TS 3-5 Once it is completed, provide Mr. Raphael's analysis of the visual impact of the concrete mats in Little Bay at low tide.

**Response:** The Applicant is in the process of reviewing potential impacts associated with the concrete mattresses in Little Bay at low tide and will provide the results when complete. The Applicants anticipate that such an analysis will be completed and submitted to the Site Evaluation Committee and SEC Distribution List around July 17, 2017.

## Visual Assessment of the Proposed Concrete Mattresses for the Submarine Transmission Cable across Little Bay

The Visual Assessment (VA) for the Seacoast Reliability Project ("Project") dated April 2016 concluded that the overall visual sensitivity to change for Little Bay was moderate. This conclusion was based on the methodology employed in the Visual Assessment (set forth on pages 5 through 31 of the VA) and remains unchanged. This methodology identified scenic resources with potential Project visibility and those resources included Little Bay and Little Bay Channel. On page 53 of the Visual Assessment all scenic resources with potential visibility were analyzed for their "Cultural Designation" and "Scenic Quality". In both these categories, the determination was that there was moderate sensitivity with regard to cultural and scenic values. Resources with moderate sensitivity are not analyzed further—only those with moderate to high or high sensitivity are analyzed in the next step of the methodology, which assesses visual effect and viewer effect. Given that the analysis concluded that the Little Bay resource had only moderate sensitivity, LandWorks determined that the proposed elements described herein and associated with the Project did not rise to a level of concern where the Project would result in an unreasonable adverse effect on aesthetics in the Project area. Nonetheless, LandWorks prepared a narrative as well as photographs and visual simulations that support the review of Project effects on Little Bay and users of that water resource. The LandWorks review concludes that the Project as proposed would be acceptable due to the presence of existing development, the lack of outstanding or unique characteristics associated with the channel, and the fact that the transmission facility was already established across the channel. These factors contributed to the finding that the change associated with the transmission upgrade would not be dramatic and would not substantively affect any users and their boating and recreational activities along this portion of Little Bay. This analysis and its conclusions are set forth on pp. 97 through 101 of the Landworks VA.

This current assessment reviews the Applicant's proposal to install concrete "mattresses" to protect the cables in nearshore areas where ledge precludes burial to full depth. This proposed component of the Project was not included in the initial analysis, because use of concrete mattresses had not yet been determined to be an essential element of the Project. Based on this current analysis of the proposed concrete mattress installations, it has been determined that the conclusion forwarded in the initial assessment is still valid, and that the concrete mattress installation as designed will not result in an unreasonable effect on aesthetics or scenic beauty of the Project area.

## Description of the Specific Project Elements

As part of the installation of the underwater cable for the Seacoast Reliability Project, protective elements referred to as "concrete mattresses" may be installed on either side of Little Bay at that point at which the cables transition from the shoreline to the underwater installation. In the shallow areas of the Bay edges, typically referred to as Tidal Flats, these concrete elements will be placed to protect the cables where they are very shallow in the seafloor in this transition zone. The concrete mattresses are typically mats of interconnected individual precast concrete forms that conform to the bottom contours of the seafloor. Individual mattresses are typically 8' x 20' and 4.5-9" thick. On the Durham side the starting width is 24 feet (3 mattresses wide) and it widens to about 30 feet over a distance of approximately 102', which will take 5 mattresses end to end for each of the 3 sections. On the Newington side, the configuration is also 3 mattresses in width to start, overlapping at the start point along the shore to have a 16' width and ending at 34' in width over a distance of approximately 214 feet.

It is our understanding that the Applicants are in the process of finalizing the details and extent of the concrete mattress installation; the information relied on for this assessment may change slightly. At each shoreline there will be a short section of concrete mattress installation that will be placed on the slope of the bay floor before the seabed flattens out, resulting in potential visibility of about 34 feet of the installation on the Durham side, and 50 feet on the Newington side of the Bay. The location for the mattresses and their lengths and widths, as well as how they will relate to seabed contours have been based on discussions with the Project team and contractors, as well as on plans provided in the "Seacoast Reliability Project Amended Environmental Maps" developed by Normandeau

LandWorks

## Analysis of Proposed Installation

LandWorks conducted a site visit on June 29, 2017 to the Project Area for the expressed purpose of reviewing the locations for the concrete mats and to assess their potential visibility and the effects of that visibility. The site visit was conducted at low tide, and observations made from the Durham shore, just off shore, from the mudflats beyond the shore, and from the navigable channel at low tide. Observations of the Newington transition area and concrete mat location were conducted from the channel. This site visit was also informed by previous visits to this portion of the Project area.

A number of distinct observations and conclusions emerged from both the on-site study and a review of plans, profiles and aerial and site photographs of these 2 areas and they include:

## I) Visibility and Viewing Distances at Low Tide.

The visible area of the concrete mattresses will be primarily just off the shoreline at the point where the mattresses begin and for the distance that mattresses are located on the initial slope coming off the shore. Each shoreline has a short distance of sloping seabed and then a more level expanse of seabed and tidal flats stretching out into the Bay. The sloped area will be where the mattresses will be most visible. On the Durham side, the actual area of visible mats will be limited to an expanse of approximately 24-28' wide and 34 feet long. Beyond the 34' sloping section the mats will be located along a more gradual, almost level expanse of the tidal flat. At that size and with the typical viewing distance in the middle of the channel at almost 2/3 of a mile (3315' from the shoreline) during low tide, these mats will be an unobtrusive element and even difficult to pick out. The closest view at low tide is at just under a 1/2 mile (2055') from the shore due to the presence of very shallow tide flats which stretch out that distance from the shore—so shallow that even kayaks would be unlikely to paddle to close to shore at low tide. At that vantage point of about ½ mile the mattresses will be difficult to even pick out and/or focus on.

On the Newington side, the area of visible mattresses will be approximately 16-18' by 60 feet in length before the mattresses lie flat on the seabed/tidal flat area, and below the water level at low tide. The center of the channel, where most boat traffic occurs at low tide, is just under ½ mile from shore at 2060'. As with the Durham side, the view of the mats from this distance will not result in an intrusion or visible element that will necessarily draw the eye and be prominent at all within that view.

Overall, in periods of low tide, paddlers on either side will not be drawn to the locations of the transmission corridor's transition to the underwater design. On both sides, there are areas of very shallow water which, even if navigable for kayaks or canoes would be difficult for paddling as the paddles will inevitably hit the bottom during the periods of lower tide. The navigable channel is closer to the Newington side, and yet not an ideal location for non-motorized watercraft to linger. Based on boating enthusiast's typical behaviors and observations on site and in the water, it was readily concluded that motorized and non-motorized watercraft will typically be too far away to be affected by the view of this relatively small scale element near to the shoreline. Additionally, motorized boat traffic is moving faster and in a direction that does not focus on or put the transition areas in the primary angle of view or cone of vision. The visual context, as described in the next section of this narrative, further diminishes the potential for negative effects on the visual quality or viewer's experience.

## 2) Characteristics of the View

As stated, the typical viewing distances at low tide will reduce the prominence and presence of the concrete mattresses in the view and reduce their visual effect. Other factors also contribute to the conclusion that the proposed concrete mattress installation will not be obtrusive or have any real negative effect to the viewscape of the Little Bay Channel. These factors include the nature of the view and the context of the view. The views of the two sites are to the side of the channel as opposed to being in the foreground or direct view of boaters and paddlers. Observations on several site visits indicated primarily north south traffic and the eye and the experience tend to be focused on points to the north and south rather than directly at the shorelines perpendicular to the view.

Additionally the context for the view is one of a developed and residential appearing shoreline, with larger homes, extensive

clearings and numerous docks and shoreline elements such as outdoor furniture (See Exhibits 21A and 22A which accompany this review). This is not a pristine shore on either side. There are no distinctive landscapes or scenic elements that are unique or constitute a draw for boaters (and most of the land in this section appears to be privately owned on both shores – Adams Point and Great Bay National Wildlife Refuges are located to the south of this section of Little Bay). When directly opposite the Project ROW along the Durham shore, the view takes in the presence of the transmission infrastructure that has been well established, with the Cable House and existing transition structure readily visible. These existing elements and the aforementioned docks, shoreline rocks and bedrock, and other objects such as boats, lounge chairs and landscape components provide a visual pattern which can readily accommodate the proposed mattresses and their limited visibility.

## 3) Viewer Effect

The foregoing narrative highlights how the visibility of the concrete mattresses will be limited, and how the small scale of and minimal presence of the visible portion of the mattresses, when viewed from the water, will limit the visual effects. These factors translate directly into a limited effect on the viewer as well—one that will not undermine the viewer's enjoyment to any great extent, and one that will not discourage people from boating in this portion of Little Bay. Given the long established presence of the underwater transmission cables and the associated structures and Cable Houses on the shore, there already is an established expectation related to the infrastructure, and this new element is not a substantive change nor would it be a surprise to see another small scale element that is part of it.

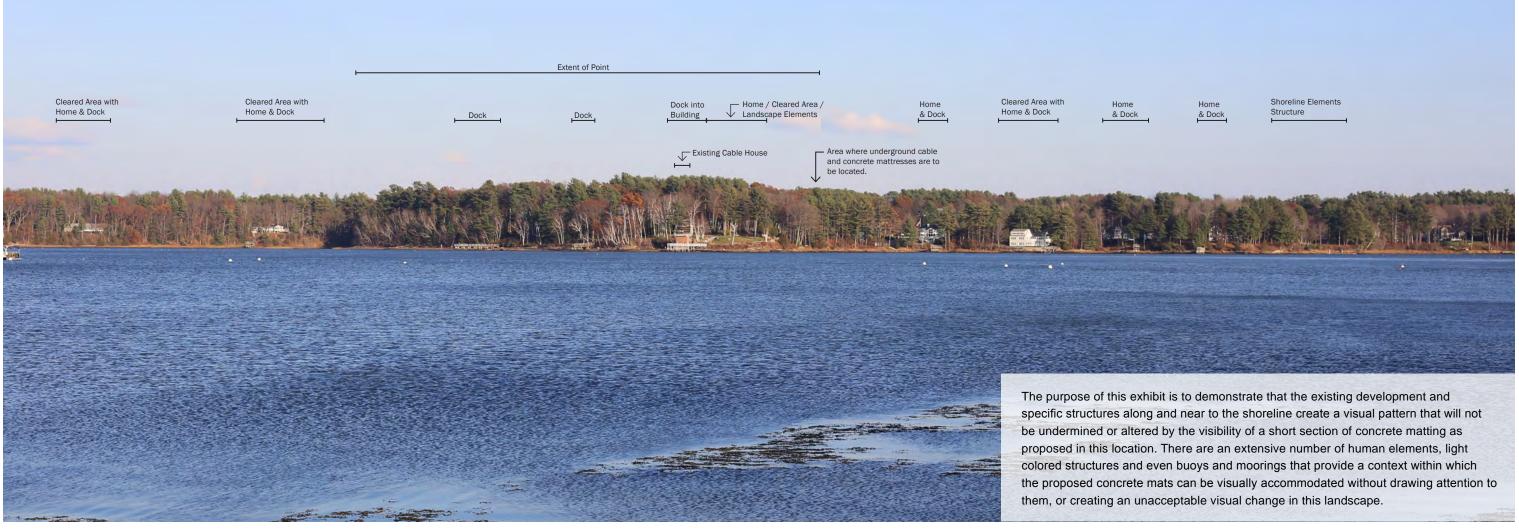
View duration is limited due to the fact that most boating activity in this portion of Little Bay tends to be moving north or south between the larger water body of Great Bay to the south and the variety of water destinations to the north, including Little Bay proper, the Piscataqua and Oyster Rivers and Royall's Cove. Given the north-south orientation of the channel there will be limited direct views of the installation. When heading south through the channel from Little Bay proper the Newington installation will not be visible due to the shoreline configuration – a point of land just to the north, where the old Cable House is located, obscures the new location for the land to water transition of the transmission lines. It will not be visible until boaters are to the south of it. The configuration on the Durham side may also limit visibility for those boating or paddling from the north and the south, until one is more directly opposite the installation.

