UNITED STATES OF AMERICA
BEFORE THE
DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Millennium Pipeline Company, L.P.,	)	
	)	
Appellant,	)	
		AFFIDAVIT OF
v.	)	**CHARLES M. RUSSELL, Jr., P.E.**
	)	
State of New York, Department of State,	)	
	)	
Respondent.	)	

STATE OF NEW YORK)
) **ss:**
COUNTY OF ROCKLAND)

CHARLES M. RUSSELL, Jr., P.E., being duly sworn, deposes and says as follows:

1 I am a Vice President of Michael Baker Jr., Inc., a wholly owned subsidiary of the Michael Baker Corporation. I am associated with Baker Engineering NY, Inc., which is the New York subsidiary of the Michael Baker Corporation. I will collectively refer to Michael Baker Jr., Inc. and Baker Engineering NY, Inc. as ("Baker") in this Affidavit. I have been employed with Baker for approximately 21 years. Prior to joining Baker, I had approximately 23 years of engineering experience with other firms. I am a Licensed Professional Engineer in Alabama, Florida, Illinois, Indiana, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, and West Virginia. Among my professional experience is over 20 years of experience with large, high-pressure natural gas transmission pipelines. I am also the project manager for Baker's involvement with the Millennium Project. A true copy of my resume is annexed hereto and incorporated herewith as Attachment "A."

2 make this affidavit in response to many of the assertions set forth in the Reply Brief submitted by the New York State Department of State ("NYSDOS") in connection with this appeal. More specifically, I make this affidavit to explain the nature of the services rendered by Baker for the Millennium Project in evaluating the alternative pipeline routes and the certificated route, as those routes are at issue in this appeal, and our opinions regarding the proposed alternative routes, including the variations suggested in the Reply Brief submitted by the NYSDOS. The specific scope of our services and conclusions that we have reached are set forth below. This affidavit supplements our report dated March 2003, which was submitted by Millennium with its reply brief, and was sealed by me in my capacity as a licensed Professional Engineer.

3. Baker is a multidisciplinary engineering company with offices worldwide. Annexed hereto and incorporated herewith as Attachment "B" is literature concerning the multidisciplinary expertise of Baker. Among our areas of expertise is significant expertise regarding pipeline siting, design and construction. Pipeline transmission and gathering systems require a thorough understanding of the engineering, environmental and construction components that comprise successful projects. Baker's understanding of these requirements is derived from many years of experience in all phases of pipeline projects. Pipeline engineering services include initial planning and conceptual feasibility studies, design engineering, the preparation of construction plans and specifications, and value engineering studies, bid phase engineering, construction and construction phase engineering, facility startup services, and ongoing operation and maintenance consulting services.

4. Of significance to the issues before the Secretary of Commerce, Baker has a great deal of experience with large, high-pressure natural gas transmission pipelines. High-pressure

natural gas transmission pipelines typically range from 12 inches to 48 inches in diameter and are designed to transmit natural gas under high pressure (varying from 250 psig to 2000 psig). To name just a few examples, our experience includes the Alaska Northwest Natural Gas Transportation Company project, which is a 48-inch diameter pipeline, 745 miles long, running from Prudhoe Bay Alaska to the Canadian border. We provided pipeline and civil engineering services in a joint venture company. Another example is the 380-mile, 30-inch diameter pipeline designed for the ANR Pipeline Company in OH and PA. There are many more examples of large-scale projects of a similar scale to, and larger scale than, the Millennium Project, including the Trans-Alaska Pipeline, a 789 mile 48-inch diameter, 8 billion dollar oil pipeline. Annexed hereto and incorporated herewith as Attachment "C" is information on Baker's extensive pipeline experience.

5. I highlight the significant experience that Baker has regarding large, natural gas transmission pipelines, because it is important to have a thorough understanding of pipeline permitting, design and construction issues in making an evaluation of proposed pipeline routes and evaluating the feasibility of alternatives.

Scope of Review

6. The construction of large pipelines presents many unique challenges. The design and construction of natural gas pipelines is regulated by the Office of Pipeline Safety ("OPS"), United States Department of Transportation, to ensure pipeline safety. Baker is currently under contract with the OPS to provide expert technical services related to pipeline integrity management. The regulatory requirements taken together with the challenges associated with the permitting, design and construction of large pipelines segments in a manner that leads to a safe and reliable system is part of the specialized expertise of Baker.

7. Specifically in relation to the Millennium Project, Baker was retained to evaluate alternative pipeline routes and corridors that were suggested by the NYSDOS and other parties to this proceeding and to compare those alternatives to the route certificated by the Federal Energy Regulatory Commission ("FERC"). This assignment was in addition to other work we were already doing for Millennium, including work associated with the crossing of the Catskill Aqueduct at the Bryn Mawr Siphon. Baker approached this assignment as we typically do by gathering together persons with the specialized expertise in the issues associated with the assignment Several key Baker staff experienced in pipeline design and construction participated in this review including: Don Miller, Ken Havasi, John Zagorski, Roland Belay, and Dave LaPearle. Annexed hereto and incorporated herewith as Attachment "D" are the resumes of those persons who assisted me with this project.

8. Baker also approached this assignment as we would any other pipeline routing assignment. The evaluation of feasible pipeline routes requires an in-depth field evaluation of the proposed route and the application of pipeline engineering judgment to determine whether a particular route is feasible. In approaching this assignment, we treated the alternative pipeline routes suggested by the NYSDOS as proposed corridors. In other words, if there were a feasible route through a given area that was in the general vicinity of what had been proposed, we considered that option in making our engineering judgment concerning the viability of the proposed corridor.

9. It should also be mentioned that it was not our scope of work or purpose to look for ways to reject the proposed corridors. We evaluated them as we would any other routing assignment and formulated our professional opinions based upon the facts that are readily evident from an inspection of the various proposed routes.

10. It is also worth mentioning that in order for a particular route or corridor to be viable for pipeline routing, the entire route must be viable. Any location where construction is not feasible renders the entire route infeasible, unless there is a minor variation to the route that overcomes the feasibility problem. Our analysis included an assessment of whether a minor variation would correct the many problems that we identified in the proposed routing corridors. In all cases, we did not find a viable solution to the many problems that were readily apparent.

11 It is also appropriate to point out that it is not the purpose of this affidavit to rebut everything that is set forth in the NYSDOS Reply Brief. Instead, this affidavit addresses many of the significant problems associated with new alternatives proposed for the first time in the Reply Brief and highlights some of the other issues that have not been remedied by the assertions of the NYSDOS in its Reply Brief. To the extent that the particular issue is not addressed in this affidavit, I respectfully refer the Secretary of Commerce to the Baker Report for our detailed assessment of each individual route and sub route. Nothing that the NYSDOS has put forth in its Initial or Reply Briefs has altered our conclusion that the various alternative routes proposed by the NYSDOS, its consultants, and the other parties to this proceeding are not viable from a design, construction, operation and/or maintenance perspective, and several alternatives would have very significant adverse environmental and social impacts that far outweigh those associated with the FERC-certificated route.

High Pressure Transmission Pipeline Construction

12. In order to creditably propose that a route for a corridor is feasible, one must fully understand the specialized construction procedures associated with installing high-pressure natural gas transmission pipelines, such as the pipeline proposed by Millennium. Typically, high-pressure gas pipelines are constructed of pipe segments approximately 40 feet long that weigh approximately 2.5 tons each. In order to construct a pipeline of this magnitude, a right-of-

way ("ROW") must be cleared and there must be sufficient space to excavate the trench, store the excavated spoil which, in many cases, includes large rocks and boulders until backfilling, haul in sections of pipe, field-bend the pipe to match the contour of the excavated trench, weld the sections of pipe together, perform required x-ray inspections, patch coat the pipe where required, lower the welded pipeline string into the trench, carefully backfill the trench to avoid damaging the pipe with the excavated rock, and restore the ROW.

13 Exhibit 47 of the NYSDOS's reply brief shows O'Brien & Gere's "Typical Right-of-Way Cross-Sections" and "Typical Drag Section" for construction along the Palisades Interstate Parkway (PIP). These figures depict a construction ROW 30 feet in width. While such a narrow ROW width may be used in localized areas for short distances under ideal conditions, such is not the case along the PIP, or any other highway that the NYSDOS has proposed as a highway corridor for that matter. As I discussed in Baker's March 2003 Pipeline Route Review report filed as Exhibit 78 in Millennium's reply brief (Baker Report), a pipeline construction spread installing welded steel pipe operates as a moving assembly line performing specialized procedures in an efficient, planned sequence (Baker Report, Attachment 1, Figure 2). Unlike the O'Brien & Gere figures, Figure 1 of Attachment "E" provides a dimensioned, realistically scaled depiction of how the construction work area (CWA) is utilized. As shown, twenty-four inch pipeline construction normally requires a CWA that is approximately 75 feet wide if the area is relatively flat. It is essential that equipment be able to work side by side with adequate space for passing and efficient stringing, bending, welding, coating, and lifting of the steel pipe section. Ideal field conditions may allow short sections of the pipeline to be installed on narrower workspace, but an adequate staging area and suitable access would still be required in the near vicinity.

4. To better show pipeline construction techniques and the physical size of the equipment necessary to safely and efficiently accomplish the task, I have included a short video prepared by Columbia Gas Transmission Corporation as Attachment "F." This video is representative of typical high-pressure gas transmission pipeline construction and demonstrates the size of the equipment involved. When the size and operation of this specialized equipment, as depicted in this video, are compared to the photographs of the alternatives proposed by the NYSDOS and others in the Baker Report, the serious constructability problems due to an inadequate ROW for construction becomes self evident.

Construction Along the Palisades Interstate Parkway

15 The NYSDOS offers the O'Brien & Gere figure to support the proposition that construction along the Palisades Interstate Parkway ("PIP") could be constructed on a 30 ft. cleared area. This is simply not true. The PIP alignment, whether on the east or west side, does not provide adequate site space needed to construct a large diameter pipeline on restricted ROW, regardless of the technique used. Access would be extremely poor, preventing equipment from passing and positioning itself to accomplish the various tasks during the workday. As a result, equipment would have to back up, sometimes for miles, and allow the proper piece of equipment to move forward and safely complete its task. Pipe could not be strung along the ROW using conventional techniques. Unloading and stringing with a backhoe, as suggested in the O'Brien & Gere figures, is perhaps possible but creates an unsafe condition for the operator and workers. The equipment would be operating above its maximum capacity, resulting in the probability of the equipment turning over from the excessive weight of the pipe and the extension of the boom.

16. It should also be noted that there are several inaccuracies in the figures presented by O'Brien & Gere. For example, pipe should not be strung ahead of trenching activities where blasting is anticipated, such as along much of the PIP. This ensures that the pipe will not be

damaged by the blasting operation and leaves sufficient space for the backhoe and/or trencher to operate. The top width of the trench will vary from 6 feet (in rock and very competent soil) to 16 feet (in normal route soils having an angle of repose of 45 degrees). For most of the alignment, the ditch width is 16 feet. This would leave 14 feet of working space for ditch spoil, equipment and safe working space for pipe-laying operations, and at least a single construction drive lane. In addition, utilizing the procedure depicted in the O'Brien & Gere figure, the pipe could be damaged in at least two different ways. Since there is only 10 feet from the centerline of the trench to the edge of the work area (outside of which is nearly all forested) the pipe and skids cradled to temporarily support it could be damaged from contact with the equipment tracks. The pipe could also be damaged from the back end of the backhoe as it swings the spoil to the working side of the ROW. I also note that O'Brien & Gere has depicted the pipe on the opposite side of the completed trench from the equipment (probably because there is no room on the working side), thus side booms could not reach the pipe to move it into position for bending, welding or lowering. further note that the sequence is not correct as the "completed section" cannot be completed until it is welded together. Finally, the bending operation is depicted as the last step in the operation, which is also incorrect. Each individual joint of pipe must be bent independently for two reasons. First, the bending machine can not handle the weight of even a short string of pipe without tipping over, and second, the internal mandrel used to produce wrinkle free bends cannot be inserted and retrieved for that great a distance (See Attachment F, Video).

17. The O'Brien & Gere figures also depict operating the equipment on top of excavated spoil. Although this technique can be utilized in ideal soil conditions, the presence of rock makes this an unacceptable and unsafe practice. The numerous rock outcrops along the PIP

and its location in "Rockland" County, which is known for its rocky terrain, make this practice highly unlikely at this location.

18. In summary, it is my opinion that the O'Brien & Gere figures do not represent a viable construction sequence or plan for even a short distance, never mind the miles of pipeline that would have to be installed along the PIP, as suggested by the NYSDOS. Further, due to the restricted access and uneven and rocky terrain, I do not believe that such a narrow work area can be reasonably used to construct the pipeline along this alignment.

19. The NYSDOS's comparison of the construction conditions along the PIP to the bike path in Westchester County is also invalid. In contrast to the uneven, rocky terrain without adequate access or staging areas along the PIP, the bike path is relatively straight and at a constant grade because it was formerly a railroad grade. In addition, there is good access along the entire length; usually a crossroad is available every ¼ mile or so. Even still, the development of feasible construction plans along the bike path were the subject of much debate within the Millennium team. However, since the alignment is straight and level, the pipe joints can be welded together at each road crossing and pulled into place on a roller system spanning over the trench. Obviously such a construction plan would not work along the PIP due to the greater lengths involved and the need to frequently bend the pipe to match the uneven terrain. These situations only further point out the need for detailed on-ground investigation of proposed pipeline routes and the need to avoid the "one size fits all" approach to developing large diameter pipeline construction plans.

Tennessee Pipeline Right-of Way River Crossing

20. A number of the alternative routes and corridors proposed by the NYSDOS depend upon the crossing of the Hudson River at Tallman State Park in the vicinity of the Piermont Marsh on the west side of the Hudson River and the Village of Dobbs Ferry on the east

side of the Hudson River. In the Baker Report, we identified a number of reasons why this proposed crossing location is simply not feasible, both on the west side of the Hudson River and on the east side of the Hudson River.

21. As noted on pages 11 and 12 of the Baker Report, approximately 10 acres of mature forest would have to be removed within Tallman State Park. More importantly, since the Tennessee pipeline has taken all of the usable workspace in the existing rock cut in the Palisades cliff, the rock cut would have to be widened significantly. At the base of a 20 to 25 degree slope the Piermont Marsh begins. This Marsh is designated as a Significant Coastal Fish and Wildlife Habitat and is one of only 25 National Estuarian Research Reserve locations, as reported by the National Oceanic and Atmospheric Administration ("NOAA"). Although there is an existing stream channel to the north of the Tennessee pipelines (as was reported in the Baker Report), it is doubtful that any environmental agency would give permits to utilize that area for a pipeline crossing. First, in order to stage a pipeline crossing at this location, a wetland area of approximately 1 acre would have to be filled. This would impede the flow into the stream and require the redirection of the stream flow. Then, a significant cut would be required in the emergent wetland area to allow barge access to begin the river crossing. This could cause significant adverse impact to this wetland area.

22. In the Baker Report, we pointed out that there is simply no room in the area of the Landings Development or in the other residential areas that were chosen by the NYSDOS as their preferred route on the east side of the Hudson River to construct a pipeline. Once again, we refer you to the video (Attachment "F") so that you have a better understanding of why it would be impossible to construct a major high-pressure gas transmission system through the congested

areas in these developments. Evidently, the NYSDOS now concedes that that route is not constructible, because it has proposed an alternative route on the east side of the Hudson River.

As an alternative to the obvious problems presented by its original proposal, the NYSDOS now proposes to directionally drill both the west and the east banks of the Hudson River and tying both borings together by lay-barge construction in the middle of the river. It also proposes that the pipeline be routed approximately one-quarter mile north of their original proposal along the northern property boundary of Mercy College. A careful review of its brief concerning this proposal demonstrates that it has not made any engineering or professional evaluation of the feasibility of these proposed construction methods in relation to this proposed reroute. Instead, it is offering speculation that directional drilling might be feasible at these locations. This type of speculation, without an engineering evaluation or a feasibility study should discredit this proposal at the outset. Nevertheless, at the request of Millennium, we have looked at the feasibility of the proposed directional drilling at these locations, focusing in particular on staging the drilling operations on the eastern shore.

Although it is true that there is an available area that would provide sufficient workspace to stage directional drilling, it is readily apparent that the NYSDOS and its consultant have not received any determination from any contractors that a directional drill is feasible at this location. In fact, based upon the language of its brief, it appears that all it and its consultants have done is asked directional-drilling contractors if drilling through rock formations that they identified is feasible. In contrast, we, in cooperation with Millennium, contacted a directional drilling contractor and gave them the specifics of the proposed directional drill, including detailed information on the geology and, more importantly, information concerning the topography and the anticipated sediments in the Hudson River at the proposed location of the

directional drill. Mr. Tim McGuire of Michels Corporation has provided an affidavit which demonstrates the lack of feasibility of a directional drill, not only on the east side of the Hudson River, but on the west side of the Hudson River as well. I have read this affidavit and find the issues that have been raised to be reasonable and consistent with my understanding of the site geology, the topography and the condition of the Hudson River at this location. This affidavit also demonstrates that there would be significant environmental impacts associated with directional drilling, including a significant release of drilling lubricant, at least 30,000 barrels of bentonite for each of the drilling episodes to the Hudson River, because they terminate in the river rather than extend from shore to shore.

25 Annexed hereto and incorporated herewith as Attachment "G" is a copy of the cross-section prepared by Baker regarding the Mercy College shoreline and the proposed directional drilling. This cross-section is also useful to demonstrate that the speculative assertion by the NYSDOS about using a horizontal bore under the railroad tracks. As that cross-section reveals, there is no room to construct a bore pit on the east side of the railroad tracks due to the steep embankment that exists in close proximity to the railroad tracks. Typically, a bore pit must be 20 feet wide by 60 feet long. At this location, the toe of this very steep slope is only 10 feet from the railroad tracks. As such, there is no room for a horizontal bore at this location. An additional constraint on the Mercy College site is the location of the Old Croton Trailway Aqueduct. The designated historic structure is directly in the path of the pipeline. No mention of this aqueduct was made in the Reply Brief. Because the NYSDOS has not proposed a feasible River Crossing at this location and our field reviews show that an HDD crossing at this location is infeasible, all of the various alternative routes and corridors that depend upon this river crossing should be rejected by the Secretary as being infeasible and, therefore, not available.

