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Chapter O: Reports and Analysis and Controls Skills

1. Background

This chapter:

- Examines the reporting used to monitor AMRP progress against defined standards and targets
- Evaluates the sufficiency of analysis of reported information to support the optimization of AMRP performance
- Assesses the organization and resources engaged to provide such reporting and perform such analysis
- Addresses the capabilities of personnel in the program and project controls functions to meet AMRP needs.

A program such as the AMRP requires controls personnel with a high level of analytical skill. Management at all levels needs help in the analysis and facilitation of corrective action. A professional controls staff best serves this need. A program of the size and duration of the AMRP justifies investment in developing resources able to meet the need.

Discussions of management tools generally begin with “reports.” They represent the one tool that large projects rarely lack. Unfortunately, the industry has a tendency toward project reports long on data but short on analysis, and lacking the value that such analysis adds. Reports with a strong analytical component differ, however. When they identify performance issues and their causes, together with potential corrective measures, they offer substantial value in optimizing performance, especially for long duration programs like the AMRP.

Liberty applies a number of standards by which it evaluates the effectiveness of project reports. This chapter and Chapter V: Monitoring discuss them.

2. Findings

a. Reports and Analysis

i. Overview

Liberty has not found a sufficient level of reporting. More fundamentally, program management and those responsible for program oversight have not made effective use of performance results to drive improvement actions. This gap exists from the board of directors and executive management down to day-to-day supervision. Reports exist, but preparing them only starts to fulfill the need; using them as an instigator of corrective action gives them their principal usefulness.

Discussions that Liberty began with senior leadership of Integrys and Peoples Gas last September identified the need for a review of current reporting. That review needs to follow the guiding principle that the value of a report intended for management or oversight purposes is proportional to the degree to which it facilitates action on the part of the reader. Reports tend most often to fail because those involved too frequently explain away deviations with pat answers (*e.g.*, spending lags behind the plan because of delayed invoices; construction lags behind schedule because of the

bad winter, the project exceeded budget because of a bad estimate rather than weak performance). Such over-used explanations frequently obscure, rather than explain the real reasons; *i.e.*, the root causes. Performance measures only have real merit when analysis transforms them into meaningful performance insights. A chart (or the underlying data) does not communicate much until researching and interpretation what exists behind the obvious allows for informed judgments about root causes.

Effective monitoring has the following characteristics: importance-focus (zeroing in on critical or significant areas), insightful analysis (what drives variances), action orientation (what can be done better), and accountability (who must take corrective action, when, and how).

Chapter V: Monitoring provides a more detailed discussion of the foundation for Liberty's general reporting standards. Beginning from those more general standards, this portion of the report focuses on reporting that serves owner program management and oversight.

ii. Standards of Performance

Effective analysis of performance requires clear benchmarks or metrics against which to measure. Some kind of plan generally establishes the basis for the work and the expectations for its performance. Such guidance finds expression in a high-level plan, a budget, a schedule, quality targets, safety indices, or similar assumptions made at some point during program or project planning. A very longstanding approach to project management compares actual performance against these previously established standards, analyzes deviations from those standards, identifies appropriate corrective action, reflects those actions in a revised plan as appropriate, and provides for measurement of those actions in correcting the problems that led to their adoption.

This long-standing approach has a much greater likelihood of failure when applied to large, complex projects and programs. Programs like the AMRP magnify the circumstances under which this traditional reporting approach often breaks down. Effectively holding people accountable requires a standard that is reasonable, credible, and given high priority. A common problem lies in the failure of original plans, budgets, or schedules to have substantial credibility. Where credibility is lacking, hard-hitting testing of performance shortfalls by management has difficulty in getting past out-of-the-box assertions, like "the estimate was bad," for example.

Thus, management must exercise vigilance in ensuring the credibility of plans, budgets, and schedules. Second, management must instill and enforce a philosophy that an "estimate is bad" type of conclusion will gain acceptance only after proper examination tests the contribution of all possible causes.

The AMRP's early history did not comport with a number of the standards that apply. The necessary baselines (plans, budgets, estimates, and schedules, for example) frequently did not exist. Where they did, they have tended to lack sufficient credibility to serve as meaningful standards. Program quantities and expectations for performance are not clearly defined. There is no schedule to lay out the 20 years of required main, service, and meter installations. The AMRP uses an outdated cost estimate that understates program costs, but still forms the basis for project forecasts. Management does not accompany annual budgets with meaningful schedules or resource plans. The AMRP regularly underspends its budgets. Management has not reconciled project

estimates to actual costs after work completion. These factors exemplify the need for substantial improvement in setting credible standards. The existing gaps have made effective management reporting impossible in the AMRP's first stages.

iii. Analysis of Performance

A typical utility project report contains volumes of data and the AMRP's regular reporting offers no exception. AMRP reporting suffers from a problem Liberty has commonly found. Specifically, management and leadership, whether at the project, executive, or board level, frequently find themselves left to their own devices to analyze extensive data. A common failing in reports arises from the assumption that everyone, regardless of level in the organization, has the time and ability to dig behind the numbers. Such digging is required, for example to: (a) ferret out actionable problems, (b) analyze the root causes of those problems, (c) intuitively grasp appropriate actions in response, and (d) understand the resources needed to act accordingly. Regular reports too often confuse the role of the analysts who contribute to reports and those who must read and makes sense of them. AMRP reporting fits this description.

AMRP reporting must change to meet the primary measure for judging a report. Directly stated, that measure consists of the degree to which reports facilitate management action. To meet this measure, AMRP reporting requires adjustments that will give management: (a) a clear description of performance gaps, (b) evidence supporting that description, (c) analysis of the primary causes of problems, and (d) clear measures and alternatives for responsive, corrective action. The discussions that Liberty and senior leadership began in September 2014 led to a significant level of consensus on the need for improvement and to the design by Peoples Gas of initiatives to secure that improvement. It remains for management to complete those initiatives. The best test of success will be to observe the changes in reports, the attitudes of management toward their use, and evidence that information reporting has produced responsive actions.

iv. Reporting Organization and Resources

Well-designed program management functions employ analysts skilled in performance analysis of major, complex engineering and construction programs and projects. The skills of those individuals must also include the ability to understand the unique technical aspects of the work. Combining technical with analytical skills produces the ability to provide credible analysis and to advance workable solutions. Such capability proves invaluable to program and more senior leadership. Enhancement of the AMRP resources in this area also represents part of the Peoples Gas initiatives resulting from the discussions that began last September.

v. AMRP Reporting

The AMRP monthly progress report comprises the central element of program reporting. This 50-plus page document covers all program aspects. It presents, in various formats, data illustrative of what has been done and is being done. Its primary focus is on work that occurs in the field. Liberty found the report fundamentally unresponsive to program needs. Its design to "cover all the bases" appears to create a false sense that its contents provide full knowledge of all important project events, that management is on top of all parts of the project, and that progress is on or near plan.

Reports similar to the AMRP monthly progress report tend to keep everyone happy. Such reports allow executives to feel informed and program managers to present an image of control. Yet such reports rarely speak of problems, corrective measures, or failures to perform. The notion of a manager saying through a project report that “I have a problem” is not common in the industry, and AMRP managers have certainly not done so. The December 2014 report illustrates this finding:

- Many presentations of data exist, but without context; *i.e.*, the report provides numbers, but gives the reader no way of knowing whether they represent good or bad results
- The report contains material difficult even to read (see pages 33-39).
- The report fails to provide important data and some reported data contains errors (see page 28, which Chapter B.1 of this report discusses).
- The report does not relate resource data to staffing required and its characterization of resource data as “jobs created” seems aimed at objectives other than management of the project (see page 31).
- Most importantly, no analysis accompanies any of the data, even though many charts appear to beg analysis questions.

The flaws in the report indicate lack of clarity in defining the intended audience. Moreover, Liberty’s discussions with management found that the report serves no meaningful management purpose. The many levels and sources of management responsible for oversight of the AMRP within Integrys and Peoples Gas increase the significance of this problem. Assuring common understanding of critical project status information becomes more important as authority and accountability spread to a wider set of people.

AMRP regular reporting does not provide a number of important types of support to program management, including:

- Insightful analysis by capable program management staff, including clear identification of problems and their causes.
- Specific identification of any failing organizations and managers, so that it is clear where the responsibility for improvement lies.
- A focus on what is important: On a large project, it is not possible for managers and executives to follow everything. In reporting and analysis, there must be concentration on the paraphrased adage that 20 percent of the project makes up 80 percent of the costs, risks, and opportunities.
- An action orientation: Clear discussion of the actions that should be taken and by whom. There must be clearly defined expectations for what must be done.

b. Controls Skills

i. Background of Controls Personnel

Liberty evaluated the background and experience of the Project Management Office’s personnel involved in project controls. Liberty’s review covered persons filling cost, scheduling, and contract management roles. Jacobs Engineering provides most of the people serving in these AMRP roles. We found the background, education, and experience of the team to be above average. Virtually all of the people are degreed professionals, with most possessing engineering degrees. Several

have advanced degrees. We found considerable experience levels as well. Six of the team members have more than two decades of related experience. Liberty considers the mix of experience on the team, from junior to senior people, excellent. As the cost, planning, estimating, and management chapters of this report (Chapters G, K, and L) explain, however, significant concerns exist with respect to the application of such skills in a well-constructed, suitably empowered organization.

ii. Analytical Capability

This report concludes in other chapters that the Project Management Office does not apply analytical skills broadly and deeply in examining project performance. The degree to which the organization has this capability therefore remains unknown. One might conclude from the backgrounds of the AMRP controls personnel that the organization likely has this capability if called upon, but Liberty's work found no evidence that management has made substantial demands to date.

3. Conclusions

O.1 AMRP reporting is not sufficient in level and quality to ensure that management has complete and timely information about AMRP performance and progress. (Recommendation O.1)

Liberty focused principally on the monthly report, which program management offered as the primary source of communication. Other reports, however, have a similar lack of focus on communicating information that is well organized, comprehensive, and subjected to careful and insightful analysis.

O.2 AMRP management has not made effective use of performance results analysis to drive improvement actions, from the board and executive management levels down to day-to-day supervision. (Recommendation O.2)

Management is not well positioned to use performance results effectively, because it does not receive performance results in an actionable or credible way. Liberty found a lack of focus on management follow-up to address performance gaps, as this report discusses repeatedly in many chapters.

O.3 The AMRP lacks a credible and comprehensive set of standards, which leaves it without a prerequisite to effective AMRP reporting and performance analysis. (Recommendation O.3)

Project measurement bases should find definition in program plans and in documentation of the underlying assumptions. Budgets and schedules, for example, provide standards of performance and management's expectations regarding performance requirements. Management should hold project organizations and contributors accountable to those standards. Management cannot seek accountability where standards do not exist, or where standards lack credibility.

O.4 AMRP management has not given strong emphasis to creating a culture and a set of capabilities for aggressive analysis. (Recommendation O.3)

The mass of data presented to management does not lend itself to meaningful analysis or valuable insights. The organization has not yet shown the capabilities for such analysis or evidence that it recognizes the need for making analysis a central element of program management.

O.5 The AMRP monthly progress report, (the primary vehicle for communicating AMRP progress status and results to the boards of directors and to executive management), requires significant overhaul. (Recommendation O.1)

The monthly progress report has existed in the same form for many years. Liberty was unable to discern clear and meaningful use by managers or staff of this document. Moreover, the presentation of information in the monthly progress report does not support the identification of problems or corrective action.

O.6 Project controls personnel, supplied almost entirely by Jacobs Engineering, have above average background, education and experience.

Few companies recognize the urgent need to staff the project control organization with well-educated and technically capable individuals. The AMRP provides an exception. Largely through Jacobs Engineering personnel, the AMRP has a better than average team of cost and schedule professionals.

O.7 Peoples Gas has not called upon its project controls personnel to provide the analysis and facilitation of corrective action that the AMRP requires. (Recommendation O.5)

Given the apparent higher than average skill level of the people, the AMRP appears to under-utilize them. They likely have the capability to provide the analytical contributions that management does not appear to have demanded. The need for augmentation of cost estimating and management resources may or may not make these personnel a potential pool of resources from which to draw.

4. Recommendations

O.1 The AMRP Project Management Office should overhaul its approach to reporting, with emphasis on defining and meeting the needs of managers and staff. (Conclusion O.1 and O.5)

The purpose of the AMRP reports is unclear, and there does not appear to be a sound objective behind the monthly report. Rather than focusing the report structure on what information the program chooses to share, the structure should emphasize what information is needed by readers and what they should be expected to do with it. The program should work with managers to define their needs and then design reports to meet those needs.

O.2 Management should establish a framework for performance improvement based on analysis of project performance and corrective actions. (Conclusion O.2)

One specific management need is information on program performance and how to facilitate improvements where appropriate. Management should put in place a specific process to provide a

continuing means to understand and improve performance based on strong analysis of actual progress.

O.3 In the course of its current improvement initiatives, Peoples Gas should redefine and reestablish its standards for program performance. (*Conclusions O.3*)

Given the current lack of standards, Peoples Gas will be unable to provide the insightful analysis needed. The current improvement initiatives should remedy this shortcoming. As Peoples Gas develops these new budgets, plans, and other relevant documents, the Company should define and communicate their intended use for future performance analysis and reporting.

O.4 The Project Management Office should establish a culture and a regular, defined, comprehensive program that provides insightful analysis of program performance, and should acquire the capability to perform such analyses. (*Conclusion O.4*)

The Project Management Office must overcome its reluctance to provide objective and, if necessary, self-critical analysis. The greatest beneficiary of such analysis will be the Organization itself. To accomplish this, the Project Management Office must develop an enhanced capability for analysis.

