UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of — Docket # 50-293

Entergy Corporation

Pilgrim Nuclear Power Station

License Renewal Application — May 27, 2008

PILGRIM WATCH MOTION TO INCLUDE AS PART OF THE RECORD EXHIBITS ATTACHED TO PILGRIM WATCH MOTION TO STRIKE INCORRECT AND MISLEADING TESTIMONY FROM THE RECORD OF MAY 15, 2008

Pilgrim Watch requests to make part of the record the exhibits that were attached to Pilgrim Watch Motion to Strike Incorrect and Misleading Testimony from the Record, May 15, 2008.[1]

The Exhibits include:

1. *Pilgrim Nuclear Power Station: Salt Water Discharge Piping Trenchless Rehabilitation Challenges*, Jonathan Raymer, Miller Pipeline Corporation, Indianapolis, IN March 22-24, 2004, North American Society for Trenchless Technology (NASTT) No-Did 2004
2. John H. Fitzgerald III, P.E., *Retrofitting Cathodic Protection at Pilgrim Station* and CV
3. Cathodic Protection, Email Correspondence: Graham E.C. Bell, Ph D.,P.E., Schiff Associates; William Carlson, Cathodic Protection management Inc., President; Larry Brandon, CorPre Tek, President; Ted Huck, MATCOR, Vice President

Pilgrim understands that the hearing has not been closed. The Board's Order (Setting Deadlines for Provisional Proposed Findings and Conclusions on Contention 1 and for Pleadings to Pilgrim Watch's Recent Motion Regarding CUFs) ASLBP No. 06-848-02-LR (May 12, 2008) said that,

[1] Entergy's Counsel, David Lewis, was contacted May 27, 2008 and opposed; NRC Counsel, David Adler, was contacted May 27, 2008 and withheld opinion.

"…setting the deadlines in question should not be construed as closing the hearing in the matter; among other things, if the need for further findings later arises based on the current stay or related activities, these will be permitted as appropriate and necessary" (Order at 3).

Pilgrim Watch submits this motion asking to include these documents as part of the record because, as we explained on May 15, 2008, some of the critical testimony presented by Entergy and NRC Staff at the April 10, 2008 Hearing regarding cured in place linings, coatings and cathodic protection/stray current interference was either inaccurate, incomplete or gave a misleading impression. The following information could materially affect the decision of the Atomic Safety and Licensing Board (the "Board") in this proceeding; therefore the Board should take into account these Exhibits in their decision process.

Thank you in advance for your consideration,

Mary

Mary Lampert

Pilgrim Watch, pro se

148 Washington Street

Duxbury, MA 02332

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CERTIFICATE OF SERVICE

I hereby certify that the following was served May 27, 2008 by electronic mail and by U.S. Mail, First Class to the Service List: Pilgrim Watch Motion to Include as Part of the record Exhibits Attached to Pilgrim Watch Motion to Strike Incorrect and Misleading testimony From the Record of May 15, 2008.

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EXHIBIT 1

North American Society for Trenchless Technology (NASTT)
NO-DIG 2004

New Orleans, Louisiana
March 22-24, 2004

PILGRIM NUCLEAR POWER STATION: SALT SERVICE WATER DISCHARGE PIPING TRENCHLESS REHABILITATION CHALLENGES

Jonathan Raymer

Miller Pipeline Corporation, Indianapolis, IN

ABSTRACT: Miller Pipeline Corporation, an international gas and utility construction company with over 50 years of experience, was contracted by Entergy's Pilgrim Nuclear Power Station to rehabilitate 240' of 22" nominal diameter standard weight carbon steel piping with an existing 3/16" natural rubber lining. The subject piping contained three 45-degree elbows, one 90-degree long radius elbow, and an elevation change of over 22 feet. Other site conditions further complicated this installation. After removing a vault cover and piping spool located under the main reactor building, the upstream mouth of the pipe was accessed 8' below grade, 6' off the bottom of the vault, and offset 10' horizontally under the building exiting the vault away from the building. This piping configuration required that the liner be turned a total of 270-degrees before entering the mouth of the pipe. The submerged downstream outlet of the pipe presented other unique access challenges. Prior to lining the pipe, Miller personnel visually inspected the pipe and any sections of the existing natural rubber lining that displayed damage were removed and the thickness of the host pipe was determined using an ultrasonic measurement device.

The project was scheduled to be completed during an April 2003 plant refueling outage, in which time was of the essence. Miller assembled a team to work a continuous 24 hour/day schedule to complete the work in the allotted time. The project was completed on time and within budget.

INTRODUCTION

Entergy's Pilgrim Nuclear Power Station (PNPS) has the ongoing challenge and responsibility of securing and maintaining a state of the art power production facility. Their team of in house engineers and technicians constantly monitor the facility in order to design solutions to maintain ideal operating conditions and allow for growth and improvement where it is determined necessary. The fact that this facility produces energy using nuclear fuel makes this responsibility ever more critical. Homeland security and public health are of the utmost importance and take priority over all other operations at this and other nuclear power plants. In addition to security concerns, it is important that the plant provide uninterrupted service except during certain planned activities. This important responsibility was brought to the forefront of international news during the power outages that took place in the northeastern United States in the latter days of August, 2003. Non-emergency construction activity is typically completed during refuel outages to minimize the amount of time that the station is not producing electricity. For this reason the refueling schedule dictates the amount of time allotted for inspection, maintenance, and construction activities taking place throughout the plant.

Pilgrim Nuclear Power Station falls under the authority of the U.S. Nuclear Regulatory Commission (NRC)[1], which maintains a constant presence at the plant. The NRC is an independent agency established by the Energy Reorganization Act of 1974 to regulate civilian use of nuclear materials. The plant maintains a Nuclear Quality Assurance program in accordance with Appendix B to Part 50 of Title 10 of the Federal Regulations.[2] It is from this program that the subject work was discovered and designed for construction. The subject project inspection, design, materials, installation, testing, and documentation were performed and accepted under this program.

The project studied in this paper consisted of the installation of a cured-in-place pipe liner in Loop "A" of the Salt Service Water (SSW) Piping at PNPS. The installation of the pipe required extensive preparation work consisting of construction activities performed by multiple trades to support this task. The power station had utilized trenchless technology in the past with mixed results. There was a clear challenge going into the work that was addressed by the project team with thorough planning and teamwork. Given the history and location of the project, it was essential that this work be completed on time and as planned.

CURED IN PLACE PIPE – WHAT IS IT?

Cured in Place Pipe is made up of a resin-impregnated tube engineered from non-woven polyester needle-punch material which is specifically designed for bonding with chemical resistant resin systems. The needle-punch materials inner surface is coated with a clear geo-membrane that allows for the resin to be encapsulated within the felt layers to ensure non-contamination of the resin. Various different resin selections are available including polyesters, vinylesters and epoxies, all of which are formulated by several manufacturers throughout the world. CIPP is most commonly specified and tested in accordance with ASTM F-1216[3], ASTM D638[4], ASTM D790[5] and other relevant standards applicable to the installation of CIPP in wastewater, storm water, and industrial systems.

The lining process is accomplished by either inverting or pulling the tube into the host pipe made of virtually any material. Almost always, CIPP is installed from one manhole or access structure to another so the process is completely trenchless which significantly reduces surface congestion and is generally less expensive compared to typical open cut methods. Each installation method has its specific application depending on a variety of circumstances. Once the resin impregnated tube has been fully installed, it is cured by circulating hot water or steam inside the liner. During the cure process, the tube is held tightly against the host pipe by internal pressure. After the tube has cured into a monolithic structure, any laterals are reopened robotically or by man-entry depending on the size of the liner. The finished product molds to the host pipe and leakage at pipe joints and cracks are eliminated. Due to the smooth interior surface of the liner, flow in the line is often enhanced.

HISTORY

The Salt Service Water Discharge piping was originally designed and built using 22" nominal diameter standard weight carbon steel pipe (0.375" wall thickness). Flange connections in the piping are rubber lined Pressure Class 150 flat-faced slip-on flanges. This piping was initially protected using a 3/16" thick natural rubber lining to prevent deterioration due to corrosion from the constant flow of aerated salt water. The discharge piping has been routinely inspected and spot repairs in the pipe have been made using weld overlays and Belzona® 1311 Ceramic R-Metal epoxy compound. In 1999, new 40 ft pipe spools were installed in pipe vaults next to and under the Auxiliary Building. The replacement spools were

[1] Learn more about the U.S. Nuclear Regulatory Commission at www.nrc.gov
[2] 10CFR50 Appendix B: www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appb.html
[3] ASTM F1216 "Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-Impregnated Tube"
[4] ASTM D638 "Standard Test Methods for Tensile Properties of Plastics"
[5] ASTM D790 "Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials"

constructed of 22" nominal diameter standard weight carbon steel pipe coated with Duromar EAC-FE epoxy with a minimum 1/32" thickness, and included elastomeric internal joint seals commercially know as WEKO-SEALS® that acted as expansion seals on both end flange joints of the replacement spool.