Route 117 River Crossing

26. A number of the NYSDOS alternatives depend upon a River Crossing that begins at Nyack State Park on the west side of the Hudson River and joins Route 117 on the east side of the Hudson River. Nyack State Park is, based upon signs posted at the Park, apparently a cooperative venture of several state and federal agencies. Most importantly, it is a Historic Park with charm and character that is created by historic stone walls, historic buildings and, most importantly, mature trees.

27. The inappropriateness of using this Park for pipeline construction was addressed at page 14 of the Baker Report. As a variation, the NYSDOS proposes routing the pipeline along the southern boundary of the Park. The southern boundary of the Park is occupied by the entranceway, a roadway, historic walls, and mature trees leading down to a beach at the river. All of those features of the Park would be destroyed during pipeline construction. In addition, a 75 foot cleared area leading down to the Hudson River would be the dominant landscape upon entering the Park. This would be in contrast to the existing view of a meandering road, historic walls and mature trees, all against the backdrop of the Hudson River.

28. A significant feasibility problem with the NYSDOS proposal is the fact that there is no staging area at the bank of the Hudson River on the south side of the Park. As such, construction equipment would still be required to access the parking lot utilizing the existing roads with historic rock walls supporting them. The impact to the structures could be significant and it is hard to believe that any restoration effort could replace the workmanship and character of these existing features.

29. In addition, there is simply no way to route a pipeline to Nyack State Park. The NYSDOS proposal to route around the quarry along Snake Hill Road fails to take into account that the 75 to 100 feet of space that it identified is part of the buffer zone for the quarry, which is

very steep in most locations and is permitted to a depth well below sea level. As such, at least 75 feet of mature trees would have to be cleared, and an area would have to be leveled for pipeline construction, all of which would occur in very close proximity to a hard rock quarry that has permits to mine well below sea level. Because hard rock mining uses blasting as its primary method of rock removal, routing a high-pressure gas transmission system in such close proximity to ongoing blasting activities is totally inappropriate. As such, the feasibility of this entire route and all of its alternatives fail at this location.

30. Proceeding further north, the Baker Report identifies a number of locations where the NYSDOS route along the CSX railroad tracks is not feasible due to homes that exist in close proximity to the railroad tracks and the ballast for those tracks. The Baker Report also identifies other routing problems such as lakes and utility structures that also exist within very close proximity to the railroad tracks. Even using the 25-foot offset that the NYSDOS suggested (NYSDOS Reply Brief at page 152), there are numerous locations where there is a total lack of space to construct a pipeline or achieve that requirement. Once again, I refer you to the enclosed video and the photographs in the Baker Report.

31 In apparent recognition that its original proposal to route the pipeline through the tunnel under Hook Mountain is not feasible, the NYSDOS now suggests that the pipeline be routed over Hook Mountain adjacent to the transmission line that runs over Hook Mountain. Once again, it appears that the NYSDOS did not conduct a field survey of this area. The transmission right-of-way is relatively narrow and is occupied by historic telegraph towers on one side. As a result, the right-of-way would have to be widened by at least 50 feet on the west side of the existing right-of-way. Although a pipeline could be constructed over Hook Mountain at this location, a permanent scar would be left that would be readily visible from the Hudson

River in Haverstraw Bay. Moving away from the existing right-of-way to run parallel to the Hudson River as suggested by the NYSDOS in an attempt to hide the permanent scar does not appear to be feasible as it would result in significant lengths of side-slope construction, a situation that must be avoided as explained in the Baker Report.

32. Further to the north, along the CSX tracks, the problems are similar to the areas to the south, with houses, buildings and utility structures existing in close proximity to the railroad tracks and/or the ballast for the railroad tracks. Also, there are number of locations where the ballast for the railroad tracks is a steep bank, with the toe of the slope being very close to buildings and houses. The infeasibility of this route has not been cured by the NYSDOS's suggestion that the pipeline could be routed over Hook Mountain

Proposed Northern Routes

33. All the northern alternate routes proposed by the NYSDOS depend upon routing on the east side of the Hudson River under Route 9 in the vicinity of Buchanan. Before I address the infeasibility of that particular routing option in detail, it is appropriate to address a few of the assertions put forth by the NYSDOS in an attempt to support its alternative suggestions.

34. At page 152 of their Reply Brief, the NYSDOS suggests that the rock in the vicinity of Stony Point State Park can be directionally drilled. The NYSDOS offers no engineering report or feasibility evaluation to demonstrate that an adequate staging area exists and that the rock in the area could be directionally drilled. In fact, there is no adequate staging area, and any construction effort of that kind in that area would disrupt rail transportation for an extended period of time.

35. If the problems at the entrance to Stony Point State Park could be solved, which they cannot, the solution to that problem would not eliminate the many other problems associated with using the CSX right-of-way. In many other locations, the problems are similar to

those described above, with elevated railroad tracks and railroad ballast that is constructed with steep banks that are in close proximity to houses, businesses and existing utility structures. In order for a route to be feasible, all of the problems associated with that route must be resolved and the route must be fully constructible from beginning to end.

36. The NYSDOS also suggests that other routing options are feasible because houses that encroach upon the right-of-way can be remedied. NYSDOS Reply Brief at 154. In many instances, there are no encroachments. Rather, the houses have been built adjacent to the existing right of way in compliance with whatever setback is required by local zoning. There is still not enough room to construct a high-pressure, natural gas transmission line in these locations without condemnation of the houses and the wholesale relocation of property owners. This is not a viable solution to an existing route that is certificated by the FERC which does not require those type of social impacts.

The Route 9 Crossing at Buchanan

37. As mentioned above, all of the northern routing options proposed by the NYSDOS depend upon crossing New York State Route 9 in the vicinity of Buchanan. All of the alternative routes proposed by the NYSDOS and others converge at this point.

38 The lack of feasibility of constructing a high-pressure natural gas transmission pipeline in this location was addressed at Table 2, Segment O, of the Baker Report. None of the suggestions by NYSDOS or its consultant has remedied the serious problems of trying to construct a pipeline at this very difficult location.

39. In order to put this area into perspective, we have conducted additional field visits and have produced a cross-section, drawn to scale. The true copy of the cross-section is annexed hereto and incorporated herewith as Attachment "H." As that cross-section reveals, construction in this location is complicated by the severe grade changes that occur in a very short distance

when looking at the proposed routing from the east side of the railroad tracks to the Consolidated Edison right-of-way on the east side of New York State Route 9. The NYSDOS suggests that "another bore or possibly a microtunnel machine will be required to make a perpendicular crossing through rock under Route 9 at this location to reconnect with the Consolidated Edison right-of-way." NYSDOS Reply Brief at 153. No engineering report was provided to support the feasibility of these technologies at this location. Most importantly, a boring is not feasible and using a microtunnel machine at this location is experimental, at best. In either case, there is insufficient room to construct the bore pits.

40. Typically when horizontal bores of this size diameter reach lengths of over 300 feet, the accuracy of controlling the direction of the drill head diminishes dramatically. In addition, a horizontal bore must be constructed as a straight line. The annexed cross-section reveals that it is simply impossible to locate a horizontal bore on this topography within the limits of that technology. Likewise, I am personally not aware of any technology using a micro-tunnel machine that would solve these very serious logistical problems. Again, no engineering report or feasibility study was provided to demonstrate the appropriateness of the technology at this location.

Catskill Aqueduct Crossing

41 The NYSDOS also suggests that Millennium utilize an alternate route at the Catskill Aqueduct Bryn Mawr Siphon by routing the pipeline along the west side of the New York State Thruway and crossing the Thruway at a location that has a rock cliff immediately adjacent to the Thruway on the west side and a steep drop off on the east side. The lack of feasibility of this route was addressed at page 23 of the Baker Report. Nothing in the NYSDOS brief has caused us to change our opinion about the lack of feasibility of this option.

42 Annexed hereto and incorporated herewith as Attachment "I" is a copy of the cross-section prepared by Baker regarding the horizontal bore across the Thruway. At page 171 of the NYSDOS Reply Brief, the NYSDOS suggests that in order to overcome the limitation of conventional boring technology, multiple boring pits can be constructed along the approximately 600 ft. boring that would be required. What the NYSDOS fails to point out, however, is that those boring pits would be located in the middle of Thruway lanes because the entire boring is necessary to cross underneath the Thruway at this location. The net result would be the closing of multiple lanes of Thruway traffic for extended periods of time.

43 A further complicating factor is that, even if the pipeline could be constructed across the Thruway, it would enter the Consolidated Edison right-of-way in close proximity to large transmission towers. The NYSDOS does not include any correspondence from the New York State Public Service Commission indicating that this would be acceptable. As such, it has not demonstrated that, even if the pipeline could be constructed across the Thruway to this location, that it is a viable alternate route. Moreover, the angle of the pipeline will require multiple bends in the pipeline to bring its alignment back to being parallel with the aqueduct. The multiple bends will exceed 90 degrees. Then, the pipeline will follow the aqueduct until intersecting the Sprain Brook Parkway where another 90degree bend will be necessary to avoid a bridge abutment and existing apartment complex.

44. This points to a another fundamental problem associated with many of the alternative routes suggested by the NYSDOS and its consultant. In a number of situations, the NYSDOS and its consultant have put forth suggestions and drawings that include multiple, closely spaced 90-degree turns in the pipeline. This is simply inappropriate for pipeline safety reasons. Recently promulgated regulations and enhanced requirements agreed to by Millennium

for construction in close proximity to the Consolidated Edison transmission towers (as required by the New York State Public Service Commission) require multiple inspections of pipelines utilizing devices known as "smart pigs." Smart pigs are devices that are inserted into the pipeline and travel in the pipeline while the pipeline is in service. They are called smart pigs, because they contain electronic data sensors and recorders that record information concerning the condition of the pipeline. Multiple bends required at this location preclude the use of smart pigs required for testing and maintenance.

45. Not only do to the proposals put forth by the NYSDOS compromise pipeline safety through the alignments they suggest, they also compromise pipeline maintenance, which is directly related to pipeline safety. For example, proposing construction of a pipeline to cross Route 9 in the vicinity of Buchanan, as suggested by NYSDOS and its consultants, would seriously compromise the ability of Millennium to access that area for periodic inspection and maintenance.

46. Based upon our extensive review of all of the alternative routes presented by the NYSDOS, its consultant, and the other intervening parties to this proceeding, it remains our opinion that none of the alternative routes is viable. For the most part, all of the routes have serious fatal flaws that prevent construction in one location or another. In addition, all of the routes have serious environmental and social consequences that far outweigh the environmental and social consequences of the route certificated by the FERC.

Dated: April 18, 2003

CHARLES M. RUSSELL, P.E.

Sworn to before me t
18 day of April, 20

Notary Public
80658

THOMAS S. WEST
Notary Public, State of New York
No. 4953814
Qualified in Albany County
Commission Expires July 31, 2003

Charles M. Russell, P.E.

Vice President - Civil Engineering

Years with Baker: 21
Years with Other Firms: 23

Education
University of Pittsburgh
B.S., Civil Engineering, 1959
M.S., Civil Engineering, 1970
M.P.W., Public Works, 1970

Registrations
Professional Engineer
Alabama, 1982
Florida, 1979
Illinois, 1983
Indiana, 1983
New York, 1966
North Carolina, 1983
Ohio, 1968
Oklahoma, 1993
Pennsylvania, 1964
Tennessee, 1982
West Virginia, 1969

General Qualifications

Mr. Russell has more than 44 years experience in civil engineering, primarily in management positions. Throughout his career, he has served in both the design and construction of civil works projects in the development of America's infrastructure in various locations across the U.S. He has also lead similar efforts on projects around the globe, including Mexico, and Latin America. He is experienced in the design of new facilities, as well as for the modernization and expansion of existing facilities. As vice president in charge of the General Civil Engineering Department in Beaver, Pennsylvania, he assumes responsibility for overall administration of major contracts, including marketing, finance, engineering and construction, estimating, cost control, planning, and scheduling with the ability to consistently meet tight budgets and schedules. A principal in the Engineering Group, he oversees the design of projects including pipelines, linear utilities, mining and industrial projects, airports, site development, geotechnical engineering, and municipal/sanitary projects.

Experience

Pipelines

Principal-in-charge responsible for overall design quality control, budgets, and schedules for various pipeline projects including the following:

- **Conoco, Inc. - The C&L Processors DOT Pipeline** - Engineering and construction services responsible for bringing approximately 410 miles of two DOT regulated natural gas gathering and transmission pipelines into compliance with the Code of Federal Regulations (CFR), Title 49, Parts 191 and 192 as administered by the Oklahoma Corporation Commission. The project is located in the Oklahoma City area. Project responsibilities include: evaluation of existing records, preparation of design and construction procedures, permitting with applicable agencies, construction management and inspection, construction material procurement and disbursement, and preparation of final documentation records.

  Conoco, Inc. - Cardinal States Gathering Line - This pipeline consists of 54 miles of 12 and 16 inch diameter steel pipeline running from Buchanan County, Virginia, through Pike County, Kentucky, to Mingo County, West Virginia. The project involves gathering coalbed methane from various sources along the route, and delivering it to a major distribution network. Project responsibilities include: conceptual design, route selection, alignment survey, right-of-way research and acquisition, alignment design, environmental permitting, construction inspection, and preparation of record drawings.

- **Conoco, Inc. - Pocahontas Collection System** - This pipeline project consists of approximately 80 miles of a coal bed methane collection pipeline running through the rugged hills of western Virginia. This gathering system

includes 150 CBM wells and 80 miles of 4 to 12 inch diameter steel and polyethylene low and high pressure pipelines. Project responsibilities include: conceptual design, right-of-way acquisition, environmental assessment, permitting, aerial mapping, route selection, alignment surveys, design, and permitting. Construction phase services include right-of-way acquisition, construction inspection, and record drawings.

- **OXY U.S.A., Inc. - Oakwood Gathering System** - This pipeline project located in Buchanan County, Virginia, consists of over 100 miles of a 1 to 12 inch diameter coal bed methane collection pipeline, interconnecting 300 wells, 28 compressor facilities, four electrical substations, and 60 miles of electrical distribution lines. Project responsibilities include: conceptual design, final design, right-of-way services, alignment surveying and route selection, permitting, photogrammetric mapping, environmental assessment, and construction management.

- **Tioga Pipeline Company, Pittsburgh International Airport Aviation Fuel Pipeline** - Design, permitting, and construction inspection of a 12-inch diameter steel pipeline that provides aviation fuel for Pittsburgh's New Midfield Airport. Project responsibilities include: selection of final alignment, preparation on construction drawings, obtaining permits for state highway crossings, supervision of construction inspection and preparation of final record drawings.

- **ARCO Chemical Company** - Design and construction inspection of a 4 inch diameter nitrogen gas pipeline serving an existing major chemical processing plant located in southwestern Pennsylvania. Project responsibilities include: selection of the final alignment, preparation of the construction drawings, supervision of the construction inspection, and preparation of the final record drawings.

- **Buckeye Pipeline** – Managed the remediation and restoration of a jet fuel pipeline rupture in Armstrong County crossing a tributary to the Allegheny River.

- **Columbia Gas** – Civil Engineer responsible for transmission pipeline design, ROW acquisition, surveys and mapping and well location for the Columbia Gas System in PA, NY, WV, MD and OH.

Pipeline Services

General

Pipeline transmission and gathering systems require a thorough understanding of the engineering, environmental and construction components that comprise successful projects. Baker's understanding of these requirements is derived from many years of experience in all phases of pipeline projects. Our diverse experience encompasses not only pipeline design, but also the environmental, planning, construction, and practical operations-maintenance expertise that is essential for such multi-faceted projects.

This full range of services has enabled Baker to serve as Program Manager for large, complex projects. For example, Baker was the lead design engineer and provided construction management for a $10 million, Natural Gas Gathering System project for CONOCO, Inc. in Oklahoma City, OK in 1992-94. This project encompassed all engineering, construction management, evaluation, on-site construction inspection and permitting for the 450 miles of pipeline.

Pipeline engineering services include initial planning and conceptual feasibility studies, design engineering, and preparation of construction plans and specifications, value engineering studies, bid phase engineering, construction and construction phase engineering, facility start-up services, and on-going operation and maintenance consulting services.

Additionally, Baker provides services in surveying, planning, mapping, design, geotechnical engineering, environmental permitting, construction management and program management for pipelines, site development projects, municipal water and wastewater facilities, hydroelectric development, dams and impoundment's, marine facilities, fiber optic cable routes, airports, and recreational facilities. In the private sector, services are primarily provided to telecommunications, electric, gas, oil and coal companies.

Finally, Baker's diverse engineering capabilities have focused on pipeline projects requiring **special expertise**. In particular, we offer special expertise in the following areas:

Cold Region Design
Pipeline System Evaluation and Upgrade
Coalbed Methane Application

Feasibility Studies

Baker has conducted several feasibility studies for proposed oil and gas pipeline projects. Evaluations are based upon, but not limited to, the following criteria: constructibility, geologic conditions, surface and/or deep mine activities, number of property owners involved, availability of acquirable properties, wetlands, endangered species, stream and river crossings, highway crossings, historical and archaeological sites, facilitation of existing and proposed compressor stations and gathering systems, and assessment of design standards and permit requirements of governing regulatory agencies. The results of the criteria along with recommendations are documented into a formal report.

Route Alignment Design

Following industry standards and proven, accepted engineering practices, Baker can prepare a detailed, comprehensive route alignment design that includes: pipeline location, coordinate system and monumentation, drainage features, property owner and property line identification, foreign utilities, wellhead locations, access roads, compressor station locations, valve locations, soil erosion and sedimentation control devices, detailed stream/river/high-way/railroad crossings, typical construction details, and detailed cost estimates.

Environmental Studies and Permitting

Baker's professional environmental staff provides environmental services ranging from basic field surveys to complex, multi-disciplined evaluations. Our highly diversified group of environmental scientists, geologists, ecologists, and archaeologists successfully work in concert on environmental investigations, impact assessments, and permitting related to pipeline projects.

The range of environmental services include: wetland identification and delineation, wetlands analysis, regulatory wetland encroachment permitting, wildlife habitat evaluation, wetland replacement design, water quality studies, aquatic habitat analysis, threatened and endangered species surveys, air quality studies, noise analysis and noise barrier design, vibration analysis, socioeconomic evaluations, visual impact assessments, and cultural and historic resource management.

