9	SE1
5	120.1	SE1
AVERAGE	**114.8**	
STD. DEV.	5.39	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-005
LAB ID NO.: L20-010-005-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-5B

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	87.4	SE1	<10
2	93.2	SE1	<10
3	92.5	SE1	<10
4	88.5	SE1	<10
5	103.1	SE1	<10
AVERAGE	**92.9**		
STD. DEV.	5.55		
INSIDE TRACK (WELD "B")			
1	76.3	SE1	<10
2	83.1	SE1	<10
3	76.7	SE1	<10
4	78.1	SE1	<10
5	82.6	SE1	<10
AVERAGE	**79.4**		
STD. DEV.	2.92		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	113.7	SE1
2	111.9	SE1
3	113.2	SE1
4	101.8	SE1
5	119.8	SE1
AVERAGE	**112.1**	
STD. DEV.	5.82	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-38

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	88.5	SE1	<10
2	90.9	SE1	<10
3	82.3	SE1	<10
4	77.7	SE1	<10
5	89.1	SE1	<10
AVERAGE	**85.7**		
STD. DEV.	4.94		
INSIDE TRACK (WELD "B")			
1	85.6	SE1	<10
2	77.9	SE1	<10
3	49.1	AD	100
4	83.6	SE1	<10
5	64.1	AD	100
AVERAGE	**72.1**		
STD. DEV.	13.72		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	110.2	SE1
2	107.3	SE1
3	106.7	SE1
4	108.5	SE1
5	105.9	SE1
AVERAGE	**107.7**	
STD. DEV.	1.50	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-39

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.6	SE1	<10
2	91.5	SE1	<10
3	88.1	SE1	<10
4	88.5	SE1	<10
5	90.8	SE1	<10
AVERAGE	**88.9**		
STD. DEV.	2.10		
INSIDE TRACK (WELD "B")			
1	82.2	SE1	<10
2	85.0	SE1	<10
3	80.9	SE1	<10
4	80.5	SE1	<10
5	82.3	SE1	<10
AVERAGE	**82.2**		
STD. DEV.	1.58		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	102.8	SE1
2	104.0	SE1
3	102.0	SE1
4	103.8	SE1
5	104.5	SE1
AVERAGE	**103.4**	
STD. DEV.	0.90	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-003
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-40

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	93.4	SE1	<10
2	93.4	SE1	<10
3	97.7	SE1	<10
4	96.8	SE1	<10
5	91.3	SE1	<10
AVERAGE	**94.5**		
STD. DEV.	2.37		
INSIDE TRACK (WELD "B")			
1	94.5	SE1	<10
2	93.0	SE1	<10
3	74.5	SE1	<10
4	76.0	SE1	<10
5	80.5	SE1	<10
AVERAGE	**83.7**		
STD. DEV.	8.45		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	105.0	SE1
2	104.4	SE1
3	103.1	SE1
4	104.7	SE1
5	104.6	SE1
AVERAGE	**104.4**	
STD. DEV.	0.66	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-004
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-41

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	80.8	SE1	<10
2	84.3	SE1	<10
3	80.9	SE1	<10
4	83.9	SE1	<10
5	79.2	SE1	<10
AVERAGE	**81.8**		
STD. DEV.	1.96		
INSIDE TRACK (WELD "B")			
1	92.7	SE1	<10
2	91.6	SE1	<10
3	95.5	SE1	<10
4	90.0	SE1	<10
5	70.7	SE1	<10
AVERAGE	**88.1**		
STD. DEV.	8.88		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.2	SE1
2	90.6	SE1
3	106.5	SE1
4	107.2	SE1
5	103.1	SE1
AVERAGE	**102.1**	
STD. DEV.	6.00	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-005
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-42

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.0	SE1	<10
2	81.0	SE1	<10
3	86.0	SE1	<10
4	89.8	SE1	<10
5	87.2	SE1	<10
AVERAGE	**85.8**		
STD. DEV.	2.89		
INSIDE TRACK (WELD "B")			
1	93.2	SE1	<10
2	72.7	SE1	<10
3	79.9	SE1	<10
4	89.7	SE1	<10
5	79.2	SE1	<10
AVERAGE	**82.9**		
STD. DEV.	7.47		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	101.0	SE1
2	108.0	SE1
3	103.4	SE1
4	102.6	SE1
5	101.4	SE1
AVERAGE	**103.3**	
STD. DEV.	2.51	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-006
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-43

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	96.9	SE1	<10
2	97.7	SE1	<10
3	97.9	SE1	<10
4	93.9	SE1	<10
5	97.7	SE1	<10
AVERAGE	**96.8**		
STD. DEV.	1.50		
INSIDE TRACK (WELD "B")			
1	90.7	SE1	<10
2	92.4	SE1	<10
3	87.1	SE1	<10
4	87.6	SE1	<10
5	92.0	SE1	<10
AVERAGE	**90.0**		
STD. DEV.	2.21		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	104.5	SE1
2	105.4	SE1
3	104.5	SE1
4	106.1	SE1
5	105.2	SE1
AVERAGE	**105.1**	
STD. DEV.	0.60	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-007
MATERIAL: 40 mil LLDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DS-44

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	83.6	SE3	<10
2	81.1	SE3	<10
3	86.8	SE3	<10
4	92.2	SE3	<10
5	98.1	SE3	<10
AVERAGE	**88.4**		
STD. DEV.	6.12		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	90.9	SE1
2	86.9	SE1
3	85.8	SE1
4	83.8	SE1
5	86.5	SE1
AVERAGE	**86.8**	
STD. DEV.	2.32	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-008
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-45

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.6	SE1	<10
2	84.0	SE1	<10
3	89.4	SE1	<10
4	91.0	SE1	<10
5	90.8	SE1	<10
AVERAGE	**89.0**		
STD. DEV.	2.56		
INSIDE TRACK (WELD "B")			
1	88.4	SE1	<10
2	87.7	SE1	<10
3	90.0	SE1	<10
4	77.7	SE1	<10
5	84.4	SE1	<10
AVERAGE	**85.6**		
STD. DEV.	4.37		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	101.9	SE1
2	101.0	SE1
3	99.0	SE1
4	99.6	SE1
5	101.5	SE1
AVERAGE	**100.6**	
STD. DEV.	1.12	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-009
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-46

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.2	SE1	<10
2	94.6	SE1	<10
3	96.6	SE1	<10
4	99.3	SE1	<10
5	98.6	SE1	<10
AVERAGE	**96.9**		
STD. DEV.	1.84		
INSIDE TRACK (WELD "B")			
1	79.6	SE1	<10
2	81.1	SE1	<10
3	80.4	SE1	<10
4	82.7	SE1	<10
5	84.8	SE1	<10
AVERAGE	**81.7**		
STD. DEV.	1.85		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	115.4	SE1
2	111.6	SE1
3	110.8	SE1
4	111.1	SE1
5	109.5	SE1
AVERAGE	**111.7**	
STD. DEV.	1.99	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-010
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-47

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.5	SE1	<10
2	82.0	SE1	<10
3	93.6	SE1	<10
4	92.3	SE1	<10
5	95.0	SE1	<10
AVERAGE	**89.7**		
STD. DEV.	5.04		
INSIDE TRACK (WELD "B")			
1	83.9	SE1	<10
2	92.8	SE1	<10
3	91.8	SE1	<10
4	96.5	SE1	<10
5	89.4	SE1	<10
AVERAGE	**90.9**		
STD. DEV.	4.17		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	108.5	SE1
2	108.3	SE1
3	108.1	SE1
4	107.0	SE1
5	106.9	SE1
AVERAGE	**107.8**	
STD. DEV.	0.67	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-011
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-48

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	100.7	SE1	<10
2	92.3	SE1	<10
3	81.6	SE1	<10
4	92.3	SE1	<10
5	89.6	SE1	<10
AVERAGE	**91.3**		
STD. DEV.	6.12		
INSIDE TRACK (WELD "B")			
1	96.5	SE1	<10
2	90.3	SE1	<10
3	82.4	SE1	<10
4	80.3	SE1	<10
5	76.7	SE1	<10
AVERAGE	**85.2**		
STD. DEV.	7.18		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	114.1	SE1
2	110.6	SE1
3	111.3	SE1
4	109.7	SE1
5	112.8	SE1
AVERAGE	**111.7**	
STD. DEV.	1.57	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-006
LAB ID NO.: L20-010-006-012
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-49

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	82.4	SE1	<10
2	91.1	SE1	<10
3	81.3	SE1	<10
4	86.9	SE1	<10
5	89.2	SE1	<10
AVERAGE	**86.2**		
STD. DEV.	3.79		
INSIDE TRACK (WELD "B")			
1	81.0	SE1	<10
2	77.2	SE1	<10
3	78.2	SE1	<10
4	76.8	SE1	<10
5	91.2	SE1	<10
AVERAGE	**80.9**		
STD. DEV.	5.36		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	108.1	SE1
2	107.0	SE1
3	105.6	SE1
4	107.7	SE1
5	109.6	SE1
AVERAGE	**107.6**	
STD. DEV.	1.31	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-007
LAB ID NO.: L20-010-007-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-38A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.7	SE1	<10
2	96.6	SE1	<10
3	95.7	SE1	<10
4	94.9	SE1	<10
5	90.9	SE1	<10
AVERAGE	**93.6**		
STD. DEV.	2.74		
INSIDE TRACK (WELD "B")			
1	86.9	SE1	<10
2	87.1	SE1	<10
3	90.6	SE1	<10
4	88.1	SE1	<10
5	89.0	SE1	<10
AVERAGE	**88.3**		
STD. DEV.	1.36		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	104.7	SE1
2	103.8	SE1
3	103.3	SE1
4	102.9	SE1
5	101.9	SE1
AVERAGE	**103.3**	
STD. DEV.	0.93	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-007
LAB ID NO.: L20-010-007-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-38B

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.6	SE1	<10
2	94.6	SE1	<10
3	90.8	SE1	<10
4	97.5	SE1	<10
5	98.0	SE1	<10
AVERAGE	**95.3**		
STD. DEV.	2.57		
INSIDE TRACK (WELD "B")			
1	78.6	SE1	<10
2	85.7	SE1	<10
3	77.0	SE1	<10
4	83.3	SE1	<10
5	77.9	SE1	<10
AVERAGE	**80.5**		
STD. DEV.	3.39		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	106.1	SE1
2	107.5	SE1
3	107.5	SE1
4	108.8	SE1
5	108.0	SE1
AVERAGE	**107.6**	
STD. DEV.	0.88	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-50

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	93.9	SE1	<10
2	90.5	SE1	<10
3	80.6	SE1	<10
4	92.4	SE1	<10
5	97.8	SE1	<10
AVERAGE	**91.0**		
STD. DEV.	5.74		
INSIDE TRACK (WELD "B")			
1	94.4	SE1	<10
2	96.1	SE1	<10
3	90.7	SE1	<10
4	93.9	SE1	<10
5	94.8	SE1	<10
AVERAGE	**94.0**		
STD. DEV.	1.79		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	108.1	SE1
2	101.3	SE1
3	103.2	SE1
4	104.7	SE1
5	102.0	SE1
AVERAGE	**103.9**	
STD. DEV.	2.41	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-51

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	96.0	SE1	<10
2	85.6	SE1	<10
3	89.3	SE1	<10
4	86.5	SE1	<10
5	93.7	SE1	<10
AVERAGE	**90.2**		
STD. DEV.	4.04		
INSIDE TRACK (WELD "B")			
1	84.0	SE1	<10
2	79.5	SE1	<10
3	78.7	SE1	<10
4	76.2	SE1	<10
5	77.2	SE1	<10
AVERAGE	**79.1**		
STD. DEV.	2.70		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	104.9	SE1
2	105.2	SE1
3	106.6	SE1
4	104.3	SE1
5	105.6	SE1
AVERAGE	**105.3**	
STD. DEV.	0.77	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-003
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-52

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	88.9	SE1	<10
2	85.8	SE1	<10
3	86.1	SE1	<10
4	84.2	SE1	<10
5	83.1	SE1	<10
AVERAGE	**85.6**		
STD. DEV.	1.97		
INSIDE TRACK (WELD "B")			
1	88.9	SE1	<10
2	89.3	SE1	<10
3	82.1	SE1	<10
4	90.4	SE1	<10
5	90.3	SE1	<10
AVERAGE	**88.2**		
STD. DEV.	3.10		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	104.8	SE1
2	104.1	SE1
3	107.8	SE1
4	106.0	SE1
5	105.3	SE1
AVERAGE	**105.6**	
STD. DEV.	1.26	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-004
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-53

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	97.9	SE1	<10
2	97.7	SE1	<10
3	92.4	SE1	<10
4	102.6	SE1	<10
5	99.0	SE1	<10
AVERAGE	**97.9**		
STD. DEV.	3.27		
INSIDE TRACK (WELD "B")			
1	82.6	SE1	<10
2	88.4	SE1	<10
3	80.6	SE1	<10
4	82.7	SE1	<10
5	84.3	SE1	<10
AVERAGE	**83.7**		
STD. DEV.	2.62		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	113.6	SE1
2	111.2	SE1
3	109.4	SE1
4	107.3	SE1
5	110.0	SE1
AVERAGE	**110.3**	
STD. DEV.	2.08	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-005
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-54

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	94.8	SE1	<10
2	100.0	SE1	<10
3	88.3	SE1	<10
4	94.5	SE1	<10
5	87.6	SE1	<10
AVERAGE	**93.0**		
STD. DEV.	4.60		
INSIDE TRACK (WELD "B")			
1	92.1	SE1	<10
2	88.0	SE1	<10
3	87.7	SE1	<10
4	87.3	SE1	<10
5	87.8	SE1	<10
AVERAGE	**88.6**		
STD. DEV.	1.77		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.3	SE1
2	101.6	SE1
3	101.4	SE1
4	98.3	SE1
5	97.9	SE1
AVERAGE	**100.5**	
STD. DEV.	2.07	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-006
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-55

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	102.3	SE1	<10
2	103.1	SE1	<10
3	99.3	SE1	<10
4	99.8	SE1	<10
5	99.4	SE1	<10
AVERAGE	**100.8**		
STD. DEV.	1.60		
INSIDE TRACK (WELD "B")			
1	87.8	SE1	<10
2	88.1	SE1	<10
3	85.9	SE1	<10
4	84.4	SE1	<10
5	86.0	SE1	<10
AVERAGE	**86.4**		
STD. DEV.	1.36		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	106.9	SE1
2	110.1	SE1
3	105.3	SE1
4	106.8	SE1
5	106.1	SE1
AVERAGE	**107.0**	
STD. DEV.	1.63	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-007
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-56

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	96.5	SE1	<10
2	95.7	SE1	<10
3	99.5	SE1	<10
4	91.7	SE1	<10
5	97.5	SE1	<10
AVERAGE	**96.2**		
STD. DEV.	2.58		
INSIDE TRACK (WELD "B")			
1	75.4	SE1	<10
2	85.3	SE1	<10
3	77.3	SE1	<10
4	75.7	SE1	<10
5	88.9	SE1	<10
AVERAGE	**80.5**		
STD. DEV.	5.53		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	110.6	SE1
2	112.7	SE1
3	112.3	SE1
4	113.1	SE1
5	116.2	SE1
AVERAGE	**113.0**	
STD. DEV.	1.82	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-008
LAB ID NO.: L20-010-008-008
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-57

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	89.1	SE1	<10
2	107.3	SE1	<10
3	102.6	SE1	<10
4	92.3	SE1	<10
5	90.9	SE1	<10
AVERAGE	**96.4**		
STD. DEV.	7.18		
INSIDE TRACK (WELD "B")			
1	82.8	SE1	<10
2	103.1	SE1	<10
3	94.6	SE1	<10
4	83.3	SE1	<10
5	89.1	SE1	<10
AVERAGE	**90.6**		
STD. DEV.	7.60		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	101.6	SE1
2	99.8	SE1
3	102.1	SE1
4	100.7	SE1
5	106.4	SE1
AVERAGE	**102.1**	
STD. DEV.	2.28	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-001
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-58

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.5	SE1	<10
2	84.0	SE1	<10
3	93.8	SE1	<10
4	85.1	SE1	<10
5	86.7	SE1	<10
AVERAGE	**87.0**		
STD. DEV.	3.50		
INSIDE TRACK (WELD "B")			
1	86.9	SE1	<10
2	89.0	SE1	<10
3	87.7	SE1	<10
4	89.5	SE1	<10
5	89.5	SE1	<10
AVERAGE	**88.5**		
STD. DEV.	1.04		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	101.6	SE1
2	101.6	SE1
3	100.2	SE1
4	102.7	SE1
5	105.0	SE1
AVERAGE	**102.2**	
STD. DEV.	1.60	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-002
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-59