In April 2001, PNPS developed a specification for lining Loop "A" and Loop "B" from the last flange connection at the Auxiliary Building piping vault to the end of the discharge pipe at the outfall. The Loop "A" discharge piping is 240 ft with three 45-degree elbows and one 90-degree long radius elbow. The Loop "B" discharge piping is approximately 225 ft with four 45-degree elbows and one 90-degree long radius elbow.

Construction was completed on Loop "B" during the refuel outage in 2002. Loop "A" was to be completed during the same refuel outage, but was postponed for one year due to unexpected delays. These delays were later attributed to decisions to use an onsite wet-out, the decision to use epoxy resin and hardener, and using a steam cure as opposed to heated water. Although these are proven methods and solutions throughout the industry they were not the right fit for this application. The liner in Loop "B" was allowed to reach excessive temperatures during the steam cure of the epoxy resin that caused noted concern in the plant, and the liner split upon cool down at each of the bends. Belzona® and WEKO-SEALS® were utilized to repair these areas before putting the piping back into service, but a goal was set for the installation in Loop "A" to eliminate the cracks at the bends in the pipe. A procedure was set up for the forthcoming lining of "Loop A" to initiate cracks at each of the bends by cutting the liner to allow stress to be relieved and then initiating repairs at each crack. It was important to the owner that they have the opportunity to repair any cracks that might form while the piping was out of service instead of having to repair it at an unexpected time. The design team for Loop "A" saw this as an unnecessary step and it was later agreed to cut and observe the liner at the first 45-degree bend and then determine if there was a need to repeat this procedure at each of the remaining bends. The resin selection and curing procedures were to be carefully considered to determine movement of the liner within the host pipe during installation, cure, cool down, and operation in order to accurately predict the characteristics of the liner.

The construction on Loop "B" provided the planning team with many lessons learned that allowed for an improved plan to be implemented for the construction of Loop "A" in April, 2003.

THE CHALLENGE

The challenges of this particular installation were plentiful. The site specific challenges included access to the pipe, bends in the pipe, and grade. Figure 1 is the "As Built" drawings of Loop "A" as provided by PNPS. This drawing illustrates the multiple bends and grade associated with the piping. Material challenges included determining felt thickness, resin type, cure schedule, and cool down schedule.

Other challenges were present due to the fact this installation was in a facility regulated by the NRC. Some examples of these challenges included disposal of cure water, security clearance for the construction team and equipment, and nuclear specific safety training for the construction team.

Access to both the upstream and downstream openings provided unique challenges. The dotted line to the lower right corner of Figure 1 represents the 40' spool that was removed to provide an opening into the pipe to begin the lining. Figure 2 shows an isometric view of the access vault at the upstream mouth of the pipe. Figure 3 is a photograph showing the alignment of the pipes in the vault. The pipe to the right in Figure 3 is the discharge pipe for Loop "A" and the opening is immediately out of the picture to the right. To begin inversion of the liner in the pipe required turning the material 90-degrees vertically to access the vault under the building and then turning 180-degrees degrees horizontally to enter into the pipe with limited room to make the turns within the vault. The liner would need to be routed over the pipe on the left of Figure 3 to reach the staging from where this picture was taken. The client did not consider it an option to cut the pipe near the wall of the vault to allow for the liner to make a single 90-degree turn into the pipe. Access to the downstream mouth of the pipe was equally challenging.

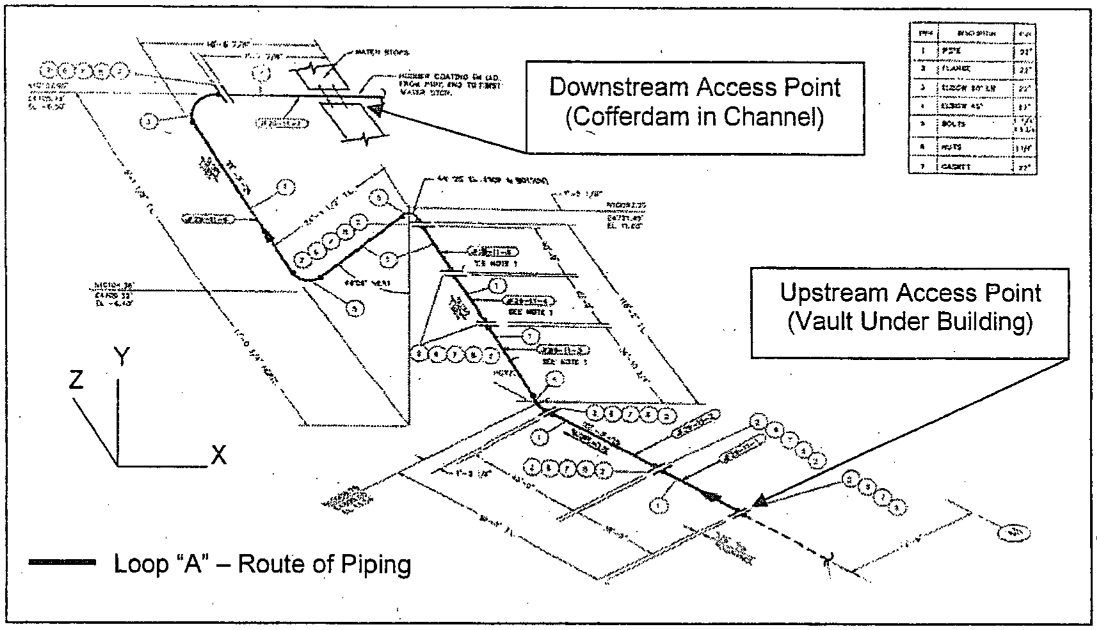

Figure 1. As Built Drawing of Loop "A"

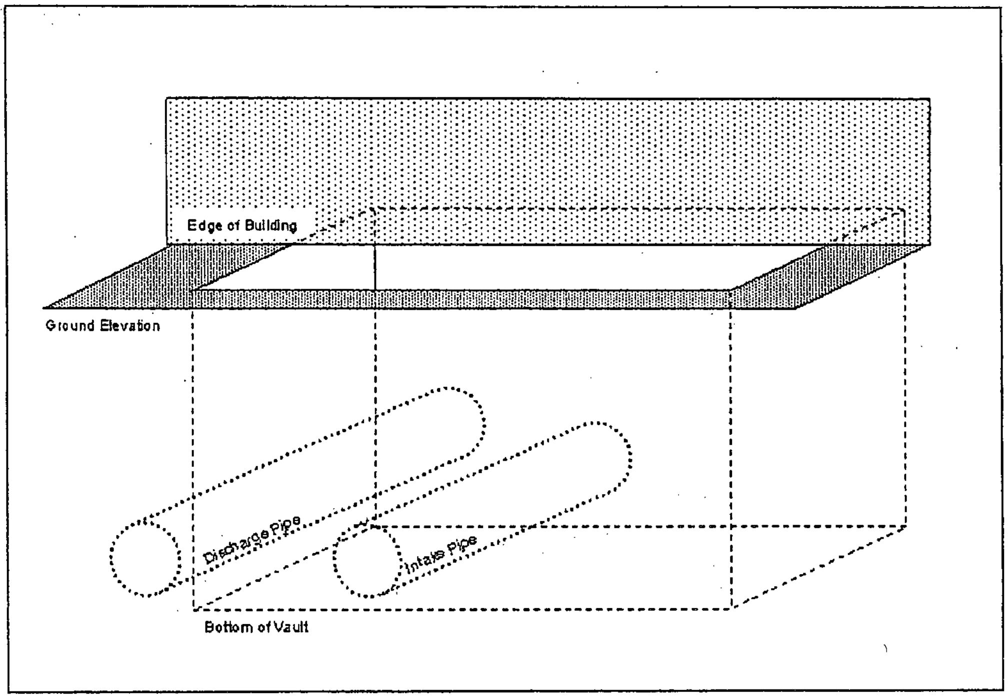

Figure 2. Isometric Vault View: not to scale.