Surveying and Mapping

Since our inception in 1940, Baker has been a leader in the survey industry, utilizing the most current technology and providing our clients with innovative solutions. Our crews are equipped with total stations interfaced with data collectors. We perform high accuracy GPS surveys using dual frequency receivers with kinematic capability. We also collect feature positions, to sub-meter accuracy, and feature attributes using Pathfinder GPS receivers.

Baker has provided photogrammetric mapping services for over 45 years. We have complete in-house aerial photo reproduction services. Digital topographic mapping is performed on first order analytical stereoplotters interfaced to graphic workstations. Digital orthophotos are produced using our Intergraph/Zeiss high resolution photo scanner and Intergraph ImageStations running Imager software. Digital topographic map files and digital orthophoto files are delivered in a variety of formats compatible with the customers hardware/software platform of choice.

Baker has provided surveying and mapping services for many thousands of miles of corridor type projects serving the pipeline, telecommunications, power, highway, and rail transportation industries. Baker's full spectrum of surveying services offered to the pipeline industry include design alignment staking, construction staking, boundary, right-of-way, easement, condemnation, land title, subsidence monitoring, hazardous material sites, topographic data collection, photogrammetric mapping control and magnetic location/tracing surveys.

Mapping services include aerial photography, photo enlargements, control extension by analytical aerotriangulation, digital terrain modeling (DTM), profiling and cross sectioning by digitizing or extraction from DTM, digital planimetric and topographic mapping and color and black and white digital orthophotography.

AM/FM and GIS

GIS is a Core Competency at Baker permeating all of our business units. We have used GIS technology to help many of our clients achieve higher levels of efficiency and productivity in their businesses.

Baker offers GIS expertise in consulting services including strategic planning, implementation planning, needs assessment and database design. In addition, we offer data conversion and application development services.

Right-of-Way Acquisition

Baker's right-of-way support staff provides right-of-way services ranging from property ownership investigations to negotiating agreements for utility easements. The range of right-of-way support services include: investigation of property ownership, property appraisals such as coal and timber rights, negotiation of option agreements for easements, negotiation for temporary construction work space, negotiation of settlements for construction damages and releases, and preparation of final documents for recording purposes. Our ROW staff is experienced veterans in every aspect that involves right-of-way issues on pipeline projects. Their

experience includes dealing with individual property owners to negotiating major agreements with railroads, utility companies, and Federal agencies.

Horizontal Directional Drill (HDD)

Since it's inception in the 1960's, Horizontal Direction Drilling (HDD) has made possible the installation of utility conduits through sensitive or congested areas without the surface disturbance inherently a part of conventional trenching methods. Baker has completed the design and permitting activities required for numerous HDD projects ranging in size from short road, stream and wetland crossings to bores for trans-oceanic cable landings and major river crossings thousands of feet in length. The specific activities completed by Baker for HDD projects include: field investigations to determine possible HDD routes and staging areas; investigations to define property ownership, existing geologic conditions and obstructions within the project area; design of the horizontal and vertical alignment of the bore; consultation with HDD contractors to verify material, equipment and construction requirements; development of design, construction and as-built documents and project specifications; and permitting activities required by Federal, State and local jurisdictional agencies.

Compression Design

Whether the project calls for a small portable field compressor or a large horsepower stationary compressor, Baker has the experience and expertise to evaluate and determine the proper compressor to meet the compression requirements. Conceptual and final compressor engineering includes: size, performance and material specifications, site/foundation design, "custody transfer" quality metering design, gas flow regulation, auxiliary and support systems (electric transformer/switchgear, engine fuel gas system, water cooled exchangers, etc.) coordination, and the evaluation of alternative economics - the approach of buying, leasing and contracting compression.

Construction Management and Inspection

The construction services staff of Baker provides the necessary expertise required for the successful completion of construction activities. Construction Management Services include: the daily monitoring and reporting of work progress as it pertains to contractual performance, technical interpretation and field design modifications required during construction activities, overseeing that the quality of work preformed by contractors is in accordance with specifications, and preparation of scope change documents along with the effects on budget and schedule. In connection with construction management services, Baker provides inspection services that include: daily inspection records describing and documenting the construction activities, maintenance of material quantities and record drawings, and verification that construction is done in accordance with the design plans and specifications.

Program/Project Management

Baker has long been recognized as leaders in the field of Program/Project management of large scale pipeline projects. Each of our Project Managers has extensive experience in the pipeline field, with many of them coming directly from careers at major pipeline companies. Typical Program/Project Management services Baker provides include: scheduling, cost estimating, manpower allocations, client satisfaction reviews, quality control/assurance and overall administration of the projects.

Record Documentation

The availability of accurate documentation of pipeline and compressor station facilities is a technically challenging assignment; having the expertise and experience is essential. Baker provides this service with a technical staff that has significant experience with record documentation for facilities ranging from small diameter pipelines to highly developed, complex gathering systems and compressor stations. Baker utilizes virtually every source of information available, from inspection notes to field reconnaissance/verifications to existing records. State-of-the-art resources such as CADD systems, automated databases, and Global Positioning System (GPS) are commonly used depending upon the required level of detail.

SPECIAL EXPERTISE

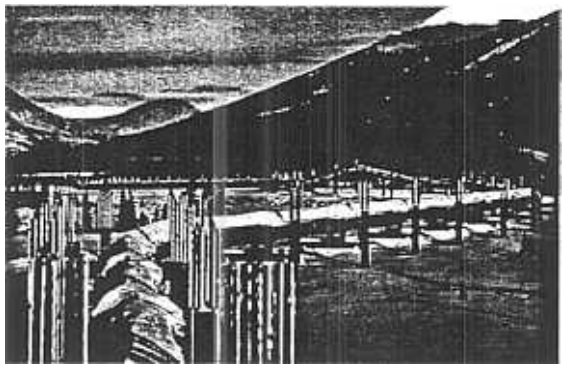
Cold Region Design

Baker has operated in cold region environments, from Europe to Greenland, on a continuous basis since 1942. Our Alaskan experience started with surveys, design,

and construction engineering services connected with the rapid military build up in Alaska during World War II. The firm's ability to provide a rapid effective response to the mobilization requirements of major projects on the "last frontier" has been carried through to its services for the energy industry, the State of Alaska, and the Federal Government through succeeding years.

Baker served as an engineering consultant to Alyeska Pipeline Service Company from 1969 through 1978. Over 3,200,000 work hours of service were provided to the Trans-Alaksa Pipeline System project through all project development phases from concept to commissioning. During this period, Baker also provided essential personnel to the team formed for the location and concept development of the El Paso Natural Gas Pipeline project.

The Baker team was called to service again in early 1978, this time for the Alaska Natural Gas Transmission System (ANGTS). We participated in the early studies and field engineering connected with this project. In late 1978 we were selected to provide a "blue ribbon" team of professional experienced in the design and construction of major pipeline projects in Alaska to develop conceptual designs, project description and estimate for the ANGTS Federal Energy Regulatory Commission filing. In 1980 the 50/50 joint venture of Gulf Interstate Engineering Company and Michael Baker Jr., Inc. was brought under contract to provide all design and construction phase engineering services for ANGTS. These services continued through mid-1982.



In subsequent years, Baker has provided engineering services on a number of projects to the Alaska Department of Transportation and Public Facilities and to Federal Agencies with facilities in the arctic. Baker has recently completed a joint-venture contract with a Canadian firm whereby Baker provided operations and maintenance services to DEW Line sites across the arctic from Alaska to Greenland. In recent years, we have designed special purpose military facilities for the DOD in Alaska and Greenland. We currently hold contracts with a U.S. company and provide construction engineering support for an above-ground crude oil pipeline in the Russian arctic, and with Alyeska Pipeline Service Company for engineering and preliminary design of a section of TAPS which is under consideration for conversion from buried to above-ground mode.

In late 1995, Baker's Alaskan Operation began a Conceptual Engineering Study for ARCO's Colville River Delta Oil and Gas Reservoir on the North Slope of Alaska. This project will require the "best-of-the-best" in Cold Region Pipeline Engineering and Construction Management; the main reason Baker was chosen to complete the project.

Coal Bed Meth e App cations

Coalbed methane gas has always posed a threat to coal mining because it accumulates in the mines and can explode. Because there is very little commercial difference between coalbed methane gas and conventional natural gas, oil and gas companies have been looking for a way to turn coalbed methane into a marketable commodity while mitigating the hazard for the miners. Developing this resource, however, has proven difficult because of complex regulatory and ownership issues, and the mountainous terrain usually associated with coal mines.

Since the winter of 1990, Baker has been involved in the development of technology that has turned a natural resource from a waste product to an economically viable and marketable commodity. Baker has been providing pipeline engineering services for the capturing and transport of millions of cubic feet of coalbed methane gas from underground mines and coal seams in the coal-rich Appalachian Basin region of the United States. Typical projects involve the design and construction of various sizes of pipelines and compressor stations. Baker's services have included: photogrammetric mapping, route selection, right-of-way acquisition, field surveys, mechanical, structural and hydraulic designs for collection lines and compressor stations, electrical designs, permitting, material procurement and inventory, and construction inspection.

Pipeline S ste Evaluation and Upgrade

Baker offers special expertise in the evaluation and upgrade of existing pipeline systems. In the United States, such upgrades are required by the U.S. Department of Transportation and must comply with the Code of Federal Regulations (CFR), Title 49, Parts 191 and 192. The design, construction, operation, and maintenance history of the pipeline system must be

reviewed and, where sufficient historical records are not available, appropriate tests must be performed to determine if the pipeline system is in a satisfactory condition for safe operation. The pipeline right-of-way, all aboveground segments of the pipeline system, and appropriately selected underground segments must be visually inspected for physical defects and operating conditions which reasonably could be expected to impair the strength of tightness of the pipeline system. All known unsafe defects and conditions must be corrected in accordance with the conditions prescribed in the CFR. The pipeline system must be pressure-tested to a predetermined value above its maximum allowable operating pressure. Each operator must keep a record of the investigations, tests, repairs, replacements, and alterations made for the life of the pipeline under the requirements of the CFR.

Baker has been involved in providing not only engineering services, but also construction services related to the evaluation and upgrade of existing systems to meet compliance regulations. Baker services include: inventory and evaluation of existing records, preparation of design and construction procedures for pipeline remediation, construction supervision and inspection, construction material procurement, disbursement and inventory, permitting with applicable agencies, coordination of right-of-way services, and preparation of final documentation records.

Pipeline engineering and construction management is a major part of Baker's civil engineering capability. We strive to provide the latest in engineering/construction techniques, while applying the "state-of-the-art" technology to all aspects of the project.

Summary

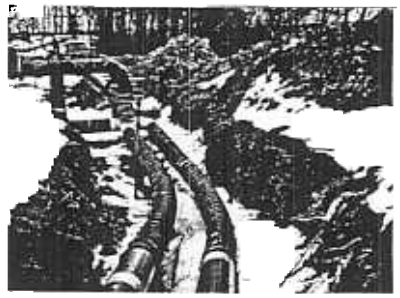
More information on the specific pipeline services Baker offers can be supplied upon request. In the following sections, specific project information is provided to further demonstrate Baker's pipeline experience.

Coal Bed Methane Gas Collection System

Oakwood Gathering System

Project Description:

Feasibility studies, surveying and mapping, right of way services, environmental permitting, road and railroad crossing applications, pipeline design, compressor requirements, electrical lines and electric sub stations, site work, geotechnical investigations, material yard management, construction management and construction inspection were many of the tasks assigned to Baker for over 100 miles of 2" to 12" diameter of a coalbed methane gathering system located in southwest Virginia.



Typical valve location construction along one of the many gathering

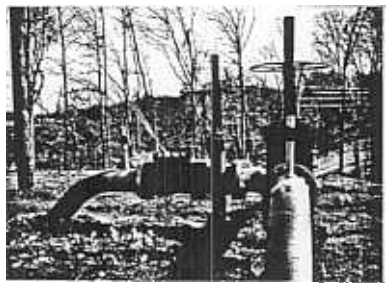
The Challenge:

Coalbed methane gas has always posed a threat to coal mining. To work in a safe environment, the coalbed methane has historically been released into the atmosphere as the mining operations take place.

Initially the concept to collect the methane gas was to drill wells in the center of 80 acre parcels and recover the gas from these wells and transport to the Northeast United States. This elimination of the gas from the coal seams would enable the miners to work more safely because the majority of the gas would be removed before the mining operations began.

Innovated Solutions:

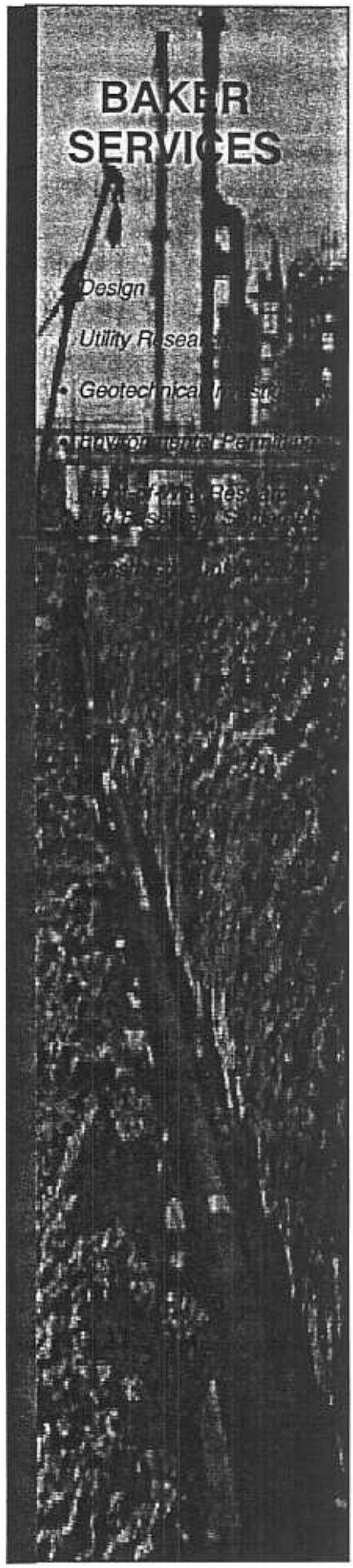
Soon it was determined that the wells did not produce as much methane as was hoped and the decision to "chase the gob" was made. Ventilation wells would be drilled in the proposed mining panels and when the mining operations passed these wells the amount of gas that was escaping into the atmosphere was in the range of 3 to 4 Mcf/day. Baker was asked to develop the technology to have the wells, the pipelines and the compressor designs completed ready to gather the gas from the mining operations without jeopardizing the safety of the miners and not having more than 10% of the methane gas escape into the atmosphere.



Valve location to regulate the flow of the coal bed methane to the many compressors.

Civil, mechanical, structural, and electrical engineers as well as surveyors, CAD operators, construction inspectors and other support personnel worked 16 hours per day for two years and accomplished the successful collection of 30Mcf/day of pipeline quality gas to the Northeast United States and the procedures and techniques are still being followed since the initial start of the project in 1990.

The system is still in operation and is producing 130 Mcf per day. It is estimated that there is 1.2 Tcf of methane gas in a 170,000 acre tract that is scheduled for deep mining operations.



The Pocahontas Coalbed Methane Gas Pipeline Project

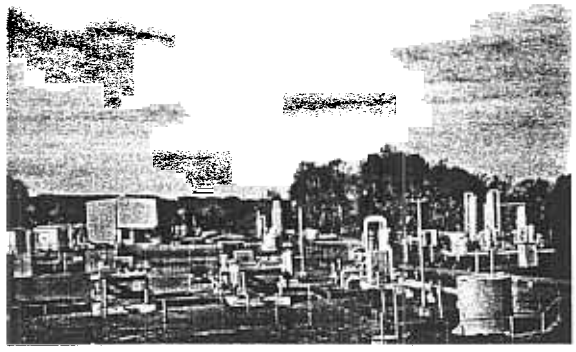
Buchannan County, VA

Project Description:

The objective of this project was to transport coalbed methane (CBM) gas from deep mine ventilation wells to a centralized gas compressor station. Conoco, Inc. teamed with Consol Coal Company on this project. The wells initially were ventilating CBM gas, produced from long-wall mining operations, into the atmosphere. A network of several hundreds of miles of small diameter polyethylene (PE) pipe was constructed to capture the CBM gas.

The Challenge:

Coalbed Methane (CBM) has always posed a threat to coal mining because it accumulates in the mines and can explode. Because there is very little commercial difference between coalbed methane gas and conventional natural gas, oil and gas companies have been searching for ways to turn coalbed methane into a marketable commodity, while mitigating the hazard for the miners. Developing this resource however, has proven difficult because of complex regulatory permitting and ownership issues, and the mountainous terrain usually associated with coal mines.

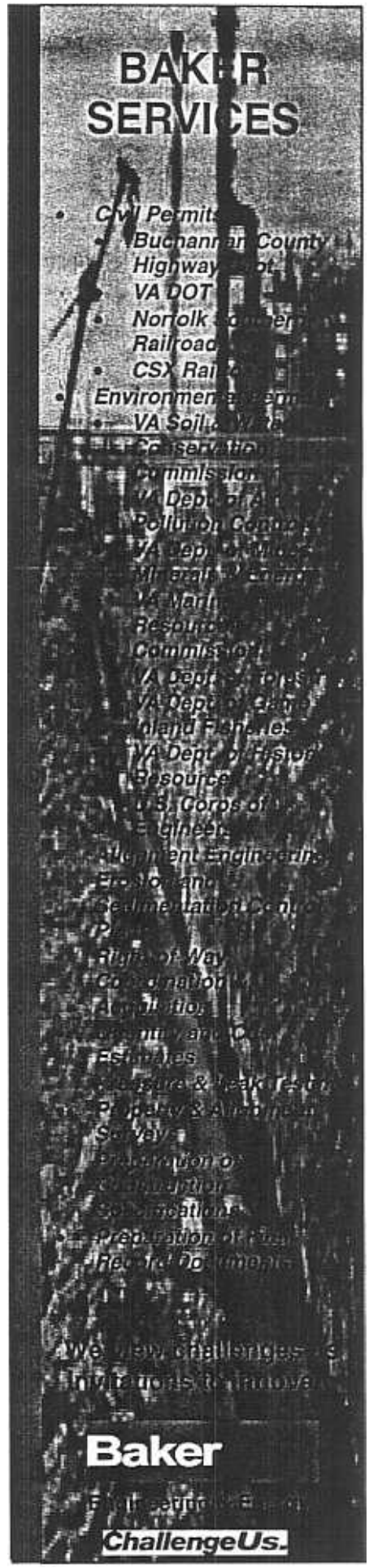


New compressor station under construction

Permitting Solutions:

Baker's role on this project involved the engineering and permitting services required to construct a network of pipelines from the wellheads to a centralized compressor station. Not only did the permitting involve addressing stream, wetland, highway and railroad crossings, but it also involved acquisition of air quality permits for the use of small portable gas compressors at each well site.