Each executive should take a more active role in demanding information and analysis from the project to fully support their oversight responsibilities. Executives must work with the program to explain their needs and insist upon necessary analysis and reports. The burden is on the project to provide that material, but executives must take the lead and insist upon responsive actions by the project on a continuing basis.

O.5 Peoples Gas should expand the role of its project controls professionals to allow for more analysis of project progress and performance and, in turn, support of management by facilitating corrective action. (*Conclusion O.7*)

This report addresses specific analysis improvement opportunities in a number of chapters. Management should address use of existing people to implement Liberty's recommendations in this regard. If they prove unsuitable, then further staff development or supplementing with added skills will prove necessary.

Chapter P Table of Contents

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Chapter P: Auditing of AMRP Costs

1. Background

Other chapters of this report address internal auditing of AMRP program and project management. Principal among such auditing has been extensive work by an outside firm over a number of years. The chapter focuses on how the Company's internal audit group (Internal Audit Services) plans and conducts audits of AMRP costs, considering the industry's use of traditional methods that assess the controls risks created by the nature, scope, and extent of work of programs such as the AMRP.

2. Findings

a. Internal Audits

Integrays applies a fairly standard overall approach in designing its internal audit plans for each year. The plans developed by Internal Audit Services consider the risks imposed by the operations of Peoples Gas. An enterprise-wide risk assessment process drives audit planning. The process, as typified by current industry thinking, identifies risks in relation to company objectives, assesses the likelihood and potential impact of the risks identified, identifies existing risk mitigation measures, assesses and incorporates additional mitigation measures determined to be effective, trends risk levels, and monitors risks and mitigation measures quarterly.

The risk identification and impact elements of the enterprise risk management program comprise primary drivers of annual audit planning. Testing related to the Sarbanes Oxley Act also forms a component of audit planning.

Internal Audit Services, sometimes using outside expertise, has conducted a number of control-related audits of AMRP since its inception. Among them are:

- 2010 Audit Plan: PwC assessment in connection with AMRP start-up addressing the program's controls environment, considering industry-leading practices for major utility capital projects (note that this audit, as well as much of PwC's follow-on work over subsequent years for Internal Audit Services, has a strong program and project management and oversight focus as well)
- 2011 Audit Plan: Review of the contractor procurement process
- 2011 and 2012 Audit Plan: Separate Reviews of compliance of Infrastructure Cost Recovery (ICR) Rider overhead cost calculations with rider requirements (one for 2010 and the second for 2011)
- 2011 Audit Plan: Verification of Infrastructure Cost Recovery Rider information sheet to verify proper calculation of and support for charges under the rider
- 2011 Audit Plan: AMRP Risk Assessment by PwC, including, among a number of program and project management and oversight matters, a review of the process for reconciling materials used versus those delivered
- 2012 Audit Plan: Verification that design of processes and controls ensured valid and proper union labor time recording

- 2012 Audit Plan: Verification that a construction close-out process adopted in the Spring of 2012 ensured payment to contractors only for work performed, after resolution of open issues, and after completion of compliance and contract requirements
- 2013 Audit Plan: Follow-up examination of materials reconciliation process to determine adequacy of measures taken to improve the process of ensuring accurate and timely materials reconciliation (found needed in the 2011 plan PwC work addressed above).
- 2013 Audit Plan: PwC assessment of AMRP governance approach, organizational structure, and processes and procedures related to the program control environment.

The 2011 audit plan’s review of contractor procurement reviewed the use of a request for proposals to solicit contractor bids, the process for narrowing 12 initial proposals to eight for final evaluation, the content of the proposals, membership of the company bid evaluation team, the scoring by team members, the selection of four firms to bid on 2011 projects, and the existence of master agreements prior to work performance.

The second of the PwC engagements identified above included reviews of a number of areas material to ensuring proper charging for work performed:

- Contract administration procedures
- Effectiveness of contractor scope change control process and procedures
- Procedures to validate costs being recovered
- Validation of contractor applications for payment.

The third PwC engagement assessed design and effectiveness of program management elements, including project controls, examining:

- Project cost estimating policy and procedures in relation to individual projects, annual projects, and AMRP costs to date
- Change management policy and procedures
- Policy and procedures for procurement of materials to ensure timely acquisition and avoid construction delays
- Policy and procedures used to evaluate contractors selected for AMRP work.

b. 2014 Material and Equipment Control Initiatives

Recent Company investigations have led to a three-year program, whose implementation began at the beginning of 2014, and which consists of 42 initiatives. Integrys has completed 29 of them. They cover a very broad spectrum of actions to promote integrity (including the use of materials and equipment required for AMRP work), among other matters affecting proper use of resources, materials, and equipment. The next table summarizes Liberty’s overall characterization of the areas into which the initiatives fall.

Table P.1: Scope of Material and Equipment Control Initiatives

Commitment to Integrity	Fleet	Surveillance Camera Upgrade
Code of Conduct	Inventory	Scrapping and Disposal
Commitment	Key Control	Policies
Training	Truck Content Inventory	Facility Security
Compliance Questionnaire	Facilities Process Gaps	Purchase Cards
Electronic Devices	Tailgate Process	Reports

Background Investigations	ISI Meter Tagging	Controls
GPS in Vehicles	Network Forensics Reviews	Review of Main Deposit Process
Ensuring Operability	Tracking Tool and Stock Orders	Leadership Training
Increasing Units Equipped	IT Systems and Access Thereto	Work Place Violence Training
Tampering Controls	Facilities Security Assessments	New Materials Mgmt. Program
Unauthorized Vehicle Use		

c. November 2014 Audit of Material Reconciliation

For 2013 AMRP projects, management added to vendor contracts a requirement to: (a) maintain records supporting the reconciliation of materials delivered, transferred, and returned, and (b) explain materials variances exceeding 10 percent. A November 2014 audit by Internal Audit Services reported on an examination of the adequacy of reconciliation processes performed through 2012. The audit included visits to contractor inventory yards. The audit found the processes used inadequate for purposes of ensuring the proper recording of AMRP materials costs.

The audit found gaps (for pipes and valves greater than 2.0” in diameter) between charges in the systems used for accounting versus facilities management purposes. Extrapolating the differences across the remaining costs (*i.e.*, in addition to those not sampled in audit testing) produced a potential mismatch of \$2.6 million for materials of this diameter through 2012. The audit also found that a lack of inventory modeling created a risk of inadvertent use of expired materials. Note that, while such a risk is important, Liberty’s field investigations did not find the use of expired materials to be a significant problem. Note also that, while the mismatch reflected a significant percentage of the equipment examined, total AMRP material costs through 2013 were only about \$22 million of \$510 million in total AMRP capital spending.

Interestingly, delays in closing out AMRP projects (discussed in other chapters of the report) contributed to the material reconciliation difficulties. The delays meant that contractors had more than the anticipated number of projects or phases open contemporaneously. This factor led to contractor mixing of materials among projects and phases without sufficient documentation. This mixing affected material reconciliation adversely. Agreements with contractors in 2011 and 2012 did not require contractors to keep records that would support accurate materials reconciliation by year, by project, or by phase. The audit found program management unable to explain significant variances (over 10 percent) for those early AMRP projects for which preliminary materials reconciliations had been performed.

In addition to recommending process, controls, and training improvements for projects beginning with 2015, Internal Audit Services recommended completing preliminary reconciliations for all historical projects, and documenting all variances found. The AMRP Project Management Office accepted the recommendations generally, but stated that it “did not have sufficient information to perform material reconciliations.” Instead, it proposed to compare material release information with final as-built drawings for completed work, in order to “recommend an acceptable variance range” for material quantities.

d. Liberty’s Field Investigations

Liberty learned that, at or near AMRP commencement, a significant unexplained absence of materials (not necessarily related to AMRP work) occurred at a Peoples Gas inventory site.

Liberty's field investigation work included a visit to a materials inventory location housing AMRP materials. At this fairly remote location, Liberty observed a lack of close control over site access. Liberty also found a lack of control over access to materials by persons who succeeded in gaining entry to the facility. Liberty found the floor lined with large bins filled with materials that one could readily remove. The materials included racks of piping and regulators to which easy access existed. A crew leader observed to Liberty that visits to the site to pick up material occasionally would find missing some materials set aside for particular work sites.

3. Conclusions

P.1 Plans for the performance of examinations of controls associated with charges to AMRP work has occurred under a typically structured approach.

Integrys uses a typical approach to risk identification and audit planning, and has applied it yearly to identify audit work related to internal and external costs charged to AMRP projects.

P.2 Audit work addressing charges to the AMRP addressed areas of risk important to setting the foundation for the program.

Integrys made substantial use of outside expertise to review important aspects of ensuring control over the process of charging, particularly by contractors, to AMRP work. Internal Audit Services has also examined internal labor charging controls, overhead costs charged to the AMRP, and the process for selecting AMRP contractors. The internal group's work has also addressed the reporting of AMRP costs to the Illinois Commerce Commission. These efforts showed due attention to establishing a sound foundation for ensuring accurate recording of AMRP costs and accurate reporting of program costs to the Illinois Commerce Commission.

P.3 The nature and extent of ongoing AMRP work requires focused and regular attention to the verification of proper charges. (*Recommendation P.1*)

The AMRP depends heavily upon contractors, whose costs comprise a major portion of the substantial annual costs for AMRP work. Those costs levels will remain very high for more than a decade to come.

The Company has in a number of respects placed strong reliance on the use of lump-sum and unit-cost contracts as a "natural" cost controller. This report's Chapter M: Procurement and Contracting (among others) addresses the wisdom of that reliance in terms of managing the AMRP substantively. Here the issue is verification of the match between work actually performed and that for which outside resources are compensated. Lump sum contracts do not obviate the need for careful control over change orders. Moreover, even without change orders, verification of work performance (and to applicable contract standards) remains necessary. The first line for ensuring proper charges falls, as it should, to the organizations responsible for managing contractor work.

Prudence requires consideration of the risk that typical industry line of defense does not always serve. Thus, the second line of defense that internal auditing brings becomes important. The Internal Audit Services group has done a substantial amount of work to address change orders from an administrative process perspective.

While commendable, those efforts need follow up to ensure appropriate testing of adherence to them. Those efforts also need to include testing designed to provide independent verification of work performance and resource (e.g., materials and equipment and hours spent on time and material change orders) consumption data as the AMRP progresses. Such testing has not formed a significant part of audit efforts. The review of contractor selection for one year is an exception, but one that should continue to be undertaken in the future as well.

Such testing needs to include focused examinations of the relationships between work billed and work performed, and in the context of what contracts require. Regular testing by a source outside of the contractor (or vendor)/program management relationship is key in ensuring that work paid for equals work performed. That testing needs to include verification by this outside source of claims of work performed, materials and equipment used, hours spent where they, and any other relevant items, drive costs under the contractual relationships involved. It is in this important area of verification that internal audit planning and execution need to focus at this and following AMRP stages.

P.4 The scope of the three-year materials and equipment control initiatives instigated in 2014, indicate a substantial need for improvements in those controls. (Recommendation P.2)

The nature and extent of the initiatives evidence a general need for enhancing controls. Moreover, Liberty's field inspection team visited an AMRP materials storage site, where it encountered concerns about controls over access to materials used for unauthorized purposes. The scope and depth of the three-year program begun by Peoples Gas about a year ago is commendable. Its scope and length, however, make it appropriate to emphasize the need for careful attention and monitoring of progress in completing the materials and equipment initiatives promptly and in a manner designed to produce lasting improvement. This concern gains added impetus from the other initiatives being undertaken by the Company to improve AMRP management, oversight, and controls.

P.5 Control over material quantities recorded to AMRP project accounts has not been sufficient; there is no reliable way to verify that wholly accurate materials cost information underlies AMRP costs. (Recommendation P.3)

The November 2014 examination of materials reconciliation by Internal Audit Services raises concern from the perspective of program management effectiveness. It has equal and perhaps greater concern for its potential impacts on the confidence that the Illinois Commerce Commission and stakeholders can and should have on the accuracy of AMRP costs that Peoples Gas are recovering through rates.

The amounts directly implicated by the audit's specific test work represent only a small portion of AMRP costs. That said, the casting of doubt about costs underlying even a small portion of rates undermines the regulatory confidence that should always form a hallmark of utility management and operation. Moreover, the Project Management Office belief that it does have a method for determining the level of inaccuracy that exists:

- Underscores the AMRP management, control, and oversight weaknesses that other chapters of this report address,

- Calls for development of more than the current, vague commitment to ensuring a reasonably accurate measure of inaccuracy in the known area of concern
- Begs the question of what review outside of the AMRP management organization is required to provide confidence that similar concerns do not underlie other areas of AMRP cost.

4. Recommendations

P.1 Peoples Gas should conduct a comprehensive assessment of AMRP risks associated with potential mismatches between work performed and work charged, and develop an ongoing program of annual testing designed to mitigate the risks identified. (Conclusion P.1)

The AMRP has by now generated sufficient history to support a focused assessment of where risk exists and in what magnitudes. The Company has already addressed key areas of risk (*e.g.*, internal labor hour charges, overheads, contractor selection, materials reconciliation, and change orders) for purposes of identifying processes and procedures to control those risks. The study recommended here should focus on what steps are appropriate to ensuring that those processes are rigorously and honestly applied. In particular Peoples Gas needs to assure the Illinois Commerce Commission and stakeholders that it will perform sufficient outside testing of the integrity of reported information that drives costs and rates.