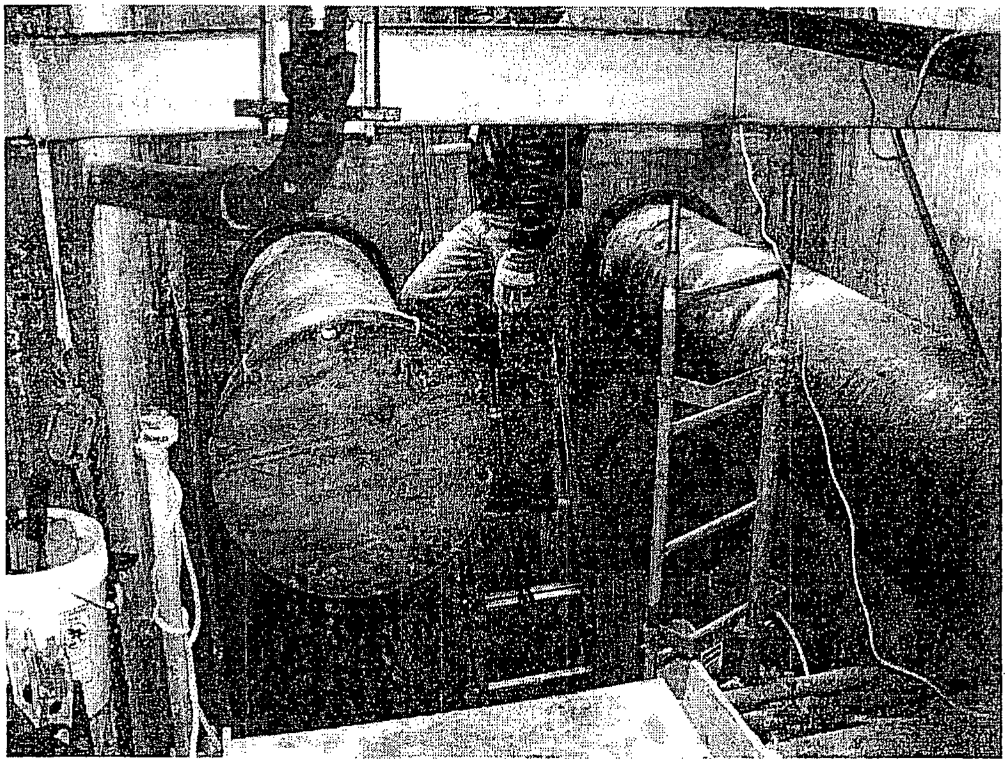

Figure 3. Vault Access at Upstream: view from staging inside vault.

The downstream mouth of the pipe was set in a discharge channel that exited to the Cape Cod Bay. Depending on tide conditions the downstream mouth of the pipe remains approximately six to ten feet below sea level. A cofferdam was constructed to be fastened to the walls of the discharge channel. This was installed by divers and dewatered and maintained by sump pumps in the invert of the cofferdam. Staging was built into the top of the cofferdam to allow for personnel to access the mouth of the pipe for inspection and construction. Sand bags were utilized in the invert of the dam to provide a surface level with the mouth of the pipe.

Figure 4 shows two cofferdams and associated staging prior to installation in the discharge channel. The cofferdams were constructed out of steel and were fastened to the walls using a series of bolts that secured a rubber gasket keeping the water out of the work space. When each dam was installed it allowed for a work space of four feet square at the mouth of the pipe.

IDENTIFICATION

It had been determined through annual inspections of Loop "A" that it was in need of repair. A procedure was developed to inspect the piping prior to installation of the liner using man entry that included utilizing a hand held camera system to record the findings of the inspection. Areas of the rubber coating that were bubbled or missing would be cut out and inspected using an ultrasonic measurement device to determine the thickness of the carbon steel host pipe. Weld overlays were to be used to repair the pipe prior to lining to assure the full original thickness of the host pipe prior to lining. Since Loop "A" could not be taken offline for inspection prior to mobilization for lining, it was determined to complete this work immediately before the installation of the cured-in-place liner.

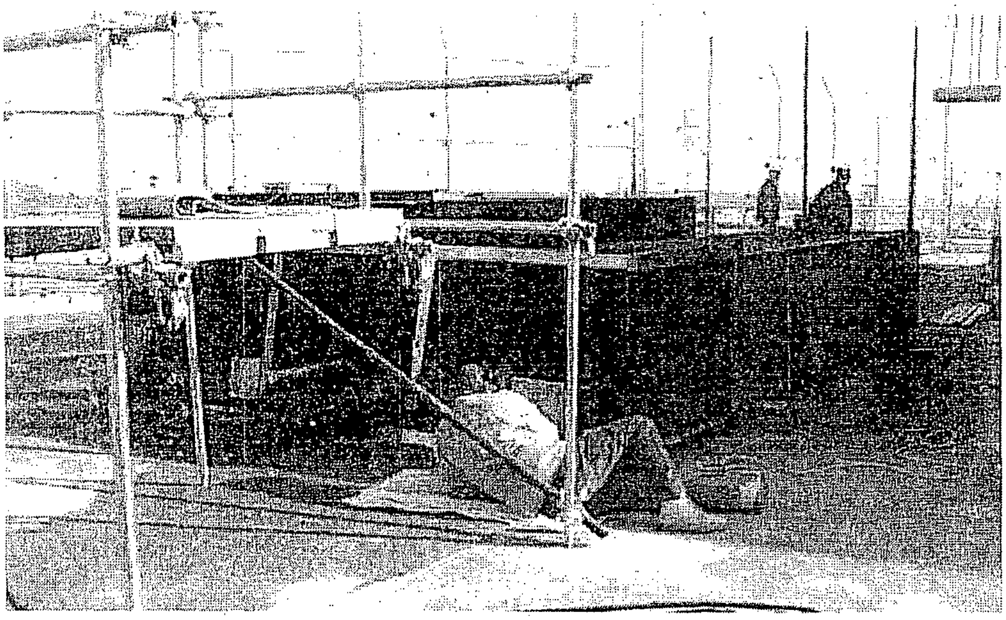

Figure 4. Cofferdams and Staging: prior to placement by divers.

SPECIFICATION AND DESIGN

The owner assumed full responsibility for the preparation and verification of the design calculations for the cured-in-place installation[6]. The minimum required thickness was determined by taking the larger of the external load or internal pressure analysis. The design thickness was then increased by 10% to allow for variations in the material during manufacturing and installation. A Factor of Safety of 2 was used in design calculations. External design calculations were based on Partially Deteriorated Gravity Pipe Condition. The vacuum that is formed in the pipe during usage was accounted for in the design by converting the vacuum (negative) pressure to an external hydrostatic pressure and adding this to the gravity pipe design. The internal pressure analysis was designed based on the Fully Deteriorated Pressure Pipe Condition since the host pipes structural properties would not be a factor that would influence the pressures exerted on the cured-in-place liner internally. The design used the long-term flexural strength and tensile strength equal to one-third of the rated short-term strength listed in Table 1.

Table 1. Short Term Design Values.

Physical Property	Rated Short-Term Value (PSI)
Flexural Modulus =	300,000
Flexural Strength =	4,000
Tensile Strength =	4,000

The Maximum External Differential Pressure of 25 ft w.g. shown in Table 2 was based on the highest negative operating pressure for the discharge piping plus an accounting for groundwater pressure acting

[6] Harizi, P.D. (2003). PNPS Specification for CIPP Lining for SSW Discharge Piping

externally. It was assumed by the owner that external soil, overburden, seismic, and live loads would not be considered due to the fact that the steel host pipe was confirmed to be intact and would continue to act as the structural component of the pipe.

Table 2. Design Loadings.

Design Parameter		Design Value
Maximum Internal Pressure/Temperature	=	30 PSIG @ 100°Fahrenheit
Minimum Operating Temperature	=	30° Fahrenheit
Maximum External Differential Pressure (Minimum Internal Pressure)	=	25 ft w.g. (-11 PSIG Internal)

It was during the design phase that the owner added a third party resin specialist to the project team to make recommendations that would allow the contractor to use polyester resin in place of epoxy and still meet the design requirements. Movement of the liner upon curing, cool down, and during variations of temperature during use was of noted concern. This movement is what was determined to have caused the cracks in the liner installed in Loop "B" in 2002.

The design for the liner in Loop "A" called for a minimum liner thickness of 1-1/2" and a diameter of 20.875".

MANUFACTURING WET OUT AND DELIVERY

It was determined that Vipel® L704-AAP-12, an isophthalic polyester resin would be used as the resin component of the cured-in-place pipe. The catalyst was specified as Perkadox 16 and Trigonox C. The felt tube was custom manufactured using nonwoven needle-punched polyester felt coated on one side by a polyurethane coating.