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	85.2	SE1	<10
2	78.7	SE1	<10
3	96.8	SE1	<10
4	79.2	SE1	<10
5	91.6	SE1	<10
AVERAGE	**86.3**		
STD. DEV.	7.04		
INSIDE TRACK (WELD "B")			
1	83.9	SE1	<10
2	80.6	SE1	<10
3	77.0	SE1	<10
4	85.9	SE1	<10
5	77.6	SE1	<10
AVERAGE	**81.0**		
STD. DEV.	3.47		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	105.4	SE1
2	102.5	SE1
3	102.2	SE1
4	103.6	SE1
5	103.9	SE1
AVERAGE	**103.5**	
STD. DEV.	1.14	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-003
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-60

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.1	SE1	<10
2	92.2	SE1	<10
3	93.1	SE1	<10
4	91.5	SE1	<10
5	95.2	SE1	<10
AVERAGE	**93.4**		
STD. DEV.	1.50		
INSIDE TRACK (WELD "B")			
1	83.8	SE1	<10
2	72.2	SE1	<10
3	75.1	SE1	<10
4	75.7	SE1	<10
5	80.1	SE1	<10
AVERAGE	**77.4**		
STD. DEV.	4.09		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	103.7	SE1
2	100.6	SE1
3	100.9	SE1
4	97.0	SE1
5	102.3	SE1
AVERAGE	**100.9**	
STD. DEV.	2.24	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-004
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-61

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	84.0	SE1	<10
2	80.9	SE1	<10
3	79.3	SE1	<10
4	81.6	SE1	<10
5	82.9	SE1	<10
AVERAGE	**81.7**		
STD. DEV.	1.62		
INSIDE TRACK (WELD "B")			
1	80.2	SE1	<10
2	74.7	SE1	<10
3	74.9	SE1	<10
4	76.4	SE1	<10
5	78.8	SE1	<10
AVERAGE	**77.0**		
STD. DEV.	2.17		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	87.3	SE1
2	81.3	SE1
3	78.8	SE1
4	81.2	SE1
5	83.1	SE1
AVERAGE	**82.3**	
STD. DEV.	2.83	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-005
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-62

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	95.9	SE1	<10
2	93.6	SE1	<10
3	92.1	SE1	<10
4	82.3	SE1	<10
5	91.0	SE1	<10
AVERAGE	**91.0**		
STD. DEV.	4.64		
INSIDE TRACK (WELD "B")			
1	80.1	SE1	<10
2	85.7	SE1	<10
3	78.0	SE1	<10
4	78.3	SE1	<10
5	80.9	SE1	<10
AVERAGE	**80.6**		
STD. DEV.	2.77		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.6	SE1
2	103.9	SE1
3	106.5	SE1
4	104.9	SE1
5	104.7	SE1
AVERAGE	**105.5**	
STD. DEV.	1.34	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-006
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-63

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	99.4	SE1	<10
2	98.3	SE1	<10
3	99.8	SE1	<10
4	105.3	SE1	<10
5	106.0	SE1	<10
AVERAGE	**101.8**		
STD. DEV.	3.22		
INSIDE TRACK (WELD "B")			
1	88.4	SE1	<10
2	87.9	SE1	<10
3	87.6	SE1	<10
4	84.2	SE1	<10
5	83.8	SE1	<10
AVERAGE	**86.4**		
STD. DEV.	1.96		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	107.6	SE1
2	106.6	SE1
3	106.4	SE1
4	104.5	SE1
5	107.0	SE1
AVERAGE	**106.4**	
STD. DEV.	1.04	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-009
LAB ID NO.: L20-010-009-007
MATERIAL: 40 mil LLDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DS-64

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	84.0	SE1	<10
2	86.9	SE1	<10
3	83.6	SE1	<10
4	83.4	SE1	<10
5	87.9	SE1	<10
AVERAGE	**85.2**		
STD. DEV.	1.87		
INSIDE TRACK (WELD "B")			
1	79.8	SE1	<10
2	82.3	SE1	<10
3	81.4	SE1	<10
4	79.9	SE1	<10
5	78.4	SE1	<10
AVERAGE	**80.4**		
STD. DEV.	1.36		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	89.5	SE1
2	95.3	SE1
3	92.9	SE1
4	96.8	SE1
5	101.0	SE1
AVERAGE	**95.1**	
STD. DEV.	3.85	

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Appendix K - Field LLDPE Defect and Repair Testing Log

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
1	DS-1	P-3/4/107'>BOS	8/26/20	4:53	2x5	X-34	JS	P	8/31/20
2	DS-2	P-5/6/11'>EOS	8/26/20	4:58	2x5	X-34	JS	P	8/31/20
3	DS-3	P-8/9/69'>BOS	8/26/20	5:03	2x5	X-34	JS	P	8/31/20
4	AT	P-10/11/18	8/26/20	5:06	2x2	X-34	JS	P	8/31/20
5	AT	P-10/17/18	8/26/20	5:10	2x2	X-34	JS	P	8/31/20
6	AT	P-10/16/17	8/26/20	5:18	2x2	X-34	JS	P	8/31/20
7	AT	P-9/10/16	8/26/20	5:21	2X2	X-34	JS	P	8/31/20
8	AT	P-9/15/16	8/26/20	5:25	2x2	X-34	JS	P	8/31/20
9	AT	P-8/9/14/15	8/26/20	5:32	2x6	X-34	JS	P	8/31/20
10	AT	P-8/13/14	8/28/20	8:09	2x2	X-34	JL	P	8/31/20
11	DS-5	P-12/13/12'>BOS	8/28/20	8:14	2x5	X-34	JL	P	8/31/20
12	AT	P-7/8/12/13	8/28/20	8:20	2x2	X-34	JL	P	8/31/20
13	AT	P-2/3/66/67	8/29/20	10:28	3x3	X-34	JS	P	8/31/20
14	AT	P-3/4/64/66	8/29/20	10:32	2x2	X-34	JS	P	8/31/20
15	AT	P-4/5/63/64	8/29/20	10:35	2x2	X-34	JS	P	8/31/20
16	AT	P-5/6/62/63	8/29/20	10:38	2x2	X-34	JS	P	8/31/20
17	AT	P-6/7/61/62	8/29/20	10:42	2x2	X-34	JS	P	8/31/20
18	AT	P-7/19/61	8/29/20	10:45	2x2	X-34	JS	P	8/31/20
19	BO	P-7/19/11'>BOS	8/29/20	10:51	2x2	X-34	JS	P	8/31/20
20	AT	P-7/12/19	8/29/20	10:55	2x2	X-34	JS	P	8/31/20
21	BO	P-7/12/25'>BOS	8/29/20	11:00	2x3	X-34	JS	P	8/31/20
22	WR	P-19/61/5'>EOS	8/29/20	11:09	2x2	X-34	JS	P	8/31/20
23	AT	P-19/20/61	8/29/20	11:14	2x4	X-34	JS	P	8/31/20
24	AT	P-20/21/23/61	8/29/20	11:20	2x5	X-34	JS	P	8/31/20
25	AT	P-23/24/61	8/29/20	11:25	2x2	X-34	JS	P	8/31/20
26	AT	P-24/25/61	8/29/20	11:28	2x2	X-34	JS	P	8/31/20
27	AT	P-25/26/61	8/29/20	11:31	2x2	X-34	JS	P	8/31/20
28	AT	P-26/27/61	8/29/20	11:35	2x2	X-34	JS	P	8/31/20
29	AT	P-27/28/61	8/29/20	11:40	2x2	X-34	JS	P	8/31/20
30	AT	P-28/29/39/61	8/29/20	11:49	2x5	X-34	JS	P	8/31/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
31	AT	P-29/36/39	8/29/20	11:55	2x2	X-34	JS	P	8/31/20
32	AT	P-29/30/36	8/29/20	11:58	2x2	X-34	JS	P	8/31/20
33	AT	P-30/34/36	8/29/20	1:00	2x3	X-34	JS	P	8/31/20
34	DS-12	P-34/36/54'>BOS	8/29/20	1:09	2x5	X-34	JS	P	8/31/20
35	AT	P-30/31/34	8/29/20	1:03	2x2	X-34	JS	P	8/31/20
36	AT	P-31/34/35	8/29/20	1:12	2x2	X-34	JS	P	8/31/20
37	AT	P-31/32/35	8/29/20	1:16	2x2	X-34	JS	P	8/31/20
38	BO	P-31/32/13'>BOS	8/29/20	1:21	2x2	X-34	JS	P	8/31/20
39	DS-11	P-31/32/33'>BOS	8/29/20	1:26	2x5	X-34	JS	P	8/31/20
40	AT	P-32/33/35/37	8/29/20	1:33	2x7	X-34	JS	P	8/31/20
41	AT	P-33/37/38	8/29/20	1:40	2x2	X-34	JS	P	8/31/20
42	AT	P-27/28/18'>BOS	8/29/20	11:44	2x2	X-34	JS	P	8/31/20
43	DS-10	P-28/29/20'>EOS	8/29/20	1:48	2x5	X-34	JS	P	8/31/20
44	BO	P-28/29/143'>BOS	8/29/20	1:51	2x2	X-34	JS	P	8/31/20
45	DS-9	P-26/27/70'>EOS	8/29/20	1:56	2x5	X-34	JS	P	8/31/20
46	DS-8	P-24/25/110'> EOS	8/29/20	2:02	2x5	X-34	JS	P	8/31/20
47	AT	P-20/21/22	8/29/20	2:07	2x2	X-34	JS	P	8/31/20
48	DS-6	P-19/20/99'>BOS	8/29/20	2:14	2x5	X-34	JS	P	8/31/20
49	DS-4	P-16/17/18'>EOS	8/26/20	5:14	2x5	X-34	JS	P	8/31/20
50	DS-7	P-21/23/53'>EOS	8/29/20	2:27	2x5	X-34	JS	P	8/31/20
51	EXT	P-20/21/22	8/29/20	2:48	6x23	X-34	JS	P	8/31/20
52	DS-34	P-64/66/62'>EOS	8/31/20	8:48	2x5	X-34	JS	P	8/31/20
53	DS-35	P-62/63/122'>EOS	8/31/20	8:54	2x5	X-34	JS	P	8/31/20
54	AT	P-63/64/65	8/31/20	9:03	2x2	X-34	JS	P	8/31/20
55	AT	P-64/65/66	8/31/20	9:08	2x2	X-34	JS	P	8/31/20
56	AT	P-39/40/61	8/31/20	9:12	2x2	X-34	JS	P	8/31/20
57	AT	P-40/61/62	8/31/20	9:15	2x2	X-34	JS	P	8/31/20
58	AT	P-40/41/62	8/31/20	9:18	2x2	X-34	JS	P	8/31/20
59	AT	P-41/62/63	8/31/20	9:22	2x2	X-34	JS	P	8/31/20
60	AT	P-41/42/63	8/31/20	9:28	2x2	X-34	JS	P	8/31/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
61	AT	P-42/43/63/65	8/31/20	9:33	2x5	X-34	JS	P	8/31/20
62	AT	P-43/44/65/66	8/31/20	9:48	2x5	X-34	JS	P	8/31/20
63	DS-15	P-43/44/20'>BOS	8/31/20	9:53	2x5	X-34	JS	P	8/31/20
64	AT	P-44/45/66	8/31/20	9:57	2x2	X-34	JS	P	8/31/20
65	AT	P-45/66/67	8/31/20	10:00	2x2	X-34	JS	P	8/31/20
66	AT	P-45/46/67	8/31/20	10:10	2x2	X-34	JS	P	8/31/20
67	DS-16	P-46/47/22'>BOS	8/31/20	10:16	2x5	X-34	JS	P	8/31/20
68	DS-14	P-41/42/42'>BOS	8/31/20	10:21	2x5	X-34	JS	P	8/31/20
69	DS-13	P-39/40/81'>BOS	8/31/20	10:27	2x5	X-34	JS	P	8/31/20
70	DS-17	P-48/49/47'>BOS	8/31/20	10:33	2x5	X-34	JS	P	8/31/20
71	DS-18	P-50/51/68'>BOS	8/31/20	10:39	2x5	X-34	JS	P	8/31/20
72	BO	P-50/51/109'>BOS	8/31/20	10:42	2x2	X-34	JS	P	8/31/20
73	BO	P-49/50/196'>BOS	8/31/20	10:48	2x5	X-34	JS	P	8/31/20
74	DS-19	P-52/53/108'>EOS	8/31/20	10:54	2x5	X-34	JS	P	8/31/20
75	DS-20	P-54/55/155'>EOS	8/31/20	11:05	2x5	X-34	JS	P	8/31/20
76	DS-21	P-56/57/24'>BOS	8/31/20	11:11	2x5	X-34	JS	P	8/31/20
77	DS-22	P-59/60/24'>BOS	8/31/20	11:17	2x5	X-34	JS	P	8/31/20
78	DS-23	P-68/69/75'>EOS	8/31/20	12:30	2x5	X-34	JS	P	8/31/20
79	DS-24	P-71/72/16'>BOS	8/31/20	12:34	2x5	X-34	JS	P	8/31/20
80	AT	P-72/73/77	8/31/20	12:39	2x2	X-34	JS	P	8/31/20
81	AT	P-72/76/77	8/31/20	12:43	2x2	X-34	JS	P	8/31/20
82	AT	P-71/72/76	8/31/20	12:46	2x2	X-34	JS	P	8/31/20
83	AT	P-71/75/76	8/31/20	1:13	2x2	X-34	JS	P	8/31/20
84	AT	P-70/71/74/75	8/31/20	1:19	2X3	X-34	JS	P	8/31/20
85	AT	P-69/70/74/78	8/31/20	1:25	2x6	X-34	JS	P	8/31/20
86	AT	P-69/78/79	8/31/20	1:35	2x2	X-34	JS	P	8/31/20
87	AT	P-68/69/79	8/31/20	1:40	2x2	X-34	JS	P	8/31/20
88	DS-26	P-79/80/66'>BOS	8/31/20	1:30	2x5	X-34	JS	P	8/31/20
89	DS-25	P-74/78/17'>EOS	8/31/20	12:52	2x5	X-34	JS	P	8/31/20
90	DS-32	P-93/94/119'>BOS	9/1/20	7:55	2x5	X-34	JS	P	9/1/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
91	DS-33	P-96/97/19'>BOS	9/1/20	8:06	2x5	X-34	JS	P	9/1/20
92	DS-37	P-100/101/30'>BOS	9/1/20	8:18	2x5	X-34	JS	P	9/1/20
93	DS-36	P-23/61/8'>BOS	8/31/20	9:01	2x5	X-34	JS	P	8/31/20
94	BO	P-68/79/7'>BOS	9/4/20	1:20	2x4	X-34	JS	P	9/4/20
95	AT	P-79/80/81	9/4/20	1:23	2x2	X-34	JS	P	9/4/20
96	AT	P-80/81/82	9/4/20	1:25	2x2	X-34	JS	P	9/4/20
97	DS-27	P-82/83/166'>EOS	9/4/20	1:31	2x5	X-34	JS	P	9/4/20
98	DS-28	P-84/85/79'>BOS	9/4/20	1:37	2x5	X-34	JS	P	9/4/20
99	DS-29	P-86/87/99'>BOS	9/4/20	1:42	2x5	X-34	JS	P	9/4/20
100	DS-30	P-88/89/100'>BOS	9/4/20	1:47	2x5	X-34	JS	P	9/4/20
101	DS-31	P-90/91/39'>EOS	9/4/20	1:52	2x5	X-34	JS	P	9/4/20
102	DS-5B	P-12/13/6'>BOS	9/4/20	4:44	2x12	X-34	JL	P	9/4/20
103	DS-5A	P-12/13/20'>BOS	9/4/20	4:56	2x12	X-34	JL	P	9/4/20
104	T	P-59,60,102	11/4/20	2:26	2X2	X-24	GB	P	11/5/20
105	DS-44	P-57/102,6'>BOS	11/4/20	3:28	2X5	X-24	GB	P	11/5/20
106	DS-38	P-102/103,240'>BOS	11/4/20	3:51	2X5	X-24	GB	P	11/5/20
107	DS-39	P-103/104,256'>BOS	11/4/20	3:59	2X5	X-24	GB	P	11/5/20
108	AT	P-102/103,202'>BOS	11/4/20	3:43	2X11	X-24	GB	P	11/5/20
109	T	P-47,48,102	11/4/20	1:58	2X2	X-22	SG	P	11/5/20
110	AT	P-46,67,102	11/4/20	3:43	2X5	X-22	SG	P	11/5/20
111	AT	P-67,102,103	11/4/20	3:48	2X2	X-22	SG	P	11/5/20
112	AT	P-67,103,104	11/4/20	3:53	2X2	X-22	SG	P	11/5/20
113	BO	P-67/104,6'>BOS	11/4/20	3:56	2X2	X-22	SG	P	11/5/20
114	AT	P-67,104,105	11/4/20	4:01	2X2	X-22	SG	P	11/5/20
115	DS-40	P-104/105,327'>BOS	11/5/20	8:23	2X5	X-22	SG	P	11/5/20
116	DS-42	P-106/107,405'>BOS	11/5/20	8:18	2X7	X-22	SG	P	11/5/20
117	AT	P-67,105,106	11/4/20	4:05	2X2	X-22	SG	P	11/5/20
118	AT	P-67,106,107	11/4/20	4:15	2X7	X-22	SG	P	11/5/20
119	CR	P-107,2'>P-67,5'>P-106	11/4/20	4:21	2X2	X-22	SG	P	11/5/20
120	AT	P-67,107,108	11/4/20	4:27	2X7	X-22	SG	P	11/5/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
121	AT	P-67,108,109	11/4/20	4:30	2X2	X-22	SG	P	11/5/20
122	AT	P-67,109,110	11/5/20	7:22	2X2	X-22	SG	P	11/5/20
123	AT	P-67,110,111	11/5/20	7:27	2X2	X-22	SG	P	11/5/20
124	DS-48	P-111/112,2'>EOS	11/5/20	7:48	2X5	X-24	SG	P	11/5/20
125	AT	P-111/66/2/1	11/5/20	7:37	2X4	X-22	SG	P	11/5/20
126	BO	P-110/111,470'>BOS	11/5/20	8:03	2X3	X-22	SG	P	11/5/20
127	DS-46	P-109/110,390'>BOS	11/5/20	8:40	2X5	X-22	SG	P	11/5/20
128	DS-45	P-108/109,314`>BOS	11/5/20	7:59	2X5	X-24	GB	P	11/5/20
129	FT	P-106/107,292'>BOS	11/5/20	8:33	2X2	X-22	SG	P	11/5/20
130	FT	P-106/107,230'>BOS	11/4/20	4:01	2X2	X-24	GB	P	11/5/20
131	FT	P-106/107,212'>BOS	11/4/20	4:20	2X10	X-24	GB	P	11/5/20
132	FT	P-106/107,196'>BOS	11/4/20	4:24	2X2	X-24	GB	P	11/5/20
133	DS-43	P-107/108,130'>BOS	11/5/20	7:38	2X5	X-24	GB	P	11/5/20
134	DS-41	P105/106,70'>BOS	11/5/20	7:46	2X5	X-24	GB	P	11/5/20
135	TI	P-102/60/68/79/81	11/5/20	8:04	2X5	X-24	GB	P	11/5/20
136	T	P-103/104/83	11/5/20	8:55	2X2	X-24	GB	P	11/5/20
137	T	P-106/107/86/87	11/5/20	9:44	4X4	X-24	GB	P	11/5/20
138	T	P-107/87/88	11/5/20	9:56	2X2	X-24	GB	P	11/5/20
139	T	P-107/108/88	11/5/20	10:05	2X3	X-24	GB	P	11/5/20
140	AT	P-109/110,7'>BOS	11/5/20	11:10	2X5	X-24	GB	P	11/5/20
141	AT	P-109/110,43'>BOS	11/5/20	11:30	2X4	X-24	GB	P	11/5/20
142	DS-47	P-110/111,83'>BOS	11/5/20	7:19	2X5	X-24	GB	P	11/5/20
143	DS-49	P-111/112,65'>BOS	11/5/20	7:27	2X5	X-24	GB	P	11/5/20
144	DS-38B	P-102/103,245'>BOS	11/5/20	1:51	2X6	X-24	GB	P	11/5/20
145	DS-38A	P-102/103,222'>BOS	11/5/20	2:00	2X6	X-24	GB	P	11/5/20
146	AT	P-91/113/110	11/7/20	12:46	2X2	X-24	GB	P	11/7/20
147	EXT	P-113/118/110	11/7/20	12:50	2X8	X-24	GB	P	11/720
148	AT	P-113/114/118	11/7/20	11:10	2X2	X-24	GB	P	11/7/20
149	AT	P-114/115/118	11/7/20	11:14	2X2	X-24	GB	P	11/7/20
150	AT	P-115/116/118	11/7/20	11:19	2X2	X-24	GB	P	11/7/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
151	AT	P-116/117/118	11/7/20	11:24	2X2	X-24	GB	P	11/7/20
152	DS-50	P-114/115,47'>BOS	11/7/20	11:35	2X5	X-24	GB	P	11/7/20
153	BO	P-118/119,115'>BOS	11/7/20	11:29	2X2	X-24	GB	P	11/7/20
154	DS-51	P-120/121,118'>BOS	11/7/20	2:29	2X2	X-24	GB	P	11/7/20
155	AT	P-121/127/126	11/7/20	2:20	2X2	X-24	GB	P	11/7/20
156	AT	P-121/126/125	11/7/20	2:15	2X2	X-24	GB	P	11/7/20
157	DS-52	P-125/124,48'>BOS	11/7/20	2:36	2X5	X-24	GB	P	11/7/20
158	AT	P-121/125/124	11/7/20	2:10	2X2	X-24	GB	P	11/7/20
159	AT	P-121/124/123	11/7/20	2:05	2X2	X-24	GB	P	11/7/20
160	AT	P-110/118/119	11/7/20	1:24	2X2	X-24	GB	P	11/7/20
161	AT	P-110/119/120	11/7/20	1:30	2X2	X-24	GB	P	11/7/20
162	AT	P-110/120/111	11/7/20	1:31	2X2	X-24	GB	P	11/7/20
163	EE	P-111,1'>120,8'>110	11/7/20	1:37	2X2	X-24	GB	P	11/7/20
164	AT	P-111/120/121/112	11/7/20	1:45	2X5	X-24	GB	P	11/7/20
165	AT	P-112/121/123/	11/7/20	1:52	2X3	X-24	GB	P	11/7/20
166	AT	P-112/123/122	11/7/20	1:39	2X2	X-24	GB	P	11/7/20
167	AT	P-112/122/128	11/7/20	2:43	2X2	X-22	CM	P	11/7/20
168	AT	P-112/128/129	11/7/20	2:41	2X2	X-22	CM	P	11/7/20
169	DS-53	P-128/129,19'>BOS	11/7/20	2:54	2X5	X-22	CM	P	11/7/20
170	AT	P-112/129/130	11/7/20	2:36	2X2	X-22	CM	P	11/7/20
171	AT	P-112/130/131	11/7/20	2:30	2X2	X-22	CM	P	11/7/20
172	AT	P-112/131/132	11/7/20	2:25	2X2	X-22	CM	P	11/7/20
173	AT	P-112/132/134	11/7/20	2:22	2X2	X-22	CM	P	11/7/20
174	AT	P-132/134,11'>BOS	11/7/20	2:18	2X2	X-22	CM	P	11/7/20
175	AT	P-132/133/134	11/7/20	2:15	2X2	X-22	CM	P	11/7/20
176	AT	P-134/133/136	11/7/20	2:07	2X2	X-22	CM	P	11/7/20
177	AT	P-133/135/136	11/7/20	1:47	2X2	X-22	CM	P	11/7/20
178	DS-55	P-133/135,22'>BOS	11/7/20	2:03	2X5	X-22	CM	P	11/7/20
179	AT	P-136/135/137	11/7/20	1:58	2X2	X-22	CM	P	11/7/20
180	AT	P-112/134/136	11/7/20	1:48	2X2	X-22	CM	P	11/7/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
181	AT	P-112/136/137	11/7/20	1:44	2X2	X-22	CM	P	11/7/20
182	AT	P-112/137/138	11/7/20	1:37	2X2	X-22	CM	P	11/7/20
183	DS-56	P-137/138,11'>BOS	11/7/20	1:40	2X2	X-22	CM	P	11/7/20
184	AT	P-112/138/139	11/7/20	1:27	2X2	X-22	CM	P	11/7/20
185	AT	P-112/139/141	11/7/20	1:09	2X2	X-22	CM	P	11/7/20
186	AT	P-139/140/141	11/7/20	1:12	2X2	X-22	CM	P	11/7/20
187	DS-57	P-140/141,14'>BOS	11/7/20	1:24	2X5	X-22	CM	P	11/7/20
188	MD	P-130,8'>131,138'>112	11/7/20	2:41	2X2	X-24	GB	P	11/7/20
189	MD	P-130,8'>131,146'>112	11/7/20	2:43	2X2	X-24	GB	P	11/7/20
190	MD	P-130,9'>129,146'>112	11/7/20	2:36	2X2	X-24	GB	P	11/7/20
191	MD	P-130,8'>131,153'>112	11/7/20	2:47	2X2	X-24	GB	P	11/7/20
192	MD	P-130,9'>129,153'>112	11/7/20	2:55	2X2	X-24	GB	P	11/7/20
193	DS-54	P-132/131,158'>BOS	11/7/20	3:05	2X5	X-24	GB	P	11/7/20
194	AT	P-155/144,205'>BOS	11/9/20	2:29	2X4	X-24	GB	P	11/10/20
195	T	P-112/141/142	11/9/20	1:50	3X5	X-24	GB	P	11/10/20
196	AT	P-141/140/142	11/9/20	1:15	2X2	X-24	GB	P	11/10/20
197	AT	P-142/140,19'>BOS	11/9/20	1:21	2X5	X-24	GB	P	11/10/20
198	DS-58	P-143/142,21'>BOS	11/9/20	1:31	2X5	X-24	GB	P	11/10/20
199	T	P-112/142/143	11/10/20	8:08	2X2	X-22	SG	P	11/10/20
200	T	P-112/143/145	11/10/20	8:03	2X2	X-22	SG	P	11/10/20
201	AT	P-145/143/144	11/9/20	1:40	2X2	X-24	GB	P	11/10/20
202	DS-59	P-155/144,43'>BOS	11/9/20	2:05	2X5	X-24	GB	P	11/10/20
203	AT	P-155/145/144	11/9/20	1:50	2X2	X-24	GB	P	11/10/20
204	T	P-112/145/155	11/10/20	7:59	2X2	X-22	SG	P	11/10/20
205	T	P-112/155/156	11/10/20	7:54	2X2	X-22	SG	P	11/10/20
206	T	P-112/156/157	11/10/20	7:49	2X2	X-22	SG	P	11/10/20
207	T	P-112/157/158	11/10/20	7:43	2X2	X-22	SG	P	11/10/20
208	DS-64	P-112/158/151,11'>157	11/10/20	7:35	2X9	X-22	SG	P	11/10/20
209	AT	P-151/158,14'>BOS	11/10/20	7:24	2X2	X-22	SG	P	11/10/20
210	AT	P-151/158/159/152	11/9/20	4:08	2X4	X-22	SG	P	11/10/20