Test designers must recognize that reliance on the project management and administration organizations should be backstopped sufficiently to give confidence that project personnel are using verifiable data, and using it objectively.

The resulting program should provide for a meaningful level of annual testing. Recognizing the long-term relationships with outsiders on which the AMRP depends, it should also operate in a way that makes all outsiders in those relationships aware that their engagement in matters with charging and billing consequence is subject to certain review at unpredictable intervals.

P.2 Peoples Gas should provide for dedicated, executive level sponsorship of the three-year materials and equipment control initiatives program and provide a regular method of reporting progress to the Illinois Commerce Commission. (Conclusion P.4)

The Illinois Commerce Commission did not engage Liberty to perform a forensic audit of controls associated with matters of personal integrity or honesty that may affect the AMRP, and Liberty did not do so. Thus, Liberty is not prepared to offer judgments about the sufficiency of the scope of the three-year materials and equipment control initiatives to address all the matters observed by Peoples Gas (or that may exist and not have yet been observed) that underlie the development of those initiatives.

Nevertheless, Liberty understands that risks associated with such forms of behavior comprise an area requiring comprehensive and well-executed controls. Having no independently derived knowledge of the forces, factors, and events that specifically underlie the institution of the initiatives, however, does not present a barrier to concluding that management has recognized a broadly based agenda for change. In a specific way, it reflects the breadth of the more general

AMRP management, control, and oversight initiatives that Peoples Gas has proposed since discussions with Liberty about the need for major change that arose in September 2014.

It is reasonable to conclude that the Company considers risks in the areas addressed by the initiatives to be relatively high and that those risks warrant a broad array of changes. With senior leadership already facing such a large AMRP change agenda, it becomes imperative to making a senior parent-level executive champion accountable for executing the initiatives. That executive should have accountability for gauging how deeply they are accepted and are guiding the personal conduct of executives, managers, and other employees. The executive should also be charged with reinforcing them as central to the values and culture of the enterprise. Such a champion should have the support of executive level parent (recognizing the material levels of AMRP support that come from Integrys organizations) and utility management to track and measure progress and to identify and resolve problems and progress lags quickly and effectively.

Change of the types initiated need a supportive corporate culture. They lie at the heart of ethical performance as nearly universally described in statements of corporate vision and values by major corporations today. Therefore, the boards of directors should also require routine, continual tracking of status in implementing the initiatives. The boards should also demand from senior executive leadership methods for gauging the effectiveness of measures that have been put into place.

Integrity, or more particularly its importance in the performance of public service responsibilities, also make important regular reporting to the Illinois Commerce Commission and stakeholders of progress in implementing these initiatives. The underlying circumstances implied by the magnitude of the initiatives being undertaken underscore this reporting need.

P.3 Peoples Gas should promptly: (a) correct the potential gap that exists with respect to ensuring the accuracy of material and equipment costs charged to the AMRP, (b) develop a method for reliably and accurately determining independently the magnitude of any error in AMRP material and equipment costs being included in rate recovery, and (c) devise and implement a similarly independent testing program to verify that no material risk exists with respect to AMRP costs subject to rate recovery. (Conclusion P.5)

The Internal Audit Services group issued its report about material and equipment reconciliation only recently (November 2014). The Company must promptly verify completion of measures that will address the inability to ensure that material and equipment costs charged to the AMRP match those actually spent. The Company also needs to verify that they have been recorded and reported under appropriate controls. Verification efforts should include the testing of specific transactions and activities.

Second, the very general comments of AMRP management about reconciliations for completed work are more notable for their observation that it cannot be done, than for giving comfort as to the reliability of valuations performed. Extremely general statements about a “variance range” need to be replaced immediately with a plan for providing a specific set of calculations (and Illinois Commerce Commission reporting) whose reliability and accuracy is fully vetted. That plan must instill confidence that it provides not only a sound method, but the most accurate one. It needs to

follow consideration of a robust range of alternatives and the best information available for populating the calculations it will require. Leadership of this effort by Company resources outside AMRP management is required.

Third, when questions arise about the accuracy of costs entered into accounts and systems that drive rate recovery, focused and high-level attention are required. It becomes prudent to ensure that one's range of vision in examining potential risks to customers is not unduly restricted by focusing only on the circumstances directly at issue. Good auditing practice, which the Integrys approach (as described to Liberty) follows, calls for robust risk assessment in forming plans for the examinations to be conducted.

What is required for the AMRP is a ground-up, fresh examination of rate risk. This examination needs to consider, but not limit itself to the materials and equipment reconciliation issue. Moreover, the examination needs to identify how the problem that has arisen may bear on what risks exist in other areas. As with the preceding element of this recommendation, that examination must fall under the direction of resources outside both AMRP and rate/regulatory leadership and management. The examination should produce a clear and comprehensive assessment of improper recovery risk, and develop plans for testing.

Reporting of the assessment and planning processes should be made promptly to the Illinois Commerce Commission on completion. The same is true for reporting of specific tests, examinations, and audits. At least internally to Integrys and Peoples Gas, if not to the Illinois Commerce Commission as well, executives outside the AMRP and rate/regulatory leadership and management chain should be prepared regularly to certify that, to the best of their knowledge, information, and belief, all costs claimed for AMRP rate recovery contain no material error. That certification should rely on explicitly stated confidence in the testing plan and the results of tests conducted. Materiality should be defined with reference to size of the retail rate elements or components under which AMRP costs are recovered.

Part Four: Managing Work in the Field

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Chapter Q: Field Work Performance

1. Background

This chapter addresses a number of issues associated with performance of AMRP work in the field:

- Quality of materials installed
- Conformity of field work to engineering and construction standards and requirements
- Consideration of field conditions
- Training and experience of field personnel
- Subsurface investigation
- Unexpected field conditions.

Extensive site inspections performed by an experienced Liberty team formed the primary basis of the examination of these issues. Liberty conducted many site inspections of AMRP field work across the 2014 construction season. Three Liberty team members conducted these field inspections. Each has prior familiarity with the Peoples Gas system and practices. All worked on the Liberty team that conducted a 2008 management and safety audit of Peoples Gas for the Illinois Commerce Commission. Each has more than 30 years of natural gas industry experience. Two have served state utility regulatory commissions as state safety regulators. All three have on a number of occasions examined natural gas field work from safety and from efficiency and effectiveness perspectives.

The inspections encompassed more than 12 person-weeks of on-site visits, generally at four to five sites per day. The team also met with field supervision and management to discuss activities and observations. Liberty's inspection activities encompassed a wide variety of AMRP work and crew types and locations throughout the City of Chicago. The inspections covered all three, geographically aligned Shops into which Peoples Gas divided work performed in the field. The following sections of this chapter summarize the results of those investigations, supplemented by information learned through document reviews and interviews at central Company offices.

2. Findings

a. Materials

Liberty's site inspection work included an examination of materials used. The major focus of the inspection work addressing materials included pipe, fittings, and valves. The inspections also included other material used at work sites. Liberty examined the conformity of materials with installation requirements, Peoples Gas specifications, and regulatory requirements.

The significant materials-related observations from these inspections include:

- With a single exception, pipe met requirements related to age and Company specifications. The one exception involved pipe more than one year old and stored in direct sunlight. This instance did not raise a safety issue. It nevertheless required correction because plastic pipe sitting in direct sunlight can degrade over an extended time.
- Liberty observed an installation in which two ¼-turn ball valves had broken stops. Installers broke off the stops by over-stressing them during initial operation. Liberty's

inspector determined that the valves were of good quality. Operating them improperly caused the damage.

- In none of the cases did Liberty inspectors observe shortages of necessary materials for standard installations of mains and services.

Liberty's field inspections observed a recurring issue with specialized brackets that secure risers for gas meters at locations with crumbling or bowed foundation walls. One of the three Shops overcame this lack by using easily-installed, "pound-in" brackets. These brackets have common application for mobile homes. The other two Shops did not have a solution for these instances. For some time, the one Shop's effective solution was not shared with the other two Shops. Thus, the Shops failed to share best practices that can improve adherence to standards and efficiency at the same time.

Interviews with field personnel indicated that some material availability issues arose in 2013. Liberty's 2014 field inspections, however, found no indication of a recurrence of shortages. Moreover, interviews with contractor construction supervisors, construction inspectors, and Peoples Gas construction managers disclosed only the riser bracket issue. Ultimately, the brackets issue did not arise from material availability issues, but from failure to share a proper solution. After one Shop's personnel became aware of the existence of an option, the Company did eventually respond by making them available to all three Shops. All crews whose work sites Liberty examined had sufficient materials and equipment to perform the work.

b. Engineering Standards

Liberty's review of engineering standards and operating procedures covering main, service, and meter work in the field found them generally appropriate in providing a basis for quality installations that meet all safety requirements. Field investigations, however, disclosed a number of exceptions that warrant attention. The next paragraphs discuss them.

Steel Straps: Reinforcing straps should be welded onto the end caps on steel and ductile/cast iron mains (both permanent and temporary). Peoples Gas should have a standard addressing the number and size of steel straps (or "rabbit ears") and the extent of required welding. Such standards would help ensure adequate strength.

Jeeping: Peoples Gas should have a standard identifying when and how inspection and jeeping of coating for steel pipe should occur. Where pipe is coated or wrapped with special materials to prevent corrosion, coating integrity is confirmed through detection of bare spots using special detectors ("jeeps"). The required standard should address pipe coating thickness and associated voltages that avoid damaging coating, yet remain adequate to confirm coating integrity.

Thrust Blocks: Peoples Gas should have a standard addressing required sizing of thrust blocks for blocking end caps of large diameter mains. Thrust blocks hold mains in place. The standard should apply to temporary and permanent mechanical end caps.

Contractor Training: Peoples Gas needs to establish requirements that will ensure regular Peoples Gas review of the methods contractors use to train their personnel. The Company should verify

the sufficiency of instructor skills and experience and the training materials used to meet Peoples Gas operator qualification programs and standards. The requirements should specifically address:

- Responsibility for and documentation of monitoring and oversight of contractor operator qualification programs
- Adequacy of training of contractor personnel
- Conformance of contractor operator qualifications with Peoples Gas requirements.

Inspector Training: Peoples Gas needs to address four issues involving personnel who inspect field work:

- Ensuring adequate training and verifying the qualifications of AMRP inspectors
- Providing training in the installation, operation, and exercising of polyethylene valves
- Ensuring sufficient inspection of contractor work to verify compliant and satisfactory material installation
- Training in riser locating: Liberty's field work included a number of instances where meter markers set potentially unsafe riser locations. Meter markers visit customer facilities to identify locations for meters (and thus associated services and service riders) being relocated from inside to outside customer buildings. Peoples Gas manages its program to move meters to outside locations jointly with AMRP pipe replacement work.

Examples of locating problems that Liberty observed include riser locations placed within three feet of building opening and service regulator vent terminus. Such locations violate Peoples Gas procedures, and can require relocation and avoidable piping and labor costs.

Liberty also observed a number of instances where Peoples Gas does not provide sufficient guidance, training, or documentation for those responsible for ensuring field work quality and compliance.

Inspection Documentation: Peoples Gas needs to adopt requirements to document inspector verifications that contractor work complies with requirements, including engineering standards and specifications. The required documentation should include:

- Ensuring consistent inspections to verify quality contractor work
- Documenting daily completed contractor work at a level at least as detailed as the detailed construction checklists used by the Compliance Monitoring Group.

Construction Verification Audits: The Peoples Gas Compliance Monitoring Group has not consistently performed construction verification audits of contractor main and service installations to verify compliance with Company engineering standards. The Company needs to establish clear requirements to ensure consistent adherence to procedures for verification audits of contractors.

c. Construction Conformity to Requirements

Liberty's inspectors used pertinent engineering standards and procedures to verify that contractor work met the requirements of contracts and that installations met regulatory and Company requirements. Liberty's inspectors questioned construction inspectors on the standards and procedures they deemed relevant. Liberty verified that copies were present on the job site. The field work confirmed the use of main and service engineering and design work performed prior to

contract award. Construction contracts call for contractors to use that information, except where not feasible. For example, contractors may find during a final walk down in the field conflicting facilities not shown on existing maps.

Thus, conformity with standards and procedures did not generally produce concern. Liberty did, however, identify five specific issues that warrant attention.

The first issue concerns depth of cover over installed pipe. Liberty found a significant level of confusion about the depth of cover required for services located on customer property and those in City rights-of-way. In many situations the depth of cover used for both customer and City locations is 18". Per the Field Manual Section 920 (Table 920.1), however, the minimum main depth of cover in City rights-of-way is 30". The minimum service depth of cover is 24". Some permits may specify another minimum depth of cover (such as 36"). Peoples Gas needs to address this confusion, by correcting the table or issuing separate instructions for contractors working in Chicago.

Liberty also observed instances of confusion about where customer property stopped and rights-of-way began. Moreover, some City permits specify a non-standard cover requirement. Liberty did not find a routine practice for determining the requirements to apply in cases of differences between permits, City regulations, and Peoples Gas standards.

Second, Liberty observed a number of cases where following pre-designed main locations reduced efficiency. In some cases, following those layouts would cause greater conflict with existing underground facilities than alternative layouts might produce. In such cases, these layouts would require less efficient open trenching. More efficient, horizontal directional drilling could not be used because of the conflicts found. A second example of problems occasionally arising from pre-designed layouts, as observed by some contractor personnel, is that installation in the parkway would preclude horizontal directional drilling, while placement under a sidewalk would allow it.