A considerable amount of the engineering and permitting services required the interaction and coordination with the deep coal mining activities. This interaction precipitated the acquisition of multiple environmental permits and approvals. The permitting issues included: acquiring all stream, river, and wetland permits on Federal, State, and local levels, preparation of erosion and sedimentation control plans, obtaining necessary approvals from the State Historic Preservation Offices, field identifying environmentally sensitive areas that required special construction activities, safety issues related to the ongoing deep mining operations, and coordination with the State mining agencies.



The Cardinal States Gathering Pipeline Project

Buchannan County, VA; Pike County, KY; Mingo County, WV

Project Description:

The objective of this project was to transport coalbed methane (CBM) gas from new collection systems to an existing Columbia Gas Company Compressor station. Conoco, Inc. and OXY USA, Inc. teamed together on this project. The project involved the design, permitting and construction of a 54 mile 12 and 16-inch diameter steel pipeline that traversed cross-country in three states.

The Challenge:

Coalbed Methane (CBM) as has always posed a threat to coal mining because it accumulates in the mines and can explode. To work in a safe environment, the CBM gas has historically been released into the atmosphere as the mining operations take place. The project required the fast tracking of acquiring new right-of-way easements. In addition to the detailed real estate transactions, the environmental permitting required coordination with a multitude of agencies on the Federal, State, and local levels.

A "Jigsaw Puzzle" Easement and Permit Solution:

Baker's role on this project involved the engineering, right-of-way and permitting services required to construct a 54-mile long 16-inch diameter pipeline across three states in very rugged country. The geography in this part of the United States is comprised of steep hillsides and razor-sharp mountain ridge lines. Along with the rugged terrain, Baker had to deal with missing, erroneous, and incomplete courthouse records in three county seats. Taking into account these constraints, Baker's team of right-of-way specialists was able to secure new easements on over 300 property parcels in less than 5 months. Piecing the parcels together in "jigsaw puzzle" fashion, the pipeline route was ready for construction in record time.

Pipe being layed on razor-sharp ridge

A considerable amount of the engineering and permitting services required the interaction and coordination with the deep coal mining and strip mining reclamation activities. This interaction precipitated the acquisition of multiple environmental permits and approvals. The permitting issues included: acquiring all stream, river, and wetland permits on Federal, State, and local levels, preparation of erosion and sedimentation control plans, obtaining necessary approvals from the State Historic Preservation Offices, field identifying environmentally sensitive areas that required special construction activities, safety issues related to the ongoing deep mining operations, compliance with existing reclaimed lands restrictions, and coordination with the State mining agencies.

Trans Alaska Pipeline System (TAPS)

Prudhoe Bay to the Port of Valdez, AK

Project Description:

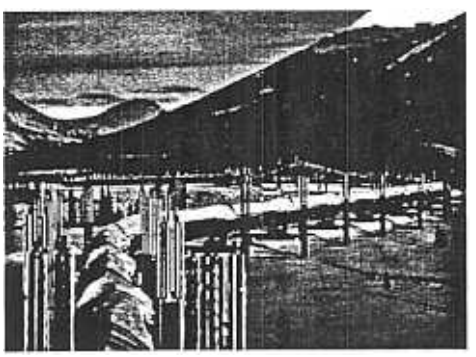
The 798-mile Trans Alaska Pipeline was built for one major purpose: to make the 9.6 billion barrel oil reserve at Prudhoe Bay, Alaska, available to U.S. industry and consumers. At the time, this was the largest privately funded project in history. The 48-inch diameter steel pipeline begins in the Arctic desert of Prudhoe Bay with its annual rainfall of only 6 inches, climbs 4,800 feet over Dietrich Pass in the Brooks Range, crosses the Yukon River, climbs 3,300 feet over the Alaska Range and then over Thompson Pass in the Chugach Mountains before reaching the ice-free Port of Valdez.

The Challenge:

Planning for the pipeline began in 1968 after the discovery of oil at Prudhoe Bay. Extensive environmental and design studies were conducted on all phases of the system. Every foot of the route corridor was checked for environmental features, soil and seismic conditions. Construction of the actual pipeline system began in 1974 and was completed in 1978.

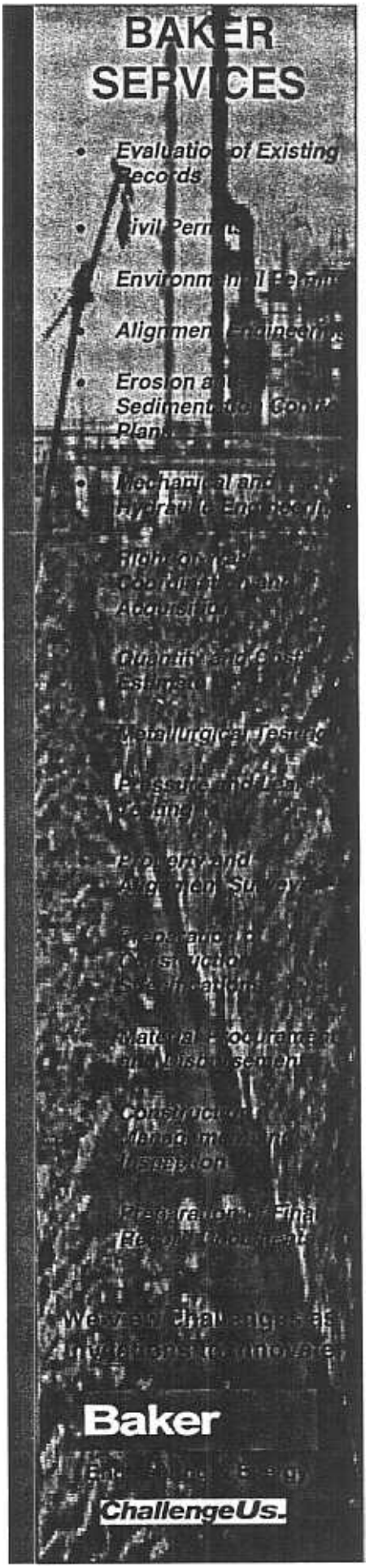
The construction of the pipeline required construction of the first all-season, all-weather highway to be built across the Arctic Circle in the United States. Baker provided design and surveying services on this highway and on: fifteen permanent access roads linking the main highway with pump stations and airfields; various temporary roads providing access to the pipeline ROW and material sites; three permanent airfields required to support the operations and maintenance of the pipeline; and eight temporary airfields which supported the highway and pipeline construction.

Innovated Solutions:



Baker's involvement also included detailed analysis of the soil conditions and design of the above-ground pipe support platforms. To find the most secure route and station locations, approximately 3,400 bore holes were drilled and more than 15,000 soil samples were taken. Approximately 382 miles of pipeline was installed above-ground on specially designed support platforms spaced 50 to 70 feet apart. To prevent thawing around the platform supports, a special thermal device was designed and installed in the supports to keep the ground frozen. The devices are non-mechanical and self-operating.

Since 1991, Baker has been supplying engineering services for the operations and maintenance of the pipeline system. One major effort involved the determination of the seismic hazard potential of above-ground sections of the system and the preparation of operating contingency procedures. A second major effort involved providing design services on the rehabilitation of the buried section of the system north of the Arctic Circle.

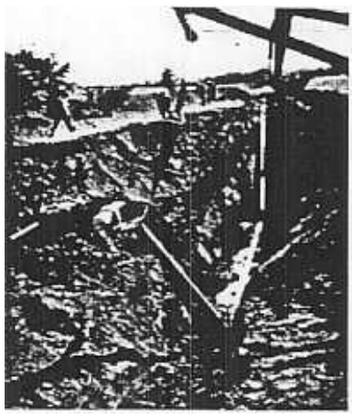


The C & L Processors of DOT Pipeline

Oklahoma City, Oklahoma

Project Description:

Conoco Inc. and Liquid Energy Corporation formed a partnership known as C & L Processors Partnership (C & L) for the purchase of two large natural gas gathering and transmission systems from Oryx Energy Company. The Goldsby System was comprised of approximately 650 miles of pipeline and the Carney System contained approximately 300 miles of pipeline. Pipe in both Systems was a combination of steel, fiberglass, polyethylene, and polyvinyl chloride, and ranged in size from 2-inch through 12-inch.



A section of pipe being lowered at a stream crossing

The Challenge:

The objective of this project was to bring the DOT regulated sections of both Systems into compliance with the Code of Federal Regulations (CFR), Title 49, Parts 191 and 192, as administered by the Oklahoma Corporation Commission (OCC). All gathering pipelines located within an incorporated or unincorporated community are regulated by the DOT. Also, all Class 2, 3 and 4 pipelines and all transmission pipelines are DOT regulated regardless of geographic location. Of the 650 miles of pipeline in the Goldsby System, approximately 350 miles were identified to be regulated. Approximately 60 of the 300 miles of pipeline in the Carney System were considered to be regulated.

Innovated Solutions:

Baker's role on this project involved not only the engineering and permitting services, but also the construction services. Having the added responsibility of Construction Manager, Baker managed a team of specialty contractors who x-rayed welds, replaced sections of pipe, provided metallurgical testing, and conducted pressure testing with water, nitrogen and natural gas.

A considerable amount of pipeline replacement work was required at river and stream crossings due to embankment washouts. This needed work precipitated the acquisition of multiple environmental permits and approvals. The permitting issues included: acquiring all stream, river, and wetland permits on Federal, State and local levels, preparation of erosion and sedimentation control plans, obtaining necessary approvals from the state historic preservation offices, and field identifying environmentally sensitive areas that required special construction activities.

River Bore Project

Confidential Client and Location

Project Description:

A confidential client selected Michael Baker, Jr. to plan, design, and perform a river bore under a major river in a highly urbanized area in northeast U.S. This project had to be designed in an area containing numerous utility and right-of-way conflicts. Due to competitive reasons, the client has requested that their name and the project location be kept confidential.

Boring rig preparing to construct a new communication link to a major world trade center.

The Challenge:

Michael Baker Jr., Inc. performed a feasibility study using a combination of (1) on-site evaluation and (2) analysis of engineering and economic reasons to select the landing sites and cable alignment. The sites were selected based on a review of telecommunications engineering, geotechnical, and environmental engineering factors, with the consideration that any single problem could cancel the project.

Innovated Solutions:

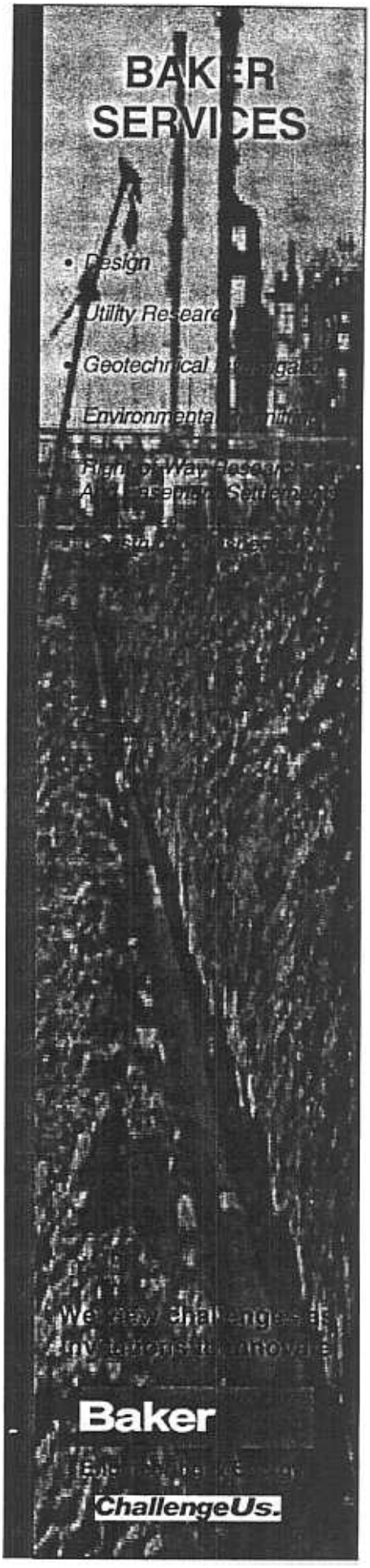
The site selection criteria used to evaluate potential sites included considering:

- Public and private rights-of-way
- Construction permitting
- Construction access
- Constructability
- Maintenance access
- Location of existing utilities
- Environmental constraints and permitting
- River traffic
- Security

This screening criteria and the field information Baker obtained, helped to characterize and profile the suitability of two key entry/exit landing sites, and to demonstrate to the client and regulatory agencies the viability of the boring operation.

A key component in successfully obtaining access to the landing sites was our ability to identify the numerous permitting agencies, and obtain the necessary approvals, in a timely fashion, to proceed. This major coordination effort was key to successfully satisfying the various agencies that the project was in regulatory compliance.

Following engineering design and construction specifications prepared by Baker, the bore was performed by a contractor.



Washington Gas & Electric

Field Design

Maryland

Project Description:

A new house, a new subdivision or a new business needs new gas service, and Washington Gas & Electric assigned two-man teams from Baker to field design the route.

The Challenge:

The package given to the Baker Teams would include the location of the new service, maps of the existing gas lines in the vicinity, size of the new service line to be placed, and owner contacts. The team communicated with the proper contact in order to schedule a meeting to find out where the entrance to the building was planned, and the date that the service was to be available. The existing system was verified and all other underground utilities that may affect the design and construction were identified. Existing maps and any other information that was needed to correctly design the project was gathered from the utility offices.

The package that was given back to Washington Gas & Electric included the existing system verification sketch, the sketch of the proposed new route, and distances with various types of topography that would be traversed. The packages also included the information for the traffic control measures that were required, the different types of construction, location of the placement of the meters, and any permitting required for construction.

After verification of the design and cost estimates tabulated by Washington Gas & Electric, the Baker Team was notified of the stakeout. The proposed alignment was then staked for construction.

Permitting Solutions:

The team visited the local, county, and state government offices to identify all permits required to be completed before the start of construction. Traffic control requirements were also collected.

Perryman Pipeline Project

Hartford County, Maryland

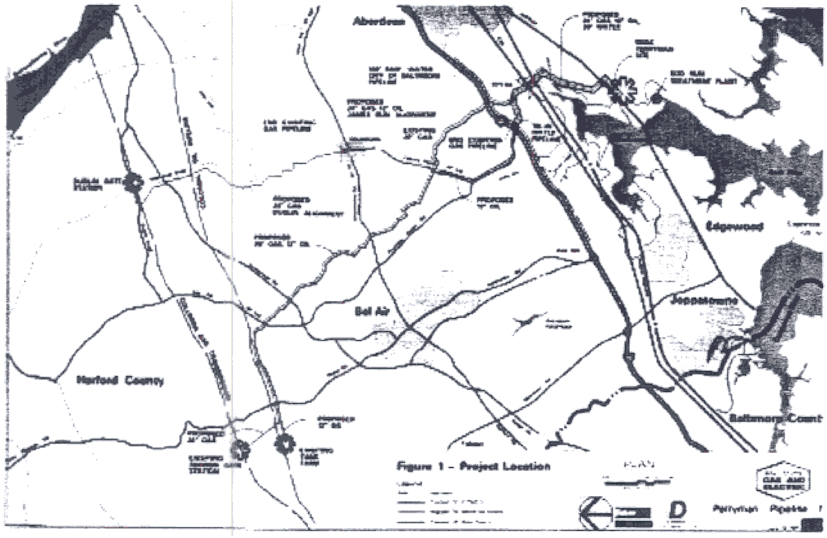
Project Description:

In early 1990 the BG&E Gas Supply Department was asked to provide fuel and water resources to the proposed Perryman Plant. It was determined that the gas, oil, and water pipelines would be laid simultaneously in portions of the same right-of-way, as follows: a 12-inch No. 2 fuel oil line; a 24-inch high-pressure natural gas line; and a 30-inch water line. Although the overall pipeline route was to be 19.7 miles long, the length of the combined pipelines total approximately 45 miles. The 30-inch raw water line, which originates at a terminal northwest of the Perryman Plant Site, parallels the gas and oil pipelines for approximately 4.5 miles.

The Challenge:

Global Positioning System Survey

- Aerial photography and topographic mapping
- Field surveys
- Route studies
- Courthouse research
- Easement plats and legal descriptions
- Environmental assessments
- Complete civil, mechanical, and electrical design
- Cathodic protection design
- Checking of shop drawings during construction
- Operations and maintenance plans



Pipeline Experience Overview

Baker has been involved with the engineering, permitting, right-of-way, and construction management of pipeline projects since the early 1940's. A partial listing below demonstrates some of Baker's experience.

Conoco

Analysis and upgrade of a natural gas distribution system. The system collected gas from wells in the Oklahoma City area and distributed it to local gas plants for processing. Baker provided all engineering and construction services responsible for bringing the approximately 410 miles of two DOT regulated natural gas gathering and transmission pipelines into compliance with the Code of Federal Regulations (CFR), Title 49, Parts 191 and 192 as administered by the Oklahoma Corporation Commission. Services included evaluation of existing records, preparation of design and construction procedures, permitting with applicable agencies, construction management and inspection, construction material procurement and disbursement, and preparation of final documentation records.

Conceptual design, route selection, alignment survey, right-of-way research and acquisition, alignment design, environmental permitting, construction inspection, and preparation of record drawings for 54 miles of 16- inch diameter steel pipeline running from Buchanan County, Virginia, through Pike County, Kentucky, to Mingo County, West Virginia. The project involved transporting coalbed methane from various sources along the route, and delivering it to a major distribution network.