HALLATON
ENVIRONMENTAL LININGS

Repair Log

Project No.: 1984-11919
Project Name: Grand Tower CCR Impoundment Closure
Date: 8/25/20
Project Location: Grand Tower, IL

Material: LLDPE-T
Thickness: 40 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Approx Size	Machine ID	Repair Tech	Vacuum Test	
		Seam #						P / F	Date
211	AT	P-158/157/159	11/9/20	4:01	2X2	X-22	SG	P	11/10/20
212	DS-60	P-157/156,58'>BOS	11/9/20	2:14	2X5	X-24	GB	P	11/10/20
213	AT	P-152/159/154	11/9/20	3:54	2X2	X-22	SG	P	11/10/20
214	AT	P-149/152/154/150	11/9/20	3:50	2X2	X-22	SG	P	11/10/20
215	DS-61	P-149/150,13'>BOS	11/9/20	3:45	2X5	X-22	SG	P	11/10/20
216	AT	P-148/149/150/153	11/9/20	3:39	2X6	X-22	SG	P	11/10/20
217	AT	P-149/151/152	11/9/20	4:12	2X2	X-22	SG	P	11/10/20
218	T	P-112/151/149	11/10/20	7:19	2X2	X-22	SG	P	11/10/20
219	T	P-112/149/148	11/9/20	4:26	2X2	X-22	SG	P	11/10/20
220	T	P-112/148/147	11/9/20	4:22	2X2	X-22	SG	P	11/10/20
221	T	P-112/147/146	11/9/20	4:19	2X2	X-22	SG	P	11/10/20
222	DS-62	P-146/147,10'>BOS	11/9/20	2:05	2X5	X-22	SG	P	11/10/20
223	T	P-94/146/147	11/9/20	2:10	2X2	X-22	SG	P	11/10/20
224	EXT	P-96/95/147/148	11/9/20	2:37	4X8	X-22	SG	P	11/10/20
225	T	P-99/98/150	11/9/20	3:13	2X3	X-22	SG	P	11/10/20
226	EXT	P-100/99/154/163	11/9/20	4:00	4X7	X-24	GB	P	11/10/20
227	AT	P-154/159/161/163	11/9/20	4:15	2X7	X-24	GB	P	11/10/20
228	AT	P-159/157/161	11/9/20	4:17	2X2	X-24	GB	P	11/10/20
229	EXT	P-101/163/161/160	11/10/20	8:24	5X7	X-22	SG	P	11/10/20
230	DS-63	P-160/161,22'>BOS	11/9/20	2:41	2X5	X-24	GB	P	11/10/20
231	T	P-101/160/162	11/9/20	4:25	2X2	X-24	GB	P	11/10/20
232	AT	P-101/162,25'>BOS	11/10/20	8:44	2X5	X-22	SG	P	11/10/20
233									
234									
235									
236									
237									
238									
239									
240									

Appendix L - Geocomposite Material Certs

January 29, 2020
Hallaton, Inc.
1206 Sparks Rd.
Sparks, MD, 21152

Ref. : Grand Tower CCR Closure, IL
Customer P.O. # P10329
Product : TN 270-2-6

We hereby certify that the TN 270-2-6 drainage geocomposite, meets or exceeds the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Value	Qualifier
Geonet[3]				
Thickness	ASTM D 5199	mil	250	MAV[6]
Carbon Black	ASTM D 4218	%	2.0 - 3.0	Range
Tensile Strength	ASTM D 7179	lbs/in	55	MAV
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	MAV
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MAV
Transmissivity[1]	ASTM D 4716	m^2/sec	5.0×10^{-4}	MAV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV[5]
Grab Strength	ASTM D 4632	lbs	160	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Trap Tear Strength	ASTM D 4533	lbs	65	MARV
CBR Puncture	ASTM D 6241	lbs	450	MARV
Water Flow Rate	ASTM D 4491	gpm/ft^2	125	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.63	MARV
AOS	ASTM D 4751	US Sieve	70	MaxARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1. *Transmissivity measured using water at 21 ± 2 ° C (70 ± 4 ° F) with a gradient of 0.25 and a confining pressure of 10,000 psf between steel plates after 24 hours.*
2. *Condition 190/2.16*
3. *Geotextile and Geonet properties are prior to lamination.*
4. *Geotextile data is provided by the supplier.*
5. *MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.*
6. *Minium average value*

Sincerely,

Rajesh Patel

Rajesh Patel
QA Manager

APPROVED 5 QA

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010001	2.49	1.98	7.15×10^{-4}	AMCX 107960	0.9528	267	2.59	88	
92131010002				AMCX 107960	0.9528				
92131010003				AMCX 107960	0.9528				
92131010004				AMCX 107960	0.9528				
92131010005				AMCX 107960	0.9528				
92131010006				AMCX 107960	0.9528				
92131010007				AMCX 107960	0.9528				
92131010008				AMCX 107960	0.9528				
92131010009				AMCX 107960	0.9528				
92131010010				AMCX 107960	0.9528				
92131010011				AMCX 107960	0.9528				
92131010012				AMCX 107960	0.9528				
92131010013				AMCX 107960	0.9528				
92131010014				AMCX 107960	0.9528				
92131010015	1.91	2.30		AMCX 107960	0.9522	264	2.28	83	
92131010016				AMCX 107960	0.9522				
92131010017				AMCX 107960	0.9522				
92131010018				AMCX 107960	0.9522				
92131010019				AMCX 107960	0.9522				
92131010020				AMCX 107960	0.9522				
92131010021				AMCX 107960	0.9522				
92131010022				AMCX 107960	0.9522				
92131010023				AMCX 107960	0.9522				
92131010024				AMCX 107960	0.9522				

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010025				AMCX 107960	0.9522				
92131010026				AMCX 107960	0.9522				
92131010027				AMCX 107960	0.9522				
92131010028				AMCX 107960	0.9522				
92131010029				AMCX 107960	0.9522				
92131010030	2.68	2.20		AMCX 107960	0.9527	266	2.46	89	
92131010031				AMCX 107960	0.9527				
92131010032				AMCX 107960	0.9527				
92131010033				AMCX 107960	0.9527				
92131010034				AMCX 107960	0.9527				
92131010035				AMCX 107960	0.9527				
92131010036				AMCX 107960	0.9527				
92131010037				AMCX 107960	0.9527				
92131010038				AMCX 107960	0.9527				
92131010039				AMCX 107960	0.9527				
92131010040				AMCX 107960	0.9527				
92131010041				AMCX 107960	0.9527				
92131010042				AMCX 107960	0.9527				
92131010043				AMCX 107960	0.9527				
92131010044				AMCX 107960	0.9527				
92131010045	1.95	2.14		AMCX 107960	0.9523	271	2.31	85	
92131010046				AMCX 107960	0.9523				
92131010047				AMCX 107960	0.9523				
92131010048				AMCX 107960	0.9523				