It was determined by the design and planning team that an offsite wet out would be utilized to limit space consumption onsite, allow for greater quality control, and reduce unnecessary risks in sensitive areas. The owner assembled an inspection team as part of the Quality Assurance program that traveled to the manufacturing and wet-out facility. The team spent several days performing quality assurance inspections and reports to confirm that the materials conformed to specifications. Material source confirmation, shelf life verification, and temperature and control monitoring were vital parts of the inspection.

The wet out liner was loaded on a refrigerated truck, packed in ice for redundant cooling, and transported to a holding area near the site one day prior to installation.

PREPARATION AND INSTALLATION

The schedule was dictated by the owner and corresponded with other activities associated with the refuel outage. The contractor was allowed access to the site starting on April 21st. Access authorization, radiation protection, medical and psychological testing were completed in a separate trip prior to mobilizing for construction. However, last minute security clearance and training was completed as tradesmen began preparations to provide access to the pipe. The schedule was set up for work to be performed 24 hours a day until the work was complete. The date that SSW Service Line Loop "A" was required to go back into service was May 2nd allowing 315 hours for all construction to be completed.

The preparation which included opening the vault, removing pipe spools, erecting the staging, and installing the cofferdam were completed by tradesmen with direction from the planning and construction team. Personnel from the construction team began the inspection of the pipe following the preparations. Safety concerns were jointly addressed with representatives of PNPS and the contractor.

The inspection followed preparation activity and revealed some areas where the rubber coating had bubbled and required removal. These areas were tested for appropriate thickness in the host pipe using an ultrasonic measurement device, which showed the host pipe did not require weld overlay repairs to reach minimum thickness as specified. The owner had determined that the rubber coating would not be repaired since the liner would serve the purpose of protecting the host pipe from the flow of aerated salt water. The inspection personnel made a video tape for review by the design team above ground prior to installation.

Figure 5 is a top view showing the orientation of the pipes in the vault and the turns that were required once the liner entered the pit. The liner was required to turn 90-degrees vertically and 180-degrees horizontally to reach the mouth of the pipe. This was accomplished using a ramp into the pit, walls attached to the staging, and ropes to direct the liner to the mouth of the pipe.

The installation head pressure was carefully monitored during this installation. The decision was made to install the liner without the use of a pull rope, which can be installed in a liner prior to wet out and assists in the inversion process of a liner. The turn rope was initially considered for this installation due to the turns, but because of the diameter it was determined to be unnecessary. Generally as liners increase in diameter, the amount of pressure to make them invert decreases given that the thickness remains the same. The thickness of a liner limits how much pressure the liner can withstand before there is a chance of the felt or a seam separating. Figures are specified by felt manufacturers by testing and historical installation data for ideal installation head, minimum inversion head, maximum cold head, and maximum hot head. These figures are used as a guideline for successful installation and curing. The liner was contained in a cap fabricated from high density polyethylene pipe. This assured that the exposed areas of the liner at the downstream mouth of pipe would remain intact during curing.

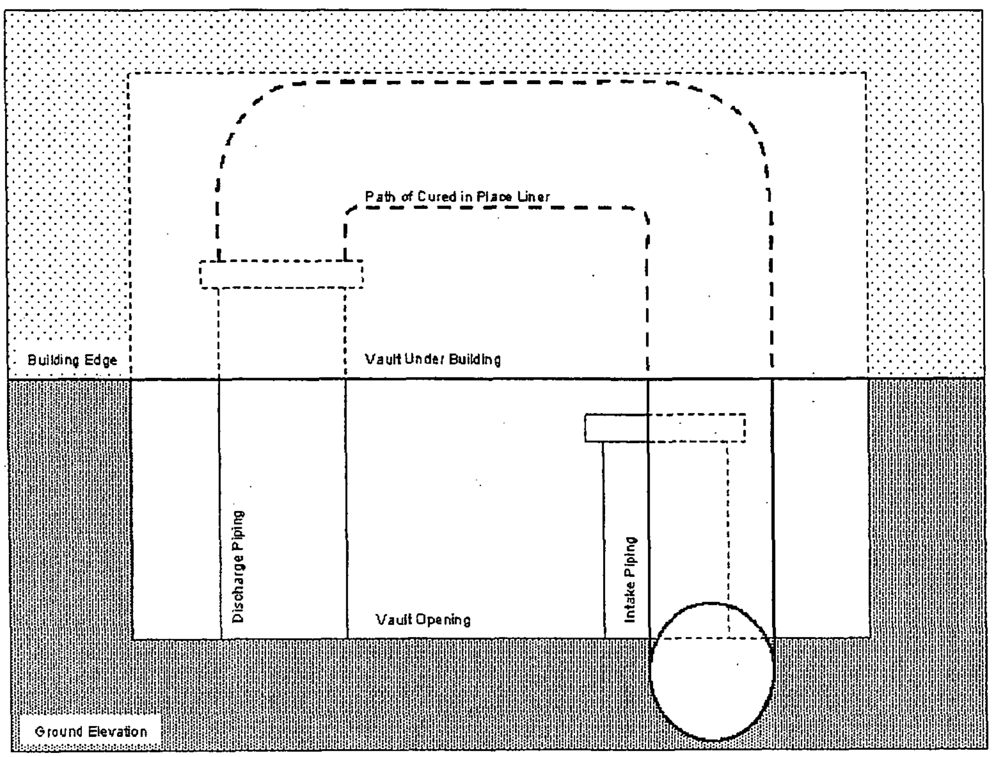

Figure 5. Top View of Vault: not to scale.

The liner navigated the 270-degrees prior to entering the pipe and then moved through the 225-degrees inside of the host pipe by utilizing a slug of water in the pipe used to make the turns. Radio contact was maintained at the upstream and downstream access points to control the rate of inversion and assuring the liner was properly contained in the cap fabricated for containing the liner at the downstream mouth of the pipe.

The water was immediately heated using a diesel fired water heater following the successful inversion. The cure schedule was specified by the resin consultant and temperatures were monitored throughout the processing of cured in place pipe using thermocouple wires and temperature measurement devices. The temperatures were monitored and recorded at the upstream mouth of the pipe, downstream mouth of the pipe, at piping entering the water heater, and at piping exiting the water heater. A water temperature of 180-degrees was targeted throughout the cure. Following the cure, the water in the liner was allowed to circulate to assist in cooling the water and liner prior to removing the cure water. A length of flexible hose was set up to as part of the piping system to act in conjunction with cool water to remove heat from the cure water. PNPS had made the decision to capture, transport, and treat the cure water at an offsite facility so it was essential to minimize the amount of water used during the cool down process. The cure water was recovered upon cutting the downstream end of the liner in the cofferdam. This was successfully completed by using a tanker fitted with pumps to collect the water.

The ends were cut on the liner providing access for a man entry cut at the first 45-degree bend to test for separation. The cut at the bend was observed over a two hour period and no additional separation occurred. The results of observing the initial cut gave the confidence to the client that the liner would not expand or contract causing any additional cracks at bends. The existing cut was repaired using Belzona® and a WEKO-SEAL®.

The final inspection revealed that the cured in place pipe liner fit tight to the interior surface of the host pipe. The tight fit was maintained through the long radius of the bends, and wrinkling at the interior bends was minimal. These favorable results can be attributed to the controlled inversion pressure and rate of inversion.

TESTING

Samples of the liner were collected from the upstream and downstream mouth of the pipe from HDPE pipe sections that contained the CIPP just outside of the host pipe to produce a sample representative of the inside diameter of the host pipe.. These samples were then sent off for physical property testing at a third party lab. The testing procedure was specified as part of the quality assurance program at PNPS and in conjunction with ASTM standards. The results of the testing were used to confirm compliance with physical property specifications.

COST SAVINGS

Excavation alternative costs to this trenchless repair are difficult to calculate due to the specific usage of the host pipe. The construction would have been difficult to complete during a refuel outage, and could have resulted in lost production for the facility that exceeds one million dollars per day. In addition, the disruption of the construction site would have hindered other construction activities taking place at the plant.

CONCLUSION

Entergy's Pilgrim Nuclear Power Stations engineering team successfully defined their needs and assembled a project team capable of completing the work in a safe and predicable manner. Challenges were identified early in the design phase and were addressed in detail during project planning. Teamwork, thorough preparation, and organized execution of the plan proved to be essential in completing this work on time and as planned.

REFERENCES

ASTM F1216 (1998). "Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-Impregnated Tube", American Society for Testing and Materials.