Third, Liberty observed that one of the three Shops employed a rule requiring direct burial of all mains of 6" or greater in diameter. Rote application of this rule in cases where no interferences exist reduces efficiency.

The fourth issue concerns the amount of interior piping required to serve premises with multiple meters (*e.g.*, multi-family or commercial). Moving interior meters to the outsides of premises forms a significant part of the work performed in conjunction with AMRP pipe replacement. Doing so at premises with a large number of meters can require very large amounts of interior piping. Placing meters outside in one (or more) meter banks still leaves the need to run interior pipe separately for each customer involved. One can often feed meters located inside a building through a single line placed in the basement at a location that reduces interior pipe requirements. Having several services to the building can permit locating banks of meters closer to customer locations. This approach can avoid the need to run piping from one side of a basement to the other side.

The fifth issue concerns the design pressure for systems moving from low to higher pressure. As with meter relocations, Peoples Gas manages its program for increasing system pressure with AMRP work. The Company installs materials that support operation at 60 psi, but tests them only

for qualification to operate in a 20 to 30 psi system. Testing for 60 psi operation would better support future growth, by allowing the same facilities to deliver greater amounts of gas at the higher pressure. Certifying new mains and services at 60 psi would entail no added material or testing costs. The Company simply needs to change its test basis for mains and services to 90 psi. Testing requirements call for 1.5 times the maximum pressure. This change would qualify new systems in Chicago similarly to most other city systems that use medium pressure.

Liberty's inspection team found some Company procedures and standards cumbersome to use or in conflict with other requirements (such as those addressing depth of cover).

d. People Skills and Experience

Liberty's field investigations found that the contractors installing mains and services employ crew members having sound skills and experience. Their work performance generally indicated sufficient capability to perform the tasks associated with installation work. They operated under supervision that also exhibited sufficient skills and experience.

The Peoples Gas field forces exhibit a characteristic typical of the industry. Its workforce, both bargaining unit and management, is aging. The Company will lose the many seasoned and experienced workers approaching retirement age. The absence of a long-term program to replace them will threaten the ability to sustain current levels of skills and experience, let alone to expand work performed internally. Liberty observed a number of factors affecting the ability to sustain internal resources:

- Incenting union crew leaders to become first-level supervisors
- Retaining experienced personnel after they have reached retirement benefits plateaus
- Establishing a structured approach to optimizing contractor use long-term
- Addressing current shortages of skilled personnel in some positions
- Dealing with a lack of sufficient numbers to provide effective work supervision and oversight
- Responding to frequent job changes and lack of prompt filling of positions due to rotations of shop-level management positions
- Filling the need for more shop-level gas workers and of trained mechanics.

Staffing issues like these can produce efficiency loss and raise safety issues. Examples of losses in efficiency include lack of supervision of Peoples Gas crew tasks. The work involved includes tie-ins, meter transfers, and gas-in of new facilities. Liberty's field inspectors observed instances of failure to begin work promptly in the morning and slow completion of tasks when supervision was not present. Other conditions observed during field inspections, often times with notable frequency, include:

- Service risers too close to building openings
- Failure to provide supports for service risers
- Vent pipes too close (within 3') to building openings
- Service lines (as noted earlier) at insufficient depth (minimum of 18" or 24" depending on location)
- Lack of sufficient mark-outs for some utilities.

e. Subsurface Investigation

Peoples Gas uses standard methods for determining the location of subsurface facilities. These methods include referencing to owner and operator maps, contracting locator service providers, undertaking electrical location testing with toning equipment, and having owners and operators perform locations, for example. An issue occurring before AMRP inception and involving a directional drill (“HDD”), led Peoples Gas to institute video recording of all sewer mains and laterals, prior to and following directional drilling, but before “gassing-in” the new main involved.

Training comprises another important component of effective subsurface damage prevention. Training for Peoples Gas crews, contractors, and other subsurface utility facility owners and operators seeks to reinforce the need to call for complete mark-outs of all utility facilities before excavation begins. Where doubts exist about subsurface facility locations, greater care must be taken. Hand digging, performing test holes until facilities are located, or changing the route to avoid conflicting installations exemplify the methods used in such cases. Additional technological methods of locating underground facilities exist, such as ground penetrating radar. They generally do not prove necessary (and are expensive) when good maps, good procedures and good care exist.

Where subsurface facilities cannot be located via conventional methods, alternatives exist. The operator can change from direct drilling to direct burial via trenching, perform more exhaustive locating surveying with conductive toning equipment, or use historic records to determine possible locations, followed by test holes to confirm the exact location. While sometimes an effective option for limited use, ground penetrating radar is too expensive and time consuming to form a regularly used tool.

f. Unexpected Field Conditions

Liberty’s field inspections undertaken during the 2014 construction season did not find unexpected field conditions to present significant barriers to performing installation work.

Prior to contractor bids on AMRP work, Peoples Gas performs work that specifies the route, considering anticipated conflicts with other subsurface utilities. This work also specifies a method of construction. Those performing design work conduct one or more walk downs of each City block involved just prior to contractor mobilization. Route planning considers large trees, whose roots can affect directional drilling. Meter markers provide new meter locations on the outsides of affected buildings. A coordinated City process supports acquisition and use of data from the other subsurface utilities to design a route that minimizes interferences. This report’s Chapter T: Government Coordination describes that City process.

Despite best efforts, unexpected conditions can arise. For example, maps of subsurface utilities sometimes prove incorrect. Efforts like mark-outs and sewer system video recording can expose some of those variances. When field personnel discover unexpected conditions, inspectors contact design personnel to report the issue. Should the required change prove significant, Peoples Gas may need a permit change, which can produce schedule delay. More typically, however, conditions can be accommodated by changing a new main’s location from the parkway to the sidewalk (or vice versa).

Peoples Gas' video recording of sewer mains and laterals before and after a direction drill constitutes a best practice. It eliminates the risk of cross boring into a sewer or sewer lateral. Cross boring creates a future hazard in circumstances where the operator cleans sewers and laterals with a rotating heat/cutter type tool.

This report's Chapter C: The Peoples Gas Distribution System addressed the unusually large number of third party damages to the Company's facilities. New installations require appropriate mapping to help mitigate the risk of such incidents. After installation or gassing in of a new main, an inspector from an engineering contractor measures its location. The contractors use tape measures and a "walking wheel" measurer. This data is then submitted for entry into the Peoples Gas mapping system. These manual (paper) handoffs can lead to errors and omissions. Using sub-meter GPS (a system that produces much greater accuracy) in areas with satellite access may offer a more accurate method of updating mapping, geographic information system, and property records. It would also produce an electronic record of the dates. Similarly, GPS technology could provide for seamless leak data integration into models.

This enhanced capability could also extend to other information needed for leak management, customer information systems, geographic information system, system mapping, system planning, and risk-ranking algorithms. Making the transition to GPS use would require a shake-out period involving use of old and new methods concurrently. It would also require expenditures to provide field personnel with sub-meter GPS devices for recording locations of mains, services, and leaks.

3. Conclusions

Q.1 Material availability and quality have supported effective and efficient field installation.

Liberty's field investigations disclosed no substantial work hindrances caused by lack of materials and equipment. Storage areas appear to have ample quantities of materials. The quality of materials being installed appeared satisfactory.

Q.2 The standards to which AMRP resources perform field work generally support safe and reliable installations, with a number of specific exceptions that Peoples Gas needs to address. (Recommendation Q.1)

Liberty's field investigations considered the standards under which contractors and Peoples Gas crews perform main and service installation, meter relocation, and pressure-increase activities. The standards used typify what one generally finds in the industry. Chapter C: The Peoples Gas Distribution System addresses engineering and design in more detail. AMRP field work generally conformed to those standards. Liberty's work, however, did identify a number of areas that require attention with respect to construction standards or to activities designed to ensure that work meets those standards. These areas include: Steel Straps, Jeeping, Thrust Blocks, Contractor Training, Inspector Training, Compliance Monitoring Group ("CMG") Training, Inspection Documentation, and Construction Verification Audits.

Q.3 Construction inspectors have not routinely used the checklist process to record and provide a basis for performance analysis and their power to halt unsafe work appears to be in question. (Recommendation Q.2)

Liberty's field work disclosed that some construction inspectors have not used checklists correctly. Some also defer completing them until the end of the week. Discussions with AMRP and Shop management also indicated lack of a structured or widespread effort to use checklist information. This data provides a basis for discussing and identifying means for correcting recurring or systemic performance issues. The use of the checklists has importance in ensuring consistent and thorough review of individual contractor performance. The checklists can also provide significant insights into issues that adversely affect work effectiveness, efficiency, and duration.

Liberty's field work also identified uncertainties among inspectors about their power (absent real-time clearance from a higher authority) to halt work activities that raise safety concerns. Giving that power to inspectors is critical to ensuring work performance that meets safety and performance requirements and expectations. Inspector lack of confidence or respect from field supervision may well contribute to this situation. Peoples Gas must recognize that denying inspectors the power to take immediate action does not offer a solution. A better approach lies in proper inspector empowerment and in training and communication about their role and authority.

Q.4 Contractor field resources demonstrate sufficient capabilities to perform the main and service installation work that comprises their portion of AMRP work.

The contractors selected to perform AMRP work undergo pre-selection evaluation. Their crews and supervision, as observed by Liberty in field investigations, demonstrated sufficient competence and effectiveness in field work performance. Liberty's discussions with Peoples Gas field management personnel disclosed no significant performance issues. Note that this conclusion does not address sufficiency of resources to support overall schedule requirements.

Q.5 Peoples Gas has had difficulty in filling internal positions responsible for AMRP work, and, like the industry as a whole, faces graying workforce issues that can cause skills gaps to widen over time. (Recommendation Q.3)

Maintaining an adequate number of skilled and experienced personnel forms a central element in ensuring work quality, timeliness, and efficiency. Peoples Gas faces current shortages in a number of positions. Liberty's review also confirmed the risk that shortages will increase, given the demographics of the internal workforce. Like others in the industry, Peoples Gas faces the loss of growing numbers of skilled workers and supervisors as retirement ages approach. A combination of disincentives to remain after reaching benefits plateaus and increased employment opportunities in an improving economy further increase employee retention risk. The growth of accelerated main replacement programs around the country adds further risk.

The discussions that began last September between Liberty and senior leadership produced consensus on the need to address internal resource numbers and skills, both short- and long-term. A comprehensive analysis of needs across the immediate and the longer terms should take place. Peoples Gas also needs to identify methods to incent bargaining unit employees to enter supervision and retirement-eligible workers to remain.

Q.6 A number of factors increase the difficulties that Peoples Gas has in providing sufficient numbers of experienced personnel. (Recommendation Q.4)

Liberty's field investigations and interviews with field management disclosed a number of specific personnel-related concerns that contribute to performance, safety, and compliance issues.

Peoples Gas has experienced a significant level of vacancies in key field supervision and inspection positions. The utility has not filled vacancies resulting from retirements, promotions, and reassignments at a sufficient rate to sustain resource levels at effective numbers and levels of experience. The growth in work occasioned by the AMRP and other work growth (such as the increase to medium pressure and the relocation of meters to outside locations) has placed significant strain on resources. Frequent switches in job assignments have produced many cases where job holders have short tenures in current, key positions (*e.g.*, shop construction supervisor and manager positions). Moreover, incentives to retain people in key positions and to encourage experienced workers to take supervisory positions are not strong.

Peoples Gas has consequently experienced a shortage of trained personnel to fill supervision and inspection roles. The impacts show in what Liberty's field inspection team found to be comparatively weak levels of supervision and oversight, particularly with respect to work being performed by Peoples Gas crews. Moreover, it is clear that there have been delays by Peoples Gas crews in accomplishing their designated elements of AMRP work. As contractors continue to perform substantial numbers of gas main and service replacements, the gap threatens to widen, absent expansion in the number and capabilities of Peoples Gas resources.

Compounding the difficulty, AMRP work must compete for resources with other programs that Peoples Gas must conduct contemporaneously (*e.g.*, compliance and leak management). Senior Peoples Gas executive management acknowledges the need for increased resources and for addressing together the AMRP and other needs that will continue to require substantial resources into the future.

Problems in maintaining sufficient numbers and experience levels also lead inevitably to losses in productivity and accountability for work completion. These losses appear in a number of ways; *e.g.*, increased use of overtime, poor location of service riser mark-outs, errors in work performance and resulting rework, and increased restoration costs when service transfers are completed after initial restoration following new main installation.

Q.7 Peoples Gas' designation of roles and responsibilities for oversight of work effectiveness, quality, and safety is unclear, and fully effective means for supporting the execution of those roles do not exist. (Recommendation Q.5)

Field Supervision

Liberty's field investigations found a lack of supervision of some Peoples Gas crews. Liberty observed in a number of cases the absence of on-site supervision and a lack of visits by responsible supervisors. Each of the three Shop areas has vacancies for first level supervision. Liberty's understanding of the benefits of entering supervisory roles indicates lack of sufficient material incentives for seasoned crew leaders (a natural source of expertise) to become non-union supervisors.

Liberty also observed high turnover of supervisors. They appear to get re-assigned often to programs or areas having immediate priority. The utility's failure to find sufficient numbers of experienced personnel contributes significantly to the observed lack of supervision. Liberty observed a similar gap in its 2008 audit for the Illinois Commerce Commission. At that time, however, the cause was the amount of paperwork first level supervisors had to complete in the office, thus keeping them away from crews in the field.