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010049				AMCX 107960	0.9523				
92131010050				AMCX 107960	0.9523				
92131010051				AMCX 107960	0.9523				
92131010052				AMCX 107960	0.9523				
92131010053				AMCX 107960	0.9523				
92131010054				AMCX 107960	0.9523				
92131010055				AMCX 107960	0.9523				
92131010056				AMCX 107960	0.9523				
92131010057				AMCX 107960	0.9523				
92131010058				AMCX 107960	0.9523				
92131010059				AMCX 107960	0.9523				
92131010060	2.09	1.50	6.99×10^{-4}	AMCX 107960	0.9525	268	2.45	87	
92131010061				AMCX 107960	0.9525				
92131010062				AMCX 107960	0.9525				
92131010063				AMCX 107960	0.9525				
92131010064				AMCX 107960	0.9525				
92131010065				AMCX 107960	0.9525				
92131010066				AMCX 107960	0.9525				
92131010067				AMCX 107960	0.9525				
92131010068				AMCX 107960	0.9525				
92131010069				AMCX 107960	0.9525				
92131010070				AMCX 107960	0.9525				
92131010071				AMCX 107960	0.9525				
92131010072				AMCX 107960	0.9525				

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010073				AMCX 107960	0.9525				
92131010074				AMCX 107960	0.9525				
92131010075	2.48	2.04		AMCX 107960	0.9529	272	2.53	90	
92131010076				AMCX 107960	0.9529				
92131010077				AMCX 107960	0.9529				
92131010078				AMCX 107960	0.9529				
92131010079				AMCX 107960	0.9529				
92131010080				AMCX 107960	0.9529				
92131010081				AMCX 107960	0.9529				
92131010082				AMCX 107960	0.9529				
92131010083				AMCX 107960	0.9529				
92131010084				AMCX 107960	0.9529				
92131010085				AMCX 107960	0.9529				
92131010086				AMCX 107960	0.9529				
92131010087				AMCX 107960	0.9529				
92131010088				AMCX 107960	0.9529				
92131010089				AMCX 107960	0.9529				
92131010090	1.70	2.83		AMCX 107960	0.9521	270	2.69	84	
92131010091				AMCX 107960	0.9521				
92131010092				AMCX 107960	0.9521				
92131010093				AMCX 107960	0.9521				
92131010094				AMCX 107960	0.9521				
92131010095				AMCX 107960	0.9521				
92131010096				AMCX 107960	0.9521				

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010097				AMCX 107960	0.9521				
92131010098				AMCX 107960	0.9521				
92131010099				AMCX 107960	0.9521				
92131010100				AMCX 107960	0.9521				
92131010101				AMCX 107960	0.9521				
92131010102				AMCX 107960	0.9521				
92131010103				AMCX 107960	0.9521				
92131010104				AMCX 107960	0.9521				
92131010105	2.65	1.87		AMCX 107960	0.9530	276	2.55	86	
92131010106				AMCX 107960	0.9530				
92131010107				AMCX 107960	0.9530				
92131010108				AMCX 107960	0.9530				
92131010109				AMCX 107960	0.9530				
92131010110				AMCX 107960	0.9530				
92131010111				AMCX 107960	0.9530				
92131010112				AMCX 107960	0.9530				
92131010113				AMCX 107960	0.9530				
92131010114				AMCX 107960	0.9530				
92131010115				AMCX 107960	0.9530				
92131010116				AMCX 107960	0.9530				
92131010117				AMCX 107960	0.9530				
92131010118				AMCX 107960	0.9530				
92131010119				AMCX 107960	0.9530				
92131010120	2.69	2.31	7.04×10^{-4}	AMCX 107960	0.9526	274	2.35	82	

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010121				AMCX 107960	0.9526				
92131010122				AMCX 107960	0.9526				
92131010123				AMCX 107960	0.9526				
92131010124				AMCX 107960	0.9526				
92131010125				AMCX 107960	0.9526				
92131010126				AMCX 107960	0.9526				
92131010127				AMCX 107960	0.9526				
92131010128				AMCX 107960	0.9526				
92131010129				AMCX 107960	0.9526				
92131010130				AMCX 107960	0.9526				
92131010131				AMCX 107960	0.9526				
92131010132				AMCX 107960	0.9526				
92131010133				AMCX 107960	0.9526				
92131010134				AMCX 107960	0.9526				
92131010135	1.48	2.05		AMCX 107960	0.9524	277	2.30	84	
92131010136				AMCX 107960	0.9524				
92131010137				AMCX 107960	0.9524				
92131010138				AMCX 107960	0.9524				
92131010139				AMCX 107960	0.9524				
92131010140				AMCX 107960	0.9524				
92131010141				AMCX 107960	0.9524				
92131010142				AMCX 107960	0.9524				
92131010143				AMCX 107960	0.9524				
92131010144				AMCX 107960	0.9524				

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010145				AMCX 107960	0.9524				
92131010146				AMCX 107960	0.9524				
92131010147				AMCX 107960	0.9524				
92131010148				AMCX 107960	0.9524				
92131010149				AMCX 107960	0.9524				
92131010150	2.43	2.68		AMCX 107960	0.9527	275	2.70	87	
92131010151				AMCX 107960	0.9527				
92131010152				AMCX 107960	0.9527				
92131010153				AMCX 107960	0.9527				
92131010154				AMCX 107960	0.9527				
92131010155				AMCX 107960	0.9527				
92131010156				AMCX 107960	0.9527				
92131010157				AMCX 107960	0.9527				
92131010158				AMCX 107960	0.9527				
92131010159				AMCX 107960	0.9527				
92131010160				AMCX 107960	0.9527				
92131010161				AMCX 107960	0.9527				
92131010162				AMCX 107960	0.9527				
92131010163				AMCX 107960	0.9527				
92131010164				AMCX 107960	0.9527				
92131010165	1.81	2.14		AMCX 107960	0.9521	278	2.33	83	
92131010166				AMCX 107960	0.9521				
92131010167				AMCX 107960	0.9521				
92131010168				AMCX 107960	0.9521				

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010169				AMCX 107960	0.9521				
92131010170				AMCX 107960	0.9521				
92131010171				AMCX 107960	0.9521				
92131010172				AMCX 107960	0.9521				
92131010173				AMCX 107960	0.9521				
92131010174				AMCX 107960	0.9521				
92131010175				AMCX 107960	0.9521				
92131010176				AMCX 107960	0.9521				
92131010177				AMCX 107960	0.9521				
92131010178				AMCX 107960	0.9521				
92131010179				AMCX 107960	0.9521				
92131010180	2.46	2.13	7.11×10^{-4}	AMCX 107960	0.9526	263	2.25	85	
92131010181				AMCX 107960	0.9526				
92131010182				AMCX 107960	0.9526				
92131010183				AMCX 107960	0.9526				
92131010184				AMCX 107960	0.9526				
92131010185				AMCX 107960	0.9526				
92131010186				AMCX 107960	0.9526				
92131010187				AMCX 107960	0.9526				
92131010188				AMCX 107960	0.9526				
92131010189				AMCX 107960	0.9526				
92131010190				AMCX 107960	0.9526				
92131010191				AMCX 107960	0.9526				
92131010192				AMCX 107960	0.9526				

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010193				AMCX 107960	0.9526				
92131010194				AMCX 107960	0.9526				
92131010195	1.83	2.07		AMCX 107960	0.9524	273	2.71	89	
92131010196				AMCX 107960	0.9524				
92131010197				AMCX 107960	0.9524				
92131010198				AMCX 107960	0.9524				
92131010199				AMCX 107960	0.9524				
92131010200				AMCX 107960	0.9524				
92131010201				AMCX 107960	0.9524				
92131010202				AMCX 107960	0.9524				
92131010203				AMCX 107960	0.9524				
92131010204				AMCX 107960	0.9524				
92131010205				AMCX 107960	0.9524				
92131010206				AMCX 107960	0.9524				
92131010207				AMCX 107960	0.9524				
92131010208				AMCX 107960	0.9524				
92131010209				AMCX 107960	0.9524				
92131010210	2.16	2.86		AMCX 107960	0.9528	269	2.43	86	
92131010211				AMCX 107960	0.9528				
92131010212				AMCX 107960	0.9528				
92131010213				AMCX 107960	0.9528				
92131010214				AMCX 107960	0.9528				
92131010215				AMCX 107960	0.9528				
92131010216				AMCX 107960	0.9528				

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Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

Geocomposite				Geonet					
Roll Number	Ply Adhesion (lb/in)		Transmissivity (m^2/sec)	Resin Lot Number	Density (g/cm^3)	Thickness (mils)	Carbon Black (%)	Tensile Strength MD (lb/in)	Transmissivity (m^2/sec)
	Side "A"	Side "B"							
92131010217				AMCX 107960	0.9528				
92131010218				AMCX 107960	0.9528				
92131010219				AMCX 107960	0.9528				
92131010220				AMCX 107960	0.9528				
92131010221				AMCX 107960	0.9528				
92131010222				AMCX 107960	0.9528				
92131010223				AMCX 107960	0.9528				
92131010224				AMCX 107960	0.9528				
92131010225	2.86	1.88		AMCX 107960	0.9522	265	2.66	90	
92131010226				AMCX 107960	0.9522				
92131010227				AMCX 107960	0.9522				
92131010228				AMCX 107960	0.9522				
92131010229				AMCX 107960	0.9522				
92131010230				AMCX 107960	0.9522				
92131010231				AMCX 107960	0.9522				
92131010232				AMCX 107960	0.9522				
92131010233				AMCX 107960	0.9522				
92131010234				AMCX 107960	0.9522				
92131010235				AMCX 107960	0.9522				

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

POLYETHYLENE RESIN CERTIFICATION

Customer Name : Hallaton, Inc.
Project Name : Grand Tower CCR Closure, IL
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 270-2-6

We hereby certify the following test results for the above referenced product/project:

Resin Manufacturer	Resin Lot Number	Property	Test Method	Units	Resin Manufacturer Value	Tested Value*
Global Plastics	AMCX 107960	Density	ASTM D1505	g/cm^3	0.9480	0.9476
		Melt flow Index	ASTM D1238[(a)]	g/10 min	0.25	0.27

(a) Condition 190/2.16

* Data from SKAPS Quality Control

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Geotextile Certification

Product: TN 270-2-6
Project : Grand Tower CCR Closure, IL

We hereby certify the following test results for the above referenced product/project :

GEOCOMP ROLL#	FABRIC SIDE	WEIGHT oz/yd^2	GRAB lbs. (MD)	GRAB ELG % (MD)	GRAB lbs. (XMD)	GRAB ELG % (XMD)	TRAP lbs. (MD)	TRAP lbs. (XMD)	CBR PUNCTURE lbs	AOS us sieve	WATER-FLOW gpm/ft^2	PERM-ITY sec^{-1}
92131010001	Side A	6.29	162	75	179	84	73	90	472	70	132	1.76
	Side B	6.28	168	69	177	81	72	80	484	70	133	1.77
92131010030	Side A	6.36	170	72	174	83	80	87	452	70	136	1.82
	Side B	6.24	162	70	176	79	73	83	477	70	136	1.82
92131010060	Side A	6.47	165	74	175	85	74	89	493	70	133	1.77
	Side B	6.36	170	72	174	83	80	87	452	70	136	1.82
92131010090	Side A	6.35	167	68	178	76	80	90	491	70	135	1.80
	Side B	6.46	160	68	171	75	78	83	495	70	136	1.82
92131010120	Side A	6.69	161	67	172	80	74	84	470	70	136	1.82
	Side B	6.28	168	69	177	81	72	80	484	70	133	1.77
92131010150	Side A	6.39	167	74	175	85	71	89	462	70	136	1.82
	Side B	6.60	166	73	173	77	75	85	457	70	135	1.80
92131010180	Side A	6.65	164	71	177	81	77	82	464	70	132	1.76
	Side B	6.47	165	74	175	85	74	89	493	70	133	1.77
92131010210	Side A	6.39	167	74	175	85	71	89	462	70	136	1.82
	Side B	6.60	166	73	173	77	75	85	457	70	135	1.80

*571 Industrial Parkway, Commerce, GA 30529 * Ph : 706-336-7000 * Fax : 706-336-7007 * Email : contact@skaps.com*

Appendix M - Geocomposite Conformance Testing

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-001
LAB ID NO.: L20-010-001-001
MATERIAL: SKAPS TN 270-2-6 Geocomposite
ROLL NO: 0092131010001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	2.2	1.5	5.4	3.0	3.0	**3.02**	1.333
	SIDE"B"	MD-lb/in	3.9	2.9	3.1	1.9	2.3	**2.78**	0.693

CHECKED BY: JLK DATE: 1/23/2020

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TRANSMISSIVITY TEST RESULTS

ASTM D 4716

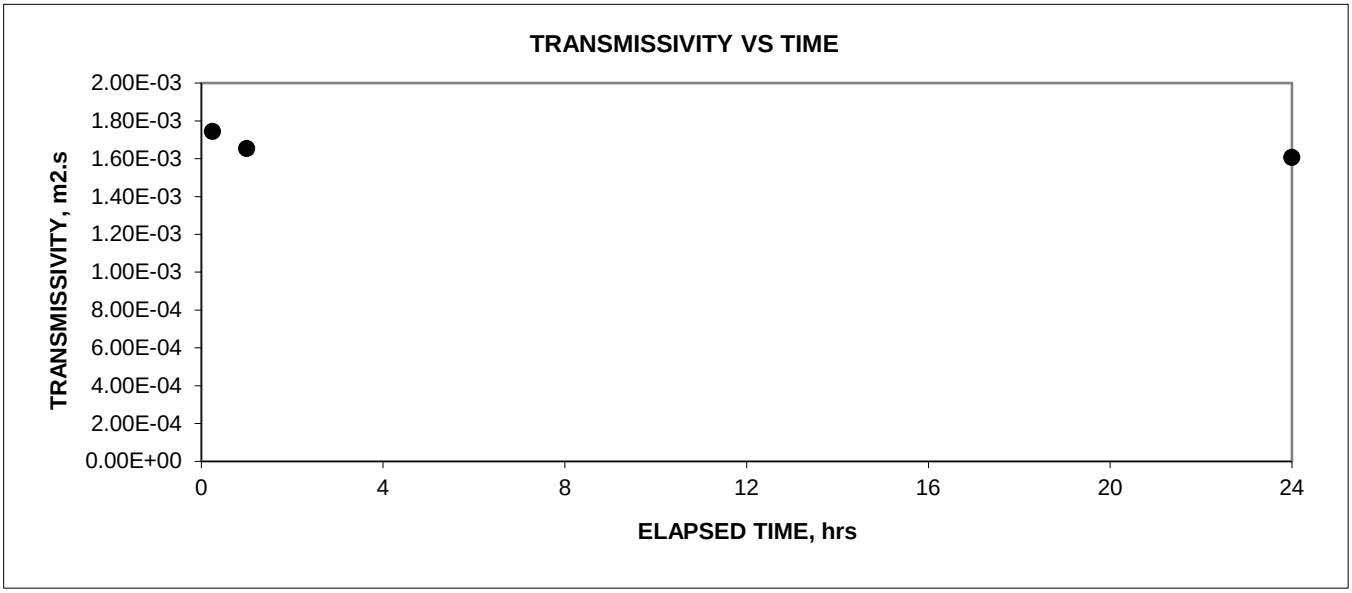
CLIENT: ERM
PROJECT: Grand Tower Inactive Ash Basin Closure
MATERIAL: SKAPS TN 270-2-6
Geocomposite

PROJECT NO.: L20-010-001
LAB I.D. NO.: L20-010-001-001
ROLL NO.: 0092131010001
REPLICATE NO.: 1 of 1

TEST SECTION: Plate
Geocomposite
Plate

10,000 psf NORMAL COMPRESSIVE STRESS

ELAPSED TIME (hrs)	MANOMETERS RES. (in)	MANOMETERS WEIR (in)	HYDR. GRAD.	COLLECTION DATA VOLUME (ml)	COLLECTION DATA TIME (sec.)	WATER TEMP °C	AVERAGE FLOW RATE (l/s-m)	AVERAGE FLOW RATE (gpm/ft)	CALCULATED TRANSMISSIVITY (m2/sec)
0.25	3.35	0.35	0.25	1350 1350 1350	10 10 10	19.5	4.36E-01	2.108	1.75E-03
1	3.35	0.35	0.25	1280 1280 1280	10 10 10	19.5	4.14E-01	1.999	1.65E-03
24	3.35	0.35	0.25	1240 1240 1240	10 10 10	19.4	4.02E-01	1.941	1.61E-03