## 4) Mitigation

The concrete mattresses will also include some inherent mitigating factors. It is likely the mats will sink into the muck of the tidal flats which is an elastic material that has a "quicksand-like" effect if walked upon, or when objects are placed on it when the mud is exposed. Additionally, the color of the concrete surfacing is expected to fade and become grey over time due to the natural weathering process, the deposition of sediments and the action of the salt water tides. Limiting the size and scale of the mattress installation represents another mitigating factor.

## Overall Conclusion

The concrete mattresses will not draw the eye to any great extent, and they will not be a substantive intrusion into the visual landscape. Due to their limited size, their minimal visual presence and the fact that they will readily fade into and become part of the surrounding shoreline and waterscape, the concrete mattresses will be a very minor feature of the landscape and will only minimally affect the viewer's experience of the water, the bay, and the views to the shoreline. The conclusions reached initially in the VA, which determined that Little Bay has moderate sensitivity as a scenic resource, remain unchanged. The addition of this element along the shoreline in Durham and Newington will not result in a substantive visual effect or negative impact on the viewer's experience and enjoyment, or ongoing and future use of this resource. Thus the proposed placement of the concrete mattresses will not result in an unreasonable adverse effect on aesthetics of the Project area.





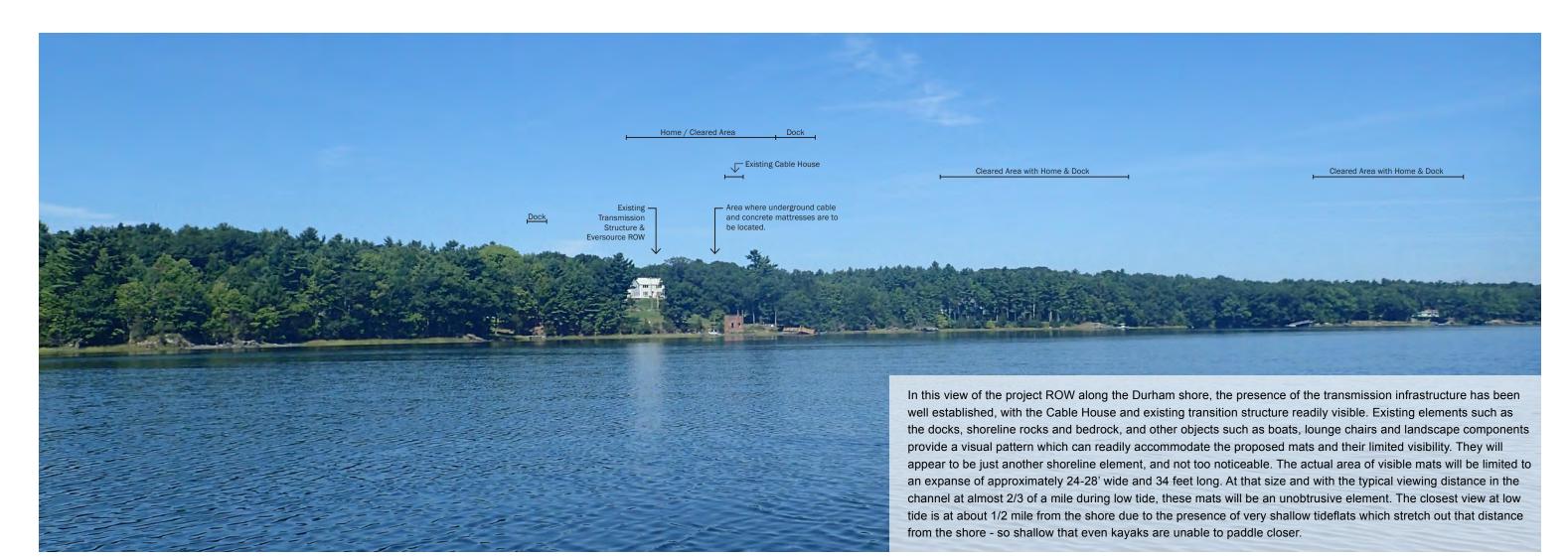
Aerial Context Map with approximate ROW location



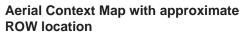
**View Location Map** 













**View Location Map** 





## SEACOAST RELIABILITY PROJECT VISUAL ASSESSMENT

**View Location Map** 



## **Simulation Information**

## **Base Photograph** Date: 6/29/17

Time: 1:27 pm Weather conditions: Overcast Image Size: 5472 x 3648 pixels

## **Camera Properties**

Camera Make/Model: Canon EOS 6D Sensor Dimensions: 35.8mm x 23.9mm Lens Make/Model: Canon EF 50mm Lens Focal Length: 50mm Focal Length (35mm Equivalent): 52mm Approx. Angle of View: 40° horizontal, 27° vertical Camera Height: 3 ft (0.914 meters)

## **View Location Information**

View Location Name: Exhibit 22A Location: Little Bay, Durham, NH Classification: Resource Orientation: West/Northwest Latitude/Longitude: 43.105557°, -70.866763° Camera elevation above sea level: 3.00' (0.91 m) Simulation viewing distance: 21.3 in (54.102 cm)

Distance to nearest visible structure: 0.25 miles (0.40 km) Distance to furthest visible structure: 0.28 miles (0.45 km)

## **Proposed Structure Information**

Visible structure type: Weathering steel monopole, 3-pole Visible structure numbers: F107-100, F107-101

Height range of proposed transmission structures (visible): 70' (21.3 m) Height range of existing transmission structures (visible): N/A

Visible area of concrete mattresses at Low Tide: Approx. 28'x34' Right of way width: 100'

<u>15</u>00' (🖔

## **Visual Simulation Notes:**

- 1. Visual simulation is based on GIS data available at the time from USGS National Elevation Data Set, Eversource and NH GRANIT. Data is only as accurate as the original source and is not guaranteed by LandWorks.
- 2. This simulation depicts structures, conductors, and technical equipment as well as visibility of any associated clearing.

## **Technical Information**

Software: Nemetschek VectorWorks 2015; SketchUp Pro 8; Adobe Photoshop CS5 Digital elevation data source: USGS National Elevation Dataset (NED) 1/3 arc-second



**Aerial Context Map** 



EXHIBIT 22A: EXISTING CONDITIONS AT LITTLE BAY, DURHAM (SHEET 2 OF 3) SEACOAST RELIABILITY PROJECT VISUAL ASSESSMENT



EXHIBIT 22A: VISUAL SIMULATION OF PROPOSED CONDITIONS AT LITTLE BAY, DURHAM (SHEET 3 OF 3) SEACOAST RELIABILITY PROJECT VISUAL ASSESSMENT

Durham 1-8 When it was developing this Project did PNSH take into account the possibility of directional boring under Little Bay? If it did not, please explain why not. If it did, please explain why it rejected this option.

**Response:** The Project investigated the use of horizontal directional drilling ("HDD") as a means to cross Little Bay and retained firms familiar with large scale HDD to analyze the crossing of Little Bay. The use of HDD to cross Little Bay would have required drilling through quartzite rock with a bore diameter of over 40 inches exceeding 6,000 feet in length.

The quartzite rock under the bay is classified as portions of the Kittery and Eliot formations that contain quartzite rock with known compressive strengths up to 30,000 pounds per square inch ("psi"). The drilling process would have required drill units be placed on the east and west shores, drilling 24 hours a day for a period of three to six months to complete the drill. An HDD drill for electric cable requires the bore be sleeved with a plastic pipe. This pipe must be constructed outside the bore and pulled through as a solid piece. Assembly of the PVC sleeve would have required a setup area over 6,000 feet long. As an example, if this setup were done on the Durham side using the existing ROW, the PVC sleeve would have extended from the shore of Little Bay across Durham Point Road and across Longmarsh Road. Moreover, HDD would have required large set-up areas on both sides of the bay for puling and staging cable reels, typical setup areas are approximately 100 feet by 250 feet. This would have been a significant disturbance to project abutters.

Use of HDD also requires large quantities of a bentonite (clay) slurry which is used to coat and lubricate the drilled shaft. While the material is inert, containment procedures are required to prevent its spilling into the surrounding environment. The containment would have required large pools be established on both sides of the bay during the drill. A review of the geologic structure indicated the potential for fault lines in the bed rock under the bay. Drilling through the fault lines increases the possibility of the bore "fracking out," which could release the bentonite slurry across the bottom of the bay coating the sea floor.

Based on technical, environmental and abutter impacts identified during the bore analysis, PSNH did not select HDD as the method to cross Little Bay. Please also refer to the Pre-filed testimony of James Jiottis at pages 20 to 21 for a complete description of the methods considered for crossing Little Bay.

Witnesses Available for Cross Examination include: Jim Jiottis

Please describe, and produce all documents, information and communications related to, any alternatives to the proposed Little Bay crossing analyzed by Eversource, including but not limited to alternative routes in or around Little Bay, non-transmission alternatives, and alternative construction techniques, including but not limited to horizontal directional drilling.

Response: The Applicant objects to this question as it seeks information not relevant to the proceeding and therefore is not reasonably calculated to lead to the discovery of admissible evidence. RSA 162-H:7, V(b) requires the Applicant to "identify both the applicant's preferred choice and other alternatives it considers available for the site and configuration of each major part of the proposed facility and the reasons for the applicant's preferred choice." The Applicant has done that. See Application Section 301.03(h)(2). Other hypothetical alternatives, or alternative projects, are not subject to consideration under RSA 162-H:7 (application requirements for a certificate) or 162-H:16 (findings required for issuance of a certificate) and therefore are not relevant. See also *Decision Granting Certificate of Site and Facility with Conditions*, Application of Laidlaw Berlin BioPower, LLC, NH SEC Docket 2009-02 (Nov.8, 2010) at 36–40 (finding that RSA 162-H does not require the subcommittee to review all "available alternatives" and does not require consideration of every possible alternative). Notwithstanding the objection, the Applicant responds as follows:

The review of a non-transmission alternative was performed as part of the ISO-NE process to select a solution. The Project was approved through the ISO-NE Transmission Planning Process. Please refer to the Pre-Filed Testimony of Robert D. Andrew. The Pre-Filed Testimony of Mr. Andrew references several studies, including the 2010 New Hampshire/Vermont Needs Assessment and ISO-NE Load Forecasts (CELT) report. Each study discusses the need and methodology for the study. Most of the data in these reports are Critical Energy Infrastructure Information ("CEII") and not available publicly. Please refer to Appendix 22A, New Hampshire 10 Year Reliability Project for a publicly available summary of the NH/VT Needs report which contains a discussion of load forecasts and demand response treatment. Additional detail of the ISO-NE Planning process can be found at <a href="https://www.iso-ne.com/system-planning/system-plans-studies">https://www.iso-ne.com/system-planning/system-plans-studies</a>.

As part of the ISO-NE study process alternative transmission projects were considered. In the case of the Seacoast Reliability Project, an alternative suite of solutions, which included a new autotransformer and substation in Newington, was thoroughly reviewed. Ultimately, the suite of projects including the new line from Madbury to Portsmouth was selected. Please refer to Mr. Andrew's Pre-Filed Testimony at page 5, which discusses alternative projects for the Seacoast NH Solutions. Much of the detail behind the project selection is CEII and not publically available. A redacted version of the January 18, 2012 ISO-NE PAC meeting discussing alternative projects is attached. Moreover, alternative proposals or non-transmission alternatives were included as part of the ISO-NE studies.

The ISO-NE Planning Advisory Committee (PAC) is charged with introducing project alternatives, including, transmission and non-transmission solutions, see Planning Advisory Committee (PAC) Process <a href="https://www.iso-ne.com/committees/planning/planning-advisory">https://www.iso-ne.com/committees/planning/planning-advisory</a> No non-transmission alternatives were proposed by any PAC member to address the Seacoast

Area identified problems.

Three route alternatives were also studied for the Project. These included a northern, middle and southern route along with variations of the selected middle route. Please see the Pre-Filed Testimony of James Jiottis beginning on page 4 which discussed the alternative routes and the process for their selection.

Alternative measures to cross Little Bay were considered. These included an overhead crossing, uses of a jet plow and use of horizontal directional drilling (HDD). Please see the prefiled testimony of James Jiottis, starting on page 20 for discussion of the design to cross Little Bay and the response to Durham question 8.

Witnesses Available for Cross Examination include: Robert Andrew and James Jiottis

TS 2-5 Please provide a complete copy of all presentations and documents from your subcontractors, Mears and W.A. Chester, pertaining to the feasibility of Horizontal Directional Drilling (HDD) under Little Bay.