Meter Markers

Liberty's field inspections disclosed a number of cases where inaccurate marking of new meter locations raised concerns about compliance with safety and with Company procedures and standards. The work that Peoples Gas performs under common management with AMRP replacements involves moving to outside locations meters currently located inside customer structures. Marking the new locations thus comprises a significant effort. Completing the work that new main and service installation by contract crews initiates has been a problem for Peoples Gas. Adding to the problem, a lack of knowledge on the part of overly stressed and busy workers performing meter markings has produced violations and cost impacts for corrective work.

Supervision of Contractor Crews

Peoples Gas assigns a construction inspector to each contractor crew installing mains and services. However, Liberty's field investigations identified a lack of sufficient skill and experience levels of Peoples Gas construction inspectors. Many construction inspectors did not have gas or any other pipeline inspection experience prior to their hiring. The training they received is more appropriate for individuals with extensive gas construction experience such as former employees familiar with the Peoples Gas system. A majority of inspectors have come from other types of construction (*e.g.*, highway, water main, buildings). The mentoring provided comprises a good practice, but the quality of mentoring is also a function of expertise in gas construction.

Technical Training and Compliance Monitoring

The Company also needs to identify and empower a single source for providing ultimate guidance for field personnel questions involving operations and materials procedures and specifications. At present, contractors who have questions regarding standards or procedures rely on the advice they obtain from the construction inspectors, who may or may not have the needed experience or knowledge.

Another Integrys-based group, Technical Training has responsibility for training Compliance Monitoring Group inspectors. This group trains all Peoples Gas employees in safety, operating procedures, compliance, and Operator Qualification matters. Technical Training personnel should serve as the definitive source of guidance. Technical Training should be the most knowledgeable about Company procedures and standards and how they relate to compliance with state and federal safety regulations. The Technical Training staff, however, also has many members who lack substantial experience. Liberty also observed a loss of knowledge and expertise in Technical Training with regard to standard operating procedure requirements. Over the last several years, Technical Training lost many experienced staff members through retirements. This loss, coupled with changing standards and procedures (*e.g.*, an Integrys standardization program) has left the new management of Technical Training inexperienced in providing day to day answers to technical issues.

Liberty found some construction inspectors and Compliance Monitoring Group auditors confused about their roles and responsibilities when they observe non-compliant work or work methods.

Operator Qualification

The Pipeline and Hazardous Materials Safety Administration requires that pipeline operators performing covered tasks undergo evaluation intended to demonstrate the ability to “perform assigned covered tasks and recognize and react to abnormal operating conditions.” Peoples Gas has the responsibility for ensuring that the resources it employs are operator qualified.

Liberty found instances of contractor non-compliance with the standard operating procedures and standards program of Peoples Gas, particularly with respect to: (a) required operator qualifications (“OQ”), gas system mark-out (to avoid third-party damages when working in the vicinity of gas facilities) accuracy issues, providing adequate ground cover (above replaced mains and services), providing adequate service regulator vent terminus clearance (minimum distances from opening in buildings through which gas can migrate), performing meter marking to promote efficient interior piping, and thrust block sizing. In one instance an operator of a directional drilling machine did not have an up-to-date certification.

In addition, Liberty’s field investigation team made inquiries of those with proper certification about Abnormal Operating Condition (“AOC”) training. A person qualified to perform covered tasks must have the ability to respond appropriately when faced with abnormal operating conditions reasonably expected to be encountered when performing that task. In many cases, the responses produced an apparent lack of knowledge about what would comprise an abnormal condition for their operation. This observation applied to contractor personnel and the construction inspectors trained by Peoples Gas. The construction contractors and subcontractors were trained by an outside organization. The training provided appears to have gaps. Peoples Gas should be reviewing and clearing training material.

Liberty found a lack of full control by Peoples Gas of the quality of contractor Operator Qualifications programs or of similar programs for those inspecting contractor project work. Inconsistencies exist in the nature and degree of oversight of contractors by Peoples Gas inspectors and in approaches that the three Shop areas take to resolving field needs and issues. How inspectors carry out roles, document inspection activities, use inspection checklists, and prepare reports also exhibited inconsistencies.

Quality Control

Concerns exist with respect to quality control as well. Designation of the source of authority for quality control is not clear. The approaches applied to contractor quality control programs lack consistency, as do those processes for training and uniform knowledge and skills requirements for contractors and inspectors. In addition, Peoples Gas does not apply a consistent approach in addressing field questions, complaints, and improvement suggestions.

Q.8 The high rates of turnover, the lack of experience among replacements, and the slow pace in filling some positions make the need for training a particularly high AMRP priority. (Recommendation Q.5)

Peoples Gas does not provide training in a reasonably uniform manner to those who require it, and its training programs do not fully reflect the needs of a work force that has a large number of people filling roles in which they do not have significant experience. Moreover, when making organizational and process changes to address oversight of work safety and quality, the Company will have to provide training intended to ensure that those responsible for key roles understand their authority and how they need to execute it. Training regarding procedures and standards for construction inspectors requires particular attention.

Q.9 Peoples Gas has applied appropriate subsurface investigation methods.

Peoples Gas has generally been able to install new mains and services required by the AMRP in a safe and low risk manner by employing methods typically used in the industry. The Company has succeeded in locating its own and other utility subsurface facilities accurately and in a timely manner. When encountering difficulties in determining the location of subsurface facilities, Peoples Gas has used conventional methods successfully.

Q.10 Unexpected field conditions have not presented an abnormally high number of problems for AMRP installations, but the high incidence of third-party damages to Peoples Gas facilities indicates the need for examination of better methods for mapping new installations. (Recommendation Q.6)

Liberty's field work did not observe an unusual level of "surprises" affecting the ability to make installations as planned. Pre-construction work to investigate field conditions takes industry-typical forms. Peoples Gas has taken action to improve the locating of subsurface utility locations by performing follow-up quality control checks on problematic service providers, performing test holes to physically locate services, and using meter markers to locate entry points of legacy services on plot plans.

The high number of third-party damages to Peoples Gas facilities (described in this report's Chapter C: The Peoples Gas Distribution System), however, does raise concern about the marking of Company facilities. Peoples Gas currently uses manual processes to map new main and service installations. These processes can introduce errors in fixing the locations of new installations. Moreover, Peoples Gas currently uses building property lines measured from existing street corners. These corners can change, further reducing the accuracy of maps identifying Peoples Gas subsurface facilities. Considerable time can also pass between converting manually measured locations to geographic information system coordinates for placement on maps supplied to locating and mark out personnel and service providers.

Urban environments with a prevalence of very tall buildings can make it problematic to obtain a sufficient number of GPS satellites to locate mains and services accurately. Many Chicago neighborhoods undergoing AMRP work, however, consist primarily of low-rise residential structures that do not present this difficulty.

4. Recommendations

Q.1 Peoples Gas should address a number of construction standards' needs, and should enhance training, documentation, and auditing in a number of areas related to construction standards. (Conclusion Q.2)

Peoples Gas needs to address requirements related to the use of steel straps, jeepling, and thrust blocks. Moreover, the Company needs to address contractor and inspector training, in order to ensure compliance with Company and regulatory standards. The Company also needs to improve consistency and documentation of field work inspection, and consistently perform construction verification audits of contractor work.

Q.2 Peoples Gas should adopt measures to ensure consistent use of construction inspection checklists, develop a structured program for analyzing the information they produce to identify and respond to field performance issues disclosed, and clearly empower inspectors to halt unsafe work. (Conclusion Q.3)

Company-proposed initiatives resulting from discussions between Liberty and senior leadership include the initiation of an audit process intended to verify that all inspectors use the forms, use them correctly, and complete them promptly. This initiative, if implemented effectively, should address the need for ensuring that inspectors fill out the forms completely, do not allow them to accumulate for several days before completing them, and complete them under approved standards, with proper content, and on a timely basis.

Achieving these completion objectives, however, does not go far enough. The Company needs to add to its initiatives the design and implementation of a structured program, under dedicated oversight within the AMRP management organization, for analyzing the forms to determine where the information they capture identify performance problems. This analytical program needs to consider where such problems may exist in a variety of areas; *e.g.*, a particular contractor, employee performance in a geographic area, an engineering or construction standard, or an AMRP-wide work activity.

Liberty's field observations also indicate that Peoples Gas needs to provide additional training for construction inspectors, in order to improve their ability to recognize work that fails to comply with regulatory and procedural requirements. Similar training is in order to enable inspectors to better recognize abnormal operating conditions ("AOC"), and to document deficiencies in contractor training.

Most importantly, Peoples Gas needs to make clear to inspectors their power to halt improper work or activities as and immediately when they observe them.

Q.3 Peoples Gas needs promptly to conduct short-term and long-term analyses of its requirements for skilled and experienced field resources, develop incentives for moving personnel into new positions and incenting senior workers to remain, and ensure that training and development efforts anticipate (and not merely react to) vacancies. (Conclusion Q.5)

Performing a comprehensive field resource needs analysis represents a key first step. The Peoples Gas initiatives resulting from discussions between Liberty and senior leadership include plans for a needs analysis that will identify potential losses of first-level and general supervisors reaching retirement age. Peoples Gas should supplement that “numbers” analysis, which is appropriate, with an examination of the likely training and development needs for potential replacements.

The Company seems to understand that incentives to move into supervision and to remain with the Company after reaching retirement benefits plateaus must form part of its plans for ensuring adequate resources over the long AMRP duration that remains. The Company has acknowledged the long-term need to promote first-level supervisors from within (*e.g.*, moving well qualified and motivated crew leaders into management from this current highest union position). Such movement historically has provided an important source for acquiring first-level supervisors.

The needs analysis should look closely at the utility worker (formerly called gas mechanic) position, given the time it takes to fully qualify such mechanics. That training time makes it too late to begin the training process when a vacancy occurs, or becomes imminent.

Disincentives for crew leaders to leave the union and become first-level supervisors include loss of job security, reductions in some benefits (*e.g.*, pensions), and direct financial impact from loss of overtime premiums. The industry generally faces this problem, but changes in the Peoples Gas pension plan may exacerbate it. The Company must address the supervision shortage immediately. Liberty’s field work indicated instances of very little supervision of some AMRP work performed by Peoples Gas crews. Productivity impacts become inevitable when a lack of reasonably close and present supervision persists. The Company must examine and develop rewards programs that offer experienced crew leaders sufficient incentives to move into supervisor positions. The Company must also recognize the “vacuum” effect of employee movement into other positions. Movement into supervision will create a need for movement of gas mechanics into crew leader positions, thus threatening a resource area already under stress. In turn, measures to develop personnel to perform the work of gas mechanics must increase.

Short-term plans incorporate the use of contractors to fill vacant positions. Despite the importance of filling key vacancies “through any means available,” Peoples Gas needs to focus on the long term. With respect to the AMRP that long term still approaches two decades. Peoples Gas resource acquisition, training, and development initiatives require clear and aggressive time frames. Such time frames avoid the inevitable tendency for inertia to convert a short-term approach into the long-term approach.

Using contractors on a long-term basis for positions like meter markers, construction inspectors, and Compliance Management Group auditors will not likely prove most efficient over the long term. Moreover, developing an internal resource capability to address threats to future contractor

resource availability makes sense. The number of other companies pursuing and likely to initiate accelerated main replacement programs make future contractor availability a risk.

Company improvement initiatives contemplate a study of the optimal use of contractors versus internal employees. Peoples Gas must complete that study very promptly for it to have value in influencing resource acquisition. The Company must consider all costs and benefits involved. They include the value in developing resources that will outlast the AMRP, the costs of training short-term contractors, and the broader impacts of creating incentives designed to meet specific, targeted AMRP resource needs.

Peoples Gas must consider AMRP needs when conducting management position rotations. Those rotations have produced openings that have taken significant time to fill, and have caused disruption in some cases, as new position holders gain experience.

Q.4 Identify and pursue means to increase the stability in and the numbers of field supervision and inspection personnel. (Conclusion Q.6)

Discussions with senior management make clear its recognition that Peoples Gas faces resource restrictions that affect AMRP performance. A comprehensive understanding of the size of the resource gaps in areas affecting safety and compliance, however, must depend upon progress in improving overall planning, management, and control of the AMRP.

Nevertheless, on an immediate basis, Peoples Gas needs to begin addressing barriers that exist to securing resources to enhance supervision of crews.

The Company should undertake a focused examination of the incentives necessary to induce union crew leaders to become first level supervisors, as an alternative to filling vacancies through outside hires with limited gas operations experience. Current disincentives to internal succession include retirement programs, pay, and other benefits. The timeframe for filling first level supervision positions is long, as is the learning curve for outside hires. Peoples Gas needs to begin to address vacancies before they occur, even at the expense of temporarily having extra supervisors. Their ability to be trained and mentored by senior general supervisors prior to being assigned to crews will represent resources well spent in the interests of long-term AMRP optimization.

The Company also needs to promote a greater level of continuity in AMRP management and supervisory ranks at the Shop level. Minimizing job shifts that deprive the local Shops of key resources needs to become a priority. Doing so will permit faster resolution of issues by personnel not in the process of learning on the job. Greater stability will also help to make lines of authority and responsibility more clear. Lack of clarity about who (*e.g.*, the Project Management Office versus the Shop areas, Integrys versus Peoples Gas) has responsibility and accountability for what decisions and actions will improve performance beyond what our field inspection teams observed.