CHECKED BY: JLK DATE: 1/23/2020

C:\My Documents\EXCEL\Templates\[Trans100hr1Load1Grad.xls]Sheet1

T:\Synthetics\2020 Synthetics\010 - ERM - Grand Tower Inactive Ash Basin Closure\L20-010-001 Ply & Trans 24hr\[L20-010-001-001 trans.xls]Rep1 L20-010-001-00 1/23/2020

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-001
LAB ID NO.: L20-010-001-002
MATERIAL: SKAPS TN 270-2-6 Geocomposite
ROLL NO: 0092131010088

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	2.2	2.2	1.4	2.5	3.9	**2.44**	0.820
	SIDE"B"	MD-lb/in	1.2	1.3	2.5	2.3	2.9	**2.06**	0.666

CHECKED BY: JLK DATE: 1/23/2020

T:\Synthetics\2020 Synthetics\010 - ERM - Grand Tower Inactive Ash Basin Closure\L20-010-001 Ply & Trans 24hr\[L20-010-001-002 ply.xls]Sheet1 L20-010-001-002 1/23/2020

TRANSMISSIVITY TEST RESULTS

ASTM D 4716

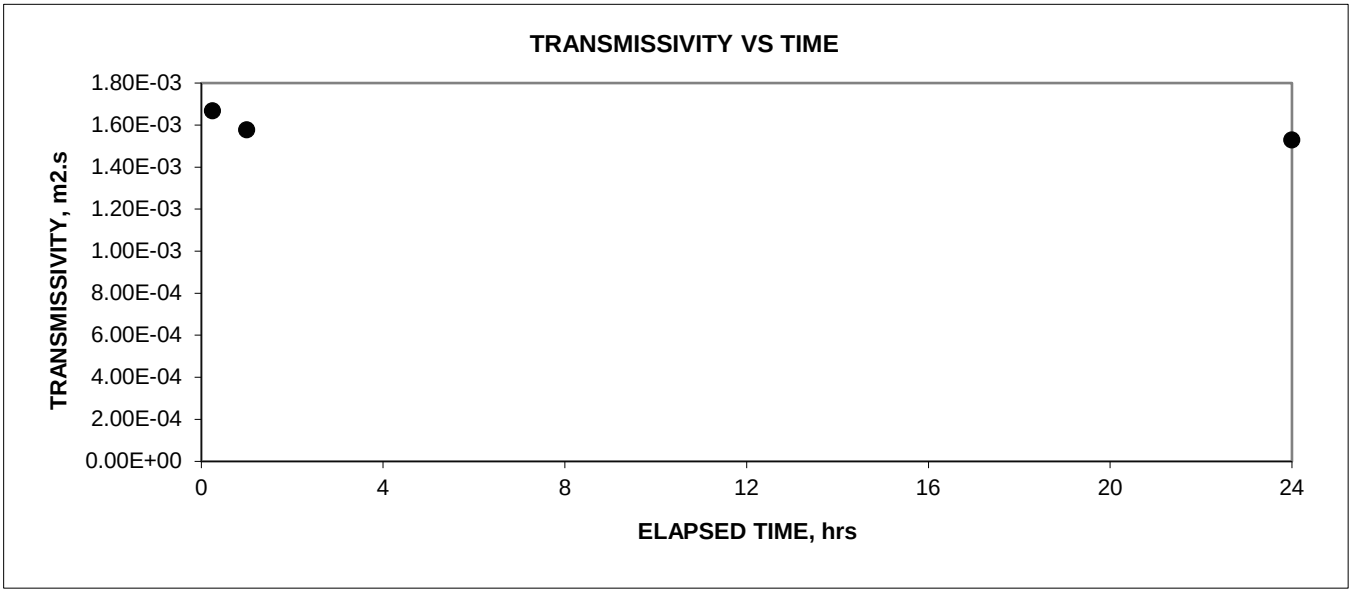
CLIENT: ERM
PROJECT: Grand Tower Inactive Ash Basin Closure
MATERIAL: SKAPS TN 270-2-6
Geocomposite

PROJECT NO.: L20-010-001
LAB I.D. NO.: L20-010-001-002
ROLL NO.: 0092131010088
REPLICATE NO.: 1 of 1

TEST SECTION: Plate
Geocomposite
Plate

10,000 psf NORMAL COMPRESSIVE STRESS

ELAPSED TIME (hrs)	MANOMETERS RES. (in)	MANOMETERS WEIR (in)	HYDR. GRAD.	COLLECTION DATA VOLUME (ml)	COLLECTION DATA TIME (sec.)	WATER TEMP °C	AVERAGE FLOW RATE (l/s-m)	AVERAGE FLOW RATE (gpm/ft)	CALCULATED TRANSMISSIVITY (m2/sec)
0.25	3.65	0.65	0.25	1290 1290 1290	10 10 10	19.5	4.17E-01	2.014	1.67E-03
1	3.65	0.65	0.25	1220 1220 1220	10 10 10	19.5	3.94E-01	1.905	1.58E-03
24	3.65	0.65	0.25	1180 1180 1180	10 10 10	19.4	3.82E-01	1.847	1.53E-03



CHECKED BY: JLK DATE: 1/23/2020

C:\My Documents\EXCEL\Templates\[Trans100hr1Load1Grad.xls]Sheet1

T:\Synthetics\2020 Synthetics\010 - ERM - Grand Tower Inactive Ash Basin Closure\L20-010-001 Ply & Trans 24hr\[L20-010-001-002 trans.xls]Rep1 L20-010-001-00 1/23/2020

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: Grand Tower Inactive Ash Basin Closure
PROJECT NO.: L20-010-001
LAB ID NO.: L20-010-001-003
MATERIAL: SKAPS TN 270-2-6 Geocomposite
ROLL NO: 0092131010175

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
Geocomposite									
PLY ADHESION	D 7005								
	SIDE "A"	MD-lb/in	3.5	1.6	4.0	2.1	1.6	**2.55**	0.989
	SIDE"B"	MD-lb/in	2.3	1.1	2.4	1.8	2.7	**2.05**	0.577

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TRANSMISSIVITY TEST RESULTS

ASTM D 4716

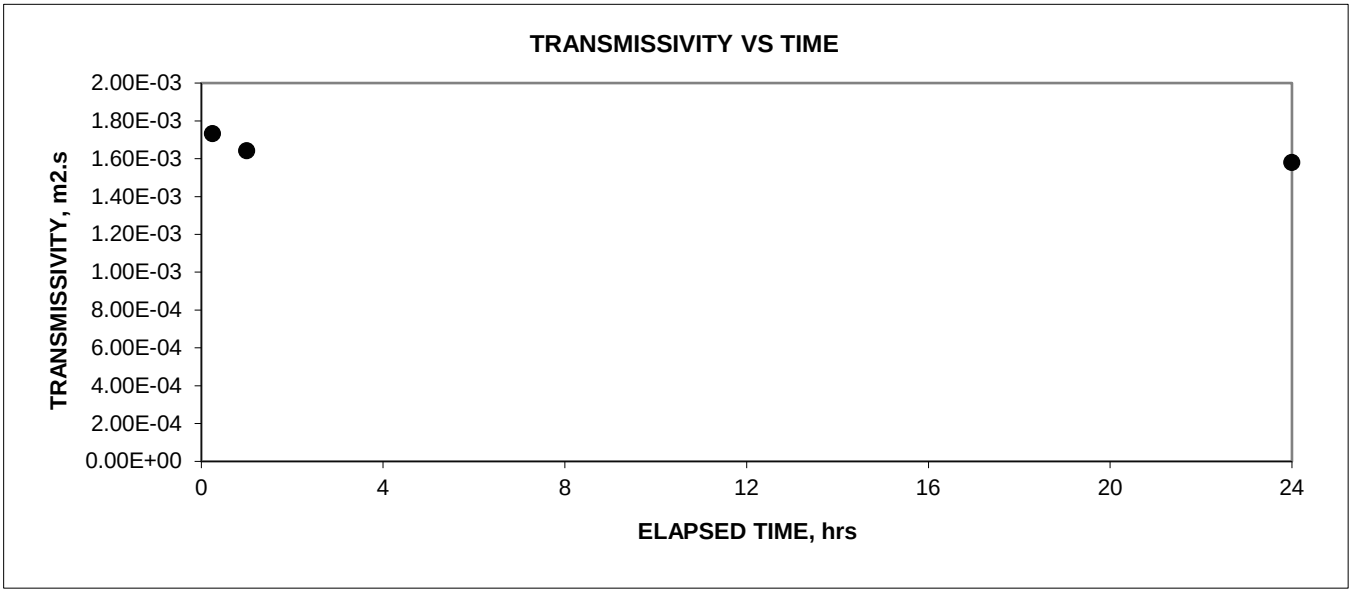
CLIENT: ERM
PROJECT: Grand Tower Inactive Ash Basin Closure
MATERIAL: SKAPS TN 270-2-6
Geocomposite

PROJECT NO.: L20-010-001
LAB I.D. NO.: L20-010-001-003
ROLL NO.: 0092131010175
REPLICATE NO.: 1 of 1

TEST SECTION: Plate
Geocomposite
Plate

10,000 psf NORMAL COMPRESSIVE STRESS

ELAPSED TIME (hrs)	MANOMETERS RES. (in)	MANOMETERS WEIR (in)	HYDR. GRAD.	COLLECTION DATA VOLUME (ml)	COLLECTION DATA TIME (sec.)	WATER TEMP °C	AVERAGE FLOW RATE (l/s-m)	AVERAGE FLOW RATE (gpm/ft)	CALCULATED TRANSMISSIVITY (m2/sec)
0.25	3.30	0.30	0.25	1340 1340 1340	10 10 10	19.5	4.33E-01	2.092	1.73E-03
1	3.30	0.30	0.25	1270 1270 1270	10 10 10	19.5	4.10E-01	1.983	1.64E-03
24	3.30	0.30	0.25	1220 1220 1220	10 10 10	19.4	3.95E-01	1.909	1.58E-03



CHECKED BY: JLK DATE: 1/23/2020

C:\My Documents\EXCEL\Templates\[Trans100hr1Load1Grad.xls]Sheet1

T:\Synthetics\2020 Synthetics\010 - ERM - Grand Tower Inactive Ash Basin Closure\L20-010-001 Ply & Trans 24hr\[L20-010-001-003 trans.xls]Rep1 L20-010-001-00 1/23/2020

Appendix N - Photographs

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/10/19

Description:
Delivery of bulldozer



Date: 12/10/19

Description:
Assembly of recently delivered excavator.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/13/19	
Description: Silt fence installation – west side of impoundment.	

Date: 12/14/19	
Description: Northeast view of site trailers	
This is the perforated	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/6/20

Description:
Northeast looking view of north pond and pump (pumping to ditch to south pond)



Date: 1/6/20

Description:
Southeast looking view of north pond pump discharge line



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/7/20

Description:
Northwest looking view of abandoned sections of fiberglass discharge pipe at north side of basin



Date: 1/7/20

Description:
Northwest looking view of remaining pipe supports for fiberglass discharge pipe



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/7/20

Description:
North looking view of remaining pipe supports for fiberglass discharge pipe



Date: 1/7/20

Description:
Northeast looking view of north pond after pumping



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/7/20

Description:
East looking view of south pond after receiving water from the north pond pumping



Date: 1/8/20

Description:
East looking view of road expansion south of jobsite trailers



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/9/20

Description:
South looking view of south pond discharge point into sediment bag



Date: 1/9/20

Description:
East looking view of south pond discharge pump and intake (intake held up by buckets)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/13/20

Description:
North looking view of southeast corner of basin after 3-inch rain event over the weekend



Date: 1/13/20

Description:
Pumping from south pond. Note backed up drainage south of basin



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/7/20 **Description:** East looking view of typical equipment extraction after testing basin for trafficability with unloaded truck.	. 

Date: 1/14/20 **Description:** **Sou**th looking view of southwest corner – river at approximately 560 feet	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/14/20

Description:
East looking view of ash movement



Date: 1/14/20

Description:
North looking view of new barriers for diesel AST



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/15/20 **Description:** South looking view of new 10 by 15 foot filter bag during pumping south pond Note zone of clear water in south ditch in comparison with more sediment laden river water.	

Date: 1/15/20 **Description:** North looking view of bottom ash being used to fortify haul road.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/16/20 **Description:** West looking view of piezometer abandonment (PA-B) – pull protective casing	

Date: 1/16/20 **Description:** West looking view of piezometer abandonment (PA-B) – plug with bentonite chips	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/16/20 **Description:** West looking view of piezometer abandonment (PA-B) – pull plugged piezometer casing (top 5 feet)	

Date: 1/16/20 **Description:** Restore ground surface post piezometer removal Similar actions taken for second piezometer (PA-A)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/17/20

Description:
North looking view of south pond excavation to expand volume



Date: 1/20/20

Description:
Northeast view of ash movement operations



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/22/20	
Description: Southwest looking view of ash movement operations (southern portion of basin)	

Date: 1/22/20	
Description: Northwest view of new diesel AST located just north of main site entrance. AST was pumped empty prior to movement. Note gray metal containment for AST.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/23/20

Description:
West looking view of ash movement operations (northern portion of basin)



Date: 1/23/20

Description:
West looking view of ash movement operations (southern portion of basin)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/24/20

Description:
Northeast looking view of testing new filter bag (10x15 feet; 50 micron) inside berm.



Date: 1/27/20

Description:
Outfall 002 sample collection from the 50 micron bag.

Note that the whitish appearance on the bag is frost. The sample contained a final TSS result of 7 mg/L.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/28/20

Description:
West looking view of ash movement operations at the south end of the basin.



Date: 1/20/20

Description:
Southeast looking view of ash movement operations at far west of basin, just north of basin center (slightly south of north pond)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/28/20

Description:
South looking view of perimeter berm, northwest portion (pre-rill repair)



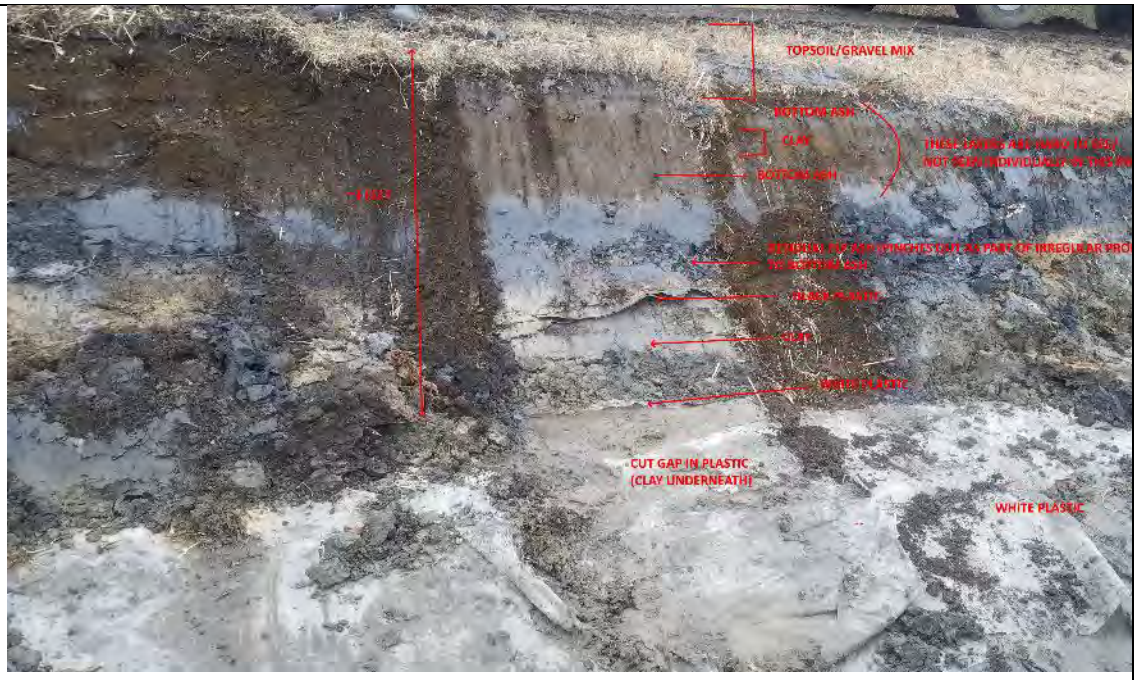
Date: 1/28/20

Description:
East view of south perimeter berm checking extent of ash



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 1/28/20	
Description: South looking view of north-facing side of south perimeter berm (with added notes)	

Date: 1/29/20	
Description: North looking view of ash test pit just north of south gate.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/29/20

Description:
Northeast looking view of test pit at basin perimeter berm (north end; near first AST location). Ash thickness of ~6 inches.