The Applicant objects to the question as it seeks information not relevant to the Response: proceeding and therefore is not reasonably calculated to lead to the discovery of admissible evidence. The Applicant further objects as the question is vague and ambiguous. The Applicant also objects to this question to the extent it seeks information that is protected by the attorney client privilege and/or attorney work-product privilege. See RSA 541-A:33, II ("Agencies shall give effect to the rules of privilege recognized by law."). See also N.H. R. Evid. 502 (Lawyer-Client Privilege); N.H. R. Prof. Conduct 1.6 (Confidentiality of Information). To the extent this data or document request seeks to obtain prior drafts, notes, or edits of any expert or consultant report, drawings, diagrams, photosimulations, or any other information contained in the Application, pre-filed testimony, and attached appendices, the Applicants object as the request is unduly burdensome, duplicative, irrelevant and not likely to lead to admissible evidence, and is protected as work-product pursuant to state and federal law. See RSA 541-A:33 (stating that the "presiding officer may exclude irrelevant, immaterial or unduly repetitious evidence" and providing that "[a]gencies shall give effect to the rules of privilege recognized by law"); RSA 516:29-b (requiring a witness retained or specifically employed to provide expert testimony to only disclose "the facts or data considered by the witness in forming the opinions"), which was recently amended to remove the requirement that an expert disclose such "other information" and to make the New Hampshire expert disclosure law consistent with recent amendments to Fed, R. Civ. Pro, 26, which explicitly protects prior draft reports from experts). See also Fed, R. Civ. Pro. Rule 26(b)(4)(B) (protecting drafts of any report or disclosure required under the general witness disclosure rules regardless of the form in which the draft is recorded).

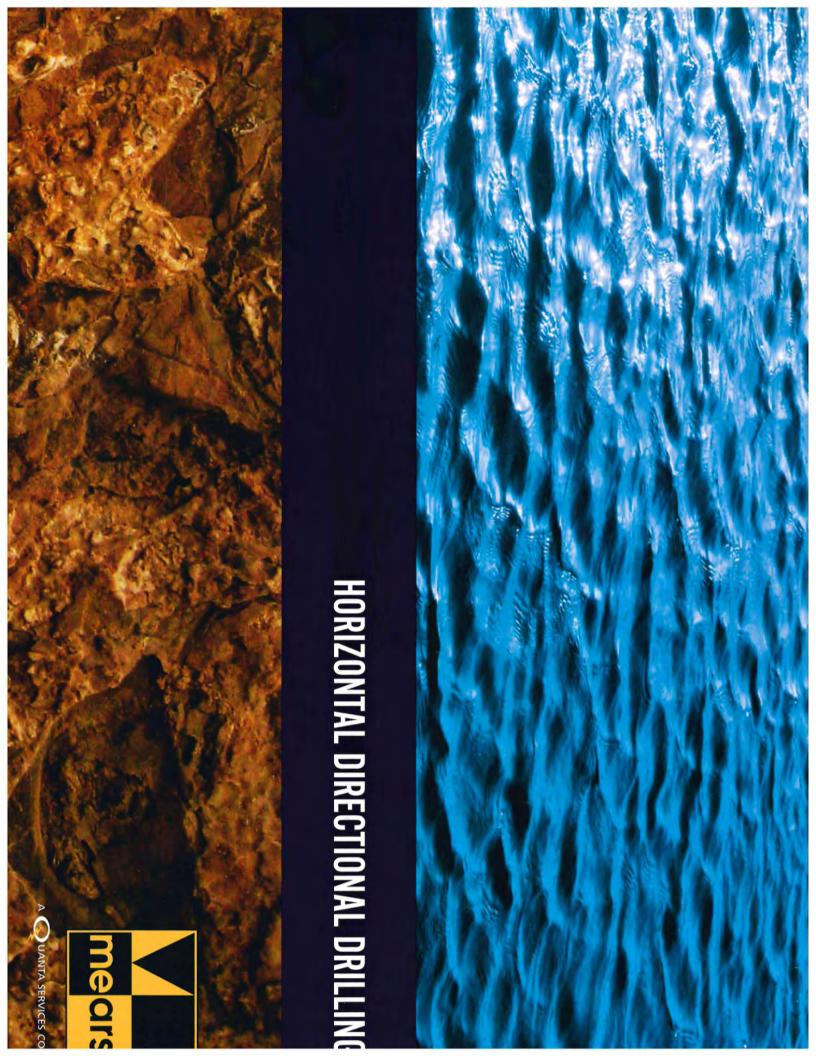
Notwithstanding the objections, please see the attached documents.

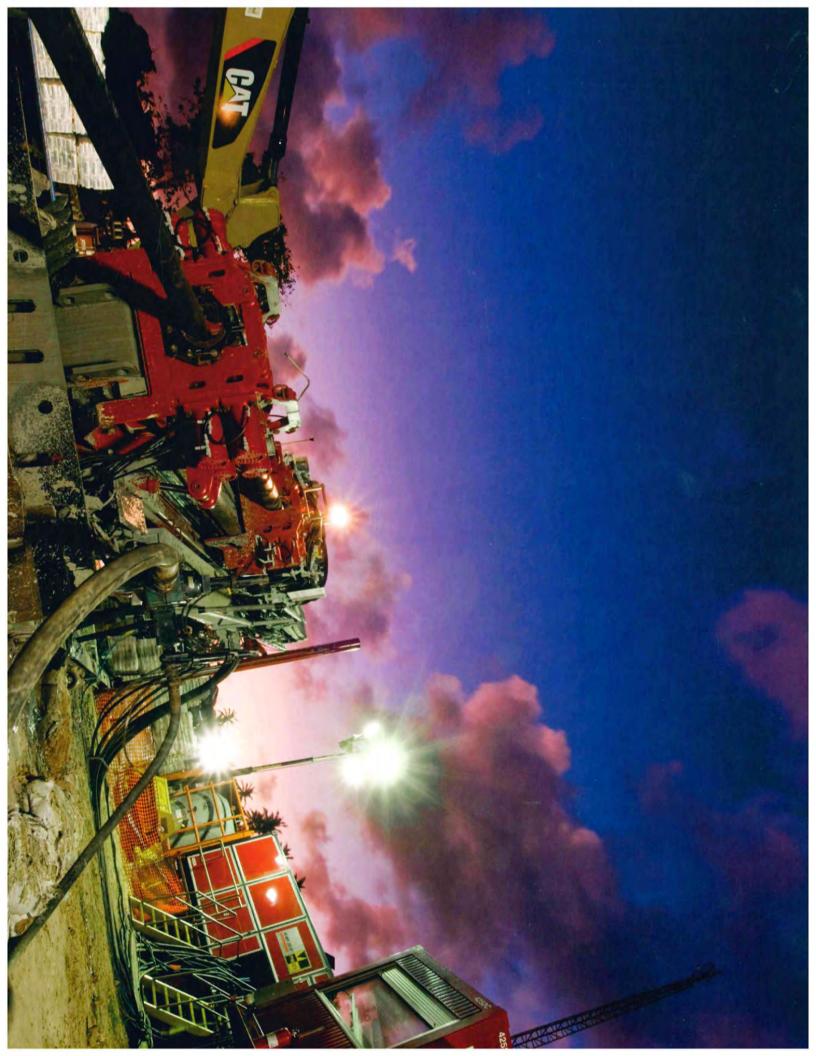
- 1. Mears HDD Model
- 2. Mears HDD Presentation for Northeast Utilities
- 3. Mears HDD Hand-out
- 4. WA Chester HDD Presentation

TS 2-6 Please provide all Eversource/PSNH Internal documents regarding the feasibility of HDD under Little Bay.

The Applicant objects to the question as it seeks information not relevant to the Response: proceeding and therefore is not reasonably calculated to lead to the discovery of admissible evidence. The Applicant further objects as the question is vague and ambiguous. The Applicant also objects to this question to the extent it seeks information that is protected by the attorney client privilege and/or attorney work-product privilege. See RSA 541-A:33, II ("Agencies shall give effect to the rules of privilege recognized by law."). See also N.H. R. Evid. 502 (Lawyer-Client Privilege); N.H. R. Prof. Conduct 1.6 (Confidentiality of Information). To the extent this data or document request seeks to obtain prior drafts, notes, or edits of any expert or consultant report, drawings, diagrams, photosimulations, or any other information contained in the Application, pre-filed testimony, and attached appendices, the Applicants object as the request is unduly burdensome, duplicative, irrelevant and not likely to lead to admissible evidence, and is protected as work-product pursuant to state and federal law. See RSA 541-A:33 (stating that the "presiding officer may exclude irrelevant, immaterial or unduly repetitious evidence" and providing that "[a]gencies shall give effect to the rules of privilege recognized by law"); RSA 516:29-b (requiring a witness retained or specifically employed to provide expert testimony to only disclose "the facts or data considered by the witness in forming the opinions"), which was recently amended to remove the requirement that an expert disclose such "other information" and to make the New Hampshire expert disclosure law consistent with recent amendments to Fed. R. Civ. Pro. 26, which explicitly protects prior draft reports from experts). See also Fed. R. Civ. Pro. Rule 26(b)(4)(B) (protecting drafts of any report or disclosure required under the general witness disclosure rules regardless of the form in which the draft is recorded).

Notwithstanding the objections, please see the Applicant's response to number 2-5 above.

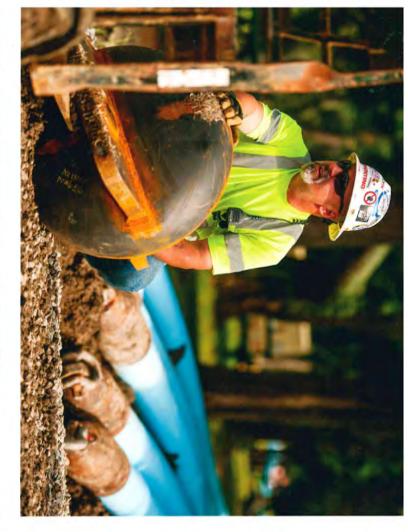




## HAN JUST DRIL /E DO MORE

have experience, expertise and ingenuity that is well-known to the oil and gas, electrical and water/wastewater industries. gaining their confidence in our capabilities by completing complex and innovative projects. Our professional construction and engineering teams The Mears reputation as a leading horizontal directional drilling (HDD) company has been earned by working hard and smart for our customers,

power and pipeline industries all across the world. to provide customers with the nation's largest pool of skilled workers, equipment and specialized services to deliver infrastructure solutions to the Mears is part of a professional network of companies under Quanta Services, Inc. (a Fortune 500 Company). As part of this network, Mears is able





## **HORIZONTAL DIRECTIONAL DRILLING**

Changing regulations, safety and quality standards and environmental concerns are an ever-present challenge to pipeline, power and utility companies responsible for installing and maintaining pipelines, cables and conduits. Led by a team of in-house engineers, project managers, steering technicians, international logistics and field personnel, Mears navigates the concerns of our customers through even the most complex projects.

With support from our Certified Equipment Managers, our fleet of horizontal directional drilling rigs and support equipment can complete projects with pipe diameter up to 60-inches, and our drilling capabilities include continuous lengths of over 11,000 feet.

Our experience also includes:

- Conventional HDD Crossings
- Marine Crossings (Water-to-Water and Shore Approaches)
- Hard Rock Drilling
- Design/Build
- Engineering, Procurement and Construction



## MEARS' COMMITMENT TO SAFETY, QUALITY & ENVIRONMENT

Our **Safety Management System (SMS)** has allowed Mears to maintain the highest standards in health and safety, and it is our company policy to provide and maintain safe and healthy conditions for all employees, customers and the public. Our commitment to safety is at the core of our company values and forms a foundation for operational excellence. The **OHSAS 18001:2007** standard has elevated our safety practices to an even higher level for our employees and customers.