Conceptual design, right-of-way acquisition, environmental assessment, permitting, aerial mapping, route selection, alignment surveys, design, and permitting for approximately 80 miles of a coal bed methane (CBM) collection pipeline. This gathering system included 150 CBM wells and 80 miles of 4 to 12-inch diameter steel and polyethylene low and high-pressure pipelines. Coalbed methane is being collected from Consolidation Coal Company's Buchanan Mine in Virginia. Construction phase services included right-of-way acquisition, construction inspection, and record drawings.

Provided engineering design, drafting, and CADD developed project plans for a 64 kilometer, 32.38 cm diameter pipeline in the Russian Republic. This elevated pipeline was constructed through a non-thaw stable discontinuous permafrost area, utilizing an expansion loop configuration. It was designed to carry warm crude oil from production facilities to another pipeline in the Russian Arctic. Specific services on this project included: geotechnical characterization and design modeling based on route specific soils data; prepared 92 plan and profile sheets for the length of the pipeline; prepared special plans for river, roadway, and reindeer crossings; provided construction surveys, quality control, and coordination with Russian survey parties working on this project.

Oxy USA, Inc.

Conceptual design, final design, right-of-way services, alignment surveying, route selection, permitting, photogrammetric mapping, environmental assessment, compressor design, mechanical design, electrical design, construction inspection, material yard management, construction management, and record documents for over 100 miles of a 1 to 12- inch diameter coal bed methane collection pipeline, interconnecting 300 wells, 28 compressor facilities, four electrical substations, and 60-miles of electrical distribution lines. Coalbed methane gas is being collected from Island Creek Coal Company Mines in Virginia.

Air Reduction Company

Design, plans, specifications, and surveys for a 70 mile, 20-inch diameter, high pressure, and gaseous oxygen pipeline running from Arroyo, West Virginia to Aliquippa, Pennsylvania.

Alaska Northwest Natural Gas Transportation Company

The joint venture of Baker and Gulf Interstate Engineering Company provided pipeline and civil engineering services on this pipeline system, running from Prudhoe Bay, AK to the Canadian border. The data gathering and design work for the 745 mile, 48-inch diameter pipeline was accomplished through offices in Houston, Texas and Fairbanks, Alaska. Baker provided survey and Geotechnical management, technical support for center line drilling, material site investigations, frost heave analysis, preparation of permit drawings for material disposal sites, and provided civil engineering design for the construction work pad, access roads, airports, pipeline and work pad bridges over major streams, and various temporary facilities.

Alyeska Pipeline Service Company

Provided pipeline design, surveys, and construction phase services for the 789 mile, 48-inch diameter, $8 billion Trans-Alaska Pipeline, stretching from Prudhoe Bay to the Port of Valdez. Project participation over a nine-year period also included feasibility studies, civil and structural engineering design of pump stations, and drainage studies for contingency plans, amounting to more than 3 million hours of engineering effort. Specific projects included: Mile-by-Mile Pipeline - Pipeline design, surveys, optimization and follow-up during pipeline construction; Design of Tanana River aerial pipeline suspension structure and 17 modular structures for aerial pipeline river and stream crossings; Design of pipeline supports for elevated pipeline; Special design with respect to fault zones, and animal and public road crossings; Yukon River to Prudhoe Bay Highway - Survey, design, construction phase services, and quality control inspection; Access Roads - Survey and design; Civil engineering design services (site plans, design of foundation and pipe supports, building plans, design of water supply and water disposal, technical specifications, etc.) for pump stations; Hydrologic and hydraulic engineering including rivers and floodplain pipeline design; Material Sites - Field reconnaissance and borings, analyses, reports, mining plans, and management of operations; Disposal Sites - Field reconnaissance, investigation reports, and site utilization plans.

Preliminary design of approximately 4,000 feet of the 48-inch diameter crude oil pipeline, which was being considered for retrofit from, buried to above-ground mode at Wilber Creek along the Trans-Alaska Pipeline. Baker's responsibilities included: supported Geotechnical and hydrologic engineering studies; identified route and developed pipeline layout; prepared design drawings for preliminary design; designed special construction details including workpad, access road crossings and tie-in details; determined specifications requirements and prepared procurement specifications for engineered materials; and prepare technical report.

ANR Pipeline Company

Provided right-of-way, field surveying, mapping, design and drafting services for a 380 mile, 30-inch diameter pipeline, running from Defiance, Ohio to Tamarac, Pennsylvania. Planimetric mapping was prepared at a scale of 1 inch to 400 feet for the route, which was used as a basis for the surveying. In compliance with the project schedule, the surveying for the entire pipeline route was completed in a 6-week period. This was accomplished with survey crews working 10-hour days, 7 days a week. The design drafting included the preparation of 75 alignment drawings at a scale of 1 inch to 1,000 feet and 196 special construction drawings. A staff of 35 drafting technicians was utilized to complete the drafting within a 5-month schedule.

Apollo Gas Company

Field surveys and permit preparation for two river crossings, and four railroad crossings of a 12-inch diameter gas pipeline in Armstrong County, Pennsylvania.

ARCO Chemical Company

Design and construction inspection of a 4-inch diameter nitrogen gas pipeline serving an existing major chemical processing plant for ARCO Chemical Company, located in Monaca, Pennsylvania. Services included selection of the final alignment, preparation of the construction drawings, supervision of the construction inspection, and preparation of the final record drawings.

Prepared a pipeline survey manual for field engineers to follow during the supervision of contract surveyors.

Baltimore Gas and Electric Company

Provided engineering services for 4 miles of 24-inch diameter high pressure gas pipeline running from Creswell to Emmorton, Maryland. The design involved Global Positioning Survey (GPS), aerial photography, topographic mapping, field surveys, route studies, courthouse research, easement plats and legal descriptions, environmental assessments, permitting, design, construction plans, and construction phase services.

Provided engineering services for 10 miles of 24-inch diameter high pressure gas pipeline between Notch Cliff and Joppatowne, Maryland. The design involved Global Positioning Survey (GPS), aerial photography, topographic mapping, field surveys, route studies, courthouse research, easement plats and legal descriptions, environmental assessments, permitting, design, construction plans, and construction phase services.

Prepared a wetland delineation report and a Section 404 Non-tidal wetland permit application for five wetland and stream crossings for 3,000 feet of 20-inch diameter pipeline, and 4.5 miles of an 8-inch diameter pipeline that provides natural gas service to Aberdeen Proving Grounds, MD. On this project, Baker provided coordination with the Maryland Historic Trust, the Maryland Natural Heritage Program, and the U.S. Fish and Wildlife Service.

Provided all preliminary and final design, surveying, right-of-way services, and construction management for 7.5 miles of 20-inch diameter natural gas pipeline, located on a new right-of-way north of Baltimore, Maryland. Baker provided all environmental services required to identify, delineate, and permit wetland impacts along the pipeline right-of-way. Project impacts were documented in an Environmental Assessment Package which included: the Environmental Review outlining the general procedures for pipeline construction right-of-way restoration and alternatives analyzed; a review of the environmental requirements of the state Non-tidal Wetland Regulations; a Section 404-Nontidal Wetlands Permit application identifying all permanent and temporary impacts to wetlands and streams; and the Wetland Delineation Report, documenting the hydrology, soils, and vegetation of each wetland or stream.

Provided project management services for 4.5 miles of 30-inch diameter waterline, 20 miles of 12-inch diameter oil pipeline, and 30 miles of 24-inch diameter, high pressure, natural gas pipeline to service a major expansion of the Perryman Power Plant in Perryman, Maryland. Ranging from surveys through construction, Baker's comprehensive project management services for this project included: Global Positioning Surveys (GPS); aerial photography and topographic mapping; field surveys; route studies; courthouse research; easement plats and legal descriptions; environmental assessments; complete civil, mechanical, and electrical design; cathodic protection design; checking of shop drawings during construction; operations and maintenance plans. The pipeline project was on Intergraph CADD platform and included a geographic information system (GIS). The GIS incorporated environmental and engineering constraints as database attachments to the CADD drawings.

Services provided by Baker on this project included a feasibility study, aerial photography, digital mapping, surveying, wetland identification and delineation, permitting, preparation of erosion and sedimentation control plans, archaeological investigation, and project management for an 8.5 mile, 24-inch diameter natural gas pipeline to be located within an existing powerline right-of-way.

Buckeye Pipeline Company

Investigated subsurface oil pollution along a leaking pipeline in Clarkson, Michigan. Monitored groundwater and determined direction of plume; developed a collection and treatment design plan.

Design, field surveys, and plans and specifications for relocation of a 7,000 foot, 10-inch diameter flammable products pipeline in Blair County, Pennsylvania.

Design of 12 miles of gasoline product pipeline in Pittsburgh, Pennsylvania.

Field surveys, aerial photography and photogrametric mapping, geologic field mapping, core borings, and test pits were performed in determination of remediation alternatives following a landslide and rupture of a 10-inch diameter petroleum pipeline in Armstrong County, Pennsylvania. Baker developed plans, and managed construction activities for stabilization of the landslide.

CNG Transmission Corporation

Performed transit (slope chain) surveys, condemnation surveys, expert witness appearances, prepared construction alignment plans, line lists, erosion control mapping, permitting plats (roads, streams, rivers, and railroads), DOT sheets (pipe classifications) and right-of-way plats for over 160 miles of pipeline routing combinations running throughout western Pennsylvania.

Carnegie Natural Gas Company

Design, route selection, surveys, and permit applications for a 15 mile, 16-inch diameter gas pipeline between Crown Point and Gary, Indiana including three river crossings and many railroad crossings.

In performing environmental engineering services for this pipeline project in Pittsburgh, PA, Baker completed a study to determine locations where hazardous pipeline residue may have contaminated the environment, and the nature and extent of such deposits. The technical approach developed to accomplish this objective included a file search and interviews with employees, waste characterization, site investigations involving some drilling and boring activities, and an organic vapor analysis.

Columbia Gas Transmission Company

Extensive survey & mapping experience for over 150 miles and approximately 50 various pipeline projects involving, surveys, condemnation plans, utility relocations, and related tasks due to major highway and airport construction projects, and maintenance work throughout West Virginia, Pennsylvania, New York, Ohio, Virginia, Kentucky and New Jersey.

Consolidated Gas Supply Corporation

Preparation of an environmental assessment report for a 34 mile gas pipeline between Colvin and Tonkin pumping stations in southwestern Pennsylvania. The report was prepared according to FERC regulatory requirements.

Mapping and feasibility study of a 190 mile pipeline running through the states of Virginia, Maryland, and Pennsylvania.

Design, specifications, route relocation surveys, and mapping for a 240 mile, 36 and 40-inch diameter, high pressure gas pipeline between Lebanon, Ohio and Koppel, Pennsylvania.

EICON, Inc.

In performing environmental engineering services for this pipeline project, Baker located potential voids at gas pipeline crossings beneath various Connecticut state roads and interstate highways. The voids occurred due to pipe jacking operations of a pipeline running through the southwest part of the state. Performed a geophysical survey to guide remediation of the voids via grouting or excavation and backfilling.

Exxon, U.S.A

Provided engineering services and Geotechnical investigations concerning borrow materials at Point Tompson, Alaska.

Hess Oil and Chemical Company

Designed, prepared plans and specifications, conducted location surveys, staked of right-of-way, designed fuel storage tanks, and provided construction phase engineering services for a 75 mile oil pipeline between Smithdale and Lumberton, Mississippi.

Hope Gas Company

Approximately 50 miles of miscellaneous pipeline projects involving detailed surveying and mapping throughout West Virginia.

Interstate Oil Pipeline Company

Route location surveys, profiles of stream, highway, railroad, and levee crossings, terrain reconnaissance, and mapping for a 104 mile pipeline between LaRose and Belle Rose, Louisiana, and Sunset to Anchorage, Louisiana.

Iroquois Gas Corporation

Location surveys, and staking of right-of-way for a 90 mile, 24-inch diameter natural gas pipeline running from Alma to Lancaster, New York.

Kiantone Pipeline Corporation

Engineering design of an intermediate booster station to increase capacity for an oil pipeline running from West Seneca to Warren, Pennsylvania.

Knauf Fiberglass Company

Pipeline design, route selection, surveys, and permitting for a 4 mile gas pipeline including two river crossings and three railroad crossings in Shelbyville, Indiana.

Mississippi Valley Gas Company

Route location studies and right-of-way investigations for a 100 mile, 18-inch diameter pipeline running from West Point to Greenwood, Mississippi.

Provided engineering services concerning the planning, design, and construction of a 6 mile, 8-inch diameter pipeline running from West Point, Mississippi to the R.L. Burns Pipeline.

Provided engineering services in connection with the planning, design, and construction of a 6 mile, 8-inch diameter pipeline connecting the Splunge Gas Field to the Armory Storage Field.

Mobil Pipeline Company

Provided engineering services in connection with the planning, design, and construction of an 8 mile, 18-inch diameter pipeline running from a Mississippi Valley South Pump Station to a Texas Gas Transmission Corporation Pipeline.

New York State Electric & Gas

Approximately 6 miles of various pipeline projects involving utility relocations, surveys, and right-of-way acquisition plans due to major highway and airport construction projects throughout Pennsylvania.

Provided aerial photography, topographic mapping, and GPS surveys for a 500 mile gas distribution pipeline system located in Tompkins County, New York.
Aerial photography, mapping, and surveys at various locations for a 45 mile existing pipeline system and extensions, running from the Ohio State Line to Greensburg, Pennsylvania.

Pennzoil Company

Design, surveys, preliminary engineering studies, and cost estimating to determine the size of an 8-inchdiameter crude oil pipeline and pumping stations, running from Rouseville to Midland, Pennsylvania.

Peoples Natural Gas Company

Approximately 6 miles of pipeline relocation and construction projects due to highway and airport construction projects in Pennsylvania. Services provided by Baker included pipeline design, surveying, layout, construction monitoring, and preparation of as-built record plans.

Aerial photography, field surveys, and mapping at various locations of an existing system and extensions running for 600 miles through the states of Pennsylvania and New York.

Environmental sampling and contamination assessments were performed at a natural gas pipeline transfer facility. The assessment was performed as part of a statewide (PA) investigation of the natural gas industry's handling and disposal of pipeline liquids. The assessment revealed elevated concentrations of polychlorinated biphenyl compounds (PCBs) in shallow soil samples collected within a metering regulating building and near an outdoor pipeline leak. Baker developed draft and final remediation work plans for regulatory agency review. The final work plan included the following tasks: pre-cleanup sampling; soil excavation and off-site disposal at a landfill licensed to receive toxic substances; post-cleanup confirmatory sampling; remediation report preparation. The remediation was performed in accordance with the work plan. Statistically based three-dimensional grids were established for collection pre- and post-cleanup samples.

Shell Oil Company

Engineering design services for the Thomasville high pressure gas and sulfur production facilities, located in Rankin and Simpson Counties, Mississippi, included structural design of pipe and vessel supports, tank foundations, stack anchors, well drilling pads, and pipeline anchors.

Field surveys in connection with the construction of a 429-mile pipeline running from Poplar, Montana to Fort Laramie, Wyoming.

Sun Pipeline Company

Prepared a report containing alternative solutions to relocate a 10-inch diameter petroleum product pipeline subjected to landslides in Rochester, Pennsylvania. Various cost estimates were prepared supporting the relocation recommendation.

Professional engineering services for a 190 mile oil pipeline running from Fox Chapel, Pennsylvania to Hudson, Ohio.

Tennessee Gas Company

Performed geophysical engineering services for a gas transmission line that had previously been jacked beneath the Massachusetts Turnpike and along a railroad embankment. The project required ground penetrating radar profiling to delineate zones of suspected voiding within the sub-base and embankment materials.

Provided engineering services for planning, design, and construction of a 4 mile, 4.5-inch diameter pipeline running from Rye Dobbs Well No. 20-1 to a Tennessee Gas Compressor Station in Jackson, MS. The project was designed, constructed, and put into service in one month.

Texaco Incorporated

Topographic survey, design, and resident inspection of a 10-inch diameter pipeline from a Buckeye Pipeline, Coraopolis terminal, to the Texaco Inc. Pittsburgh terminal.

Texas Pipeline Company

Field surveys for alignment and profile, preparation of maps, plans, crossing permits, and terrain reconnaissance for a 162 mile pipeline running from Hearne to San Marcos, Texas.

Field surveys for alignment of pipeline route for construction, preparation of alignment plans, property ownership maps, aerial mosaics and profiles, and terrain reconnaissance for a 327 mile pipeline between Jal, New Mexico and Cushing, Oklahoma.

Tioga Pipeline Company

Route selection, alignment survey, alignment design, permitting, construction inspection, and preparation of record drawings for a 12-inch diameter, 10,000 linear foot steel pipeline that provides aviation fuel to Pittsburgh International Airport.

Union Carbide Corporation

Designed, provided construction specifications, performed location surveys, and mapping of a 13 mile pipeline located near Ashtabula, Ohio.

Provided professional engineering services for an oxygen pipeline serving the Republic Steel Corporation in Youngstown, Ohio.

United States Air Force Reserve

As part of an open-end agreement, Baker designed an upgraded gas distribution system for the 911th Tactical Airlift Group located at Pittsburgh International Airport. The old system was leaking and had inadequate gas pressure. Baker began by researching the existing system records and performing a site survey to determine the location and size of the pipeline. The optimal solution called for sliding 1.5 to 6-inch diameter plastic pipe into the existing metal pipeline. Baker drafted the plans, completed the construction specifications, and estimates for this work, including: Site Condition Survey - location and inspection of gas valve boxes; verification of the location of existing gas lines; measurement and inspection of existing regulator station. Pipeline Design - determination of the correct pressure for regulator stations, and adjustments to the main regulator; specifications for a new regulator station for each building; Recommendations for repairs; design of identified repairs; checking of shop drawings during construction.

United States Marine Corps

In performing environmental engineering services for this pipeline project, at Camp Lejeune, Baker conducted a site assessment investigation for the military base's aircraft refueling area. The study was performed to address concerns of possible leakage of the refueling system, which included a 6-inch diameter pipeline, numerous underground storage tanks, and all associated piping. Assessment activities included reviewing background information, soil and groundwater sampling for analysis, installation of ten penetrometers, and installation of several groundwater monitoring wells.