Date: 1/29/20

Description:
North looking view of ash test pit just west of central portion of bottom ash area on top of perimeter berm (ash thickness of ~2 feet)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/29/20

Description:
Northeast looking view of test pit outside of basin perimeter toward south end on east side; no clay visible



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/29/20

Description:
Northeast looking view of ash test pit at northeast area on east side (note gate on berm in background); apparent clay cap with a layer of ash of unknown eastern extend underlain by clay; Excavation depth of ~6 feet.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 1/30/20

Description:
North looking view of basin perimeter at northwest after smoothing of erosion rills.



Date: 2/3/20

Description:
Northeast view of ash movement from west central area



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/3/20	
Description: East looking view of ash movement operations (dumping and spreading) at central area of the basin.	

Date: 2/5/20	
Description: Southwest looking view of filter bag at Outfall 002	
Note the addition of guide rope and picket for sampler access. Other ropes are for securing the bag as it slowly fills with sediment.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/7/20

Description:
Northwest looking view of ash movement operations



Date: 2/8/20

Description:
Northeast view of ash movement operations just south of north pond.

Long reach excavator is moving material up to the second excavator to load trucks



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/10/20 **Description:** Northwest view of starting digging ash in earnest at south portion of basin	

Date: 2/11/20 **Description:** East looking view of (bottom) ash movement operations at southwest area of the basin to facilitate ash removal in southwest basin area	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/11/20	
Description: East looking view of modified pump layout at Outfall 002	

Date: 2/11/20	
Description: Northeast looking view of south pond with relocated intake (further out/north into water)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/12/20

Description:
East view of ash movement operations along south end of basin.



Date: 2/12/20

Description:
Southeast view of ash movement operations along west side of basin, just south of north pond.

Excavations (at left and in front of excavator) are connected and water flows south.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/13/20

Description:
Southeast view of ash movement operations along south end of north pond.

The long reach excavator will be needed to complete the connection between the north pond and the adjacent excavation.



Date: 2/13/20

Description:
Northwest view of ash movement operations along south end of north pond.

Excavation from earlier in the week is now connected to the pre-existing south pond.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/19/20

Description:
North view of ash movement at south of central/west side of basin; truck in photo at end of haul road



Date: 2/19/20

Description:
Northeast looking view of ash movement operations at southwest area of the basin; excavation is being pumped to extended south pond



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/19/20	
Description: Southeast looking view of excavation work just south of north pond.	
Clay is being segregated from ash (clay left/north of excavator). Iron oxide staining is confined to the visible north pond sump; remainder of undisturbed water in basin is clear	

Date: 2/20/20	
Description: West looking view of example geotextile delivery	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/20/20	
Description: Northwest view of south pond intake repositioning (after adding filter bag cover to intake screen)	
Intake was moved again to the east (right) on 22Feb20 when another section of intake hose was added.	

Date: 2/21/20	
Description: North view of ash movement operations along west side of basin, just south of north pond.	
Excavation in foreground is about to be pumped to west ditch (which will fill SW area excavation)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/22/20

Description:
Southeast view of ash movement operations along west/south central area of basin



Date: 2/22/20

Description:
Northeast view of ash movement operations along north end of basin.

Bottom ash movement for roads at photo left



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/22/20

Description:
Southeast view of ash excavation on west side of basin.

See photo #7 for location; clay visible in excavation (pending GPS elevation check, clay thickness/presence will be verified)



Date: 2/22/20

Description:
Close up of photo #9 (clay is brownish material at excavation bottom and short sidewall in excavation)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/22/20

Description:
West view of stockpiled and spread ash from week of 19-22Feb20 (plus prior work also in



Date: 2/24/20

Description:
East view of ash movement at southwest area of basin; excavator just moved pile in photo from foreground area



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/24/20

Description:
North looking view of just north of southwest corner of the basin



Date: 2/27/20

Description:
East looking view of ash movement in south area, west side of basin.



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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/20/20

Description:
West looking view of laydown area



Date: 2/28/20

Description:
West view of south ash movement – ash from west central area



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/28/20

Description:
North view of segregated clay from excavation just south of north pond



Date: 2/29/20

Description:
North view of southwest corner; connecting excavations and allowing water flow



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 2/29/20

Description:
East view of ash movement operations just south of north pond.



Date: 2/29/20

Description:
East view of road building in southwest area of basin.

For movement of sump excavated ash



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/1/20

Description:
North view of bottom ash road (more brown material) running east west – from west turnaround area to pre-existing road at east



Date: 3/1/20

Description:
West view of fortified east –west road on south end; it now is mostly connected to southwest corner road

This is the south road loop and will assist in ash movement on the south side of the basin.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/3/20 **Description:** North view of ash movement at south area of basin/ at Outfall 002 intake – digging a larger sump	

Date: 3/3/20 **Description:** East looking view of just north of site center – pushing material for future load out or grading moved material (far dozer)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/4/20 **Description:** North view of dug sump at Outfall 002 intake – before connecting to water-containing excavation	

Date: 3/4/20 **Description:** Northwest looking view of southwest corner ash movement	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/9/20

Description:
North view of southwest ash movement - from ~5,6 Mar 20



Date: 3/9/20

Description:
North view of southwest ash movement - from ~6 Mar 20



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/9/20

Description:
Southeast view of area just south of north pond area – work from ~5 (possibly 6) Mar20.



Date: 3/9/20

Description:
North view of pump/filter setup for testing filtering outfall 002 discharge water



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/9/20

Description:
Northeast looking view of ash movement in west area, north of the southwest corner (at far photo right)



Date: 3/10/20

Description:
East view of digging area east of north pond

Material was extremely loose/wet.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/10/20

Description:
Southeast looking view of southwest area – bottom ash road building (dozer) and ash movement (excavator)



Date: 3/11/20

Description:
North view of south ash movement – two excavators working in tandem to dig ash and load trucks



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/12/20

Description:
West view of south ash movement – dig, load and grading dumped ash



Date: 3/13/20

Description:
Northwest view (from southeast corner) of ash movement – digging and loading trucks, grading and manipulating ash (far dozer [in line with tower] and excavator at right)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/17/20

Description:
Southeast view of ash excavating for future hauling; long reach excavators in background stacking hauled ash



Date: 3/17/20

Description:
Northwest looking view of ash stacking in central portion of the site with long reach excavators



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 3/18/20	
Description: North view of new Outfall 002 pumping setup	
Note system is in recirculation mode with hose at right side of filter skid pointed back into the basin.	

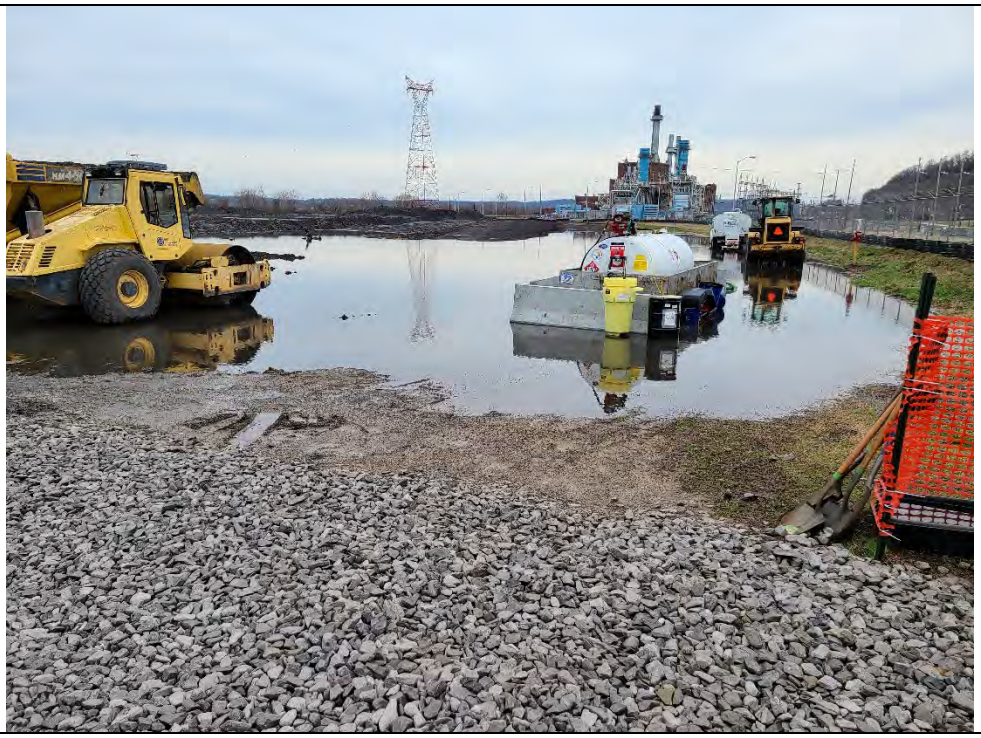
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Date: 3/20/20	
Description: North looking view from southwest corner after 1.6-inch rain event from prior day	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/20/20 **Description:** West looking view of "southeast low area" after 1.6-inch rain event from prior day	

Date: 3/20/20 **Description:** Northwest view of just north of main site entrance after 1.6-inch rain event from prior day.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/21/20

Description:
Northeast view of ash movement – excavating for future truck hauling



Date: 3/23/20

Description:
Northeast view of ash movement operations – loading/hauling/dumping and grading



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/23/20

Description:
Southwest looking view of ash stacking in north-of-central portion of the site with long reach excavator



Date: 3/23/20

Description:
Northwest view of ash movement operations in the southwest, west and southeast



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/25/20

Description:
South looking view of southwest area of site, showing new high Mississippi River water level since project start

Water from south ditch.



Date: 3/25/20

Description:
Northeast looking view of west side ash movement operations (southwest corner at photo right, out of frame)



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 3/27/20 **Description:** North view of north pond after excavating and pumping water north from south pond/Outfall 002 sump	

Date: 3/28/20 **Description:** North view of Outfall 002 sump after pumping offsite and to the north. Pump clogged with sediment at the current intake elevation/position.	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 3/30/20

Description:
Northwest view of ash movement operations – digging/hauling and stacking



Date: 3/31/20

Description:
Northeast looking view of north pond



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 3/31/20 **Description:** North view of ash deepening south pond/Outfall 002 sump to enable pumping of water north	

Date: 4/1/20 **Description:** North looking view of southwest area of site digging/loading/hauling	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/2/20 **Description:** West looking view of southwest area of site digging/loading/hauling	

Date: 4/2/20 **Description:** North looking view of southwest area of site digging/loading/hauling	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/3/20	
Description: North looking view of southwest area of site digging/loading/hauling	
Southwest corner side slope and area under ponded water dug to clay liner base.	

Date: 4/4/20	
Description: Northeast looking view of southwest area of site digging/loading/hauling	
Southwest corner side slope and area under ponded water dug to clay liner base. Note little difference in water level from prior day (minimal ash water exfiltration).	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/6/20 **Description:** North view of ash movement operations from southwest corner – digging/hauling and stacking	

Date: 4/6/20 **Description:** East looking view of south side of basin – three excavators working in tandem to get ash to trucks	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/14/20 **Description:** North view of ash movement just east of Outfall 002 sump	

Date: 4/14/20 **Description:** East looking view of southeast area of site digging ash Note exposed clay basin bottom. Berm clay layer with white plastic appears to be interim layer and top of original clay berm lies below.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/14/20 **Description:** East looking view of south area of site digging/loading/hauling	

Date: 4/17/20 **Description:** Southeast looking view of west/ southwest area of site digging/loading/hauling	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/17/20 **Description:** South looking view of west side of basin with southwest corner in far ground - site digging/loading/hauling	

Date: 4/17/20 **Description:** Northwest looking view of north of center ash consolidation work Orange excavator is digging slots for truck dumping space/stacking ash, dozer is pushing dumped material to block end of dumping slot to prevent outward flow of loose ash (excavator is idle)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/18/20 **Description:** North looking view of southwest corner of basin	

Date: 4/18/20 **Description:** East looking view of southwest corner of ash basin	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/22/20

Description:
Northwest looking view of south side of basin – digging ash in southeast, south and loading trucks



Date: 4/22/20

Description:
Northeast view of ash movement at far south edge of basin



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/22/20 **Description:** Northeast looking view of west side bench elevation modifications	

Date: 4/22/20 **Description:** East looking view of south area of site digging/loading/hauling	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 4/24/20

Description:
East looking view of ash movement work

Note additional material removed up to and adjacent to Outfall 002 structure. Center excavator is moving previously stockpiled material



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 4/27/20	
Description: Southeast corner test pit for ash delineation work	
Clay berm is present at ~12 feet below ground surface (greenish gray clay).	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/27/20

Description:
View of typical northeast ash delineation test pit. Test pit runs from NE to SW (at right)



Date: 4/27/20

Description:
Northwest view of ash movement at far southeast area of basin



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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/28/20

Description:
Northeast looking view of southwest area ash movement operations



Date: 4/28/20

Description:
East looking view of south area of site digging; clay basin bottom is exposed along south side



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/29/20 **Description:** North view of western side of the site the day after a 2-inch rain event	

Date: 4/29/20 **Description:** South view of eastern side of the site the day after a 2-inch rain event	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/1/20

Description:
Northeast looking view of ash movement work, digging ash from western basin edge, exposing underlying clay



Date: 5/2/20

Description:
Northeast looking view of ash movement work

Note slope adjustment at southwest corner and additional ramp just north of the corner (in front of long reach in photo)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/2/20

Description:
North looking view of west side ash movement work



Date: 5/5/20

Description:
North view of west side of ash basin, digging to clay base.



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 5/5/20

Description:
Southeast view of closing off north pond (foreground) from other water filled excavations to enable pumping in excavations.



Date: 5/7/20

Description:
North view of south ash stack, showing direct dumping on top of stack (relatively drier ash material).



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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/7/20

Description:
Northeast looking view of southwest area ash movement operations – digging to clay base

Remnants are present to dam off water as excavator moves south. This section of ash was relatively dry.



Date: 5/9/20

Description:
North looking view of east side of site – ash dumping, dozing ash stack and digging troughs in ash stack/stack adjustments

The long reach excavator in on the ash stacks, adjusting the material.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/11/20

Description:
East looking view of southern ash movement operations.



Date: 5/12/20

Description:
North view of southeast ash movement operations.

Note exposed clay basin bottom at photo center



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/12/20

Description:
Northwest view of ash movement operation in south (former southeast) ash stack.



Date: 5/12/20

Description:
Northeast view of southeast area ash movement operations.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/18/20	
Description: North looking view of southwest ash movement operations.	
Note that the outermost bench right at the southwest corner has been removed	

Date: 5/19/20	
Description: North view of southern ash movement operations.	
Note continued removal of southernmost bench to basin clay	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/19/20

Description:
Northeast view of ash movement operation in southeast – removing loose ash “bowls” in preparation for break



Date: 5/20/20

Description:
North view of southern area ash movement operations – removal of bench material along south and ash stacking on south stack



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/27/20

Description:
East looking view of southwest area of ash basin after holiday break (~3.5 inches of rain).



Date: 5/27/20

Description:
North view of new-to-site filter skid (2-6 bag housings and 6-inch lines)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/28/20

Description:
West view of ash geotech sampling of undisturbed materials in southeast area of site. Pulling Shelby tube with rod and strap in photo.



Date: 5/29/20

Description:
East view of southern area ash movement operations – removal/hauling of material along south



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/29/20	
Description: North view of southern area ash movement operations – removal/hauling of top bench (haul road level) material along south	

Date: 5/29/20	
Description: Northeast view of south/western area ash movement operations – – removal/hauling of top bench (haul road level) material along west Long reach excavator at photo left has smoothed/repaired deep rills in the west central area.	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 5/29/20 **Description:** East view of western area ash movement operations (just south of north pond area at west)– removal/hauling	

Date: 5/29/20 **Description:** Northeast view of south/western area ash movement operations –– removal/hauling of top bench (haul road level) material along west Long reach excavator at photo left has smoothed/repaired deep rills in the west central area.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/30/20 **Description:** East view of western area ash movement operations (just south of north pond area at west)– removal/hauling	. 

Date: 5/30/20 **Description:** Northeast view of area ash movement operations – removal/hauling of top bench and middle bench material Dumping on top of southern ash stack visible at photo right.	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/1/20

Description:
Southeast looking view of west/southwest area of ash basin. Excavator on bench is cutting to final grade.



Date: 6/2/20

Description:
North view of south side excavation work



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/2/20

Description:
Northeast view of excavation/hauling in southeast corner of ash basin. Excavator at left & long reach excavator cutting to final grade



Date: 6/2/20

Description:
East view of southern area ash movement operations – removal/hauling of material along south/southwest



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/3/20 **Description:** East view of southeastern area ash movement operations – digging to clay/final grade.	

Date: 5/29/20 **Description:** North view of south/western area ash movement operations – – removal/hauling of upper bench (below haul road level) material at southwest Dozer at photo left is moving ash at/near final cut elevations for eventual load out.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 5/29/20	
Description: East view of western area ash movement operations removal/hauling	
Excavator at left in photo is cutting to final grade.	