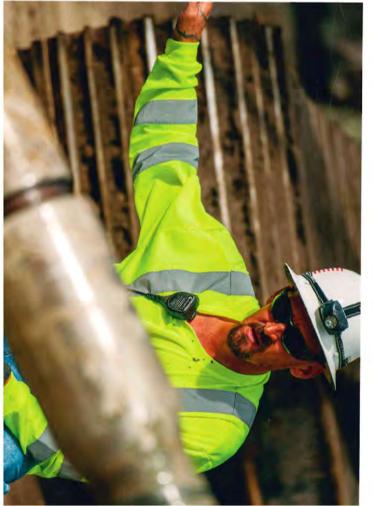
Mears' Quality Management System (QMS) is thoroughly designed and implemented to ensure client expectations and needs are exceeded. Guided by the ISO 9001:2008 standard, Mears Group monitors and documents quality performance, effectiveness and compliance.

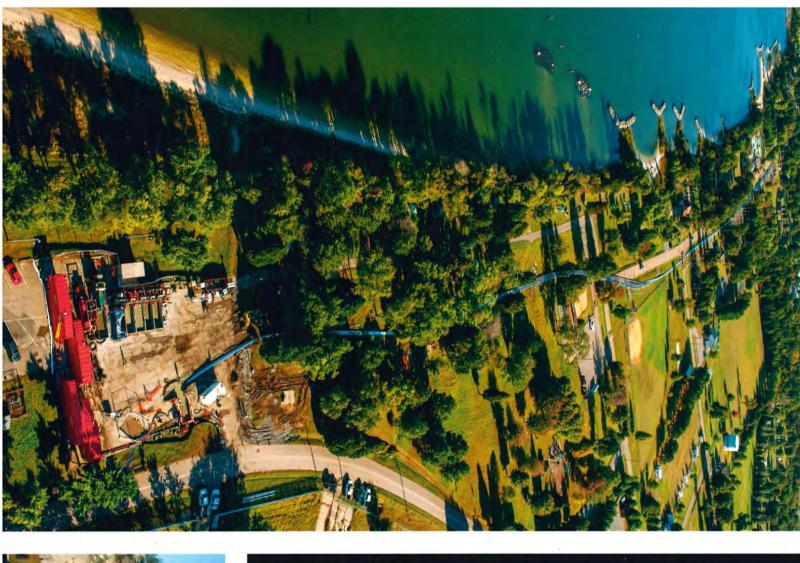
Additionally, our maintenance program, run by AEMP Certified Managers (CEMs), helps reduce downtime on projects and increases overall productivity by keeping equipment in optimum running condition.

The **Environmental Management System (EMS)** was established to strengthen Mears' commitment to protecting the environment by conducting our business operations in an environmentally responsible and sustainable manner. We recognize that by reducing and, when possible, eliminating waste, the environmental impact of our activities is significantly decreased.

To further our commitment to protecting the environment, Mears attained the **ISO 14001:2004** certification, and continues to place the value of environmental management as central to our corporate success.







## **DESIGN/BUILD**

At Mears, we offer our clients the opportunity to have their project designed and built as one turnkey operation. Benefits of design/build project delivery include:

- Reduced owner risk
- Shortened project schedules
- Single point of contact
- Increased cooperation
- Reduced owner resources
- An environment of design and construction innovation

## **ENGINEERING, PROCUREMENT**& CONSTRUCTION

Mears' engineering, procurement and construction (EPC) services provide a single source of contact and responsibility to our clients, saving them time and money. Through our EPC process, Mears' engineers, construction teams and subcontractors can communicate clearly and consistently with each other, ensuring that informative and collaborative decisions are made throughout the project. Additionally, having a single source of responsibility on a job enhances the safety and productivity of the project.







## MEARS GROUP, INC. - HORIZONTAL DIRECTIONAL DRILLING

2800 Post Oak Blvd., Ste. 3010 Houston, TX 77056 www.mears.net 281-448-2488

Certified in Safety, Quality, and Environmental: OHSAS 18001:2007, ISO 9001:2008 and ISO 14001:2004



Mears Group, Inc.

A QUANTA SERVICES COMPANY

ISO 9001:2008 Certified Company

Gregory J. Bosch HDD Division

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greg.bosch@mears.net email www.mears.net website

NYSE - PWR

## MEARS' COMMITMENT TO SAFETY, QUALITY & ENVIRONMENT

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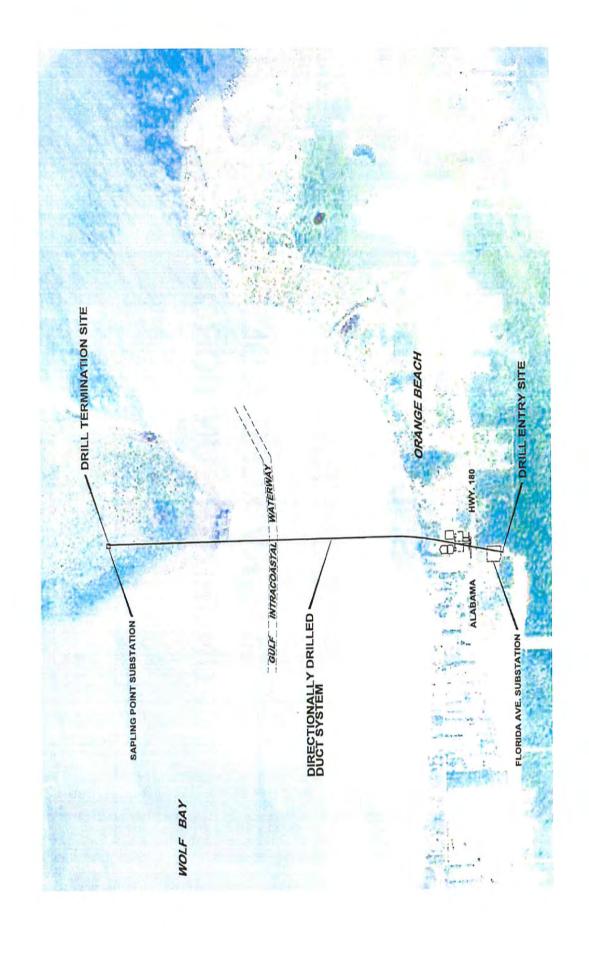
## POWERSOUTH ENERGY

## COOPERATIVE

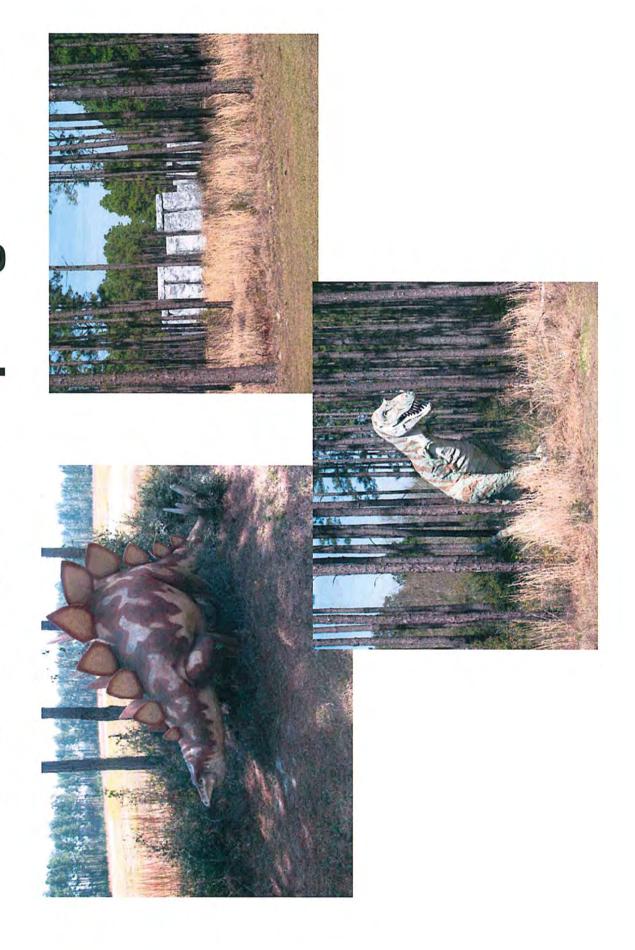
## 115 KV XLPE WOLF BAY UNDERGROUND CROSSING



## Map of Installation



# Other Sites of Sapling Point



## **Project Team**

- Owner PowerSouth Energy Cooperative
- Engineer Waldemar S. Nelson and Co., Inc.
- HDD Southeast HDD
- Cable Installation W. A. Chester LLC

Cable Manufacturer - J-Power Systems

Heavy Rigging - Barnhart

Steel Structures - DisTran

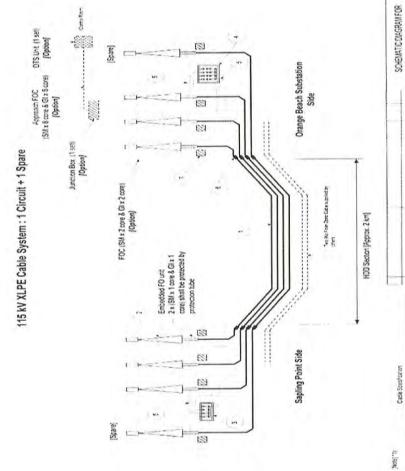
# Key System Requirements

- Steel casing for 6,131 ft. HDD crossing
- HDPE Conduits (6) grouted in casing
- XLPE Cable (3 phases plus 1 spare)
- Fiber optic temperature monitoring
- Fiber optic communications
- Hurricane protection

145 MPH Winds

Storm surge protection

# 115kV XLPE Cable System



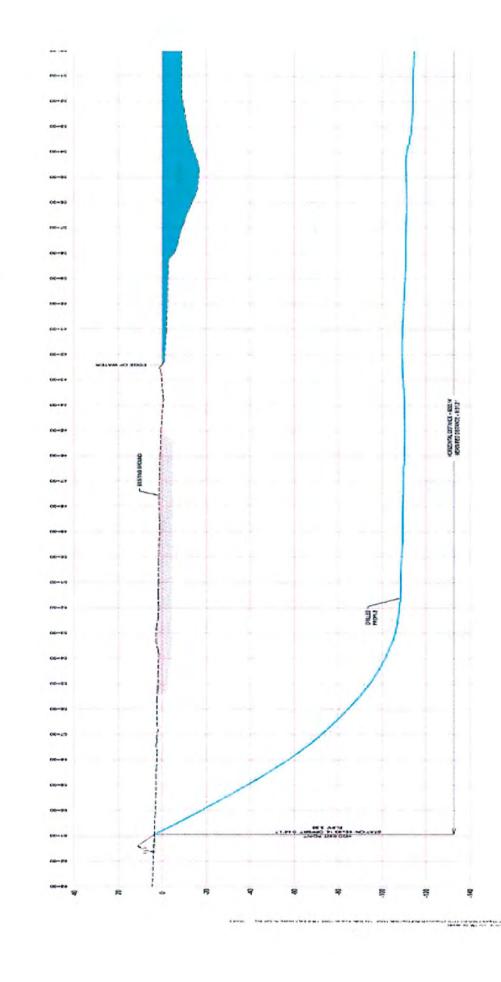
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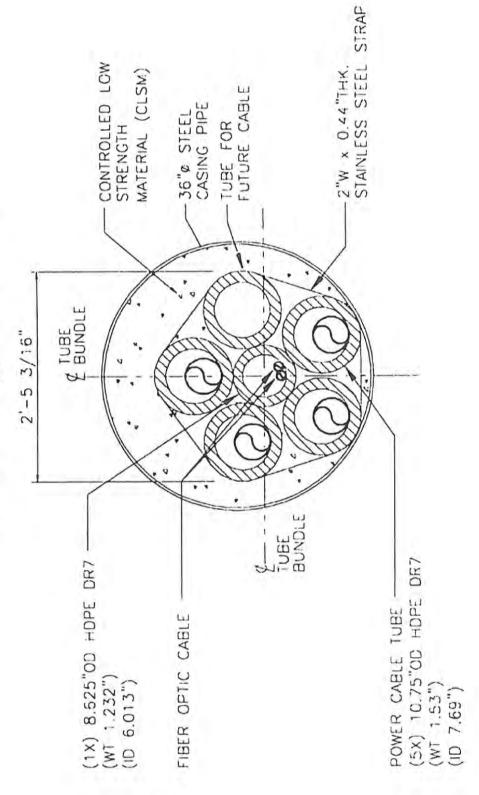
250 E70's