Q.5 Clarify responsibilities for key field roles and institute training programs to support them more fully. (Conclusions Q.7 and Q.8)

The Company needs to make clear that Technical Training is the recognized authority for guidance involving safety, operating procedures, compliance, and Operator Qualification matters, for both Integrys personnel conducting AMRP work through the Project Management Office and Peoples

Gas personnel working under management in the three Shop areas. It must also be made clear that Compliance Monitoring Group personnel are not only monitoring or advisory resources, but have the authority to address field safety and compliance issues directly and as they arise.

Technical Training needs to rework and expand the training for construction inspectors. It needs to design training that will ensure that inspectors are completely knowledgeable about Company procedures, standards, and regulatory requirements. It should undertake that effort based on a focused effort to identify the principal and recurring gaps and other problems.

The training should include practical, hands-on treatment of issues (*e.g.*, fusing and Operator Qualification requirements). It should also focus on how to spot poor quality work and who to call when questions or concerns arise. Technical Training should also make available and ensure that field personnel know how to gain prompt access to a knowledgeable person who can respond in a short time frame. Construction inspector training also needs to include City permit requirements and clear information on what requirements take precedence when conflicting or differing requirements apply (*e.g.*, City versus Peoples Gas standards; depth of cover requirements for city rights-of-way versus customer property).

Technical Training has lost expertise due to retirements and the use of contract instructors. It is therefore necessary to conduct a review of resource numbers, skillsets, and experience needs, followed immediately by preparation and prompt execution of a staffing plan to meet identified needs.

Technical Training also needs to review and improve the Operator Qualification training that contractors, subcontractors, and the construction inspectors receive. The goal of this review is to identify gaps in meeting the requirements of the Company, agreements with contractors, and applicable regulations. Particular attention needs to be paid to Abnormal Operating Condition training, to ensure that individuals know how to identify abnormal conditions associated with their positions, and what to do in case one occurs. This training is extremely important in preventing minor incidents from becoming problems. The training program of the Midwest Energy Association should be reviewed. If additional training is necessary, it should be required to be given by the Company or by an outside, approved training group.

Technical Training needs to bring the training of the meter markers back under its jurisdiction. Responsibility for such training moved to the three Shops (into which Peoples Gas divided its field operations and which managed the employee crews who perform back-end AMRP work) in 2013. Meter markers perform activities that determine the locations of meters to be moved outside of customer buildings. Meter locations affect interior piping amounts, service locations, and riser locations. Peoples Gas acquires meter markers from a contractor. The personnel provided by the contractor do not necessarily have gas distribution system experience. Recently, the contractor who supplies construction inspectors has promoted personnel from meter marker positions after assuming wrongly that individuals promoted have had adequate training.

Peoples Gas needs to become more engaged in the quality control programs of the prime contractors and some subcontractors. The utility retains ultimate responsibility for the installation and quality of construction. The Company should: (a) make itself aware of the content, resources, and methods contractors use to assure quality, (b) confirm their adequacy, and (c) see to the prompt

closing of any gaps. Peoples Gas must audit and provide guidance to the contractors and relevant subcontractor quality control programs, and ensure that these programs are designed, implemented, and audited in a manner designed to provide quality workmanship, and to meet all procedures, construction standards, and requirements.

Q.6 Peoples Gas should examine the benefits of equipping technicians with sub-meter accurate GPS devices in areas that have line of sight to satellites. (Conclusion Q.10)

The Company currently uses manual methods and paper handoffs from field personnel to map the new facilities installed. These processes produce errors and omissions. Equipping technicians with GPS capability can eliminate many such sources of error. Using sub-meter GPS in areas with satellite access may offer a more accurate method of updating mapping, geographic information system and property records. It would also produce an electronic record of the dates. Similarly, GPS technology could provide for seamless leak data integration into models.

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Chapter R: Work Management

1. Background

This chapter addresses the means by which AMRP management defines and manages the work processes required to perform AMRP project work. The chapter:

- Describes the overall work management process
- Examines the tools used to manage work
- Evaluates construction work packages and management methods and activities
- Assesses management methods for improving work processes
- Reviews means to address the work of groups whose activities support construction
- Evaluates the effectiveness of work to secure permits needed to authorize construction activities.

Workflow management refers to the creation of a repeatable business process documented and subjected to a defined set of procedural rules. Process definitions identify the activities, procedural rules, and control data used to manage a defined flow of work. Work (often termed “workflow”) management systems use software to store and interpret process definitions and to create and manage workflows. These systems typically support administrative and supervisory functions. For example, they provide a basis for work reassignment or escalation, they provide auditability, and they provide management information.

Modern work management systems support: collaboration on work processes, automation of redundant tasks, ensuring that uncompleted tasks undergo follow-up, creation of performance metrics for all elements of work flow, visibility to processes expected to be in place, knowledge of activities that slow progress, and identification of processes that may benefit from analysis and management attention. Examples of capabilities supported by modern work management systems include:

- Expediting the viewing, tracking, and comparing of costs
- Reporting tools that support more detailed budget analysis
- Work order control and communications
- Comparisons between cost estimates and actual costs
- Inventory support
- Work order management
- Fleet management.

Sophisticated work management systems, despite high costs that can run to the tens of millions of dollars, have become more common among utilities. Such systems support close management of capital and O&M project and program work activities from initiation to completion. They incorporate engineering release, procurement of materials, estimation of cost, work scheduling, preparation of the work plan, crew assignment, and job closeout. The scope, complexity, and duration of the AMRP clearly justify a substantial level of commitment to designing and implementing work management processes and tools of a reasonably sophisticated nature.

Liberty examined how Peoples Gas conducts work management. This examination included a review of how specific AMRP work orders flows through program processes.

2. Findings

a. The Work Management Process

i. Process Description

Discussing work management processes requires an understanding of the flow of AMRP work activities, around which work management centers. The AMRP work management process focuses on projects, which have three important levels of definition under the program. The AMRP makes “neighborhoods” the first level of project definition. These neighborhoods correspond to 228 areas of the City of Chicago. The second level of project definition separates many of these neighborhood-level projects into phases. The phase designation seeks to support a logical division of work large enough to justify subdivision and that may continue across multiple years. A third level of project definition also exists. Within a phase, AMRP management may assign distinct project status (numbers) to work activities segregated for accounting purposes.

AMRP project information enters the Company’s Work Management Information System (“WMIS”) upon completion of design. Management usually arranges for design work to occur at the neighborhood level. This approach can produce efficiencies. It does so by allowing contractors to pass along the benefits that can arise from projects with larger scope. Such projects, for example, can produce lower fixed, or overhead costs as a percentage of total costs. Contractors installing mains and services or providing design drawing services can bid on the broadest AMRP project scale practicable. They need reliable information to use as a bid basis. Management terms the design as it exists at this point the “WMIS Design.” That design supports the preparation of a preliminary cost estimate, which simply multiplies the design documents’ installation quantities by unit rates established for the relevant “compatible units.”

These compatible units comprise defined, standardized assembly units for which management identifies costs from historical and other data. Compatible units include factors such as labor tasks, vehicle and equipment requirements, materials, and accounting information. The industry commonly uses such units for estimating at this stage. AMRP management adjusts the units used for these preliminary estimates to account for data that may be out of date.

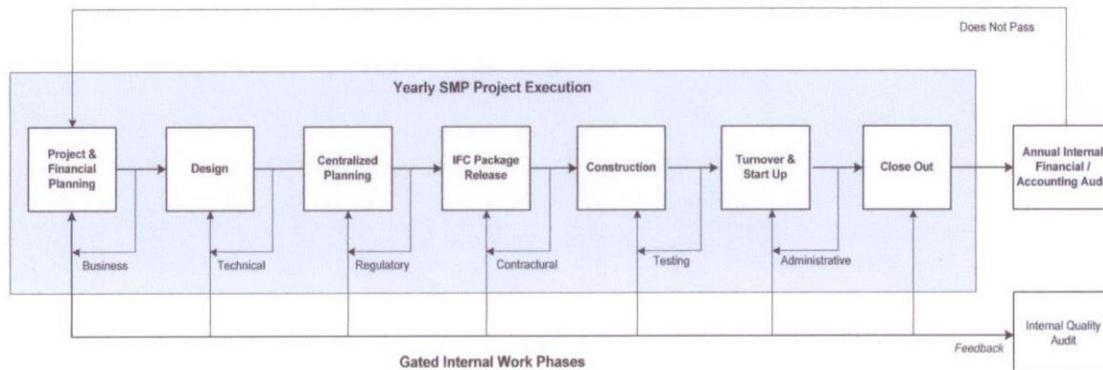
Peoples Gas submits these designs to the City of Chicago’s Office of Underground Construction (“OUC”) for review. This City Department of Transportation, Division of Infrastructure Management entity reviews and approves construction work in or adjacent to the City’s public ways. The City approval process considers clearances from underground facilities, such as sewer, water, and wiring, for example. During City review, Peoples Gas releases the design package for contractor bidding. Following final City approval, AMRP engineering finalizes the WMIS Designs, incorporating any changes resulting from City review. Following contract award, the final project cost estimate is generated. These estimates include contractor costs and the Peoples Gas costs for materials, labor, and overheads. Management then must approve the project design and estimate package prior to construction commencement.

For projects having multiple phases, the AMRP cost manager uses the scope definition for each phase and the project-level cost estimate and schedule. These phase-level products apportion the

quantities from the project-level estimate and use the year set for construction of the phase involved.

The AMRP does not operate under written guidelines or procedures addressing the work management process. The Project Execution Plan (“PEP”), however, contains a diagram that depicts the flow of major work activities. The next diagram illustrates that flow.

Illustration R.1: AMRP Work Activity Flow



Liberty found the interfaces and deliverables that need to exist among engineering, centralized planning, supply chains, field operations, shops, contractors, and inspectors clearly laid out. The delineated work activities include a close-out report that issues upon completion of a project. Procedures call for these reports to undergo review for resolution of outstanding issues, rectification of non-conforming items, return of unused materials, resolution of claims or disputes, and contractor performance evaluation. A close-out checklist for each construction work package remains open until sign-off by all responsible supervisors and managers.

The Project Execution Plan also included a number of work-flow maps charting component activities, such the audit process, engineering, centralized planning, construction, start-up, and close out. The AMRP uses a defined series of 25 work steps to chart the activities required to complete AMRP projects successfully. The next table summarizes the description of the activities comprising those steps and the deliverables that each produces.

Table R.2: Summary of Major AMRP Project Work Activities

No.	Major Step	Description of Activities	Deliverables
1	Project selection	Analyze to determine high risk main	General project area established
2	Design	Perform Stoner Feasibility and Phasing Design Analysis	Project Scope and Phasing
3	Preliminary Estimate Preparation	Prepared by design engineer	Preliminary Cost Estimate for each Phase
4	Entering Information into WMIS	Support work on tasks of other groups	Completed Business Case Authorization tasks for each Phase
5	Contract bids	Invite and receive bids	Project bids
6	Contract Award	Analyze, recommend, approve bids	Project purchase order
7	Final Cost Estimate Preparation	Prepare estimate; add Peoples Gas costs as a percentage	Final Cost Estimate

8	Authorization - Award	Make formal award per Approval policy	Info in PeopleSoft (tracking authorized level by contractor)
9	Authorization – Final Cost Estimate	Enter estimate for each Capital work order approved per policy	Info in PowerPlan (payment tracking by work/ purchase order)
10	City (OUC) Approval	Submit construction drawings to OUC for approval or resolution	OUC Approved Drawing placed in Work Package
11	Material Acquisition	Send material forecast from Work Asset Mgt. System to Advanced Planning System	Materials received into inventory of warehouse
12	Work Planning	Coordinate with customers to install main and services by contractor	Customer letters requesting appointment to discuss installation
13	Document Control	Release Engineering Work Package (EWP) to Construction planning; permits ordered/ released with materials to contractor	OUC approvals, permits, tickets, installation/retirement drawings, service tie over list, bill of materials
14	Field Planning	Implement Construction Work; coordinate contractors and change orders; resolve installation/ permit problems; resource planning, budget and schedule monitoring	On-going coordination between Peoples and Contractor
15	Construction Scheduling	Maintain main/service construction, gassing mains, meter/regulator installation, service cut-offs, retirement and restoration schedule	Submittal of scheduling requirements by contractors
16	Permitting	Request permits based on engineering; submit permit requests from Shops	Permits to Shops and Document control
17	Material Delivery	Construction planning releases materials to contractors upon request to warehouse	Materials shipped to contractor from warehouse
18	Gas Main Installation	Excavate, install, test, restore gas main, pre and post camera of adjacent main line sewer and laterals all performed by contractors	Installation of gas main per plans
19	Services Installation	Install service per service tie-over list; excavation, installation, testing, restoration, post camera of adjacent main line sewer and laterals all performed by contractors	Services installed per plans and service tie-over list
20	Gassing Mains	Tie-in and Gas main by Peoples Gas, upon satisfactory air-test of main by contractor; restoration of tie-in openings by contractor	Mains gassed by Peoples Gas crews
21	Meter & Regulator Installation	Relocate meters and necessary regulators to outside of building by Peoples Gas crews	All meters relocated to the outside of the building
22	Service Cut-offs	Cut-off old service by Peoples Gas crews once the building has successfully been transferred to the new service	Old building service transferred to new service
23	Restoration	Perform temporary and permanent restorations by contractors per specifications	Restoration by Contractor per City Department of Transportation specifications
24	Inspection	Peoples Gas construction representatives inspect to ensure all restoration complies with current City Department Of Transportation standards	Restoration punch list
25	Close-outs	Sign-off close-out checklist noting construction and base restoration completed, as-built drawings accepted, change orders processed, and punch list items completed	Project close-out checklist