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Date: 5/29/20	
Description: Northeast view of south/western area ash movement operations – – removal/hauling of top bench (haul road level) material along west	
Long reach excavator at photo left has smoothed/repaired deep rills in the west central area.	

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PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/5/20 **Description:** East view of western area ash movement operations (just south of north pond area at west)– removal/hauling	. 

Date: 6/6/20 **Description:** North view of area ash movement operations at west central – removal/hauling of material Dumping on top of northwestern ash stack visible at photo right of center.	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/8/20 **Description:** North looking view of 8-inch pump filter bag canister setup.	

Date: 6/8/20 **Description:** Northeast view of northwest area of cell ash movement.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/10/20

Description:
East view of excavation/hauling in northwest area of cell. Excavator at bottom/closest to photographer cutting to final grade



Date: 6/11/20

Description:
North view of western area ash movement operations.



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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/12/20	
Description: North view of north pond and north pond excavation.	
Note the color of the water in the north pond excavation (north of the north pond).	

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Date: 6/12/20	
Description: Northeast view of south/western area ash movement operations.	
Long reach at photo right is cutting to grade and lowest excavator at left is cutting a drainage ditch.	

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PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/12/20	
Description: East view of northwestern area ash movement operations removal/hauling	

Date: 6/13/20	
Description: North view of western area ash movement operations.	
Excavator at photo left is cutting to final grade.	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/15/20	
Description: North looking view of west side ash movement operations (bench removal)	
Removal of material at slope. Note darker material was recently exposed via material removal.	

Date: 6/16/20	
Description: North view of southwest area of cell ash movement.	
Note long reach excavator mucking out southwest corner and farthest north excavator, at clay bottom on west side, cleaning extra material at the toe of	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/16/20	
Description: North view of excavation/hauling in southwest area of cell. Excavator loading trucks using cell perimeter clay road.	

Date: 6/17/20	
Description: Northwest view of southwestern area ash movement operations.	
Bottom excavators cutting toe of ash and other excavators removing material from benches or stockpile “bowls” for load out to ash stacks.	

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/18/20 **Description:** North view of southeastern corner of cell – cutting out material to define cell southeastern corner.	

Date: 6/18/20 **Description:** Northwest view of southwestern area ash movement operations.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/18/20	
Description: Northwestern view of southern area ash movement operations – quicklime delivery to stabilize wet material.	
The quicklime was used in "bowls" over the next several days to assist in drying wet ash.	

Date: 6/19/20	
Description: West view of south/southwestern area ash movement operations.	
Excavator closest to photographer is cutting south central side of cell to rough grade. Other three excavators are either loading trucks on the bottom clay road or relaying material to the top for eventual load out by trucks to the ash stacks.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/19/20	
Description: East view of south/southwestern area ash movement operations.	
Excavator closest to photographer is cutting southwest side of cell to rough grade. Other three excavators are either loading trucks on the upper road or mixing quicklime to wet ash for eventual load out by trucks to the ash stacks.	

Date: 6/20/20	
Description: Northeast view of western area ash movement operations – grading ash to near final grade.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/22/20

Description:
North looking view of north ash movement operations



Date: 6/22/20

Description:
East view of southwest area of cell ash movement.

Note last of bench ash material under excavator on slope removed AM of 23Jun20



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/24/20

Description:
East view of grading/hauling in southwest area of cell. Raising level of haul road



Date: 6/24/20

Description:
North view of northern area ash movement operations.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/25/20

Description:
North view of northwestern corner of cell – fortifying separator berm to dig within north pond area with long reach excavator



Date: 6/18/20

Description:
North view of western side of ash movement operations – grading cell to near final elevations and loading out extra material graded off slope



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/25/20 **Description:** Eastern view of northern area ash movement operations – digging a connection across north pond to facilitate water movement	. 

Date: 6/26/20 **Description:** North view of north pond area ash movement operations. Excavator at right is connecting the far north excavation to the sump (out of photo at lower left)	. 

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 6/27/20 **Description:** North view of north pond morning after two consecutive days of excavation disturbance (last of which included bottom ash digging). Note iron colored water at north side of water with typical greenish cast colored water at southern end.	. 

Date: 6/27/20 **Description:** Northeast view of southeastern area ash movement operations – grading ash to near final grade.	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 6/27/20 **Description:** Western view of central area ash movement operations – placing ash to build up west side to near final elevation in preparation of cover placement crew	. 

Date: 6/27/20 **Description:** South view of south central area ash movement operations – grading ash to near final elevation on west side in southwest (and working toward final elevation in the south). Material from within the cell footprint was moved toward the perimeter for cover placement on slopes by cover crew. Photo taken from on top of cell near northwestern corner at break in slope	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/7/20 **Description:** North looking view of southwest corner after pumping from North Pond (site received ~2.5 inches of rain over break)	

Date: 7/7/20 **Description:** Northeast view of North Pond area ash movement. Digging sump drainage	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/7/20	
Description: Southeast view of west cell slope – showing rain related erosion	

Date: 7/8/20	
Description: North view of southern cell slope building/ash movement operations.	

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PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 7/8/20 **Description:** West view of cell – removing centrally located ash material and relocating to the west and south to build cell slopes This work will allow future cover installation on cell slopes only (stop at first break in slope).	. 
Date: 7/8/20 **Description:** North view of North Pond area ash movement operations	. 
Date: 7/9/20	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Description: Northern view of morning North Pond work area – note iron rich seep water Pumping of this water has turned the southwestern corner water body entirely rust colored (with the suspended iron particles).	

Date: 7/9/20 **Description:** West view of south cell slope area ash movement operations. Filling in of ash haul road using North Pond area bottom ash.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/9/20 **Description:** North view of North Pond ash movement operations.	

Date: 7/10/20 **Description:** East view of North Pond area ash movement operations. Central excavator is on clay, moving loose material sitting on top to excavator in photo left.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/11/20 **Description:** Western view of North Pond area ash movement operations	

Date: 7/11/20 **Description:** Northern view of North Pond area ash movement operations Area is being dug to clay at this stage; the clay is approximately two feet higher than the area final grade (two feet of clay will be removed)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/13/20

Description:
North looking view of North Pond excavation



Date: 7/14/20

Description:
West view of south side of main cell, filling in former ash haul road



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/14/20

Description:
East view looking view of North Pond excavation



Date: 7/15/20

Description:
East view of southern cell slope grading.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/8/20	
Description: East view of North Pond ash movement operations. Note separator berm material removal.	

Date: 7/15/20	
Description: North view of southern cell slope movement operations	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/16/20	
Description: Northern view of southwest corner	
Note that 1.7-inch rainfall on PM of Fri 17Jul20 changed the appearance of the water to a more typical greenish color	

Date: 7/16/20	
Description: West view of southeastern cell slope area ash movement operations.	
Work in this area started on 15Jul20	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/17/20	
Description: North view of southeastern cell area ash movement operations.	

Date: 7/18/20	
Description: North view of southwest corner, where the water skimmer has been set up with the moved 8-inch pump	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/21/20

Description:
Northwest looking view of excavation at Southeast side of cell



Date: 7/22/20

Description:
Northwest view of southeast side of main cell, filling in former ash haul road to create rough final grade



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/23/20

Description:
North view looking view of almost completion of excavator cutting southeast side of cell to rough grade (for dozer to complete)



Date: 7/23/20

Description:
Northeast view of North Pond bottom ash ramp removal (haul to south side of cell to build outer slope).



.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/24/20 **Description:** Northwest view of southwest site corner with skimmer in use with 8-inch pump.	

Date: 7/24/20 **Description:** Northeast view of northeast haul road removal operations	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/24/20	
Description: Northeastern view of southeast corner – removal of ash outside of original estimated ash pond limit.	
Start of work at this area. No USACE levee interaction at this time.	

Date: 7/25/20	
Description: Northeastern view of southeast corner – removal of ash outside of original estimated ash pond limit.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/25/20

Description:
Northwest view of southern cell slope area ash movement operations.



Date: 7/27/20

Description:
North looking view of excavation at Southeast side of cell



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/27/20

Description:
North view of south side of main cell, filling to create rough final grade



Date: 7/27/20

Description:
Southeast view looking view of former northeast road



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/28/20 **Description:** Northeast view of North Pond bottom ash ramp removal (haul to south side of cell to build outer slope).	
Date: 7/28/20 **Description:** North view of southeast site corner. Note that clay at right/bottom of excavation is from grading bottom and no clay was exposed in the sidewall at the east/photo right.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 7/31/20	
Description: West view of ash movement operations within cell center.	

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Date: 8/3/20	
Description: North looking view of excavation at Southeast side of cell	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/3/20

Description:
Northeast view of excavating north side (toe) of main cell and grading northeast section of site



Date: 8/4/20

Description:
East view looking view of northern toe of cell and grading containment berm in former North Pond area

New containment will hold seep and rain water and enable excavation of North Pond area



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/4/20 **Description:** Northeast view of new containment berm in former North Pond area	
Date: 8/4/20 **Description:** Northeast view of former North Pond area – digging to near rough final grade. Dozers will grade area to final grade when applicable.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/6/20

Description:
South view of former North Pond dig/haul operations

Note that the area in the foreground (at bottom) will have the bottom ash removed and graded when perimeter berm removed.



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Date: 8/10/20

Description:
Northwest looking view of Southwest side of cell after water removed and water seeping from southwest cell face at bottom



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/10/20

Description:
North view of start of excavating west side (toe) of main cell, removing ash runoff from first week of July to present



Date: 8/10/20

Description:
North view of excavating west side (toe) of main cell, removing ash runoff from first week of July to present



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/13/20 **Description:** North view of excavating west/north sides (toe) of main cell, removing ash runoff from first week of July to present 1.2-inches of rain 10Aug20 (no ash hauling 11/12 Aug20)	. 
Date: 8/13/20 **Description:** Northeast view of excavating north side (toe) of main cell	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/13/20	
Description: North view of excavating west side (toe) of main cell, expanding drainage area adjacent to cell	
Note the increase in width (east-west) in the current configuration versus earlier in the week.	

Date: 8/13/20	
Description: North view of east side (toe) of main cell, smoothing bottom face before final grading	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/13/20 **Description:** Northwest view of start of saturated ash removal in southwest area	

Date: 8/14/20 **Description:** East view of final regrading of slopes in southwest area (in preparation of liner)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/14/20	
Description: East view of saturated ash dumping in northeast area of cell	
For drying of material, the site name for this slot in ash is a “bowl”	

Date: 8/14/20	
Description: East view of saturated ash dumping in northeast area of cell	
For drying of material, the site name for this slot in ash is a “bowl”	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/14/20	
Description: Northeast view of regrading west side of cell to final grade prior to liner placement	
Note bottom area of cell to wet for regrading with the dozer.	

Date: 8/15/20	
Description: Northwest view of saturated ash removal in southwest corner of site – near completion	
Note exposed clay near toe of slope both in front of (SE) and behind (NW) yellow excavator.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/17/20 **Description:** North looking view of Southeast side of cell – final grading and removal of excess ash Note that the excavator in the background is completing the cell to final grade, as the lower ash elevations are too soft for a dozer to work.	

Date: 8/17/20 **Description:** Southeast view of grading west cell slope to final grade Note that the ungraded area at the bottom and right of the dozer is a soft area (which has been soft since excavated/exposed).	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/17/20

Description:
North view of grading bottom of former North Pond area to final grade.

Area was started, but not finished as of 8/24/20.



Date: 8/17/20

Description:
Southeast view of starting to build up north cell slope in preparation of liner installation (and cut from top of southeast to southwest)



PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/19/20	
Description: East view of grading north side of cell to final grade (for liner installation)	

Date: 8/20/20	
Description: North view of final graded/prepped southeastern cell slope	
Note seep just left of (and beyond/north of) excavator arm at cylinder	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/20/20 **Description:** Southwest view of southeast corner of site, removing excess ash on slope of perimeter berm	

Date: 8/20/20 **Description:** Northwest view of southwest area of cell – final grade Note seep at the bottom of the center of the southwest face. Smooth portion of slope is softer/wetter than areas higher in elevation.	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/20/20 **Description:** East view of final regrading of north slope (in preparation of liner) Note haul road at photo left has been thinned toward the east, exposing more area which can be covered in liner.	. 

Date: 8/21/20 **Description:** West view of excess ash material removal from south perimeter berm	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/21/20 **Description:** North view of moving ash material from east to west side – to accommodate future ash hauling and build west toward final grade	

Date: 8/22/20 **Description:** North view of west side of cell at final grade	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/22/20 **Description:** West view of excess ash material removal along south perimeter berm	

Date: 8/22/20 **Description:** West view of excess ash material removal along south perimeter berm	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/24/20 **Description:** West looking view of east side of site – USACE levee area fence removal Note that the concrete secured fencepost was entirely in ash and about a foot or so below grade.	

Date: 8/24/20 **Description:** South view of southeast cell slope toe – digging liner anchor trench Note that the trench was only dug along the southeast cell "face"/slope where it meets the south "face"/slope.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/24/20

Description:
Southeast view of ash removal from southeast area of site.



Date: 8/25/20

Description:
North view of south/southeast cell slope in preparation of liner and geogrid installation



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PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/25/20 **Description:** South view of start of geogrid installation on softer areas of cell slopes. Note that the geogrid was placed on the surface and not pressed in with an excavator bucket.	

Date: 8/25/20 **Description:** East view of liner first panel deployment on southeastern cell slope	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/25/20 **Description:** Southeast view of southeast corner of site, showing welding of liner panels	

Date: 8/25/20 **Description:** Northwest view of southeast area of cell – showing liner and geogrid	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/26/20 **Description:** Southeast view of USACE levee ash removal	

Date: 8/26/20 **Description:** North view of excess ash material removal from interior of north perimeter berm	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/26/20	
Description: East view of GTEC levee ash removal	

Date: 8/26/20	
Description: South view of west side of cell during liner install	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 8/27/20 **Description:** Southeast view of GTEC/USACE levee ash removal	

Date: 8/28/20 **Description:** East view of north end of cell (covered with liner on PM of 27Aug20)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/1/20 **Description:** South looking view of southeast slope of cell – start of geocomposite material deployment on top of liner material	

Date: 9/1/20 **Description:** Closer view of geocomposite on top of liner Note that there is a plastic waffle center material sandwiched between a synthetic felt-like material	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/2/20

Description:
North view of southeast corner, showing geocomposite material deployment



Date: 9/2/20

Description:
West view of Outfall 002 gangway demolition and concrete structure toppling



.

PHOTOGRAPHIC LOG

Client Name: Rockland Capital	**Site Location:** Grand Tower, IL	**Project No.** 0533442

Date: 9/3/20 **Description:** North view of ash removal on east side Note that the ash will be removed to the GTEC levee base, so that the liner anchor trench is within non-ash material	

Date: 9/5/20 **Description:** North view of anchor trench installation along western cell slope	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/5/20 **Description:** South view of southeast corner of site, showing stitching of external geocomposite layer panels Note that the plastic waffle layers (of the different rolls/panels) were zip tied together prior to the stitching	. 

Date: 9/5/20 **Description:** East view of north area of cell – showing digging of anchor trench	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/5/20 **Description:** Northeast view of GTEC levee ash removal	

Date: 9/5/20 **Description:** North view of southeast corner of cell – showing the backfilling of the anchor trench with washed stone	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/8/20 **Description:** Northwest looking view of west perimeter berm removal – start of top ash removal Note that truck traffic on top of berm was only to initiate work	

Date: 9/8/20 **Description:** West looking view of west perimeter berm and cutting of bench haul road halfway up the berm to facilitate loading trucks from above	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/8/20

Description:
Northwest view of west perimeter berm and loading trucks with ash from above



Date: 9/8/20

Description:
West view of west perimeter berm and loading trucks with ash from above



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/9/20 **Description:** West view of surficial ash removal on north slope of south perimeter berm prior to removal of ash at berm top	

Date: 9/9/20 **Description:** Southwest view of cutting in of bench haul road on interior of perimeter berm	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/10/20 **Description:** North view of western perimeter berm, showing ash removal Note that the central portion of the clay will be flattened with a dozer to enable load out of additional ash material on the far sides away from the berm centerline	

Date: 9/10/20 **Description:** South view of south area of perimeter berm ash load out	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/11/20

Description:
West view of southern portion of perimeter berm at intermediate ash removal stage.

Note ash material on outside of berm (photo left) yet to be removed.



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Date: 9/11/20

Description:
South view of Outfall 002 gangway demolition



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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/11/20 **Description:** South view of North Pond floor final grading and cleaning of side slope prior to bench road installation	

Date: 9/11/20 **Description:** West view of southern portion of perimeter berm at final ash removal stage. Note ash material on outside of berm (photo left) is being removed.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/12/20 **Description:** West view of southern portion of perimeter berm at final ash removal stage. Note ash material on outside of berm (photo left) has been removed. Additional material beyond the silt fence will need to be removed in the southwest and other locations.	