United States Navy – LANTDIV

In performing environmental engineering services for this pipeline project at the Norfolk Navel Base, Baker conducted a site characterization of an abandoned 8 and 12-inch diameter pipeline running from an above ground fuel filter area. The investigation revealed the presence of absorbed phase (soil) and dissolved phase petroleum hydrocarbons. Free phase (floating) product was not detected. Recommendation involved: remediation of the soils (passive) to remove the source. Passive remediation was recommended as well, due to limited area of contamination, lack of detectable levels of driver compounds, absence of pathways for human exposure, and the relative stability of the contaminant plume.

Washington Gas Light Company

Provided planning, surveys, records research, CADD conversion, plan preparation, and drafting and designing of transmission/distribution gas main extensions for an open-end contract with the gas company. Baker provided some or all of these services on more than 300 projects involving over 800,000 feet of pipeline.

Provided planning, design, surveying, permitting, land acquisition, and construction phase services for a pipeline running through southern Maryland, along U.S. Route 301. The work involved 5,000 feet of 12-inch diameter wrapped steel transmission pipeline inside a highway right-of-way.

Performed a planning study involving location, right-of-way easement acquisition, Geotechnical and construction costs estimates for proposed 129-mile long, 24-inch diameter transmission main running from northern Virginia to east of Richmond, Virginia.

Over a three-year period, Baker provided field services involving new pipeline extensions and construction stakeout with one to three field survey crews reporting on a daily basis to Washington Gas Light Company for their work assignments.

Provided planning, design, surveying, permitting, land acquisition, and construction phase services for these transmission and distribution pipelines. The work involved 25,000 feet of 8 and 12-inch diameter wrapped steel mains crossing country and rural state roads. The project included two pressure-regulator stations, 350 to 100 psi, in Frederick, Maryland.

Yukon Pacific Corporation

Provided planning, design, surveying, permitting, land acquisition, and construction phase services for 40,000 feet of 4 to 12 inch diameter plastic and steel distribution mains at the Air Force Base. The design required extensive effort in the relocation of existing utilities for routing the gas pipelines.

Provided planning, design, surveying, permitting, land acquisition, and construction phase services for these transmission pipelines. The work involved 20,000 feet of 8 and 12-inch diameter wrapped steel mains and one pressure-reducing station in Frederick, Maryland.

Provided preliminary engineering for this natural gas pipeline system, Trans-Alaska Gas System (TAGS). The system will transport up to 2.3 billion cubic feet per day of natural gas through a 796.5 mile-long buried pipeline running from North Slope to Tidewater Alaska. Specific assignments included: developed original engineering design and analysis tools and methodology for the analysis of damage potential to the pipeline from operating hazards, especially Geotechnical hazards of frost heave, and thaw settlement; developed a risk assessment methodology and associated tools for the pipeline; direct design and subcontractor activity for aerial crossings, above-ground pipeline design, pipeline material testing, and evaluation of pipeline design limits; assisted in the development of field and test programs for frost heave evaluation; integrated new tools and methodology into the project design criteria, project schedules, cost preparations, and response to regulatory requests; aided the preparation of the report and presenting the findings of the proposed design of the LNG terminal facilities in Valdez to the Federal Energy Regulatory Commission. This formal filing including seismic, meteorological, environmental, and structural concerns for the site in a sensitive location.

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Attachment D

John N. Zagorski II

Engineering/Operations Manager

Years with Baker: 19
Years with Other Firms: 5

Education
The Pennsylvania State University
A.S., Mechanical Engineering, 1975

University of Pittsburgh
Coursework, Civil Engineering

Robert Morris College
Coursework, Business Management

General Qualifications

Mr. Zagorski serves as engineering/operations manager of the Telecommunications/ Pipelines Department of the Michael Baker Corporation. His responsibilities within the department include, but are not limited to department management; preparing proposals, participating in presentations, developing project budgets and schedules, assigning responsibilities to project members, monitoring project quality assurance and control, providing technical guidance to project members, and maintaining close contact with clients.

Mr. Zagorski's professional experience covers a wide range of general civil engineering projects. Experience includes; pipeline design, long haul lightwave cable design, environmental permitting, digital conversion of existing coaxial cable systems, design and permitting of telecommunication regeneration and central office facility sites, design of water supply systems, waste disposal facilities, dams and impoundments, highway and bridge design, drainage and channel studies, and development and use of Baker's Interactive Graphic Design system.

Experience

Pipelines

C & L Processors DOT Pipeline, Oklahoma City, Oklahoma. *Conoco, Inc.* Senior Project Manager. Managed engineering and construction services to bring approximately 410 miles of two U.S. Department of Transportation-regulated natural gas gathering and transmission pipelines into compliance with the Code of Federal Regulations (CFR), Title 49, Parts 191 and 192 as administered by the Oklahoma Corporation Commission. Project responsibilities included: evaluating existing records, preparing design and construction procedures, permitting with applicable agencies, performing construction management and inspection, procuring and disbursing construction material, and preparing final documentation records.

Cardinal States Gathering Line, Virginia, Kentucky, and West Virginia. *Conoco, Inc.* Project Manager. Managed engineering evaluation of alternate routes, final alignment selection, preparation of construction and erosion control drawings, field engineering, alignment surveys and geotechnical and environmental studies for a pipeline consisting of 54 miles of 12- and 16-inch-diameter steel pipeline running from Buchanan County, Virginia through Pike County, Kentucky to Mingo County, West Virginia. Also managed state and county highway crossings permitting and right-of-way easements across 200 parcels involving individuals, corporations, and heirships. The project involved gathering coalbed methane from various sources along the route and delivering it to a major distribution network.

Pocahontas Collection System Design and Engineering, Virginia. *Conoco, Inc.* Project Manager. Managed selection of final alignment, preparation of construction and erosion control drawings, environmental studies, permitting for state and county highway crossings, and construction surveys for approximately 80 miles of a coal bed methane collection pipeline running through the hills. This gathering system includes 150 CBM wells and 80 miles of 4- to 12-inch diameter steel and polyethylene low and high pressure pipelines.

Aviation Fuel Pipeline Design and Engineering, Pittsburgh International Airport, Pittsburgh, Pennsylvania. *Tioga Pipeline Company.* Project Manager. Managed design, permitting and construction inspection of a 12-inch diameter steel pipeline providing aviation fuel for midfield terminal at Pittsburgh International Airport. Also managed selection of final alignment, preparation of construction drawings, permitting for state highway crossings, supervision of construction inspection and preparation of final record drawings.

Gas Pipeline Design, Pennsylvania. *ARCO Chemical Company.* Project Manager. Managed design and construction inspection of a 4-inch diameter nitrogen gas pipeline serving an existing major chemical processing plant. Project responsibilities included: selection of final alignment, preparation of construction drawings, supervision of construction inspection and preparation of final record drawings.

Jet Fuel Pipeline Design, Wilmington, Ohio. *Airborne Express.* Project Manager. Proposed 25 miles of jet fuel pipeline Responsible for tax maps; property owner lists; field reviewing of proposed road crossing; and preparing permit applications from State DOT and County Engineers for stream and road crossings. Prepared preliminary design drawings showing the proposed alignment, property lines, streams and wetlands, road crossings and directional bores.

Natural Gas Pipeline Design, Southwest Virginia. *Virginia Gas Company.* Project Manager. Proposed network of approximately 150 miles of pipeline to provide natural gas service and storage to several communities between Abingdon and Roanoke, Virginia. Project consisted of the conceptual design of pipeline sizing and mechanical analysis, route alignment studies, environmental assessments, cultural resource identification, geotechnical evaluations, right-of-way easement investigations, highway and railroad permitting assessments, and construction costs estimates and schedules.

Coalbed Methane Gas Gathering System Feasibility Investigation, West Virginia. *U.S. Steel Mining Company, Inc.* Project Manager. Investigated the feasibility of constructing a coalbed methane (CBM) gas gathering system that would transport the gas to an existing thermal dryer at the No. 50 Mine operations located in Pineville, West Virginia. The report consisted of the evaluation and summation of the following issues: fuel specifications of the dryer; quality and quantity of available CBM gas; conceptual design of a gathering system; and potential economic benefits available from the development of a gathering system.

Computer Expertise

Hardware: PC
Software: Word, Excel, PowerPoint, MS Project, Lotus

Specialized Experience

Seminars

Leadership Effectiveness and Development Training Program, February, 1998

Conference on Natural Gas Use, The U.S. Department of Energy, February, 1994

North American Coalbed Methane Conference, West Virginia University, 1993, 1994, 1995

International Coalbed Methane Symposium, University of Alabama, May, 1993

Total Quality Management Training Program, September, 1991

The Business of Design Consulting, American Consulting Engineers Council, October, 1989

Professional Affiliations

Project Management Institute
Telecommunications Management Association

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Kenneth F. Havasi, R.L.S.
Project Manager

Years with Baker: 32
Years with Other Firms: 6

Education
Michigan Technological University

Ferris State University

International Correspondence Schools

Robert Morris College

Registrations
Registered Land Surveyor
Pennsylvania, 1973, 19341

General Qualifications

Since joining Baker in 1970, Mr. Havasi has served as a project manager, assistant project manager, project engineer, field engineer, senior designer and supervisor of surveying on projects for transmission lines, pipelines, waterlines, sewerlines, railroads, photogrammetric control, and highway locations, as well as hydrographic and cadastral surveys. He has also served in various levels of expertise in the telecommunications, construction management, and pipeline fields.

Experience

Pipelines

Oakwood Gathering System, Richlands, Virginia. *OXY USA, Inc.* Assistant Project Manager. Managed all engineering activities on this 100-plus-mile, one to twelve inch diameter, coalbed methane gas collection pipeline interconnecting more than 300 wells, 28 compressor stations, four electrical substations, and 60 miles of electrical distribution lines. Engineering services included conceptual design, mechanical and electrical design, final design, route selection, alignment surveying, right-of-way services, photogrammetric mapping, permitting, environmental assessment, record drawings, preparation of construction specifications, construction surveys, and construction inspection. Specific project engineering responsibilities included prequalifying contractors, assembling bid packages, permit tracking, advertising for and obtaining bids, negotiating contracts, monitoring and reporting work progress, day-to-day interfacing with contractors, preparing scope changes, providing inspection services of contractors work, managing material yard, and verifying contractor invoices.

Cardinal States Gathering Line Gas Pipeline Design, Virginia, Kentucky and West Virginia. *Conoco, Inc.* Senior Designer. Designed a 54-mile, 12- and 16-inch diameter coalbed methane gas collection and distribution pipeline, running from Virginia, through Kentucky, to West Virginia. Engineering services included conceptual design, route selection, alignment survey, right-of-way research and acquisition, alignment design, environmental permitting, preparation of record drawings, and construction inspection.

Pipeline Rerouting, Pennsylvania. *Various Pipeline Companies.* Field Engineer. Responsible for route selection, scheduling surveys, construction inspection, and record documentation of pipeline reroutes for various companies, including Buckeye, Getty, Sun Oil, ANR, and Columbia.

Pipeline Feasibility Studies Design, Virginia and Ohio. *Virginia Gas and Airborne Express Companies.* Senior Designer. Designer for preparation of feasibility studies for 200 miles of pipeline routes in Virginia and 30 miles in Ohio. Responsibilities included gathering existing tax maps to current

ownership; preparing preliminary route maps with proposed alignments, property lines, existing utility lines, permitting indexes; and preparing preliminary cost estimates.

Specialized Experience

Training

Civil Engineering courses, Michigan Technical University, 1964-1965
Civil Engineering courses, Ferris State University, 1966
Business Administration courses, Robert Morris College, 1990-1993
Survey and Mapping, International Correspondence Schools, 1972
Business Administration, International Correspondence Schools, 1995-Present
All computations for first, second and third order surveys

Instrument Proficiency

EDM equipment
Theodolites
Levels

Foreign Experience

Greenland - Cold Storage Building Site Survey, 1969
Thailand - x,y,z Coordinates Surveys at Air Bases for Navigation Aids, 1968
Vietnam - x,y,z Coordinates Surveys at Air Bases for Navigation Aids, 1968, 1969
Germany - Site Surveys at Various Air Bases

Professional Affiliations

American Congress of Surveying and Mapping
American Society of Photogrammetry

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Roland Belay, P.E.
Project Manager

Years with Baker: 8
Years with Other Firms: 18

Education
M.S., 1986, Transportation Engineering, Polytechnic Institute of Brooklyn

M.B.A., 1980, Business Administration, New York University

B.E., 1977, Civil Engineering, Cooper Union

Registration
- Professional Engineer, Connecticut, 1981, 14984
- Professional Engineer, New Jersey, 1981, GE36026
- Professional Engineer, New York, 1980, 0594051

General Qualifications

Mr. Belay is a Professional Engineer whose expertise includes project management and design of major public work projects. He is currently serving as a Manager in Baker's Highway Design Group. As project manager, he has extensive experience in the planning, design and management of highway projects for New York State Department of Transportation, the Port Authority of New York and New Jersey, New York City Department of Environmental Protection, Triborough Bridge and Tunnel Authority, U.S. Army Corps of Engineers, and other agencies.

Experience

Utility Projects

- **Hudson River Bore Project, Manhattan, NY.** *Metro Media Fiber Network.* Deputy Project Manager. Responsible for project coordination, designing MPT schemes, utility coordination, Battery Park City Authority presentation, and roadway design for constructing a 5,600 foot long directional bore housing fiber optics, from Battery Park City under the Hudson River, to Jersey City. 11/99-11/00

- **Gas Pipeline through Westchester County, NY.** *Millennium Pipeline Company, LP.* Manager. Responsible for coordination, site planning, constructibility, MPT schemes, developing preliminary plans for routing a 24inch gas pipeline through Westchester County. Assisted in preparing permits for Federal Energy Regulatory Commission, and coordination with local agencies, government officials and NYSDOT. 6/00-1/01

- **1999/2000 Biennial Inspection & Interim Bridge Inspection in New York County.** *NYSDOT Region 11.* Project Manager. Managed the biennial, special and interim inspections of all 210 bridges in New York County, which encompasses 2,810 spans. Inspection schedules were prepared weekly for 5 teams, including equipment rentals, lane closures and agency coordination.

  Route 23A Bridge Over Kiskatom Brook, Catskill, New York. *NYSDOT Region 1.* Project Manager. Baker provided Preliminary and Final Design Services (Phases I-IV) for the construction of the Route 23A bridge over Kiskatom Brook and 650m of roadway rehabilitation. Route 23A, near Route 32 is a rural two lane road, with mostly farmland and some residential development. This project was designed in metric units and includes ground and ROW survey and mapping, preliminary studies of alternatives, development of design alternatives with various horizontal and vertical geometric improvement, accident analysis, capacity analysis, MPT staging alternates, drainage, road widening. addition of shoulders, guiderail and signing, removal and relocation of utility poles and other clear zone improvements, evaluation of cost, social, economic and environmental

factors including archeological and cultural investigations, wetlands, storm water management, ground water analysis, hazardous materials assessment, asbestos assessment, preparation of Design Reports and Environmental Assessment, including access management and public participation activities, PS&E, and construction support services. This project also included the preliminary and final highway and bridge design for the replacement of a box culvert which carries Route 23A over an unnamed stream. 4/97 8/00

- **Triborough Bridge Inspection and Deck Repair, Bronx, New York.** *Triborough Bridge and Tunnel Authority.* Principal Engineer. Developed and designed maintenance and protection of traffic schemes for the repair/replacement of the roadway decks for 3000 feet on this suspension bridge, which carries over 150,000 vehicles daily. Also was responsible for signage, pavement markings and drainage. 2/95 - 1/00

- **Manhattan Bridge Rehabilitation Construction Support Services, Jay and Sand Street, New York, New York.** *New York City Department of Transportation.* Engineer. Responsible for Maintenance and Protection of Traffic. Developed final roadway plans for lowering roadway elevations to accommodate truck traffic traveling under the structure. Plans included utility relocations, signing and striping, barrier design, traffic monitoring and forecasting. 8/97 - 9/00

- **Reconstruction of 12 Catskill System Bridges, Various Locations, New York.** *New York City Department of Environmental Protection.* Principal Engineer. Developed and designed maintenance and protection of traffic schemes for the replacement of 12 bridges over New York City Watershed/Reservoirs. Responsibilities also included traffic analysis, roadway design and drainage. 2/95 - 4/99

- **South Conduit Avenue Bridge Replacement, Queens, New York.** *New York State Department of Transportation (Region 11).* Project Manager. Performed final design and construction support services for the replacement of an existing bridge with a multiple-span, curved-steel girder bridge and improving a major interchange. The roadway configuration associated with the bridge, which carries traffic over the Shore Parkway, interfaced with the Nassau Expressway project. 1985 - 1986

Highway Engineering

- **Reconstruction of Route 23A, Catskill, New York.** *New York State Department of Transportation (Region 1).* Project Manager. Managed design services (Phases I-IV) for the reconstruction of 1.6 km of Route 23A. Responsible for the project which included the realignment of the intersection of Route 23A with Route 32A, Services included ground survey, development of base mapping survey to develop Digital Terrain Model, right-of-way survey and mapping, preliminary studies of alternatives, development of design alternatives with various horizontal and vertical geometric improvement, MPT staging alternates, signalization, traffic survey, parking alternative study, assess drainage conditions for closed and open systems, evaluation of cost, social, economic, and environmental

factors including air and noise analysis, wetland mitigation, parks, tree inventory, stormwater management, ground water analysis, hazardous materials assessment, asbestos assessment, cultural and a visual impact assessment; Phase I and II archaeological investigation; preparation of Design Reports and Environmental Assessment, including access management and public participation activities, and technical support for informational meeting and public hearing. 4/97 - 8/00

- **Route 9A Reconstruction, Manhattan, New York.** *New York State Department of Transportation (Region 11).* Project Coordinator. Coordinated and administered more than 30 subconsultants in preparation of an Environmental Impact Statement (EIS) for reconstruction of five miles of New York State's arterial West Side Highway. Prepared contracts, supplemental agreements, specifications, estimates, CPM project schedules and budgets on this $35 million fee project. Project tracked more than 3,000 activities with more than 5,000 dependent variables. Updated items on a continuing basis and issued monthly reports to subconsultants for review and comments. Responsibilities also included technical coordination of studies including traffic accident analysis, air quality, noise, archaeological, (4f), signing, striping, estimates, cost benefit analysis, origin and destination data collection for incoming and outgoing New York City traffic, and roadway design. Developed traffic model for all of Manhattan below 72nd Street. Monitored air quality and noise studies for west side of Manhattan and developed forecast models. Maintained a separate project office with staff of ten. Project included continuous community and public agency presentations to respond to various concerns, and often required development of additional studies. Maintained mailing list of 2,400 names and an EIS distribution list of 400 agencies. EIS distribution included bidding 3,000 pages of reports, coordinating printers, packaging, delivery in accordance with legal requirements and subsequent monitoring of comments and their appropriate responses. This process was typical for each of the 100 additional minor studies performed. 2/88 - 1/95