Contact See Contact figs Upon d Med Swet

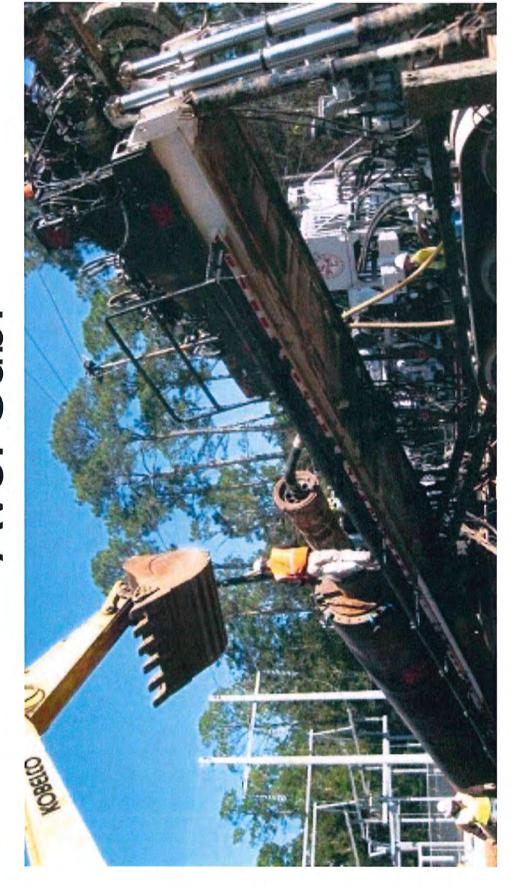
# Plan and Profile of Crossing



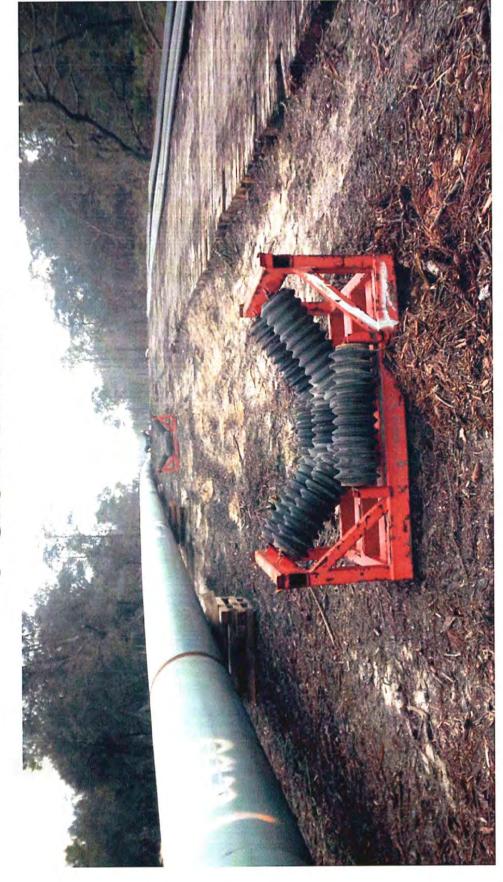
## Steel Casing & Duct Arrangement

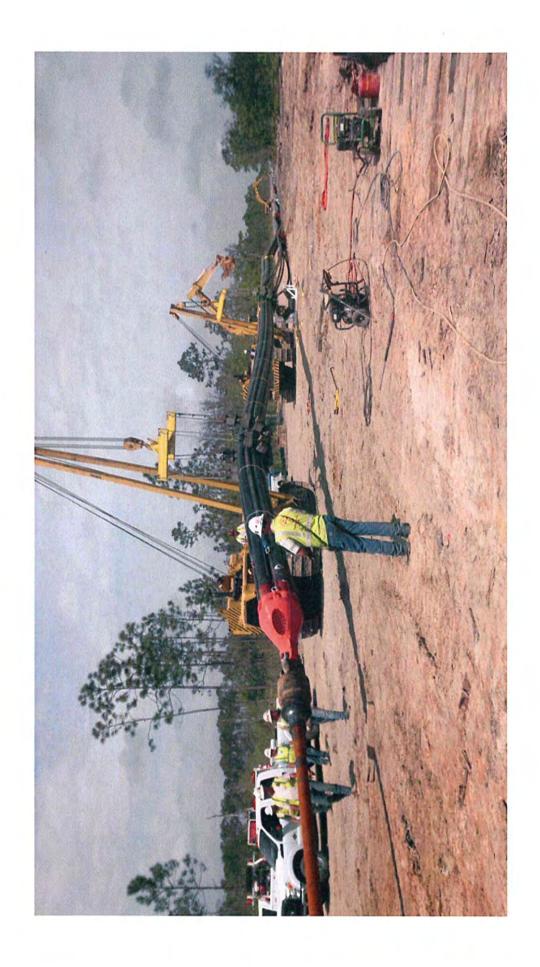


# Sleeve Installation at Florida Ave. Sub.



# Casing & HDPE Conduit Fabrication

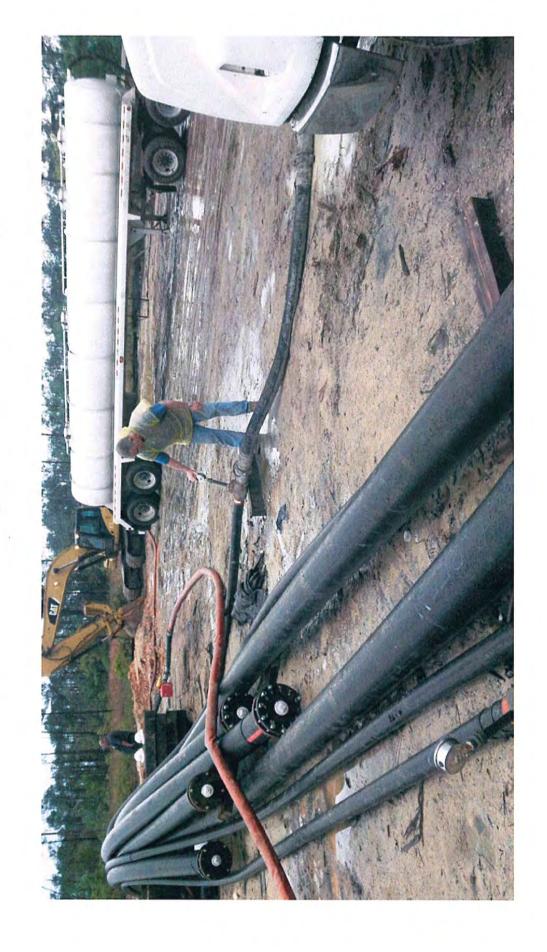




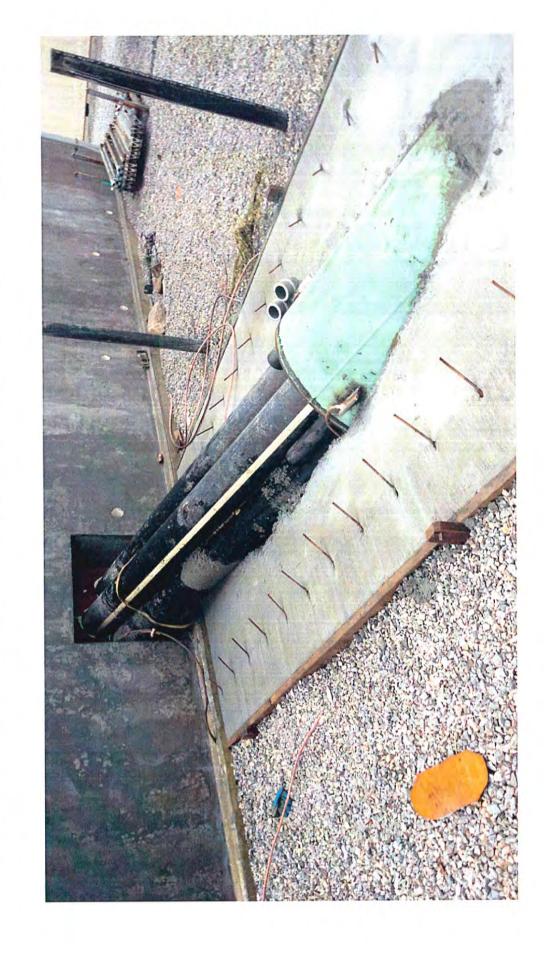
# **HDPE Bundle Entering Casing**



## **Grouting of Casing**



# Conduits at Exit of Bore Sleeve



### XLPE Cable Design

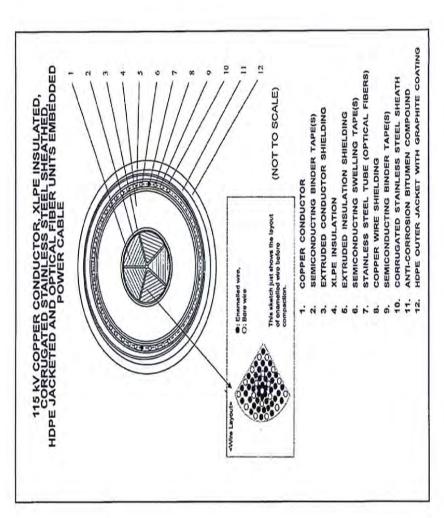
- Conductor 5 segment, enameled copper
- Insulation 630 mils XLPE
- Bedding & Binder Water swelling tapes
- Fiber Optic 2 Stainless steel tubes ea. with 1 multi-mode and one single mode fiber
- Metallic Sheath Welded and helically corrugated stainless steel.
- Jacket Extruded black high density polyethelene (HDPE)
- Cable Surface Graphite varnish

#### Cable Data

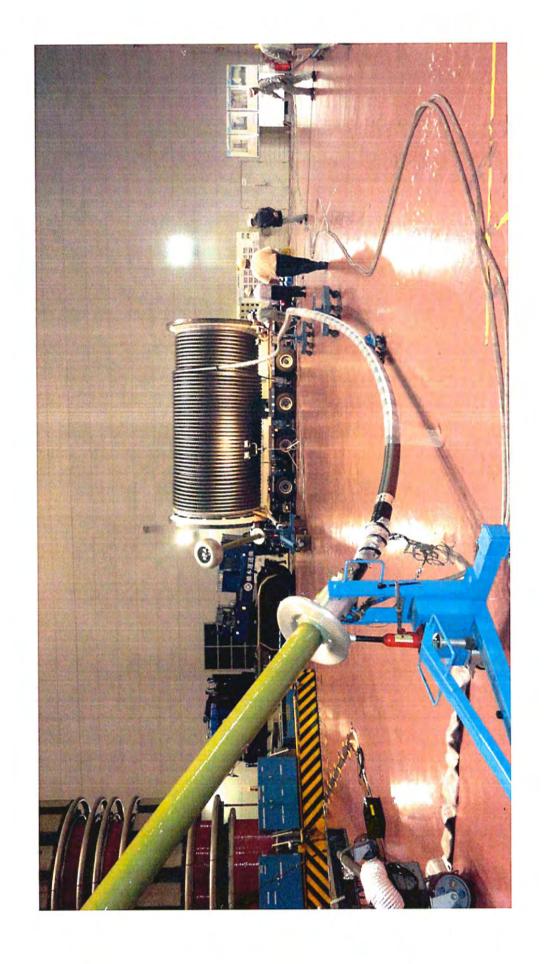
- Conductor Cross Section 5,000 kCM
- Conductor Diameter 2.45 in.
- Overall Diameter 5.39 in.
- Weight 24.3 lbs./ft.
- Minimum Bending Radius 142 in.
- Maximum Pulling Tension 38,000 lbs.