ASTM D638 (1998). "Standard Test Methods for Tensile Properties of Plastics", American Society for Testing and Materials.

ASTM D790 (1998). "Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials", American Society for Testing and Materials.

Harizi, P.D. (2003). "PNPS Specification for Cured-In-Place (CIPP) Lining for SSW Discharge Piping", M-624, March

MPC (2003). "CIPP", http://www.millerpipeline.com/cipp.html

NRC 10CFR50 Appendix B (2003). http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appb.html

EXHIBIT 2

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Tel: 313-640-9424 Fax: 313-640-9419

May 12, 2008

Ms. Mary Lampert
148 Washington Street
Duxbury, Massachusetts 02332

Subject: Retrofitting Cathodic Protection at Pilgrim Nuclear Power Station

Dear Ms. Lampert,

Thank you for sending me the documentation concerning the proposed retrofitting of cathodic protection at Pilgrim Nuclear Power Station. I appreciate receiving the information.

This is my response to the points brought forward by Dr. James Davis concerning retrofitting cathodic protection in the transcript [ASLBP Number: 50-293-LR, April 10, 2008]. My comments are based on forty nine years of experience in cathodic protection engineering for underground and marine structures. My experience includes work at several electrical generating plants, three of which were nuclear powered, as well as refineries, chemical plants and large industrial manufacturing plants. My resume including applicable experience is attached as Tab A.

Page 769, lines 24 & 25, and Page 770, line 1: Cathodic protection is something like a battery in that there is a current flow from an anode to a cathode. The protective current does not really supply a DC charge to the pipe as stated by Dr. Davis in line 25. There is, however, a flow of electrons from the rectifier (power source) through connecting cables and bonds (not through the soil) to the protected structure. These electrons then take part in electrochemical cathodic reactions on the surface of the protected structures.

In lay terms, it can be said that corrosion is caused by DC currents that flow from one point to another on a structure because of voltage differences that exist between these points; cathodic protection current overcomes these corrosion currents and stops corrosion. In electrochemical terms, cathodic protection neutralizes the voltage differences on the structure, thus eliminating the corrosion currents.

Page 770 lines 1 & 2: The statement that there are no cathodes involved is incorrect. There always is an anode and a cathodic in all cathodic protection circuits. The anode that Dr., Davis refers to is a series of ground rods (called a groundbed) that introduce the DC current from the rectifier into the earth. The cathode of the circuit is all the protected underground structures to which the cathodic protection is connected. This is why it is called cathodic protection – the structures become the cathode and the rectifier groundbed is the anode. In an electrochemical circuit, the anode corrodes, the cathode does not.

I infer from the statement "That you probably only need one." in line 2 that "one" refers to the anode (rectifier groundbed). Protecting all the underground structures in a large, complex facility like a generating plant, be it nuclear or fossil fuel, cannot be done from just one groundbed. There are various arrays of groundbeds that can be used, and but using only one groundbed will not work.

Page 770. lines 5 & 6: The statement in these lines about plating is wrong. Cathodic protection is not a plating process. While the electrochemical process that takes place in cathodic protection is similar to plating, it is not the same because plating involves the deposition of metal on the cathode surface. This does not occur with cathodic protection. In plating, the metal to be plated comes from metal ions (charged particles) in the electrolyte (bath) in which the object to be plated is placed. The metal to be plated does not come from the anode of the circuit.

Page 770, 7–9: The statements in these lines are confusing and do not make sense. Cathodic protection does prevent the iron (or other metal) from going into solution, but that prevention occurs electrically, as explained above under Page 769, lines 24 & 25. It has nothing whatsoever to do with plating.

Page 770, lines 10-14: Unless there is a NRC rule requiring this, there is no reason to have to shut down the plant if the rectifier should go off. If the cathodic protection system is properly maintained, each rectifier will be inspected every month. If one should be found to be out of operation, it will not have been out for more than 30 days. Even if it took a week or more to get it back in service, only minute if any corrosion will occur in that length of time. There are cathodic protection rectifiers in the three nuclear power station in which I have worked and no one at any of those stations had any concerns about this.

Page 770, line 25–Page 771 line 4. Cathodic protection is indeed used in the applications noted. None of these operators are concerned if a rectifier is out of service for a short time for the very same reasons cited in the paragraph above.

Page 771, lines 5-15 and Page 772, lines 1-3. These statements are blatantly untrue. There is nothing at all dangerous about installing cathodic protection in complex facilities like power stations. It simply requires proper design to ensure effective protection. It is important to realize that, with the possible exception of buried or submerged piping or tanks unique to nuclear power, the underground structures at a nuclear plant are no different from those at fossil fuel plants.

The statements in this section concerning the flow of current are also untrue. The current does flow from the rectifier to the groundbed and thence to the underground structures. It returns to the rectifier on the buried structures, not through the soil, and will not put holes in the piping. The piping (The cathode!) does need to be electrically continuous, however, as discussed immediately below.

Page 771, lines 16-25. This is basically true, although it is presented in a manner that not only gives the impression that achieving electrical continuity among the plant piping is extremely difficult, but that cathodic protection is actually dangerous, as erroneously stated on Page 771, line 6. In fact, the most difficult task when designing cathodic protection for complex facilities is achieving electrical isolation of a piping or tank system when such isolation is desired. There are so many electrical grounds, piping interconnections and other contacts, that electrical continuity of the entire underground plant is essentially ensured. As mentioned in line 20, bonds (electrical cables or wiring from one structure to another) are sometimes needed to achieve electrical continuity among structures. The term electrical continuity simply means that all the underground structures are connected together, through either piping interconnections or bond cables and wires. In lines 23-25 & Page 772, line 1, Dr. Davis is partially correct in saying that bonding, that is, electrical continuity, is necessary. Line 24 & 25 are misleading, however, because the protective current still flows through the soil to the underground structures. What really happens here is that if the current encounters a structure that is not electrically continuous with the protection system, the current can flow along that structure and discharge back into the soil. At the point of discharge, corrosion will indeed occur; this is called stray current corrosion.

The strong impression that one gets from lines 16-25 is that achieving electrical continuity of underground structures in a complex facility is extremely difficult. It is not. What is difficult is trying to isolate specific structures from everything else in the plant. In addition, if the electrical continuity is in question, tests can easily be made to locate any non-continuous structures.

In all my experience in generating stations, refineries, chemical and large industrial plants I have not found it difficult to achieve electrical continuity among the underground structures. I have found this to be especially true in the nuclear power stations where I have worked. If fact, in the nuclear facilities I have found everything to be connected to the plant grounding grid. Chain link fencing is bonded to the posts which in turn are bonded to the grid. Metal doors in buildings are bonded to the buildings and thence to the grid. All this bonding makes retrofitting of cathodic protection economical and relatively easy to accomplish. Again, there is nothing dangerous about retrofitting cathodic protection to a facility like the Pilgrim plant.

Along these same lines, I have found in that in some of the generating plants, both nuclear and fossil fuel where I have worked, the cathodic protection rectifier is connected to the structural steel of the plant itself as well as to the anode groundbed. The electrical continuity of the underground plant is so good that it often is not even necessary to excavate to tanks or piping to connect the rectifier to them.

If you have any questions or would like additional information, please call.

Thank you for this opportunity to be of service to you.

My best regards.

Sincerely,

John H. Fitzgerald III, P.E., FNACE
NACE Certified Corrosion Specialist # 166

TAB A

John H. Fitzgerald III, P.E.

Resume

6/ 55	Graduated from Yale University School of Engineering
9/55-12/55	Junior Engineer, Columbia Gas System, Columbus Ohio
1/56-7/58	US Air Force pilot training and subsequent helicopter pilot service
9/58-12/63	Engineer, Columbia Gas of Ohio, Columbus, Ohio. Began cathodic protection work 3/59.
1/64-4/00	Corrpro (and predecessors) Company, Detroit, Michigan. Surveys, investigations, design, commissioning and inspections of cathodic protection, development and presentation of training programs. Extensive work also in areas other than underground structures.
5/00-present	Consultant for Corrpro Company. Technical Editor Materials Performance Magazine for NACE International (National Association of Corrosion Engineers) Instructor for Gas Technology Institute, Chicago, in gas distribution and transmission piping.