b. Work Management Process Improvement

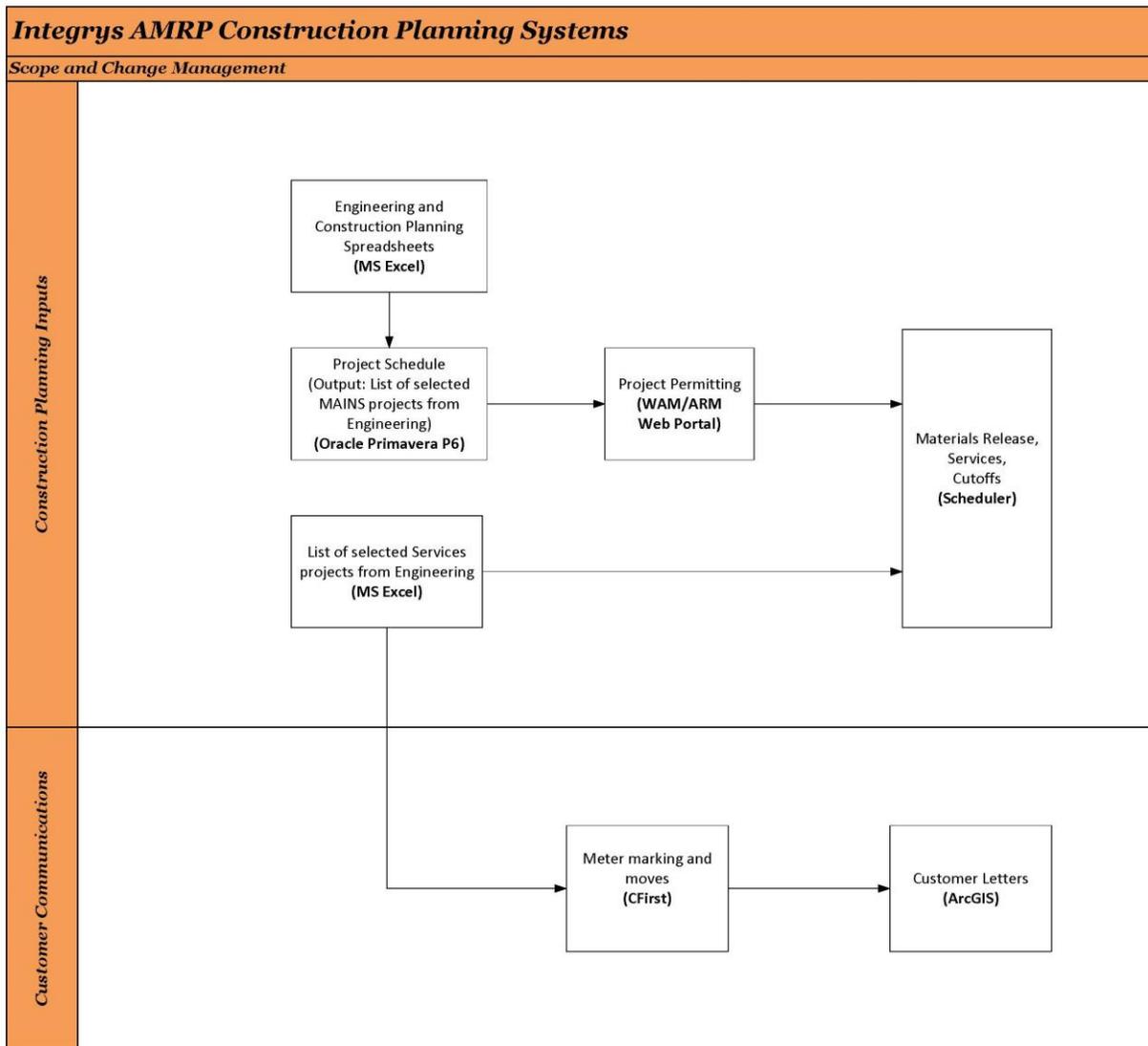
Peoples Gas has undertaken improvement initiatives to enhance the AMRP work management process. These initiatives do not take full advantage of the potential benefits resulting from the scale and duration of the AMRP. They nonetheless demonstrate positive steps to enhance the work management process:

- Adoption of a zonal approach to scheduling internal workforce and contractor crews to reduce travel time and increase productivity
- Development of detailed specifications to standardize all contractor requirements
- Implementation of document management and control
- Development of training requirements for new inspectors and annual refresher training requirements for existing inspectors
- New labor training program established at the City College to expand the labor pool and grow the apprentice program
- Metrics development to monitor performance on safety, cost, and retirement goals
- Quality management system software selected to manage field safety metrics
- Nonconformance reports and Quality Assurance/Quality Control documentation
- Reporting and tracking of construction performance
- Enhanced schedule logic and standard activity structure developed for use on individual projects
- Program work breakdown structure developed and implemented for scheduling
- Quality Assurance Manual and associated quality control procedures developed.

c. Work Management Tools

The next diagram illustrates principal interfaces among AMRP work management tools that address pre-construction and customer communications activities.

Illustration R.3: AMRP Work Management Tools



The following tools address construction related work:

- The Work Management Information System: used mainly to order materials and manage internal resources
- A SharePoint site: posts construction work packages
- Primavera P6: an industry-accepted tool that AMRP management uses for construction scheduling.

Liberty examined a specific AMRP project in more detail, in order to observe how management actually conducts the work management process. Working at Project Management Office work locations with the Centralized Planning Manager, Liberty walked through the computer screens displaying work management tools and information, discussed key documents in the construction work packages. The walk-through included, for example, valve tickets, approval letters, permits, traffic control plans, engineering drawings, construction schedules, and material lists. Liberty also

visually examined the SharePoint site, which AMRP uses to post construction work packages. Liberty examined how contractors extract construction work packages from the site. The Microsoft SharePoint concept allows organizations to provide a secure place to store, organize, share, and access information from electronic devices, using a web browser.

Liberty also examined work management tools and information for the same project in the field. This examination took place at the Central Shop, working with the Supervisory Engineer at his personal computer. Liberty reviewed the capability to extract construction work package information. The system allows contractors access only to their own awarded projects. Liberty verified the existence of the required release for construction, walked through the traffic plan, and examined the city approval letter, the services plan, and the listing of addresses affected. The information available for the project included the Office of Underground Construction Review records, the various permits, valve tickets, and a summary of the bill of materials, construction drawings, restoration drawings, and retirement drawings. The construction work package appeared comprehensive, and transmission via SharePoint to the Shop appeared effective.

d. Construction Work Packages

The Document Control group assembles Construction Work Packages (“CWPs”), issues them directly to contractors, and copies them for use by the entire construction team as a source of scope definition. That team includes the Project Management Office, contractors, and the Peoples Gas Shops. These packages get posted on a SharePoint site, accompanied by e-mail transmittal to a set distribution list. Contractors gain access through a separate SharePoint site set up outside the corporate firewall. The AMRP Construction Planning group manages all permitting activities. These activities include requests for and tracking of all permit requests, expirations, and renewals. All work requiring Illinois Department of Transportation (IDOT) permits must have traffic control plans. Engineering consultants prepare them for review by People Gas. Requests for these include Company-approved traffic control plans.

The construction work package contains drawings, valve tickets, corrosion tickets, approval letter from the city, traffic control plan, material lists, and constructions schedules. Document Control staff uploads the whole package to a SharePoint site that all authorized work groups, including the contractor selected, can access.

Liberty examined a project Construction Work Package for content. This package included the expected documentation:

- Engineering Summary
- City Office of Underground Construction - Approval letter with attachments
- Redflex Traffic Systems drawing – Traffic Control Plan for Cicero at Addison corner
- Summary Bill of Materials
- Permit by activity
- Service tie-over list at Portage Park Phase 4
- Valve tickets – Type D installation
- Restoration drawings
- Installation drawings
- Retirement drawings.

e. Construction Work Management

The Peoples Gas Shops managed their budgets at the project level by work hours. The Shops determine the work hours on the basis of the level of effort associated with main and service installation. Contractors provide detailed schedules for main and service installation. The Project Management Office scheduling group works with the Shop construction managers to identify and establish the interface requirements for Shop activities. The contractor and master project schedules address those interfaces. Contractors cannot complete their work until they finish restoration activities that follow the back-end work performed by Peoples Gas crews. The Project Management Office scheduling group and the Peoples Gas shops currently work together to begin resource loading the schedules. These loadings should assist in verifying that Peoples Gas can meet total resource requirements (and allocate them effectively) for performing their portions of AMRP work.

Peoples Gas distribution crews make the tie-ins to gassed mains after contractors have installed and tested new main and service installations. Main gang crews may need to cut out an existing main to install a tie-in piece or make a hot tap into the energized main. These crews use different methods, depending upon the type of existing main (plastic, for example). Main gang crews also have responsibility for the abandonment of old mains. Abandonment occurs after verifying the transfer of all services to the new main.

Peoples Gas distribution and service crews also conduct the activities associated with relocating meters. The relocation process involves internally plugging the existing low pressure service when possible. Otherwise, the crews make a physical cut on the exterior of the premises via an excavation. After plugging or cutting the existing low pressure service, Peoples Gas crews install new meters and regulators, and then relight appliances.

Management of these Peoples Gas work processes takes a number of forms, supported by daily communication among Shop supervisors, construction managers, and contractors. Daily updates to Shop databases identify services installed and ready for transfer, main amounts being installed, and the time horizon across which Peoples Gas can reliably predict requirements for energizing new main segments.

f. Support from Other Work Groups

Many work groups support AMRP work. The next table summarizes the major functions of these groups. Some of them operate through resources not dedicated full time to the AMRP.

Table R.4: AMRP Support Group Functions

Other Work Group	Major Functions
Engineering/Planning	Identify and plan work; develop master plans
Engineering/Design	Prepare / update the gas (Stoner) model and drawings; conduct design and constructability reviews; obtain Chicago OUC approval; define Construction Work Packages / prepare contents; review and input as-built drawings into model
Procurement	Purchase materials; manage contract bidding and award process
Construction Planning	Schedule and obtain permits from city and state; send out customer letters; coordinate conflicts with the city and other utilities
Document Management	Assemble all Construction Work Packages; control all documents between the AMRP and contractors
Shops	Mark and set meters; provide all services for live gas (retire mains); coordinate construction sequencing with contractors; coordinate field issues and logistics; manage construction tie-in and test mains
Scheduling	Plan, schedule and coordinate work between engineering, construction planning, contractors and shops
Cost Management	Develop, and manage budgets; forecast costs
Contract Management	Manage the Notice to Proceed, Request for Information and change management processes; manage contract details
Field Inspectors	Inspect contractor work to ensure compliance with specifications
Restoration Mgt.	Ensure that restoration is completed per schedule
Close-out	Verify job and paperwork completion prior to final payment release
Communications	Coordinate and provide liaison between Peoples Gas and the community and within Peoples Gas between major functional groups
Government Affairs	Develop relationships and communications with city and state
Safety	Provide safety leadership and reporting; advance safety as a way of life for all AMRP participants as realized in reduced safety incidents
Quality	Ensure that the program / projects are executed in compliance with procedures, plans, and functional practices

The AMRP Engineering Supervisor believes that design engineers have provided adequate technical support to the field during construction. Liberty observed, however, that a number of unfilled positions exist in the engineering resources dedicated to AMRP. One cause of vacancies comes from the Company’s engineer rotation program. This program creates periods of shortages pending replacement of engineers departing for rotation purposes. The Engineering Supervisor did not express confidence that the Company could fully staff AMRP engineering over the program’s long term.

The Compliance Monitoring Group Lead, an employee of the Integrys Business Support organization, oversees the AMRP Quality Assurance/Quality Control program. This Lead also has responsibility for construction in other Integrys areas of operation. Auditor qualifications include one to six years in gas operations and one to six years in field supervision. The current audit target requirement is to audit one contractor per quarter. Tasks covered by these audits include gas main replacement, service installation, anode installation on cathodic protection, and directional boring. A computerized data base houses records associated with auditing. The database identifies audit types and activity levels, and includes a 15-question checklist. Auditors generate deficiency reports when they find unacceptable conditions or circumstances. Contractors then have five to seven days to rectify problems found. The auditing program has not found any major, recurring issues.