### Cable Cross Section

#### J-Power Systems



### Factory Testing



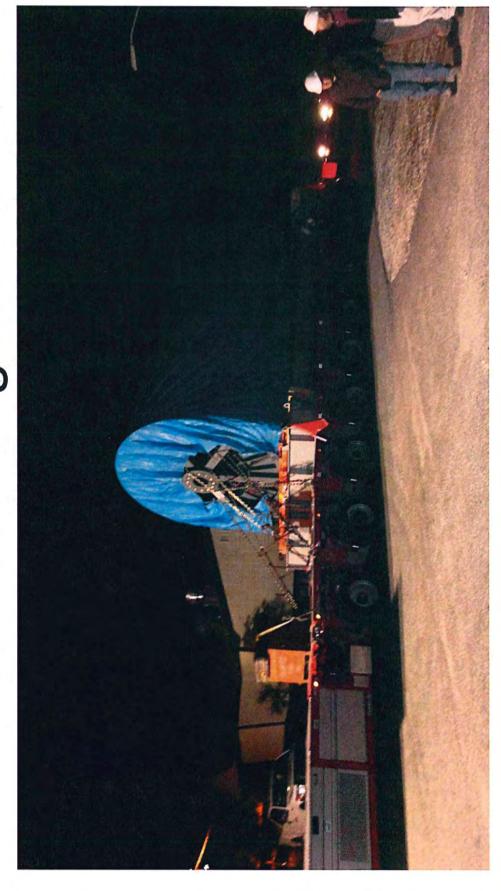
Reels Prior to Shipping from Osaka, Japan



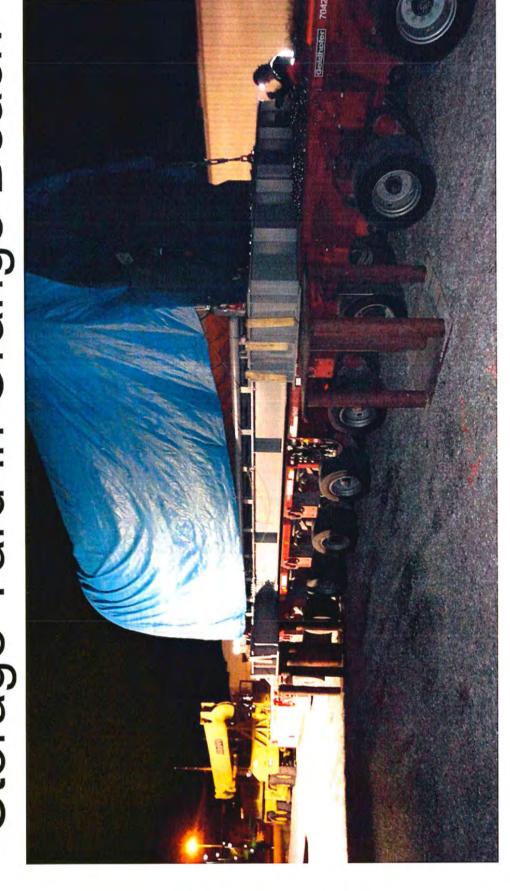
### Cable Reel Data

- Outside Diameter 12.5 ft.
- Drum Diameter 9.5 ft.
- Length 25 ft.
- Cable Weight 158,000 lbs
- Ea. Reel Shipped on Steel Frame

### Delivery From Barge to Storage Yard in Orange Beach



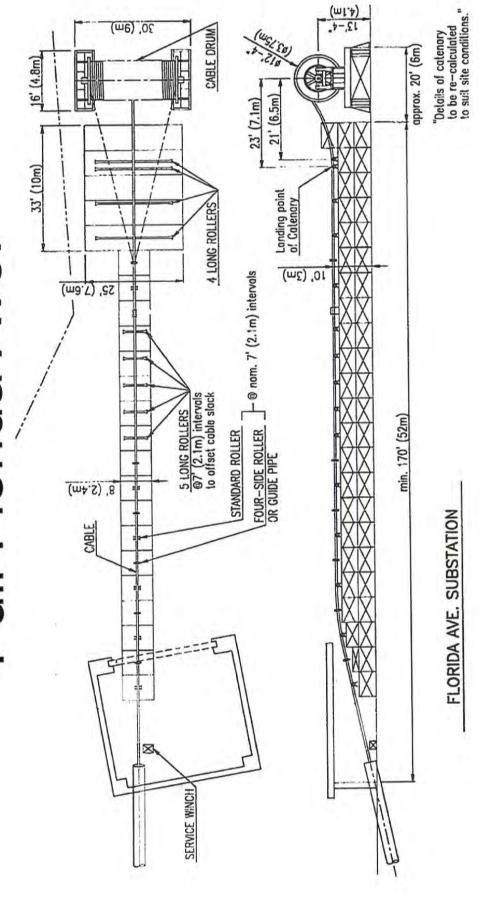
# Unloading from Barge to Storage Yard in Orange Beach



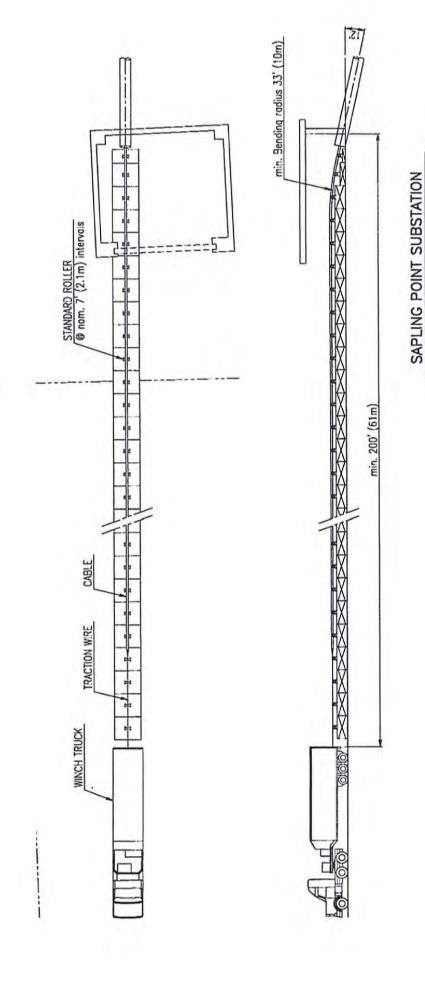
### Cable Pull Length

- 6,131 ft. is the longest XLPE cable pull attempted in conduit.
- Approximately 200 ft. required on each end for racking and terminating.
- Total cable length approximately 6,500 ft.

### General Arrangement of Cable Pull Florida Ave.



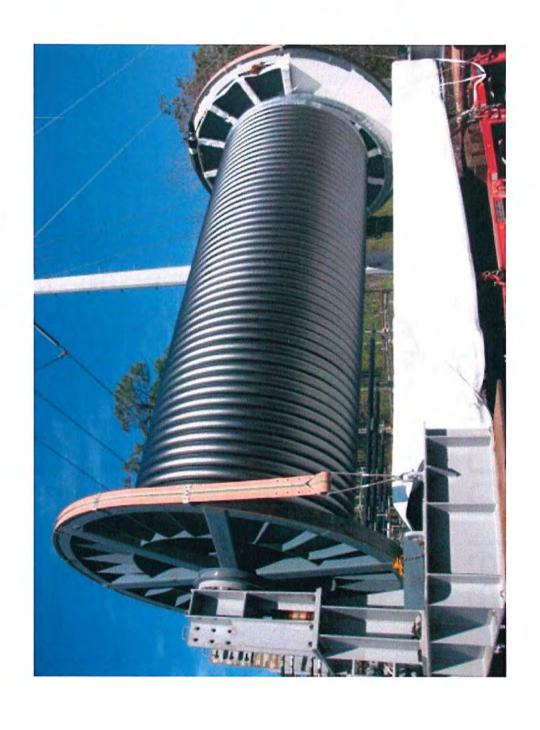
### General Arrangement of Cable Pull Sapling Point



#### Cable Pulling

- Maximum allowable cable tension 38,000 lbs.
- Calculated pulling tensions 29,936 lbs.
- 100,000 lb. Cable winch & cable pusher utilized.
- 1-1/8 in. Winch line with swivel.
- Pulling lubricant utilized.
- Pull-out shoe utilized.
- Dead-man provided for stabilization of winch

# Reel Set-up at Pulling Location



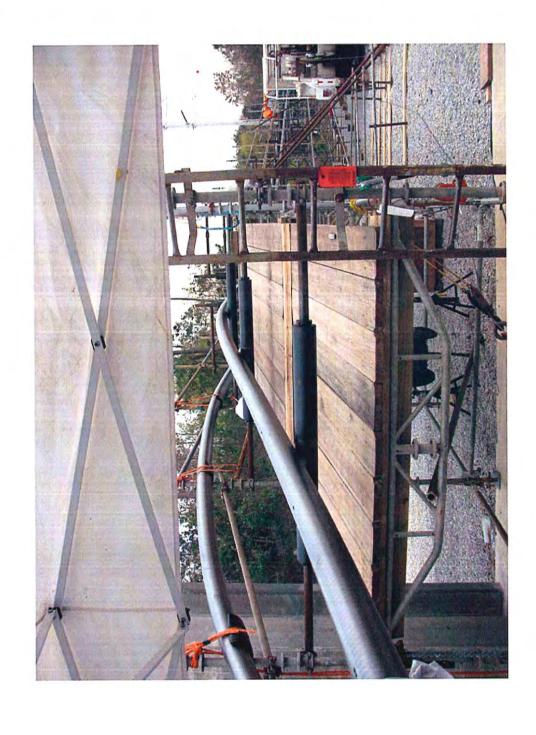
### Reel During Cable Pull



### Pull-in Structure & Rollers



## Cable Approaching Conduit



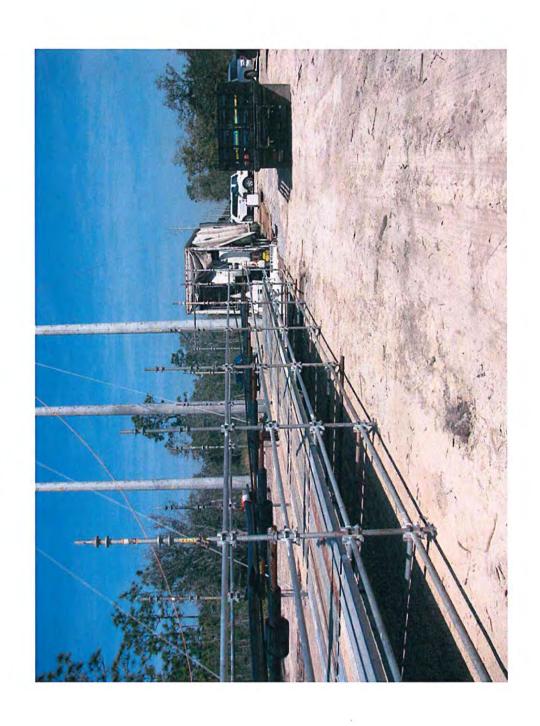
## Application of Cable Lubricant



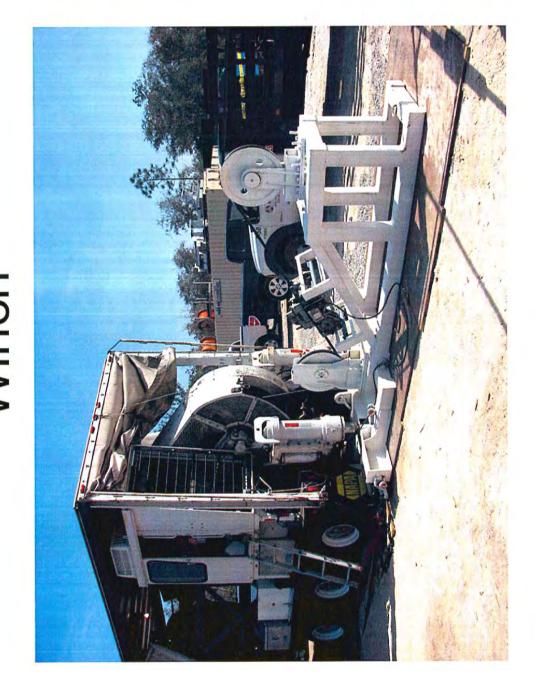
#### Pull Out Shoe



#### Rigging at Site



## Rigging Arrangement at Pulling Winch



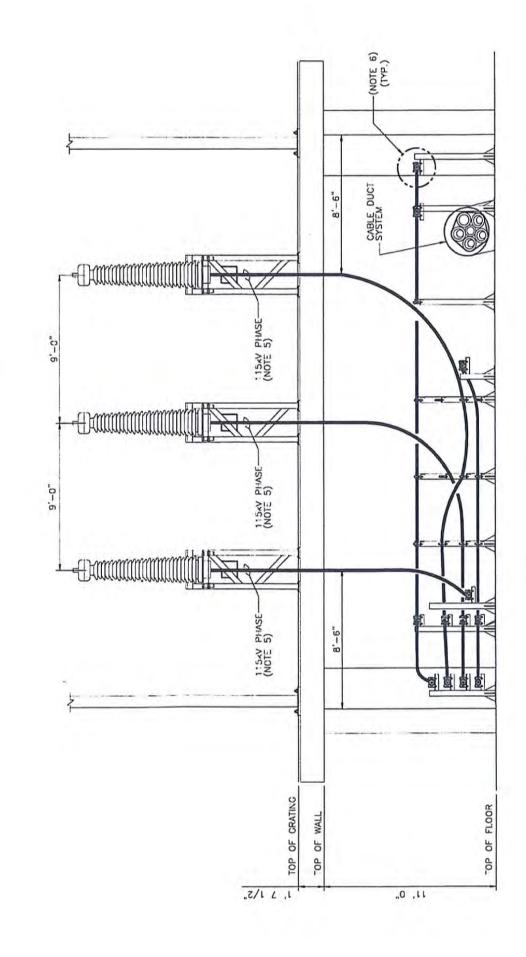
## Monitoring of Pulling Tensions

- Tension monitoring critical to successful installation.
- Tension monitored continuously by winch operator.
- Hardline communication between entry and
- Tension, Distance, Speed recorded every 2 seconds.
- Remote monitoring available.
- Actual tensions well below calculated.