<u>Professional Activities</u>

Registered Professional Engineer.
NACE Certified Corrosion Specialist.
Instructor at Appalachian, Purdue University, Omaha, Minneapolis and several other corrosion short courses.
2006 recipient of NACE International T.J. Hull Award for excellence in publications
Fellow of NACE International
Author of about 60 publications on corrosion control, mostly involving cathodic protection of underground structures
President of NACE International 1990-1991

<u>Experience related to the Pilgrim Nuclear Power Station</u>

Nuclear Plants

<u>Dresden Nuclear Generating Station</u>, Commonwealth Edison Co., Morris, IL – Evaluation of existing plant wide cathodic protection for underground structures and design of system rehabilitation.

<u>Fort Collins Nuclear Power Station</u>, Nebraska Public Power Co, Fort Collins, NE Evaluation of existing plant wide cathodic protection for underground structures and preparation of recommendations for system repairs and rehabilitation.

Palisades Nuclear Power Station, Consumers Energy, Inc., South Haven, MI – Evaluation of plant wide cathodic protection for underground structures and water inlet and outlet structures and preparation of recommendations for repairs and upgrading.

Fossil Fuel Plants

Lansing Generating Station, Board of Water and Light, Lansing, MI – Evaluation of existing plant wide cathodic protection for underground structures and design of new system to replace the inoperative existing one.

Springfield Generating Station, Illinois Power Company, Springfield, IL – Same scope of as at Palisades.

Meramec Power Plant, Union Electric Co., Arnold, MO – Commissioning of rehabilitated Plant wide cathodic protection for underground structures.

Refineries

Wood River Manufacturing Complex, Shell Oil Co., St. Louis, MO – Design of cathodic protection for underground pipelines and barge off loading facility.

Cape Girardeau Refinery, Shell Oil Co., Cape Girardeau, MO – Annual inspection of facility wide cathodic protection for underground structures and preparation of recommendations for continued maintenance.

RESUME OF

JOHN H. FITZGERALD III, P.E.

Graduated from Yale University School of Engineering June, 1955

Summer/55	Summer Stock Theater, Assistant Technical Director, Sharon Playhouse - Sharon, Connecticut
9/55 - 12/55	Junior Engineer, Columbia Gas System Service Corporation, Columbus, Ohio. Preliminary training in gas engineering, mostly in compressor section.
1/56 - 7/58	USAF. Pilot training and subsequent service as helicopter pilot with 54th Air Rescue Service, Goose Bay, Labrador.
8/58	Married Beverly Byrne, New York, Childhood Sweetheart.
9/58 - 3/59	Junior Engineer, Columbia Gas System Service Corporation. General experience training in various phases of gas engineering.
4/59 - 12/60	Worked in corrosion laboratory, Columbia Gas System Service Corporation. Prepared coating samples for testing, conducted tests on samples, assisted in cathodic protection for operating companies of Columbia Gas. Gained further understanding of corrosion engineering.
1/61 - 12/63	Corrosion Engineer for Central District, Ohio Fuel Gas Company, Columbus, Ohio. Responsible for setting up and operating corrosion control program for gas distribution system. Considerable involvement in cathodic protection engineering, interference testing and routine surveys. Trained and supervised corrosion technicians.
1/64 - 12/65	Project Manager, Hinchman Company. Responsible for consulting engineering work involving surveys, design and field engineering on a wide variety of projects. Specialized in cathodic protection and investigation of corrosion problems on underground structures.
1/66 - 12/73	Vice President, Hinchman Company. Continued responsibilities in consulting corrosion engineering. Project manager for work on the Washington, D.C. transit system. Expanded experience into several fields of corrosion. Transitioned in marketing responsibilities late in 1968. Developed additional marketing techniques to assist in company expansion.
1/74 - 12/75	Executive Vice President, Hinchman Company. Continued responsibility for marketing and further responsibility for company management. Continued active participation in technical work and engineering supervision.

1/76 - 12/87	President, Hinchman Company. Responsible for all phases of company operation. Directly active in marketing, certain phases of the actual consulting work and in engineering supervision.
1/88 - 12/94	Vice President, PSG Corrosion Engineering - Corrpro Companies. Responsible for company operation; regularly engaged in active corrosion engineering.
1/95 – 4/00	Principal Engineer, Corrpro Companies. Engaged in active corrosion engineering
5/00 – Present	Consultant, Corrpro Companies. Engaged in active corrosion engineering.

Professional Activities

Registered Professional Engineer.
Accredited by NACE as a Corrosion Specialist.
President National Association of Corrosion Engineers (NACE) 1990
Member of Michigan Society of Professional Engineers

Held all the chairs of the Appalachian Underground Corrosion Short Course and was General Chairman in 1976. Prior to that served as Basic Course Chairman. Subsequently served as Intermediate Course and Curriculum Chairman.

Lecturer at Appalachian Underground Corrosion Short Course (1960 to Present), Purdue Corrosion Short Course (1965 to Present), USAF Civil Engineering School (1963 to 1990) and Institute of Gas Technology (1969 to Present).

Spoken at many technical and professional society meetings, notable American Gas Association, American Water Works Association, NACE, Consulting Engineering Council and American District Heating Association.

Recipient of Citation of Recognition for Outstanding Contribution to NACE, 1976.

Recipient of Col. George C. Cox Award, 1978.

Other Interesting Facts

Hobbies Model railroading, model aircraft construction, sailing.

Activities
Ordained Deacon, Episcopal Church
Square Dance Caller
Community Theatre participation
Member, Mystic Seaport (Connecticut)
Advanced Pilot, United States Power Squadron - Active in educational program in Grosse Pointe Power Squadron

Experience related to the Pilgrim Nuclear Power Station

Nuclear Plants

Dresden Nuclear Generating Station, Commonwealth Edison Co., Morris, IL – Evaluation of existing plant wide cathodic protection for underground structures and design of system rehabilitation.

Fort Collins Nuclear Power Station, Nebraska Public Power Co, Fort Collins, NE Evaluation of existing plant wide cathodic protection for underground structures and preparation of recommendations for system repairs and rehabilitation.

Palisades Nuclear Power Station, Consumers Energy, Inc., South Haven, MI – Evaluation of plant wide cathodic protection for underground structures and water inlet and outlet structures and preparation of recommendations for repairs and upgrading.

Fossil Fuel Plants

Lansing Generating Station, Board of Water and Light, Lansing, MI – Evaluation of existing plant wide cathodic protection for underground structures and design of new system to replace the inoperative existing one.

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Refineries

Wood River Manufacturing Complex, Shell Oil Co., St. Louis, MO – Design of cathodic protection for underground pipelines and barge off loading facility.

Cape Girardeau Refinery, Shell Oil Co., Cape Girardeau, MO – Annual inspection of facility wide cathodic protection for underground structures and preparation of recommendations for continued maintenance.

Additional Cathodic Protection Experience

Extensive experience with gas company corrosion control going back to 1961. Served as Central District Corrosion Engineer for Columbia Gas of Ohio (formerly Ohio Fuel Gas Company); responsible for establishing and operating corrosion control program for distribution piping throughout the district. As part of this work designed cathodic protection for two, 20-inch bare inter-station mains as well as both coated and bare distribution piping.

Over the years, served several gas companies in evaluating corrosion control programs, designing cathodic protection, performing field investigations, solving interference problems, testing cathodic protection and providing training for corrosion control personnel.

In 1975, reviewed the corrosion control program for Southeast Michigan Gas Company, evaluated the effectiveness of the program and presented the economic and safety benefits of the program to management. Over the ensuing five years designed cathodic protection for several transmission lines and oversaw its installation and testing.

Beginning about 1970, designed and performed annual inspections of cathodic protection for distribution and transmission piping, and storage field piping and well casings for Indiana Gas Company. Continued in responsible charge of this program until about 1995. In 1992, led a team of eight engineers in an audit program of the company's corrosion control reviewing work orders to determine if the records reflected what had actually been installed. In 1995, performed an independent audit of the company's program, assessing corrosion control standard procedures, drawings and instrumentation.

In 1985, assisted East Ohio Gas Company with an evaluation of their cathodic protection program for bare gas distribution piping.

In 1990, undertook an analysis of corrosion leak records of bare cast iron distribution mains for Peoples Gas Company in Chicago. This led to recommendations for phased replacements. From 1996 to 1999, provided engineering services for stay current mitigation due to the rail transit system on several high pressure 24" – 42" inter-station mains in Chicago and designed and tested several strategically placed cathodic protection installations for these mains. Also performed alternating current mitigation studies for two transmission lines in Commonwealth Edison rights of way.

Since 1968, provided expert testimony on eight cases in behalf of various gas companies. Two of these involved showing that alleged stay voltage problems on farms were not due to nearby cathodic protection on distribution pipe, but rather to poor grounding on the farms themselves. Has also testifies before the Federal Energy Regulatory Commission in behalf of Columbia Gas.