Nassau Expressway Section "A", Queens, New York. *New York State Department of Transportation (Region 11).* Project Manager. Managed preparation of construction plans and subsequent construction support services for construction of a new three-lane expressway between Cross Bay Boulevard and J.F. Kennedy International Airport; a multispan bridge over Belt Parkway; and rehabilitation of roadways, ramps, and local airport and city streets. Project included development of conceptual design, preliminary and final drawings, and detailed design work for all phases of a highway project including alignment, maintenance and protection of traffic, construction phasing, roadway, structural, signing, pavement markings, drainage, lighting, utilities, traffic signal systems, intersection design, accident analysis and traffic survey. Work also included development of Port Authority signing system that involved developing standard Port Authority and matrix signs. Managed preparation of documents and reports,

scheduling, estimating, and continuous community participation. 8/85 - 10/87

- **Nassau Expressway, Stages I, II and V, Queens, New York.** *New York State Department of Transportation (Region 11).* Principal Engineer. Performed quality assurance and quality control and conceptual and final roadway design. Inspected and designed signing, overhead structures and pavement markings. Prepared plans for construction phasing, and maintenance and protection of traffic; and developed designs for traffic signals and intersections, roadway items, drainage utilities, and lighting design. Performed traffic survey, estimates and a computerized noise level study. Made frequent presentations to the state and city departments of transportation, Port Authority of New York and New Jersey and community boards. 2/83 - 8/86

- **Brooklyn-Queens Expressway Rehabilitation Design, Queens, New York.** *New York State Department of Transportation (Region 11).* Project Manager. Managed civil engineering design and construction support services for rehabilitation of three miles of viaduct including more than 60 spans, approach roadways and related interchanges of the Brooklyn-Queens Expressway at Laurel Hill Boulevard and the Long Island Expressway, between the Kosciuszko Bridge and Queens Boulevard. Work included preparing preliminary and final civil drawings, documents and reports, estimating, detailed design of roadway items, maintenance and protection of traffic, drainage, lighting, utilities, traffic signal and intersection design, signing and pavement markings. 8/86 - 9/89

- **Rehabilitation of Route 81, Greene County, New York.** *New York State Department of Transportation (Region 1).* Manager. Managed preparation of preliminary plans and design report for an Environmental Assessment, final plans specifications and estimate; coordination with NYSDOT, local officials and subconsultants; and scheduling for rehabilitation of 6.3 km of Route 81. Project design involved geometric modifications, traffic studies, pavement, sidewalks, guide rail and signing, drainage, maintenance and protection of traffic, utilities, right-of-way, archaeological and hazardous materials investigation and wetland mitigation. 2/95 - 9/96

- **Reconstruction of Route 55 from Burnett Boulevard to Noxon Road, Dutchess County, New York.** *New York State Department of Transportation (Region 8).* Construction Project Manager. Responsible for $22.8 million project. Work consisted of railroad bridge demolition; two bridge constructions; roadway widening to six lanes, new and rehabilitated roadway; concrete median, turning lanes, relocating offset intersections, drainage, utilities and sign relocations; landscaping, wetland relocation and extensive maintenance and protection of traffic. 1995 - 1997

- **Planning Aid Report, City of Glen Cove, New York.** *U.S. Army Corps of Engineers.* Project Engineer. Involved in developing conceptual plans for providing improved roadway access and restoration of a pond as part of a waterfront development plan. Included were geometric road improvements, bridge construction, traffic engineering, right-of-way taking, bicycle and pedestrian access, visual aesthetics, cultural resources, cost evaluation and

presentations to concerned groups, including mayor Tom Suozzi 10/96 - 7/97

- **Coney Island Pollution Project, Brooklyn, New York.** *New York City Department of Environmental Protection.* Project Manager. Designed the rehabilitation of Voorhies Avenue, adjoining the plant facilities, from Knapp Street to Coyle Street. Construction drawings included maintenance and protection of traffic, roadway items, and pavement markings. 1996

- **Long Island Expressway, Exits 43-46, Nassau County, New York.** *New York State Department of Transportation (Region 10).* Principal Engineer. Designed signage and pavement markings for the widening of the expressway to accommodate HOV lanes, rehabilitation of service roads, crossing roads, interchanges and intersections. 1994

- **JFK International Airport External Roadway Capacity Study, Queens, New York.** *Port Authority of New York and New Jersey.* Project Manager. Managed an extensive traffic survey, data collection and analysis for the Port Authority of all external roadways to JFK Airport. The two week effort encompassed Cross Bay Boulevard, Belt Parkway, Van Wyck Expressway, Nassau Expressway, North and South Conduit Avenues and all interchanges and local cross streets. Responsible for the coordination of three firms, 200 personnel and the development of a network identifying all traffic movements within the area. 1985

- **White Mills Road, White Mills, New York.** *New York State Department of Transportation (Region 1).* Project Manager. Responsible for final design of a single-span, steel bridge, as well as the alignment, grading, drainage, signing, maintenance and protection of traffic, specifications, estimates and design report for this roadway reconstruction project. 1984

- **Rehabilitation of FDR Drive Promenade, New York City, New York.** *New York State Department of Transportation (Region 11).* Technical Advisor/QA/QC. Performed advisory and quality control responsibilities for the preliminary design (Phases I-IV) for rehabilitating the promenade structure from 81st to 90th Streets and the construction of a pedestrian bridge. Project includes inspection, survey + mapping, ROW, drainage improvements, utility relocation, maintenance and protection of traffic, pedestrian survey, tree inventory and community involvement leading to a Design Report and Environmental Assessment. 11/97 - 12/00

- **Reconstruction of Everett Road, Albany County, New York.** *New York State Department of Transportation (Region 1).* Technical Advisor/QA/QC. Performed advisory and quality control responsibilities for the preliminary and final design (Phases I-VI) for the reconstruction of 2.1 km of Everett Road from Exchange Street to Albany Shaker Road. project includes adding turning and travel lanes, realignment of intersections, horizontal and vertical realignments, right-of-way mapping, drainage improvements, wetland mitigation, utility relocation, maintenance and protection of traffic, accident analysis, capacity analysis, signal design, air and noise analysis, preparation of an environmental assessment, and community participation activities. 6/98 - Present

- **Reconstruction of Palisades Interstate Parkway (PIP), Stage I, Orangetown and Clarkstown, Rockland County, New York.** *New York State Department of Transportation (Region 8).* Engineer. Provided technical support and QA/QC for the reconstruction of PIP at the New York State Thruway interchange. Three bridges were replaced, 28 rehabilitated and the clover-leaf interchange realigned. Work included roadway widening, added shoulders, improvement to vertical and horizontal alignments, realigning ramps, acceleration and deceleration lanes, revised grading and drainage, signing, striping and maintenace and protection of traffic. 7/98 - 11/98

- **Upgrade of Five Rail Station, Shore Line East Commuter Railroad, Brandford, Westbrook, Guilford, Madison and Clinton Connecticut.** *Connecticut Department of Transportation.* Technical Manager/QA/QC Responsible for site work design at two new stations and site work improvements a three additional Shore Line East Railroad Stations. Site work design includes grading, drainage, pavement design, curbing, sidewalks and layout of parking spaces, all conforming with ADA Accessibility Guidelines. 7/99-1/02

- **Traffic Demand Management.** *New York State Department of Transportation.* Project Manager for open end agreement. Assignment 1-performed Park & Ride Study for 16 sites in Westchester County 2001. Assignment 2-performed Park & Ride Study for 14 sites in Putnam/Rockland Counties 2001-2002. Assignment 3 - performed Travel Time Speed Runs for 4 major arterial corridors in NYC. 2002

Previous Work Experience

In a previous association, Mr. Belay managed for a private utility the design of several power plant related structures such as transmission towers, smoke stacks, scrubbers, coal yard materials handling, coal dock facilities, waste management and nuclear waste storage facilities. His assignments included preparing estimates and economic evaluations of structural designs, reviewing design drawings, coordinating fabrication and erection schedules with other phases of work and disciplines, preparing technical specifications and bid documents, evaluating bids and awarding work, preparing contract documents, administrating contracts to completion, maintaining interface with other engineering disciplines and construction personnel to solve structural problems, and negotiating claims.

Foreign Experience

Family in Germany, Austria and Switzerland

Foreign Languages

German: Speak, Read, Write

Professional Affiliations

American Society of Civil Engineers
New York Association of Consulting Engineers

Michael Baker Jr., Inc.
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David W. LaPearle, PLS

Manager of Survey Department

Years with Baker: 13
Years with Other Firms: 17

Education
Butler County Community College, Associates Degree 1971 - Engineering Technology

PA Society of Land Surveyors, Point Park College and Penn State University - Various Continuing Education Courses

Michael Baker Corporation Training:
- Total Quality Management Facilitator 1991
- Baker Project Management Training 1998
- Strategic Project Management Program 2000

Registration
Professional Land Surveyor Pennsylvania #SU034201E, 1985

General Qualifications

Since joining the company in 1988, Mr. LaPearle began in the Surveying Department as a Project Manager/Supervisor and progressed to Manager of Survey Services. Mr. LaPearle has over 30 years of experience in pipeline, utility and telecommunications, highways, bridges, boundary and subdivision surveys, ALTA/ACSM land title surveys, aerial photography and photogrammetric control and mapping, etc. He is directly responsible for successful conduct of conventional field survey and GPS activities. This includes a full range of GPS survey services utilizing Trimble dual frequency receivers, Trimble Pathfinder ProXRS receivers, Leica GS50 receivers, and Leica SR530 RTK receivers. Baker maintains a minimum of 6 - 8 field crews ranging from 2 - 4 people. Responsibilities also include the specific control, design, review and preparation of survey/engineering drawings through a technical office staff of 10 - 12 people. In addition he also manages project proposals, staff and personnel, work scheduling, correspondence, budgets, invoicing, etc. and has been actively involved in the following projects:

Experience:

- **CNG Transmission Corporation.** *Project Manager.* Over 200 miles of extensive route survey, construction mapping, erosion control mapping and completed road, stream, river and railroad permitting plats. This included preparation of numerous detailed surveys, R/W condemnation drawings and expert witness appearances for numerous projects throughout Pennsylvania and West Virginia between 1989 - 1992.

- **Columbia Gas Transmission Corporation**. *Project Manager*. Long term open-end engineering, survey and mapping contract with Baker. In the past five years alone, Baker has performed well over 220 miles of extensive gas pipeline surveys primarily in West Virginia and Pennsylvania, plus additional services throughout Ohio, Maryland, Virginia, New York, New Jersey, and Kentucky. Services include GPS high accuracy mapping control, GPS Sub-meter route surveys, digital orthophotos, pipeline mapping, environmental mapping and permit plats, landowner and public record research, right-of-way condemnations, subdivisions and boundary surveys, aerial photography, miscellaneous route conventional surveys, construction staking, as-builts, forced pipeline relocations, GPS high accuracy well surveys, storage fields and geotechnical support.

- **Columbia Transmission Communications Corporation.** *Project Manager.*
  - **Appalachia Project (Charleston, WV - Buckhannon, WV)** Baker has performed extensive conventional and GPS surveys plus preparation of alignment sheets, route and railroad crossing permit plats, and telecom design for approximately 130 miles in some very rugged areas of WV. Baker has also done considerable property line recovery and ties for ongoing reroute surveys and construction issues.

Baker

- **Chesapeake Project (New York - Washington, D.C.)** Baker has processed over 210 miles of GPS survey data and produced approximately 400 detailed alignment sheets for right-of-way acquisition and for design and construction use. Baker has also prepared numerous permit drawings for major state highways, Delaware River crossing and railroads affected by this project. More recently, Baker continues to be involved with field surveys and office mapping support for numerous reroutes and right-of-way issues during construction. Baker also performed certain as-built surveys for this project.

- **Allegheny Project (Philadelphia, PA - Cleveland, OH)** Baker initially performed detailed tax map and landowner research and helped develop specific route alignment onto maps for use by CTC's ROW and Land Department. Baker has completed considerable GPS field surveys and subsequent preparation of over 800 individual sheets of detailed alignment mapping, road and railroad crossing permits, and numerous regen site surveys, etc. supporting this 500 mile project.

- **Millennium Pipeline.** *Project Manager.* Baker has provided considerable on-call survey and mapping services for this project. This has included approximately 35 miles of GPS control and conventional surveys collecting field data for a proposed pipeline reroute (Westchester County, New York) requested by FERC. In addition, considerable detail alignment drawings, aerial photography, pipeline engineering and CAD support were supplied as part of ongoing FERC submittals and final design issues.

Pennsylvania Department of Transportation. *Survey Manager.* Manager of survey related tasks for all work orders on our open-end engineering agreements for Statewide Photogrammetric Mapping with PADOT. Preparing estimates of survey man-hours for work orders and overall scheduling and supervision for all survey crews and office technicians who perform survey or GPS related assignments for both statewide mapping projects plus local engineering projects. This also includes being the responsible licensed surveyor in charge of all activities and QA/QC of all projects. These local support tasks include GPS surveys, topographic surveys, route staking, core borings, cross sections and profiles, horizontal and vertical control, etc. Past projects include:

- SR 0026 - Centre Co., PA
- SR 0022 - Mifflin Co., PA
- SR 0220 - Centre Co., PA
- SR 1048 - Westmoreland Co., PA
- SR 0082 - Birdsboro, PA
- SR 0434 - Pike Co., PA
- SR 0209 - Monroe Co., PA
- SR 0015 - Union Co., PA
- SR 0022 - Juniata Co., PA

- **Greater Pittsburgh International Airport.** *Survey Task Manager.* Numerous miles of major pipeline utility relocation projects due to the Greater Pittsburgh International Airport - Midfield Terminal and Southern Expressway (S.R. 6060) construction projects.

- **Airport Projects.** *Survey Task Manager.* Managed Baker's Survey Department involvement on a full range of considerable surveys at airport projects including: Pittsburgh International Airport, University Park Airport, Beaver County Airport, Washington County Airport, New Castle Airport, St. Mary's Airport, Harrisburg Airport, Wheeling-Ohio Co. Airport, McConnell Air Force Base and Grand Forks Air Force Base.

- **The Pointe and Robinson Mall Development. Metro Property Development.** *Survey Task Manager.* Managed approximately 600 acres of miscellaneous design, boundary subdivision, ALTA/ACSM and construction staking surveys near Robinson Towne Centre, North Fayette, Pennsylvania.

- **Dixmont State Hospital.** *Survey Task Manager.* Baker performed a detailed boundary retracement survey, aerial photography, photogrammetric mapping plus numerous subdivision plans and other tasks for ongoing development of approximately 400 acres near Emsworth, Pennsylvania.

- **U.S. Army Corps of Engineers.** *Survey Task Manager.* Over 70 miles of land-based control recovery, re-establishment and monumentation plus extensive hydrographic surveys of coastal beach profiles extending as much as a mile seaward into the Atlantic Ocean near Atlantic City and Stone Harbor, New Jersey as part of a project with sponsorship of the New Jersey Department of Environmental Protection and Energy. Other miscellaneous past USACE projects include:
  - Barnegat Inlet to Little Egg Inlet, New Jersey
  - Port Mahon, Delaware
  - Maurice River Cove, New Jersey
  - Beltzville Dam & Reservoir, Pennsylvania
  - Victory Hills Disposal Site, Pennsylvania
  - Weirton Port Study, West Virginia
  - Iowa Army Ammunition Plan, Iowa
  - Monongahela River Dredging, Pennsylvania

- **State Departments of Transportation.** *Survey Task Manager.* Numerous miles of highway and bridge improvement survey projects throughout West Virginia, New Jersey and Pennsylvania. Tasks included detailed roadway surveys and topography, cross-sections, profiles and field stakeout, and photogrammetric mapping control surveys utilizing GPS (Global Positioning System) technology.

Various Clients. *Survey Task Manager.*

- Countless miscellaneous survey projects including subdivisions, pond and river soundings, ALTA/ACSM title surveys, environmental support surveys, geotechnical support surveys, landfill support surveys, engineering support surveys, property boundary surveys (as large as 1800 acres), R/W condemnation projects and photogrammetric mapping projects located in Pennsylvania, New York, Ohio and West Virginia.

- **Northern Consolidated Power.** Over 25 miles of route selection, survey, plan/profile, design mapping, individual R/W drawings and substation/plant sites for electrical power transmission lines in Pennsylvania and New York.

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Don Miller

Pipeline Technical Specialist

Years Experience: 40

Education:
Master of Arts, Geography, University of Colorado, 1972.
Thesis title:
Human Perception and Adjustments to the High Wind Hazard in Boulder, Colorado.

General Qualifications

Mr. Miller has spent the majority of his nearly four-decade career assisting the oil and gas industry, and to a lesser degree the manufacturing and electric energy industries with major developments, or developing markets. Often he found himself participating in both arenas. He presently assists major oil and gas firms, and international EPC and consulting organizations in developing business planning and market entry strategies and subsequent tactics. He also assists pipeline organizations in formulating environmental, engineering, and construction plans, and participates in their implementation. His professional network is global and current.

Experience

Pipelines

Throughout his professional career he has served as an advisor to many of the major oil and gas companies on environmental matters for large upstream and downstream projects. As a Senior Project Manager and a Principal he managed over 30 major natural gas, carbon dioxide, crude oil and coal slurry pipeline environmental, geotechnical, and contingency planning contracts for large pipeline systems. Clients included most of the multinational oil and gas companies, the major EPC organizations and large regional utilities. While employed by a multinational forensic and risk-engineering firm, he assisted in evaluating pipeline construction issues and operations. Prior to joining the engineering and consulting industry, he was a member of the pipeline construction industry. He achieved the position of General Superintendent of Mainline Construction for F.H. Linneman and Hood Corporation, major domestic and international pipeline constructors.