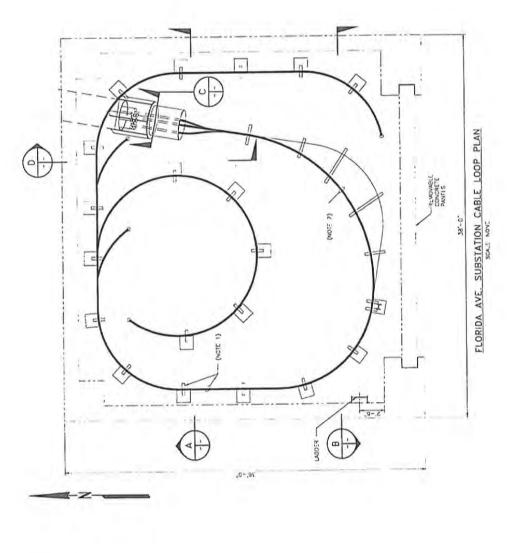
## Tension Monitoring Equipment



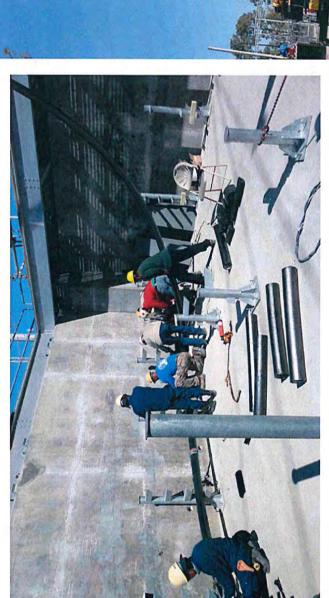
# Elevated Termination Structure



# Proposed Cable Racking at Vaults



### Racking Cable in Vaults





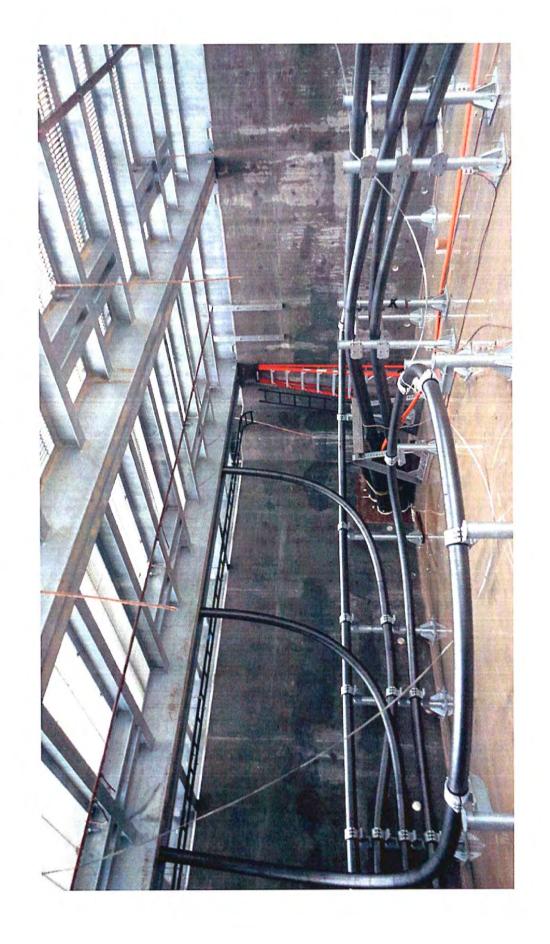
### Fixed Supports



### Supports Allowing Cable Movement

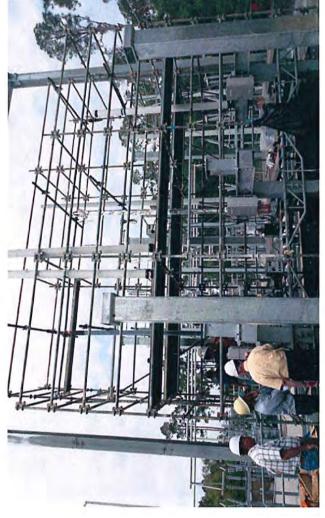


### Completed Racking



### Termination Installation

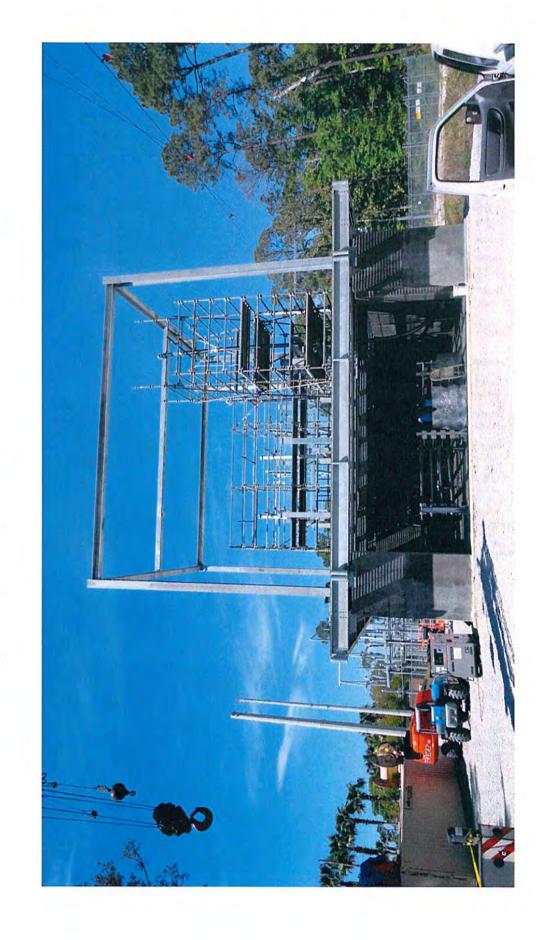




# Sandblasting of Enameled Strands



### Spare Termination



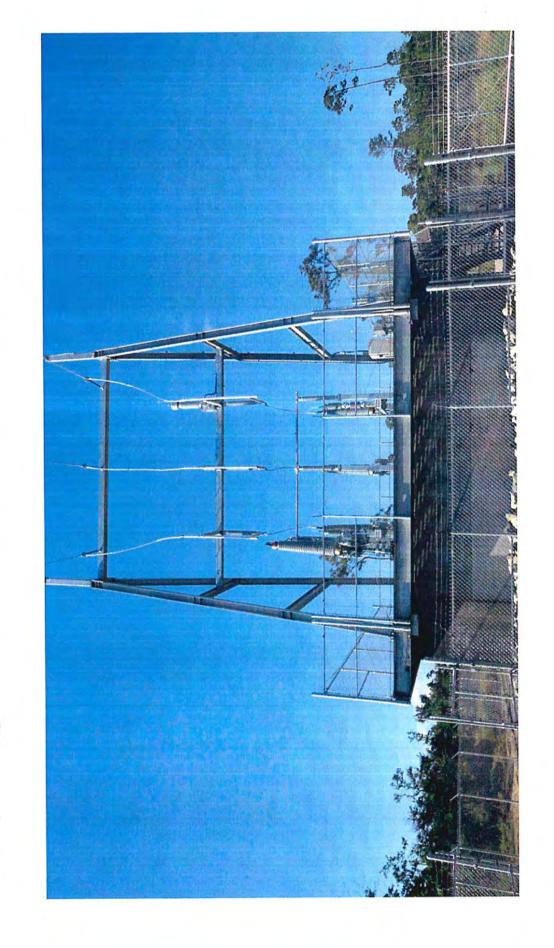
# Termination Nearing Completion



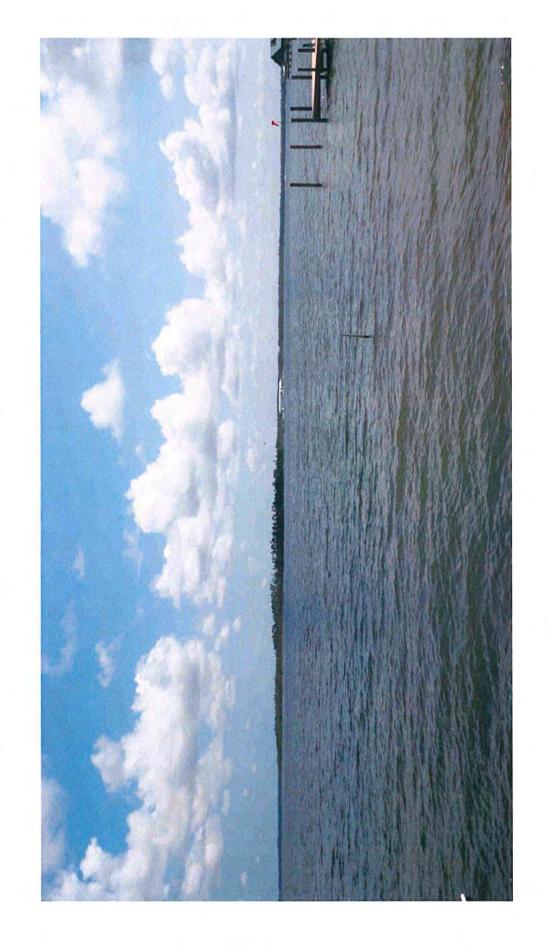
# Florida Ave. Termination Structure



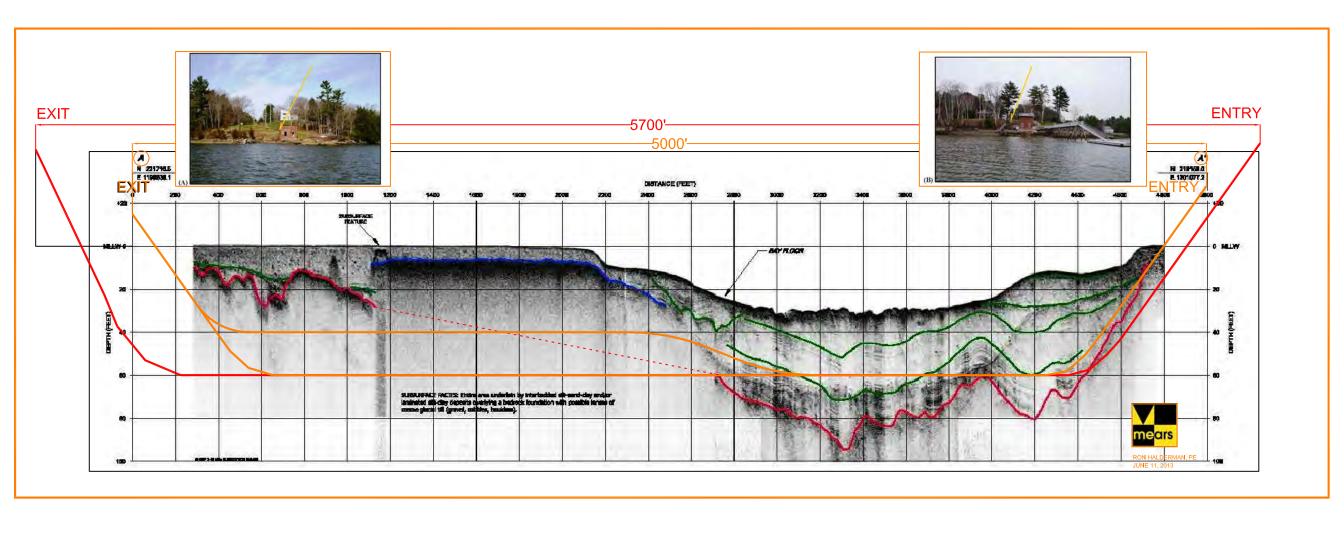
# Sapling Point Termination Structure

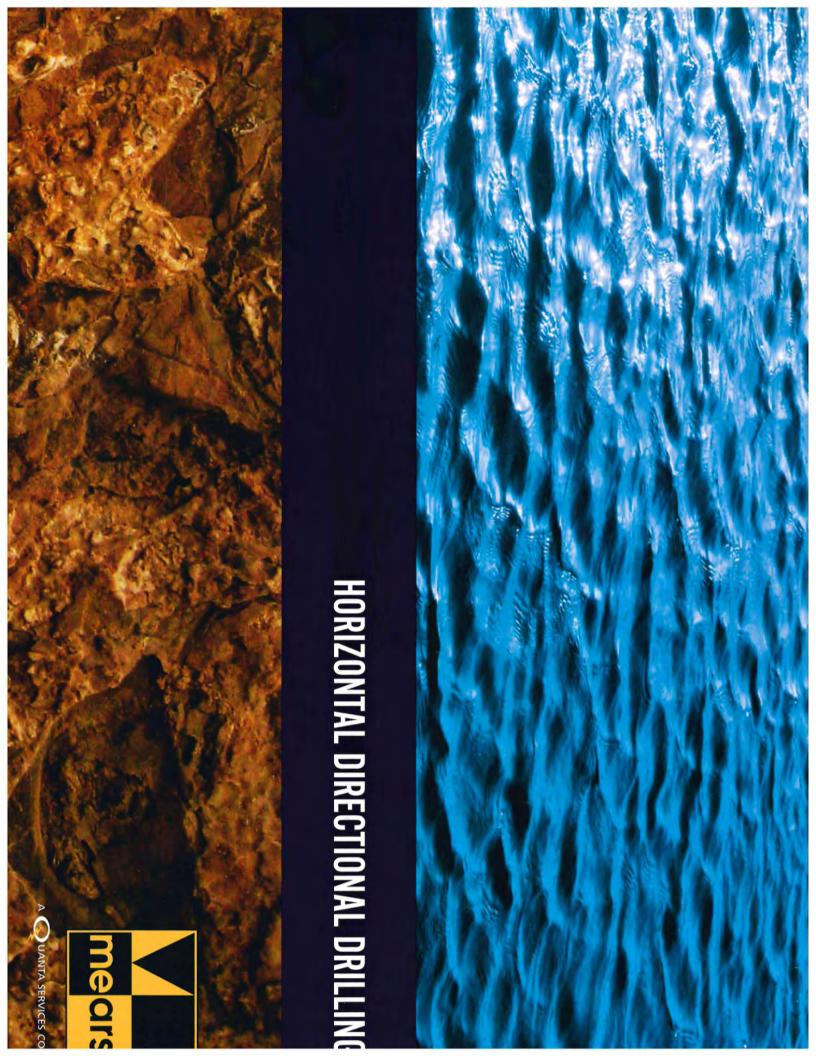


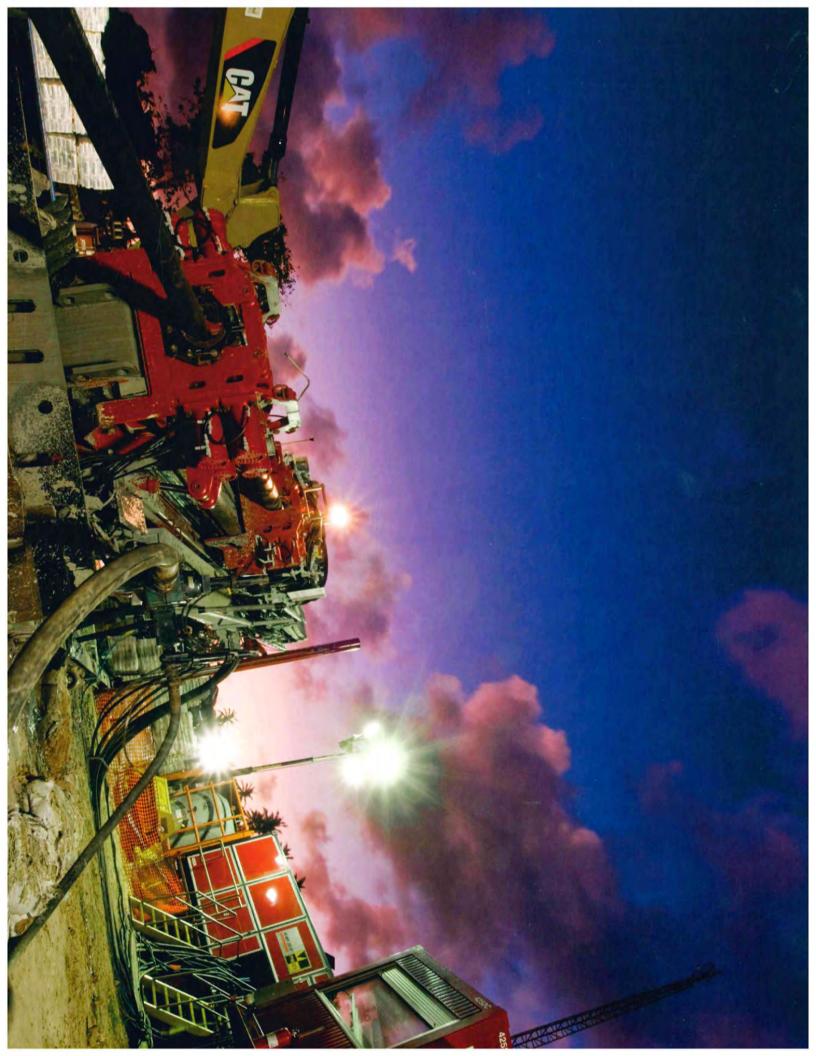
### Wolf Bay 138kV Crossing



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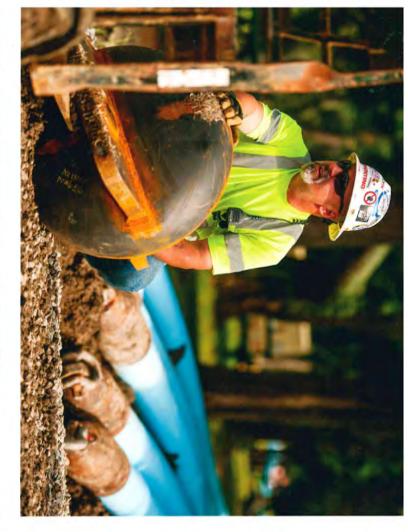




#### HAN JUST DRIL /E DO MORE

have experience, expertise and ingenuity that is well-known to the oil and gas, electrical and water/wastewater industries. gaining their confidence in our capabilities by completing complex and innovative projects. Our professional construction and engineering teams The Mears reputation as a leading horizontal directional drilling (HDD) company has been earned by working hard and smart for our customers,

power and pipeline industries all across the world. to provide customers with the nation's largest pool of skilled workers, equipment and specialized services to deliver infrastructure solutions to the Mears is part of a professional network of companies under Quanta Services, Inc. (a Fortune 500 Company). As part of this network, Mears is able





### **HORIZONTAL DIRECTIONAL DRILLING**

Changing regulations, safety and quality standards and environmental concerns are an ever-present challenge to pipeline, power and utility companies responsible for installing and maintaining pipelines, cables and conduits. Led by a team of in-house engineers, project managers, steering technicians, international logistics and field personnel, Mears navigates the concerns of our customers through even the most complex projects.

With support from our Certified Equipment Managers, our fleet of horizontal directional drilling rigs and support equipment can complete projects with pipe diameter up to 60-inches, and our drilling capabilities include continuous lengths of over 11,000 feet.

Our experience also includes:

- Conventional HDD Crossings
- Marine Crossings (Water-to-Water and Shore Approaches)
- Hard Rock Drilling
- Design/Build
- Engineering, Procurement and Construction