From 1975 to the present, has taught a block of instruction on corrosion control for the annual Gas Distributions Operations and Gas Distribution Engineering courses at the Institute of Gas Technology in Chicago. Developed and taught many courses for various gas companies and is presently preparing to teach two such courses this summer.

Teaches annually at several short courses, notably, Appalachian Underground Corrosion Short Course (West Virginia University) Purdue University, Omaha NACE Section and Milwaukee NACE Section. Much of his instruction involves cathodic protection for gas distribution piping.

From 2000 to the present, provided corrosion engineering consulting service to Minnegasco (now Centerpoint Energy) in Minneapolis, Minnesota. Major projects have been evaluation of impressed current cathodic protection installation throughout the city, design of cathodic protection for a new gas line across Minneapolis International Airport, analysis of stray current that might emanate from the proposed Hiawatha light rail transit system, design of associated stray current control and analysis and data interpretation of stray current tests after start up of the light rail system.

PUBLICATIONS

Corrosion as a Primary Cause of Cast Iron Main Breaks AWWA Journal, August 1968

Corrosion Problems in URD, Electrical South, July 1969

Visual Corrosion Training Aids, Pipeline News, Proceedings of AGA Distribution Conference, 1964

What Can the Small Gas Company Do to Establish a Corrosion Control Program?, Pipeline News, Proceedings of AGA Distribution Conference, 1970

Problems Involved in Implementing Cathodic Protection in Large Cities, Pipeline News, Proceedings of AGA Distribution Conference, 1970

Corrosion Problems Associated with Rapid Transit Systems (Co-Author L. H. West, P.E.) Proceedings of AGA Distribution Conference, 1968

Demonstration of the Theory of Cathodic Protection Proceedings of the Fifth (1960) through Twenty-First (1976) Annual Appalachian Underground Corrosion Short Course

Methods and Instrumentation for Underground Corrosion Testing, Proceedings of the Liberty Bell Corrosion Short Course, 1968 and 1969

Practical Approach to Counteracting Corrosion of Bridge Structures (Co-Author R.P. Brown) Public Works, November 1971

Cathodic Protection of Miscellaneous Underground Structures, Proceedings of the Seventeenth (1972) through Twenty-First (1976) Annual Appalachian Underground Corrosion Short Course

Experience and Case Histories with Corrosion and Cathodic Protection of Buried Utilities, Proceedings of the International District Heating Association, 1972

Suggested Criteria for Cathodic Protection in Gas Distribution Systems, Proceedings of AGA Distribution Conference, 1973

Fundamentals of Galvanic Corrosion, Proceedings of the Eighteenth (1973) through Twenty-First (1976) Annual Appalachian Underground Corrosion Short Course

Design Criteria of Underground Heat and Chilled Water Distribution Systems for Corrosion Protection (Co-Author K.J. Moody) Proceedings of NBS-BRI-ASHRAE Symposium, 1973

Corrosion Control for Buried Piping, Heating, Piping, Air Conditioning, March 1974

Sidebar Information on Cathodic Protection, Civil Engineering, March 1974

Fundamentals of Underground Corrosion: Setting Up a Program - Mechanisms of Corrosion - Methods of Control (Co-Author A.L. Claes) Plant Engineering, June 1975, September 1975, November 1975, February 1976

Corrosion Control for Buried Service Station Tanks, Paper Presented at 1975 National Meeting of National Association of Corrosion Engineers

Cathodic Protection of Stationary Marine Structures, Materials Performance, May 1972

How Good Plant Construction Inspection Facilitates Corrosion Control, Proceedings of Liberty Bell Short Course, 1975

Corrosion Control for Concrete Pipe, Proceedings of Liberty Bell Short Course, 1976

Cathodic Protection for Wharf Foundation Piles at the Port of Anchorage, Alaska; (Co-Author J. Wagner, P.E.) Presented at 1979 National Meeting of National Association of Corrosion Engineers

Corrosion Control for Foundation Piles (Co-Author A.L. Claes, P.E.) Proceedings of the PILETALK, Seminar 1978

Corrosion Control Guidelines for D.C. Operated Rapid Transit Systems, Proceedings of the 24th Appalachian Underground Corrosion Short Course, 1979

Fundamentals of Corrosion, Proceedings of the 25th Appalachian Underground Corrosion Short Course, 1980

Stray Earth Current Control, Washington D.C. Metro System (Co-Author R.E. Shaffer, P.E.) Presented at 1980 National Meeting of the National Association of Corrosion Engineers

What Causes Underground Corrosion and How Can It be Prevented?, Proceedings of the 25th Appalachian Underground Corrosion Short Course, 1980

Corrosion Control for Underground Structures, Plumbing Engineer, December 1980

URD Concentric Neutral Corrosion and its Control (Co-Author J. Wagner) Proceedings of the 25th Appalachian Underground Corrosion Short Course, 1980

Cathodic Protection of Underground Hydraulic Cylinders, Annual Conference, National Association of Corrosion Engineers, 1982

Corrosion of Underground Storage Tanks, Plant Engineering, July 21, 1983

Corrosion Fundamentals, Proceedings of the 1985 Bridge Deck Seminar (NACE, FHWA, AASHTO), San Antonio, Texas

Cathodic Protection of High Voltage Electric Tower Footings (Co-Author W. Kolb, Ohio Power Company) Materials Performance, December 1985

Don't Let Corrosion Get Your Underground Tanks, Heating/Piping/Air Conditioning, September 1986

Dealing with the Problems of Corrosion (Corrosion Control for Small Boats) The Ensign, October 1987

Copper Piping Corrosion in Potable Water Systems, Heating/Piping/Air Conditioning, October 1987

Taking the Bite Out of Corrosion (Corrosion Control for Process Piping) Heating/Piping/Air Conditioning, October 1988 (Co-Author W.T. Young)

Cathodic Protection for Underground Tank Systems, Proceedings of 34th Appalachian Underground Corrosion Short Course, 1989

Dealing with Myths and Misunderstandings about Cathodic Protection, Tank Talk, November 1990

Corrosion Control for Boilers and Heat Exchangers, Heating/Piping/Air Conditioning, December, 1991

Corrosion Experiences in Process Water Piping, Plant Services, November, 1991 (Co-Author W. T. Young, P.E.)

Stray Current Control for the St. Louis Metrolink Rail Sysytem, co-author: M. D. Lauber, Materials Performance, January 1995

Cathodic Protection of the Hull of the S. S. Admiral, Paper presented at Corrosion 95 (subsequently published in Materials Performance)

Protecting Proton Beam Piping at Fermi Laboratory, Materials Performance, March 1996

Reconstructing Pipeline Cathodic Protection in a Wetlands Area, Materials Performance, October 1996

Cathodic Protection of Product Pipelines in a Refinery Using Deep Anode Groundbeds in and Area of Concern for Cross Contamination of Multiple Aquifers, Paper presented at Corrosion 96 (subsequently published in Materials Performance)

Corrosion Engineering and NACE in the 21st Century, Plenary Lecture, Corrosion 97

Evaluating Cathodic Protection on the Exterior Bottoms of Two Asphalt Storage Tanks Using Corrosion Rate Measurement Probes, Paper Presented at Corrosion 98

Building Stray Current Control into the Rehabilitation of an Old Transit Yard and Shop in a Large Urban Area, Paper presented at Corrosion 98

Cathodic Protection Monitoring, Installation and Leak Detection Under Existing Above Ground Storage Tanks, Materials Protection, October 1999

Designing Cathodic Protection for 2000 Miles of a High Pressure Gas Transmission Line Using Computer Aided Technology, *Materials Performance*, June 2000

Using Visual Training Aids in Teaching Cathodic Interference Mitigation, Paper presented at Corrosion 2001, Houston, Texas

Using the 100mV drop Cathodic Protection Criterion in Industrial and Similar Environments, Paper presented at Corrosion 2001, Houston, Texas

Preparing gas Distribution Piping for the Construction of a Light Rail Transit System, *Materials Protection*, June 2002

Cathodic Protection Design for 1900 Miles of Natural Gas Pipeline, *Materials Performance*, August 2001, Co-authored with Lorne Carlson & David Webster

Preparing Gas Distribution Piping Stray Current Control Prior to Construction of a New Light Rail Transit System, *Materials Performance*, June 2003, Co-authored with Joel Beggs,

Stray Current Testing on Gas Distribution Piping After Start Up of a New Light Rail Rapid Transit System, *Materials Performance*, June 2005. Co-authored with Joel Beggs

Troubleshooting Cathodic Protection, *Materials Performance*, February 2006

Failure to Follow Corrosion Control Recommendations Leads to Structure Failures, *Materials Performance*, March 2007

Graphitization Leads to Long Cast Iron Pipe Life, *Materials Performance*, May 2007

EXHIBIT 3

Mary Lampert

From: Graham E.C. Bell [gbell@schiffassociates.com]
Sent: Monday, May 05, 2008 11:43 AM
To: 'Mary Lampert'
Subject: RE: retrofitting cathodic protection at nuclear reactors - question

You are correct. Stray current can be minimized by engineering and nuclear power plants are no different from other power or processing plants that have cathodic protection on plant piping. Several nuclear power plants on the west coast have cathodic protection systems on plant piping (Palo Verde and San Onofre).