Date: 9/12/20 **Description:** Southwest view of former North Pond area and bench road installation, and load out of extra ash not used for bench road	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/14/20

Description:
Southwest looking view of west perimeter berm removal – top ash removal



Date: 9/14/20

Description:
Northwest looking view of west perimeter berm – top ash and west slope ash removal



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/15/20

Description:
Southwest view of south gate ash removal



Date: 9/16/20

Description:
Southeast view of ash removal from top of USACE levee (start; working from right to left in photo)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/16/20 **Description:** Northwest view of ash removal on perimeter berm and stockpiled cover soil (at far north) movement to north slope of cell	

Date: 9/16/20 **Description:** North view of cover soil placement on north slope of cell	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/17/20	
Description: North view of former North Pond area, showing ash removal, movement at multiple locations	

Date: 9/18/20	
Description: West view of breaking Outfall 002 concrete structure	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/18/20

Description:
West view of far north portion of perimeter berm at intermediate ash removal stage. (photo 1 of 2)

Note ash material removed outside of berm just inside tree line; debris will be removed; additional material to be removed at bend in berm going south; Photo taken from where GTEC levee and perimeter berm meet



Date: 9/18/20

Description:
Northwest view of far north portion of perimeter berm at near final ash removal stage. (photo 2 of 2; just north of prior photo/photo #9)

Debris will be removed and area shaped later with no further material removal



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/18/20 **Description:** Southwest view of western portion of perimeter berm – clay removal and breaking of Outfall 001 structure Note: ash material was found below the clay layer being removed (see low area just to the right of the excavator) and appears to extend to the adjacent excavation floor (~3-4 feet thick)	
Date: 9/18/20 **Description:** West view of clay/ash noted above in photo	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/19/20	
Description: North view of USACE/GTEC levee; only minor top shaping remains (besides south perimeter berm)	

Date: 9/19/20	
Description: Northeast view of example pothole excavation on bench haul road, revealing bottom ash under clay – inner portion of perimeter berm	
This portion of the cell already had the overlying fly ash removed to clay and graded, then installation of bench haul road; only bottom haul road facing west cell toe had any indications of ash remaining.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/22/20

Description:
West looking view of cover soil on north cell slope and west perimeter berm ash removal



Date: 9/22/20

Description:
South looking view of west perimeter berm in northwest – material is ash and hauled to cell



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/23/20 **Description:** Southeast view of GTEC/USACE levee – final grading	

Date: 9/23/20 **Description:** Southeast view of cover soil removal from western berm and cover soil placement on west slope of cell	

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/24/20 **Description:** Southeast view of cover soil removal on perimeter berm for placement on southern, southwestern slopes of cell	

Date: 9/24/20 **Description:** East view of cover soil placement on southwestern slope of cell	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/25/20 **Description:** Southwestern view of western perimeter berm cover soil removal for placement on cell	

Date: 9/25/20 **Description:** East view of finish grading on northwest slope of cell	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/26/20 **Description:** Southwest view of west perimeter berm and west slope of cell cover soil movement	

Date: 9/26/20 **Description:** Southwest view of west perimeter berm and west slope of cell cover soil movement	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/29/20

Description:
Southwest looking view of cover soil removal west of cell toward southwest corner and grading on west cell slope

Note that this removal was necessary at this time to expose underlying ash and cover geocomposite on cell



Date: 9/29/20

Description:
East looking view of cover soil cover placement on top of cell in south.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/29/20

Description:
Southwest view of west cell slope cover soil placement



Date: 9/30/20

Description:
East view of final cover soil grading on southwest cell slope



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 9/24/20 **Description:** Southeast view of cover soil removal on perimeter berm for placement on southern, southwestern slopes of cell	

Date: 10/1/20 **Description:** North view of cover soil placement on southeastern slope of cell	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/1/20 **Description:** Northwestern view of western perimeter berm ash removal	

Date: 10/1/20 **Description:** Northwest view of north ash/clay perimeter berm (cap on ash) removal Note that westernmost cut of ash (left of excavator in photo) revealed non-ash material at bottom with higher elevation than current former North Pond.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/3/20 **Description:** Southwest view of west perimeter berm cover soil movement	

Date: 10/3/20 **Description:** Northwest view of north ash/clay perimeter berm (cap on ash) removal See note for photo #8	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/5/20 **Description:** North looking view of clay (top) and underlying ash removal at north side of site and start of dozer grading of north/northwest area	

Date: 10/6/20 **Description:** West looking view of (bottom) ash removal west of cell. This ash was below the clay, which was initially exposed when removing the fly ash as part of the material consolidation.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/6/20 **Description:** Northwest view of west side ash removal. Note clay overlying ash in sidewall with ash removed area in foreground.	

Date: 10/6/20 **Description:** Northwest view of final grading in north area of site. Note the grading of the former perimeter berm area at the west, northwest and north.	

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/6/20	
Description: West view of ash removal west of the cell	
Note that the work has shifted to the west by a haul road width in comparison to photo #3	

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Date: 10/7/20	
Description: North view of material grading/placement on northwestern slope of site	

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/7/20 **Description:** North view of material grading/placement on north/northwestern slope of site	

Date: 10/7/20 **Description:** North view of the start of ash removal on east-west haul road north of the cell (north side of the road)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/8/20 **Description:** East view of moved east-west haul road construction (ramp at right in photo will be removed to enable cell construction)	

Date: 10/8/20 **Description:** Northeast view of GTEC levee north of main site gate The anchor trench will tie into the GTEC levee just below the worker in the photo (down the levee slope and toward the photographer). Ash will be removed that is outside of the proposed liner. The GPS rover unit is at elevation 372 feet.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/8/20 **Description:** West view of west side ash removal. The excavator is at the farthest west of west side ash removal. The extent is equal to the west edge of the perimeter berm base (as extended vertically from this western berm edge).	

Date: 10/8/20 **Description:** Northwest view of west side ash removal at west end of former ramp.	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/9/20	
Description: Northwest view of southeast slope regrading post survey (indicated cover not consistently meeting 3 ft thick specification)	

Date: 10/10/20	
Description: Northwest view of east-west haul road ash removal and clay movement	
Excavator removing ash at time of photo.	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 10/10/20	
Description: North view of top of cell – cell at final top configuration	
Dump truck loads in background are being grading and sloped.	

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Date: 10/12/20	
Description: North looking view of clay removal at cell toe and dozer grading of additional clay on north cell slope to meet specs	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 10/13/20	
Description: Southeast looking view of clay removal at southeast corner of cell (toe).	

Date: 10/14/20	
Description: North view of start of east side anchor trench preparation	
Anchor trench will tie into GTEC levee at approximately 370' elev.	

.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/15/20 **Description:** North view of east side anchor trench Note the ash boundary in the approximate centerline of the bottom of the excavated area	

Date: 10/15/20 **Description:** Southwest view of rip rap placement/grading on southeast cell slope	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/16/20 **Description:** Additional north view of east anchor trench preparation	

Date: 10/16/20 **Description:** Northeast view of rip rap on southeast cell slope (~90% coverage)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/17/20 **Description:** North view of eastern slope of cell, illustrating slope The slight elevation drop at left will be smoothed.	

Date: 10/17/20 **Description:** Southwest view of southeast cell slope – fine tuning of rip rap placement	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/17/20

Description:
Northeast view of southwest slope rip rap placement



Date: 10/20/20

Description:
North looking view of southwest cell corner after1.9-in of rainfall (multi-day event)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/22/20 **Description:** North looking view of southwest cell corner after1.9-in of rainfall (multi-day event) with 4-in. pump setup	

Date: 10/22/20 **Description:** West looking view of southwestern site corner – tree removal in footprint of southwest drain	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 10/23/20 **Description:** Southwest view of southwest corner after tree removal (temporary drainage sloping in foreground to keep storm water onsite)	
Date: 10/23/20 **Description:** North looking view of southwest corner after pumping ~130,000 gallons of water Water depth outside of yellow sump is ~3-in. Note: rain event of ~0.9-in on Sat 24Oct20 PM	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/2/20 **Description:** North looking view of east side removal of wet, runoff material removal and burying in trench (anchor trench installation preparation)	

Date: 11/3/20 **Description:** North looking view of top of cell (west side) and resumption of liner installation (ended first phase in late August)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/5/20

Description:
Northeast looking view of top of cell during liner installation
(photo 2 of 2)



Date: 11/5/20

Description:
Southwest view of clay loading for transport to top of the cell.



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/5/20 **Description:** Northwest looking view of eastern cell slope – final grading	

Date: 11/5/20 **Description:** North looking view of top of cell during liner installation - geocomposite	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/5/20	
Description: South looking view of eastern side of cell, showing where anchor trench will run (in clean material at bottom on left)	

Date: 11/6/20	
Description: South looking view of western side of cell at top – clay placement	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/7/20 **Description:** North looking view of liner installation on eastern cell slope	

Date: 11/9/20 **Description:** Northwest looking view of east side liner installation	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 11/9/20 **Description:** South looking view of southeast slope of cell showing the raking of the slope prior to seeding Final liner placement in southeast area in foreground	

Date: 11/9/20 **Description:** South looking view of hydroseeding of USACE/GTEC levee	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/9/20 **Description:** Southeast looking view of hydroseeded USACE levee	
Date: 11/9/20 **Description:** South looking view of seeding on raked west cell slope	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/9/20 **Description:** Northeast looking view of light disking of seeded area	

Date: 11/10/20 **Description:** Northwest view of blowing straw on southeast cell slope	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/10/20 **Description:** Northeast looking view of disking straw on southeast cell slope	

Date: 11/10/20 **Description:** South looking view of liner installation in east anchor trench	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

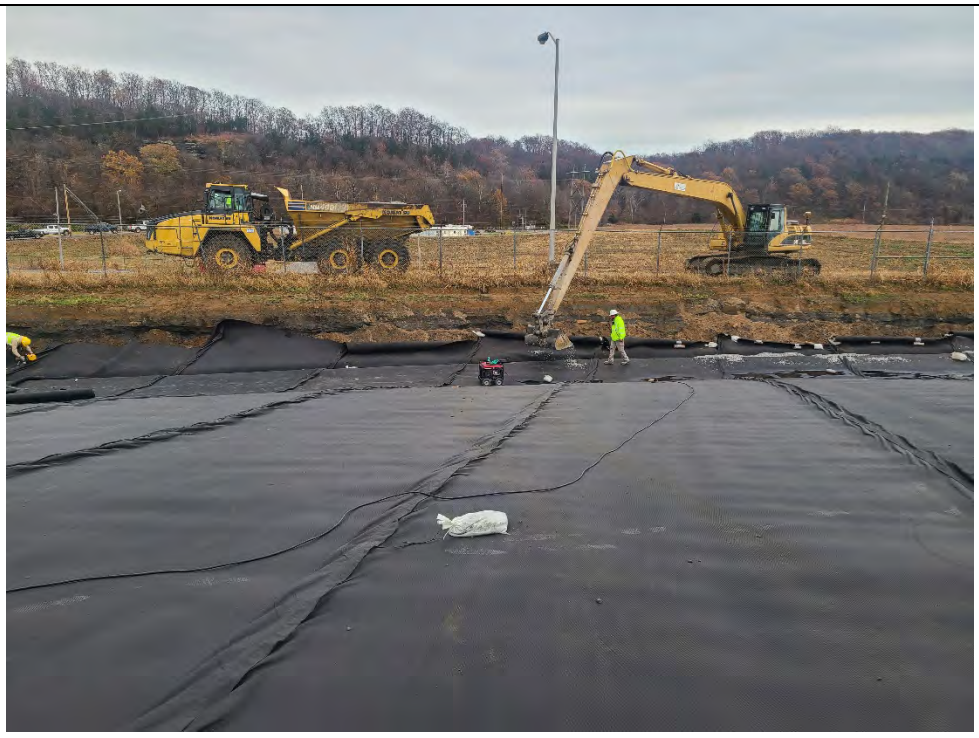
Date: 11/10/20 **Description:** Northwest looking view of clay placement on completed liner/geocomposite near the top of the east slope	

Date: 11/10/20 **Description:** Southeast looking view of anchor trench installation at northeast edge of north cell slope	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/12/20 **Description:** Northwest looking view of clay movement on eastern cell slope	

Date: 11/14/20 **Description:** East looking view of clean (no fines) stone placement into east anchor trench	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/14/20 **Description:** South looking view of completed anchor trench installation at toe of eastern cell slope	

Date: 11/16/20 **Description:** North looking view of final grading on top of cell	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/16/20 **Description:** Northwest looking view of east slope of cell showing material placement on liner	

Date: 11/17/20 **Description:** North looking view of material movement along east cell toe of slope	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
Rockland Capital	Grand Tower, IL	0533442

Date: 11/18/20 **Description:** North looking view of clay movement to cell (digging to near final grade, leaving haul road for future rip rap movement)	. 
Date: 11/18/20 **Description:** East looking view of final grading on east cell slope	. 

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/19/20

Description:
Southwest looking view of material movement from future southwest drain



Date: 11/20/20

Description:
North view of rip rap placement on north cell slope (on top of fabric)



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/20/20 **Description:** North looking view of clay placement on north cell slope (NE corner)	

Date: 11/21/20 **Description:** North looking view of final grading of east cell toe (Entrance in foreground will be removed at a later date)	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/21/20 **Description:** South looking view of east cell toe drainage swale	

Date: 11/22/20 **Description:** North looking view of east toe drainage swale after 1.3-inch rain event	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/22/20 **Description:** Southwest looking view of drainage work to enable offsite water pumping	

Date: 11/30/20 **Description:** South looking view of southwest corner after rain events over Thanksgiving break	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 11/30/20

Description:
Northeast looking view of near final clay cover installation on northeast portion of north cell slope/face



Date: 12/1/20

Description:
North looking view of rip rap placement on north cell slope



.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/2/20 **Description:** Northwest looking view of start of rip rap placement on west cell slope	

Date: 12/2/20 **Description:** North looking view of west side of site, showing the movement of wet material	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/2/20	
Description: Southwest view of southwest area wet material movement	
Work was proceeding along the cell toe from north to south and the then from west to east – note drier area to the right of the excavator	

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Date: 12/3/20	
Description: East looking view of wye trench drain installation (NE corner of north slope)	

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PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/4/20 **Description:** West looking view of wet material placement on west far slope	

Date: 12/4/20 **Description:** West looking view of west cell slope rip rap placement and far west slope grading	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

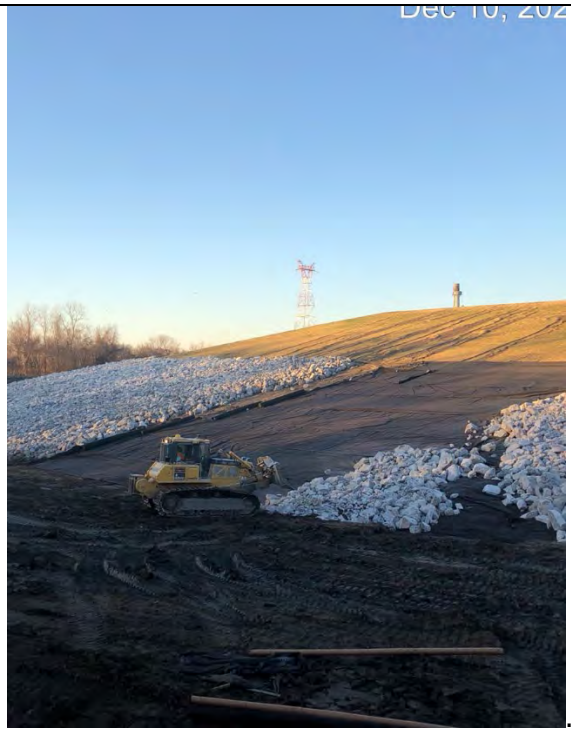
Date: 12/5/20 **Description:** South looking view of south cell slope access road removal	

Date: 12/5/20 **Description:** Southwest looking view southwest area after removal of cell toe-adjacent wet materials Area will be left to dry to enable future rip rap placement operations	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 12/6/20 **Description:** Northwest looking view of north limit of southeast cell slope – final rip rap placement	

Date: 12/6/20 **Description:** Northwest looking view of north limit of southeast cell slope – final rip rap placement	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 3/22/21 **Description:** Vegetation during spring flooding event	

Date: 3/22/21 **Description:** Vegetation during spring flooding event	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 4/22/21

Description:
Vegetation during spring flooding event. Flooding event lasted approximately 3 months.



Date: 8/12/21

Description:
Completed southwest corner trench work



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/12/21 **Description:** Completed southwest corner trench work	

Date: 8/12/21 **Description:** Completed southwest corner trench work	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Rockland Capital	Grand Tower, IL	0533442

Date: 8/12/21 **Description:** Completed southwest corner trench work	

Date: 8/12/21 **Description:** Completed southwest corner trench work	