#### MEARS' COMMITMENT TO SAFETY, QUALITY & ENVIRONMENT

Our **Safety Management System (SMS)** has allowed Mears to maintain the highest standards in health and safety, and it is our company policy to provide and maintain safe and healthy conditions for all employees, customers and the public. Our commitment to safety is at the core of our company values and forms a foundation for operational excellence. The **OHSAS 18001:2007** standard has elevated our safety practices to an even higher level for our employees and customers.

Mears' Quality Management System (QMS) is thoroughly designed and implemented to ensure client expectations and needs are exceeded. Guided by the ISO 9001:2008 standard, Mears Group monitors and documents quality performance, effectiveness and compliance.

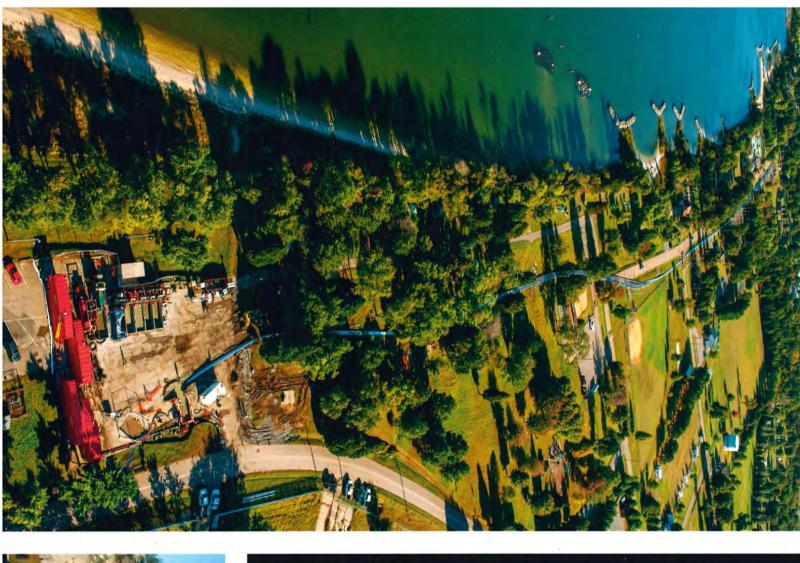
Additionally, our maintenance program, run by AEMP Certified Managers (CEMs), helps reduce downtime on projects and increases overall productivity by keeping equipment in optimum running condition.

The **Environmental Management System (EMS)** was established to strengthen Mears' commitment to protecting the environment by conducting our business operations in an environmentally responsible and sustainable manner. We recognize that by reducing and, when possible, eliminating waste, the environmental impact of our activities is significantly decreased.

To further our commitment to protecting the environment, Mears attained the **ISO 14001:2004** certification, and continues to place the value of environmental management as central to our corporate success.







#### **DESIGN/BUILD**

At Mears, we offer our clients the opportunity to have their project designed and built as one turnkey operation. Benefits of design/build project delivery include:

- Reduced owner risk
- Shortened project schedules
- Single point of contact
- Increased cooperation
- Reduced owner resources
- An environment of design and construction innovation

#### **ENGINEERING, PROCUREMENT**& CONSTRUCTION

Mears' engineering, procurement and construction (EPC) services provide a single source of contact and responsibility to our clients, saving them time and money. Through our EPC process, Mears' engineers, construction teams and subcontractors can communicate clearly and consistently with each other, ensuring that informative and collaborative decisions are made throughout the project. Additionally, having a single source of responsibility on a job enhances the safety and productivity of the project.







#### MEARS GROUP, INC. - HORIZONTAL DIRECTIONAL DRILLING

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Certified in Safety, Quality, and Environmental: OHSAS 18001:2007, ISO 9001:2008 and ISO 14001:2004



Mears Group, Inc.

A QUANTA SERVICES COMPANY

ISO 9001:2008 Certified Company

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