You might be interested to know that there is cathodic protection on the majority of the nuclear waste transfer lines at Hanford Nuclear site in eastern Washington state.

The other way to protect is through redundancy so that if safety systems are needed, they have a back-up which takes over if corrosion or some other malfunction occurs.

Hope this helps.

Graham E.C. Bell, Ph.D., P.E.
Schiff Associates
431 W Baseline Road
Claremont, CA 91711
Cell: 909-841-6729
Ph: 909.626-0967 Fx: 909.626.3316
Email: gbell@schiffassociates.com;
Web: www.schiffassociates.com

From: Mary Lampert [mailto:mary.lampert@comcast.net]
Sent: Monday, May 05, 2008 8:16 AM
To: gbell@schiffassociates.com
Subject: retrofitting cathodic protection at nuclear reactors - question

Hello:

I direct an unfunded public interest group in Massachusetts. We are intervening in the license extension application of the Pilgrim Nuclear Power Station; located on the shores of Cape Cod Bay. Our focus is on buried safety-related piping; and we are asking that the aging management program be supplemented to include various measures – a base line inspection; more frequent inspections than once in ten years of an unspecified sample; and retrofitting cathodic protection.

The licensee and NRC Staff oppose our motion.

At the hearing, NRC Staff's expert stated that "To backfit cathodic protection on a nuclear power plant is a very dangerous practice because of something we call stray current corrosion."

From our reading stray currents are an issue but not something that cannot be dealt with by a CP designer.

If you have the time, we would appreciate your comment on this and whether you know what nuclear reactors have retrofitted cathodic protection.

Thank-you for your time,

Mary Lampert
Duxbury MA
781-934-0389

Mary Lampert

From: billcpm007@aol.com
Sent: Monday, May 05, 2008 3:22 PM
To: mary.lampert@comcast.net
Subject: Re: FW: retrofitting CP at nuclear reactors - question

Mary:

Congratulations, you understand the issues and not the smoke and mirrors.

Many, if not all power plants were fitted with cathodic protection as part of the original construction. Since cathodic protection components are consumed in the process of protecting structures, by the shear nature of the process plants are constantly retrofitted or upgraded as required. The cathodic protection installed at local nuclear plants owned by Exelon are constantly monitored and the cathodic protection upgraded.

Stray currents can and do cause corrosion only if they are not identified and the proper measures taken to insure that they do not cause premature failure.

Hope this helps and if you have any questions, feel free to contact me.

William P. Carlson
President
Cathodic Protection Management, Inc.
email billc@corrosionspecialists.com

Phone 630.313.5784
Fax 630.313.5788
Cell 224.588.6760

: Mary Lampert [mailto:mary.lampert@comcast.net]
Sent: Monday, May 05, 2008 10:42 AM
To: Info
Subject: retrofitting CP at nuclear reactors - question

Hello:

I noted that your website lists nuclear reactors.

I direct an unfunded public interest group in Massachusetts. We are intervening in the license extension application of the Pilgrim Nuclear Power Station; located on the shores of Cape Cod Bay. Our focus is on buried safety-related piping; and we are asking that the aging management program be supplemented to include various measures – a base line inspection; more frequent inspections than once in ten years of an unspecified sample; and retrofitting cathodic protection.

The licensee and NRC Staff oppose our motion.

At the hearing, NRC Staff's expert stated that " To backfit cathodic protection on a nuclear power plant is a very dangerous practice because of something we call stray current corrosion."

From our reading stray currents is an issue; but not something that cannot be dealt with by a CP specialist.

If you have the time, we would appreciate your comment on this and whether you know what nuclear reactors have retrofitted cathodic protection.

Thank-you for your time,

Mary Lampert

Duxbury MA

781-934-0389

Mary Lampert

From: Larry Brandon [larrybrandon@cmsinter.net]
Sent: Monday, May 05, 2008 3:45 PM
To: Mary Lampert
Subject: stray currents -question
Attachments: CorPreTek Credentials 2007.pdf

Mary,

Whether nuclear, gas or coal fired, many power plants across the country have cathodic protection systems.

Certainly some of those systems were installed at the time of the building of the plant, but many are newer installations.

We just installed a retrofit system in Indiana two years ago, a system in Michigan three years ago, and are currently bidding a project to add CP in Ohio, at a nuclear plant.

It is true that impressed current cathodic protection can cause stray current. Many systems that are designed and/or installed improperly can cause damage.

The key is to have any system designed and installed by qualified and certified personnel in that line of work.

If you would like to pursue this further, I would be happy to explore the feasibility of adding CP to the Pilgrim Plant. My credentials have been included for your review.

Thanks in advance,

Larry Brandon
President
CorPreTek, Inc.

----- Original Message -----
From: Mary Lampert
To: larrybrandon@cmsinter.net
Sent: Monday, May 05, 2008 11:22 AM
Subject: stray currents -question

Hello:

I direct an unfunded public interest group in Massachusetts. We are intervening in the license extension application of the Pilgrim Nuclear Power Station; located on the shores of Cape Cod Bay. Our focus is on buried safety-related piping; and we are asking that the aging management program be supplemented to include various measures – a base line inspection; more frequent inspections than once in ten years of an unspecified sample; and retrofitting cathodic protection.

The licensee and NRC Staff oppose our motion.

At the hearing, NRC Staff's expert stated that " To backfit cathodic protection on a nuclear power plant is a very dangerous practice because of something we call stray current corrosion."

From our reading stray currents is an issue; but not something that cannot be dealt with by a CP specialist.

If you have the time, we would appreciate your comment on this and whether you know what nuclear reactors have retrofitted cathodic protection.

Thank-you for your time,

Mary Lampert
Duxbury MA
781-934-0389

Mary Lampert

From: Ted Huck [thuck@matcor.com]
Sent: Monday, May 05, 2008 2:41 PM
To: Mary Lampert
Subject: RE: Power Article

We bid on a project for PPL Susquehanna NPS several years ago to replace their CP system as it had fully depleted. Corrpro won that project. Other than that we have not done very much with Nuclear facilities. Typical design life of a CP system ranges from 15-30 years so every nuclear facility with CP installed during initial construction should have or should need replacement of their CP systems since initial commissioning. Whether or not this has been done I cannot say.

Ted

From: Mary Lampert [mailto:mary.lampert@comcast.net]
Sent: Monday, May 05, 2008 10:28 AM
To: Ted Huck
Subject: RE: Power Article

Ted:

I just finished your article in November 2005 Materials Performance *Designing Cathodic Protection for Power Plant Applications*.

Has MATCOR retrofitted any nuclear plants; and if so which ones and approximate date. And, by any chance do you know if CORRPRO has?

I know, for example, that Robinson, Catawba and Hope Creek NPS have CP but no information of where and when installed.

The issue here that I am concerned with is retrofitting buried piping and tanks specifically in nuclear reactors.

I understand, but have no facts, that it actually may be easier at a nuclear reactor because the electric system is all tied together for electric grounding – when everything is not electrically connected more difficult but doable.

Thanks,

Mary

From: Ted Huck [mailto:thuck@matcor.com]
Sent: Friday, April 18, 2008 11:19 AM
To: mary.lampert@comcast.net
Subject: Power Article

Mary

It was a pleasure talking to you today. Please feel free to pass along my contact information as you see fit. Our company is very engaged in the application of Cathodic Protection in Power plants. The attached link takes you to my most recent article on the subject for Natural gas fired powered plants.

http://www.powermag.com/ArchivedArticleDisplay.aspx?y=2008&m=February&a=51-F_GPS.xml

I've also attached some articles that I've published.

Best Regards,

MATCOR

No stronger name in corrosion protection

TED HUCK
Vice President, Sales & Marketing
c 267.251.7608 • thuck@matcor.com

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