CONSTRUCTION EXPERIENCE

His construction experience can be broken down into two major areas: urban distribution systems, and mainline transmission lines. It should be noted he performed all functional construction related tasks excepting welder. This includes competitive cost estimating, routing, and materials purchasing.

Distribution Systems: The majority of his experience in this arena was constructing urban natural gas distribution systems. This included mid- and large-diameter low-pressure trunks, in-street distribution lines, and individual building services. Activities included the installation of systems in newly constructed developments, refurbishing systems in older areas, and connecting and piping rural areas and small towns. In addition to welded steel natural gas systems, he supervised the construction of water, sewer, underground electrical conduit and telephone systems. He also installed plastic natural gas and water systems.

Mainline Transmission Lines: For a period of years he served as General Superintendent for Mainline Construction…or in the vernacular of the trade, a Spreadman. This experience concentrated on cost estimating, routing, constructing, and testing of mid- to large-diameter butt-welded steel natural gas transmission lines, which ranged in length from a few miles to over one hundred miles. He worked in all types of terrain, having supervised construction of portions of a natural gas pipeline, which traversed 150 miles of the Rocky Mountains in Colorado. This project was the first major pipeline to be considered under the then draft National Environmental Policy Act. He also removed and salvaged systems in the wetlands of east Texas, built lines across western prairies, and installed onshore and offshore terminal facilities in Guam. He recently routed, and developed preliminary construction plans for the 24-in high-pressure Millennium natural gas pipeline from its' Hudson River crossing to its' terminus in Yonkers, New York.

REGULATORY EXPERIENCE

His first exposure to the pipeline regulatory environment was during the planning and construction of the Trans Alaska Pipeline (TAPS), now known as Alyeska Pipeline Service Company, and has continued since then. His regulatory experience covers a wide array of assignments, jurisdictions, and precedents that involve grants of rights-of-way and subsequent design, construction and operation of over 11,000 miles of pipelines and related facilities. He managed the preparation of over 30 significant environmental, engineering and construction reports focused on pipelines. Important precedent setting activities in which he was integral follow:

Negotiated the conditions of and managed the first federal third-party Environmental Impact Statement under the National Environmental Policy Act.

Served in a management position for the development of over 20 EIA/EIS's on major welded steel pipelines, primarily crude oil pipelines.

Assisted in the development, and managed the field analysis of the first detailed Oil Spill Contingency Plan for crude oil pipelines.

Oversaw the development of a predictive model that assigned probabilities to archaeological site location and significance, and the development of immediate field mitigation measures for cultural resources sites encountered during construction.

Oversaw all environmental compliance efforts for an 1100-mile pipeline that was operational within 14 months of project initiation.

Lead negotiations resulting in FERC acceptance of a State of California selected EIS/EIR contractor being designated as both federal and state contractor thus placing both under the more stringent State time requirements.

- Managed a pipeline route selection study to move southern and central offshore California crude to Los Angeles and San Francisco refineries. This study was the basis for several

operating and proposed pipelines serving these markets.

- Managed a forensic regulatory review of a products pipeline accident that resulted in the deaths of three individuals in the Pacific Northwest.
- In response to the Federal Energy Regulatory Commission (FERC) environmental concerns recently routed, and developed preliminary construction plans for the 24-in high-pressure Millennium natural gas pipeline from its' Hudson River crossing to its' terminus in Yonkers, New York.

Many of these experiences served as precedents increasing the efficiency by which pipeline projects can be permitted, built, and operated. All are in use in some form today. He was responsible for engagement procurement; and regulatory, technical, and commercial performance for these and many other pipeline projects.

OIL SPILL CONTINGENCY PLANNING

He participated in the development and implementation of the first large scale pipeline Oil Spill Contingency Plan (OSCP): the Plan was stipulated in the grant of rights-of-way for Alyeska Pipeline Service Company's application to design, construct and operate the 2.0 mmbpd Trans Alaska Pipeline System (TAPS). TAPS was defined as the 790-mile reach of pipeline from Prudhoe Bay, the Valdez Marine Terminal, and the tanker route from the Terminal through the Port Valdez Narrows across Prince Williams Sound to the Hinchinbrook Entrance. There were three plans developed: one covering the pipeline from Prudhoe Bay to the Marine Terminal at Valdez, one covering the terminal itself to include the tanker route through Port Valdez, and the third plan covering tankers routes traversing Prince William Sound.

He was the day-to-day Project Manager for the pipeline OSCP, and participated in the development of the Valdez Marine Terminal Plan. It should be noted that these OSCP's were tested and approved prior to pipeline operation as stipulated in the grant. Brief descriptions of these experiences follow:

- ***Trans Alaska Pipeline:*** He led the technical studies, and subsequent field verification, which provided the basis for the pipeline OSCP. This involved understanding all environmental communities traversed by the pipeline, their drainage patterns, and sensitivity to an event so that appropriate immediate response actions and subsequent diversion and cleanup activities were compatible with the location and size of a spill. Drainage patterns for the entire route were determined, potential spill volumes calculated for every stream crossing (over 500) and traverses of sensitive areas, and subsequent immediate response, and containment and diversion techniques determined for each.

- ***Valdez Marine Terminal:*** His involvement was limited to (1) integrating the pipeline plan into the terminal plan, and to (2) assisting in testing oil-water-sensors, and designing and locating a permanent fence boom that was built into the terminal docking facilities.

He also served as Project Manager for the development of the OSCP for the Sohio (now BP) sponsored PacTex Pipeline. The line as proposed was to carry 1.2 mmbpd of Alaska North Slope Crude from the Port of Long Beach in Southern California to Midland, Texas where it would enter existing pipelines and be forwarded to Gulf Coast refineries. Much like the TAPS, two plans were developed: one for the marine terminal, and one for the pipeline. Although similar in length and volume, the PacTex line varied from TAPS in one significant way: it traversed a densely populated area, the Los Angeles Basin from west to east. This meant that man-made features dominated: drainages were storm sewers; flood control channels, city streets and freeways, and groundwater recharge basins. Like the plan developed for TAPS, he the lead the technical studies and field verification, which provided the basis of the PacTex pipeline plan. In addition to understanding the environment of long sparsely populated reaches of line traversing the desert southwest, the highly urban environment of Los Angeles needed to be understood. The effects of constructed features in influencing spill flow and its effects were determined. Surfaces flows for every thoroughfare traversed, for every storm sewer and flood control channel encountered were determined and appropriate immediate response, and subsequent diversion and containment actions were developed. All of this was done in concert with the concerns and requirements of a myriad of municipalities, water and sewer districts, utilities, fire and police departments, and concerned citizenry.

He also served as Project Manager for two crude oil pipeline OSCP's, one rural and one urban, and a marine terminal OSCP for Pacific Gas and Electric Company all on the California Coast. He was assistant Project Manager for a white oil pipeline OSCP for Shell Pipeline Company in a heavily populated region of the San Francisco Bay area. In 1999 he was Assistant Project Manager for the OSCP for Pacific Pipeline Company. This pipeline traversed both rural and urban areas reaching from Bakersfield to the Los Angeles Basin refineries. In 2001 he assisted in the development of an oil spill response plan framework for the BP Sponsored Baku-Tiblisi-Ceyhan (BTC) Pipeline. The framework was a portion of the IFC and World Bank submittals.

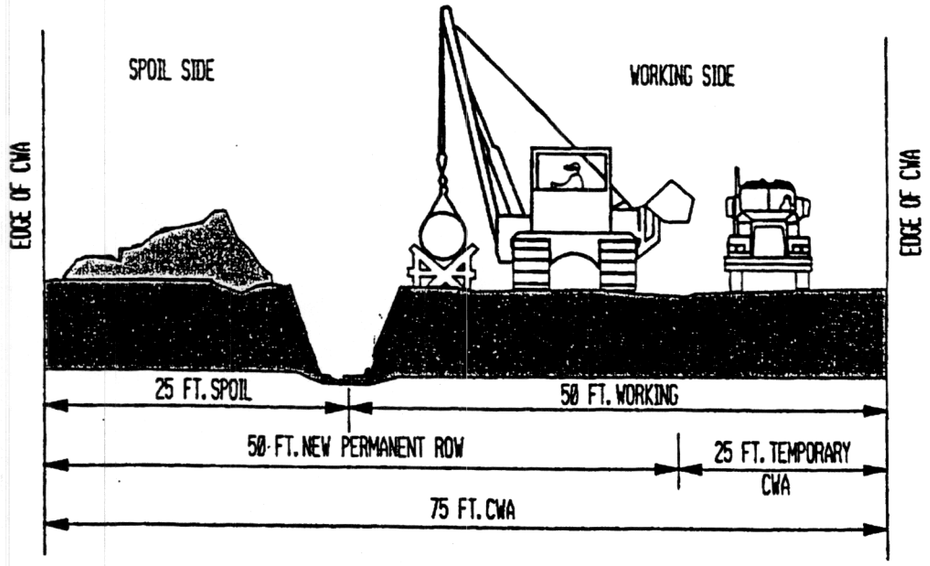
Business Planning

His present practice centers on assisting client organizations in developing new technical skills and market entry strategies. Twenty-five years of business development experience underpins and is the focus of this practice. This practice includes researching and understanding markets, as well as gaining an understanding of client's technical strengths and culture as they affect their ability to successfully compete in a new market. Engagements are international and domestic. Scopes range from national market and competitor assessments to assisting small specialty engineering and environmental consulting firms leverage niche skills into broader markets. Recruiting is integral to this practice. In the course of conducting a competitor analysis for a major oil company, he recruited a senior executive for the same company to head up a new business line in a Southeast Asian country. He also recruited numerous management and technical leaders for engineering and consulting organizations. Recruiting is generally in support of market assessments and subsequent entry strategies he developed.

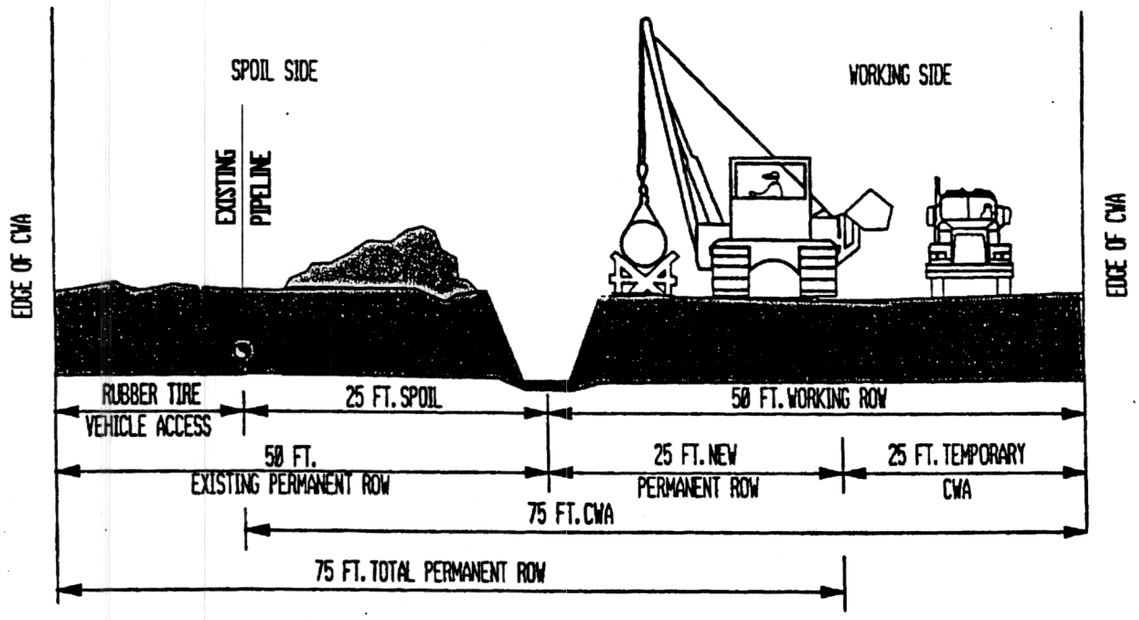
Most recently he assisted the Arab Center for Engineering Studies in Amman, Jordan in developing strategic business and business development plans, and an investment prospectus. The Jordan – United States Business Partnership sponsored this engagement.

Business Development and Management

He served as Managing Principal and Director International Business, Vice President of Corporate Business Development, Regional Vice President Business Development and Senior Project Manager for over 18 years with Woodward Clyde Group, a multinational environmental, waste management, and geotechnical engineering consulting company. As Director International Business and Vice President of Business Development, he was responsible for organizing and directing an international marketing, business development and sales organization. He has a solid record in startups, market development and expansion, and strategic alliances and joint ventures in Asia and the Pacific Rim, and other international regions. He subsequently undertook similar responsibilities with Environ International, a human health risk organization expanding their litigation support client base. He also facilitated that firm's entry into the international management consulting marketplace by locating and acquiring experts in international regulatory due diligence, and ISO 9000 and 14001 certifications and audits. He was the Managing Director, Management Systems for Aptech Engineering Services, a leading risk and forensic engineering organization that developed life cycle assessment and extension programs for LNG facilities, pipelines, and a wide variety of pressure vessels. He has extensive domestic and international business and financial contacts.



NEW ROW & LIFT AND LAY



PARALLEL TO EXISTING ROW

NOTES: 1. THE DIMENSIONS SHOWN ON THIS FIGURE ARE TYPICAL.
2. CWA (CONSTRUCTION WORK AREA)

MILLENNIUM PIPELINE

ATTACHMENT 1
CONSTRUCTION DETAILS

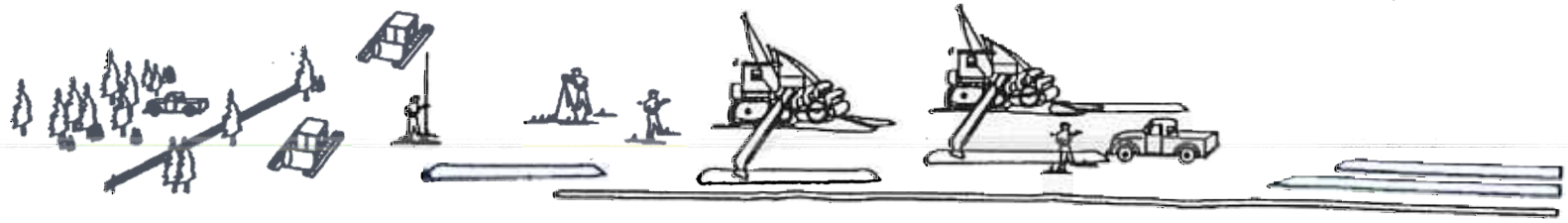
FIGURE
1
SCALE: N.T.S.
DATE: 03/10/03

SO-NUMBER B24508-004-0000-ARP02

SO-NUMBER B24508-004-0000-ARP02

MILLENNIUM PIPELINE

ATTACHMENT 1
CONSTRUCTION DETAILS



ROUTE SELECTION, SURVEY, AND ROW ACQUISITION

RESTAKE, CLEARING AND GRADING (3500' / DAY AVG.)

CENTERLINE SURVEY OF TRENCH

TOPSOIL SEGREGATION (AS APPROPRIATE) AND TRENCHING (ROCK FREE) (3500' / DAY AVG.)

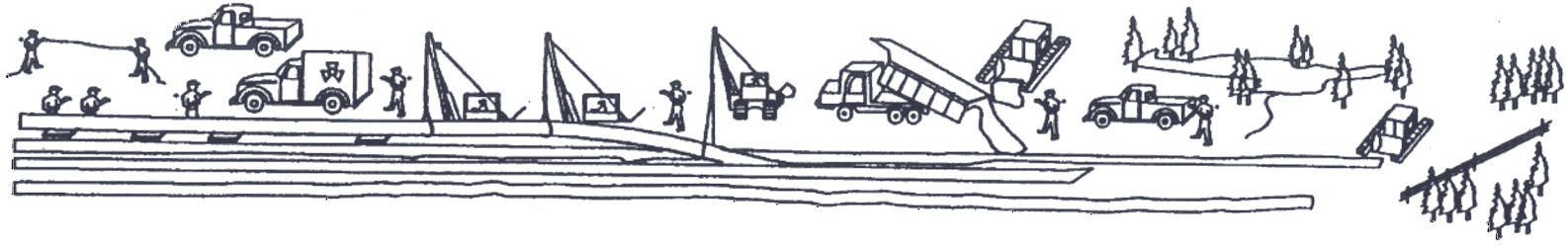
TRENCHING (ROCK) (3000' / DAY AVG.)

STRINGING

BENDING

LINE UP, STRINGER BEAD, AND HOT PASS (3500' / DAY AVG.)

FILL AND CAP WELD (3500' / DAY AVG.)



AS-BUILT FOOTAGE

X-RAY AND WELD REPAIR

COATING FIELD AND FACTORY WELDS

INSPECTION (JEEPING) AND REPAIR OF COATING

LOWERING IN AND TIE-INS (3500' / DAY AVG.)

PAD AND BACKFILL (3200' / DAY AVG.)

TEST AND FINAL TIE-IN (1300' / DAY AVG.)

REPLACE TOPSOIL AND RESTORATION (3000' / DAY AVG.)

FIGURE 2

SCALE: N.T.S.

DATE: 03/10/03

Attachment F

Attachment F to this Affidavit is a video which has been submitted as Millennium Exhibit 84.

Millennium Pipeline Consistency Appeal
Appellant's Surreply Brief
April 21, 2003

Tab 82 – Exhibit G

This document involves pipeline location information and is not available at this Internet site due to homeland security-related considerations. This portion of the Millennium Pipeline consistency appeal administrative record may be reviewed at NOAA's Office of General Counsel for Ocean Services, 1305 East-West Highway, Silver Spring, Maryland.

Millennium Pipeline Consistency Appeal
Appellant's Surreply Brief
April 21, 2003

Tab 82 – Exhibit H

This document involves pipeline location information and is not available at this Internet site due to homeland security-related considerations. This portion of the Millennium Pipeline consistency appeal administrative record may be reviewed at NOAA's Office of General Counsel for Ocean Services, 1305 East-West Highway, Silver Spring, Maryland.

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Appellant's Surreply Brief
April 21, 2003

Tab 82 – E

This document involves pipeline location information and is not available at this Internet site due to homeland security-related considerations. This portion of the Millennium Pipeline consistency appeal administrative record may be reviewed at NOAA's Office of General Counsel for Ocean Services, 1305 East-West Highway, Silver Spring, Maryland.