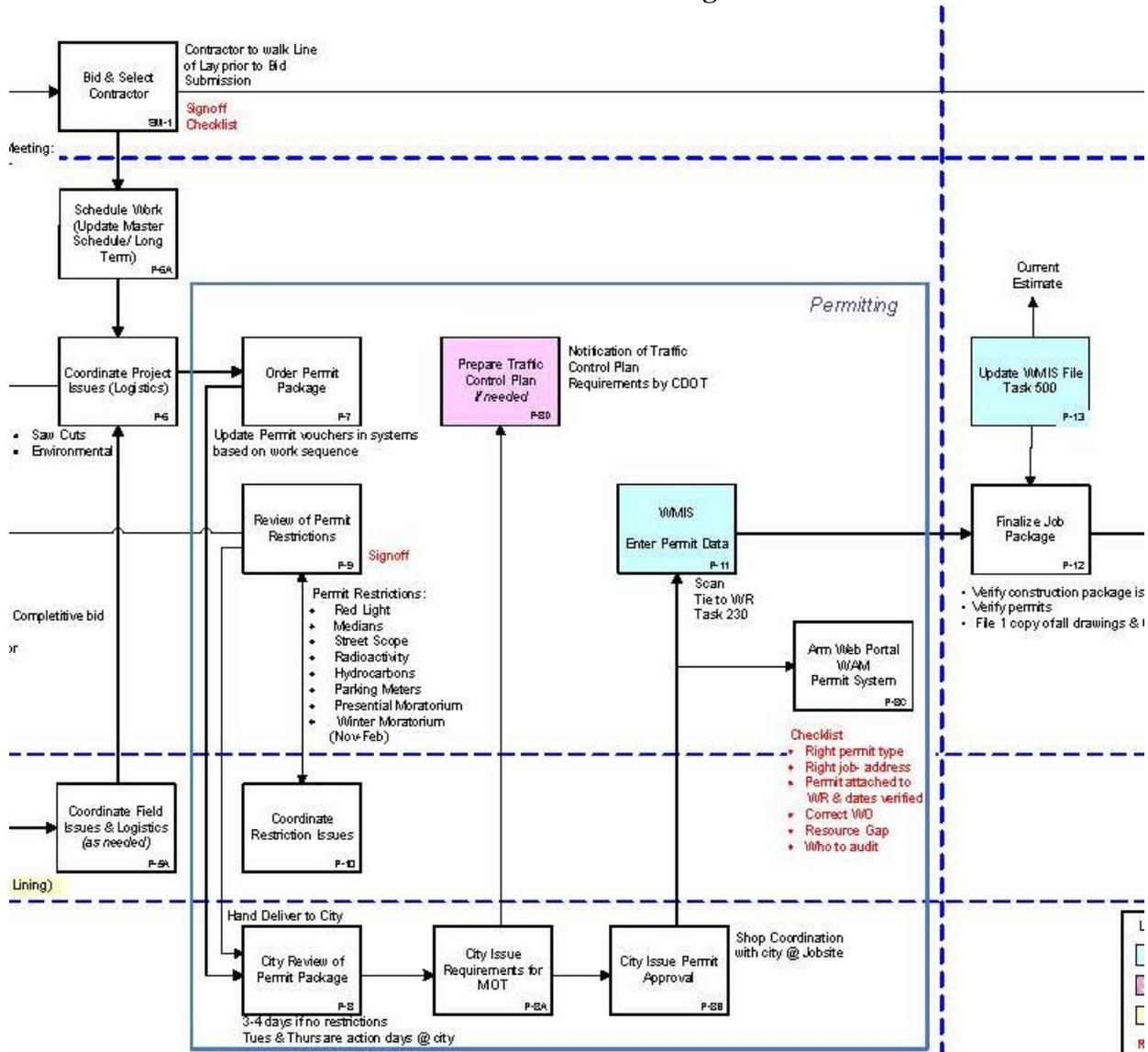
The Lead Inspector, a position filled by a Jacobs Engineering person, has responsibility for inspecting contractor AMRP work. The current inspector team has 19 members. The team, however, currently lacks people in 16 approved, but open positions. Each inspector undergoes a training plan that includes two weeks of field shadowing and two months of classroom work. The class work addresses Peoples Gas procedures; *e.g.*, as as-built drawing accuracy verification, fusion, and work orders. These inspectors only examine contractor work on main and service installations. The AMRP targets one inspector per crew. Crews generally consist of six to eight workers. Jacobs Engineering has responsibility for advertising and recruiting of needed inspectors. Retired Peoples Gas craftsmen (with 25 to 30 years of experience) make up most of the contractor inspection force.

The Lead Inspector believes a large pool of potential resources obviates any concern about resource availability. Liberty inquired about the large number of inspector vacancies, given this view about the ample number of resources available to fill positions. The reason was not clear.

g. Permit Coordination

Generally speaking, the AMRP work management process has proven supportive of getting work done in the field. Permit issues, discussed more fully in this report's Chapter S: Safety and Compliance, however, have caused significant schedule delays, and have produced work inefficiency. The next diagram (from the Project Execution Plan) highlights the complexity of permitting work activities.

Illustration R.5: AMRP Permitting Work Flows



3. Conclusions

R.1 The AMRP work management program appropriately supports construction work.

Peoples Gas employs a reasonably comprehensive work management process that employs sound work management tools. The work packages provide adequate information for construction contractors and internal Peoples Gas crews. This report's Chapter E: Plan for Management addresses the lack of assignment of project managers to many individual AMRP projects. The lack of assignment of a project manager for each project leaves no dedicated responsibility and accountability for managing performance from project inception to completion. Engineering has charge of the project work flow until construction takes it over. Significant project issues are at risk of going unaddressed as a result. Use of a project manager at the project level (as recommended in Chapter E) would provide a clear source for recognizing and addressing risks early. Permit coordination programs offer an example of such risks that have posed material

consequence for AMRP cost and schedule. Evaluation of contractor performance comprises another example. Liberty learned that management has undertaken no such evaluation for a number of years. The Supply Chain organization performed an older evaluation, but reports that responsibility for doing so now resides with Construction Management.

R.2 Peoples Gas has implemented some improvements to work management practices, which focus on construction, but has not captured all opportunities for gaining efficiency in performing repetitive AMRP activities. (Recommendation R.1)

To take advantage of the long duration and repetitive nature of AMRP work, management needs to focus on opportunities to increase productivity in the installation of mains, services, and meters, which comprise the three largest components of overall costs. This report's Chapter I: Resource Planning addresses productivity monitoring. Moving past the construction ramp-up period and informed by experience to date, Peoples Gas should be at the point of producing close to maximum installation efficiency. For instance, Liberty expected the unit rate of work-hours per meter installed by the internal workforce would show improvement (*i.e.*, reduction). Likewise, the unit cost of main installation and service installation should lower, or at least remain flat. Failure to monitor such rates, however, precludes a clear understanding of the direction of such rates over time. The Company needs to accompany improvements in monitoring such rates with efforts to examine the potential for process improvements that will produce efficiency gains.

R.3 The AMRP lacks designated project controls engineers that the program needs to support program managers. (Recommendation R.2)

Managers have the responsibility to manage work effectively and efficiently. They possess varying degrees of skills, based on their education and experience. Some managers devise their own tools and some do not. The AMRP needs a consistent set of tools routinely applied to support program management effectively. The AMRP also needs capable engineers and analysts to examine costs and to identify potential areas of improvement in effectiveness and efficiency. This report's Chapter L: Cost Management addresses this same need from the cost monitoring and analysis perspective. Its relevance in this context comes from the need for the use of cost data to support work management changes. Control engineers or cost analysts who examine cost data can assist construction management in developing metrics and performing analysis designed to highlight ways to better define and manage field work activities. This report's Chapter O: Reports and Analysis discusses the potential for using existing resources to assist in performing cost analytical functions not currently performed.

R.4 Permit coordination adversely affected progress in the field and imposed cost inefficiencies. (Recommendation R.3)

The AMRP Monthly Status Report contains a schedule section that summarizes schedule variances. The 2014 year-end report listed almost 80 percent of project phases as behind schedule. Many of these delays cited permit issues or still pending approvals from the City's Office of Underground Construction as the cause. Schedule delays generally produce cost increases.

4. Recommendations

R.1 Peoples Gas should establish a formal continuous improvement program under the Impact Team to promote a culture of and an emphasis on seeking innovations to improve efficiency in the installation of mains, services, and meters. (Conclusion R.2)

A Company-established Impact Team that has been examining AMRP performance for some time generated a number of initiatives. Most have Integrys-wide application. This team, or a successor identified by new AMRP leadership, should focus more specifically on improvement opportunities created by the highly repetitive nature and the long duration of AMRP construction work (specifically with respect to main, service, and meter installations). Employees working on the AMRP likely form a primary, if not the most likely, source of identification of improvement initiatives. A formal continuous improvement program, complete with emphasis on quantifying costs and benefits will promote a cost awareness culture, and improve efficiency on an on-going basis.

R.2 Peoples Gas should assign a project control engineer or cost analyst to each of the three Shops to handle the analysis of all AMRP construction work performed by the internal workforce and contractors. (Conclusion R.3)

Two other chapters of this report (Chapter L: Cost Management and Chapter O: Reports and Analysis) discuss the importance of equipping managers with the analytical capability and resources to support effective management. Some Peoples Gas engineers and cost professionals have skills suitable for performing this role. Management should combine existing skilled personnel and added resources to address the needs discussed in those other two chapters. These resources should also focus specifically on work processes, seeking to identify improvements that will enhance effectiveness and efficiency. Liberty recommends the assignment of one project control engineer or cost analyst per Shop to handle the analysis of AMRP construction work performed by internal workforce and contractors. The Company can matrix them to the cost management organization recommended in this report's Chapter L: Cost Management. A matrix approach will allow them to develop skills and consistency of approach through the cost management organization, while taking advantage of construction work knowledge in the Shops.

R.3 Peoples Gas should assign a single manager to coordinate AMRP-level permitting improvement initiatives and to monitor and measure permitting for the duration of the program. (Conclusion R.4)

Liberty made recommendations regarding permit coordination in this report's Chapter S: Safety and Compliance. That chapter addressed improving communications with the City, reorganizing the External Affairs organization, creating a function dedicated to liaison with the City, improving performance, enhancing project planning, developing a database for permit applications, and integrating permitting into project scheduling. To ensure that these improvement needs get proper and timely attention, the AMRP team should assign at a senior program management level the responsibility to implement needed changes, and then to continue to resolve any permit coordination problems.

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Chapter S: Safety and Compliance

1. Background

This chapter reviews safety violations of Illinois and Federal regulations from the beginning of 2012 through the middle of 2014. The chapter also describes the corrective actions taken. Liberty conducted this review to determine baseline conditions associated generally with the performance of work subject to minimum safety standards established by the State of Illinois and the U.S. Government. The review also focused on compliance with requirements more directly associated with the AMRP. The City of Chicago is the primary source of such requirements. Compliance with requirements is essential for the effective performance of a program such as the AMRP. Liberty sought to determine whether the recent violations history demonstrates any recurring or systemic problems that have had or that may have a substantial impact on the efficiency, effectiveness, or safety with of AMRP work.

The field investigation work that Liberty undertook as part of this investigation also has a close connection with matters of public safety. This chapter discusses some of the safety and compliance issues observed during those field investigations. Chapter Q: Field Work Performance addresses those investigations and their findings in detail.

A particular safety focus here concerns notices of violations received by Peoples Gas from responsible government authorities. Inquiries with respect to such violations included:

- Reviewing safety audits and violations of 49 CFR 192 over the last two years
- Reviewing corrective action reports and other documents relating to prior safety violations
- Reviewing incident reports for root causes that may involve safety violations
- Evaluation of compliance procedures and policies
- Interviewing and observing Company and contractor field personnel
- Integrating reported incidents and safety audits findings to identify any recurring or systemic issues.

2. Findings

a. Safety

Ensuring public and worker safety at work sites must be a first priority for the AMRP. Liberty's field examinations (discussed in more detail in Chapter Q: Field Work Performance) considered safety. Controlling traffic effectively keeps rights-of-way as clear as possible for the traveling public. Traffic control also ensures motorist and pedestrian safety. Liberty's field inspections found traffic control effective. Chapter T: Government Coordination addresses City relationship issues involving traffic control. Public and employee safety comprise first priorities in the performance of AMRP work and in the operation of gas systems.

Worker accident rates among Peoples Gas employees performing AMRP field work have exceeded those of contractors. This result reflects a reversal from what Liberty has seen elsewhere for field work in the gas distribution business. A 2008 Liberty audit for the Illinois Commerce Commission identified upper management focus on promoting and ensuring safety as an issue. Work on this investigation confirms a continuing need for senior leadership and for AMRP

management to communicate a strong commitment to safety. Liberty’s field investigation work disclosed instances and conditions that implicate safe work practices and conditions. The Company has made progress in recent years to reduce the number and the severity of these accidents, but their rates continue to raise concern.

The next tables list 2012 through mid-2014 safety notices occurring in the City of Chicago. It does not include violations related to storage or to liquefied natural gas. The section references are to 49 CFR 192 (“Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards”). The notices consist of three types:

- Notices of Amendment (Company procedures require amendment to meet minimum state or federal requirements)
- Notices of Probable Violations (subject to agreement by the Company or administrative resolution if contested)
- Inspection Issues (noted by Illinois Commerce Commission inspectors during inspections of field work or records).

Table S.1: Pipeline Safety Notices and Inspection Issues

Notices of Amendment

Date	Violation	Section	Closed
2012			
2/21/12	DIMP Master Meter Implementation	192.1005	5/14/12
2/23/12	Test requirements below 100 psi	192.509a	6/20/12
4/10/12	Purging of pipelines	192.629e	7/27/12
7/25/12	Public awareness	192.616c	11/20/12
2013			
6/5/13	Control Room Management	192.631c2	1/2/14
6/5/13	Control Room Management	192.631b4	
6/5/13	Control Room Management	192.631b3	1/2/14
6/5/13	Control Room Management	192.631b1	1/2/14
8/22/13	O&M Manual	192.605a	12/27/13
2014			
1/23/14	O&M Manual	192.605b3	6/17/14
1/31/14	O&M Manual	192.605a	6/2/14
1/31/14	O&M Manual	192.605a	6/2/14
5/15/14	General Requirements for Pipelines	192.13c	

Notices of Probable Violation

Date	Violation	Section	Closed
2012			
1/10/12	Electrical isolation	192.467d	7/9/12
1/10/12	Test requirements for reinstating service lines	192.725a, b	7/9/12
1/31/12	Plastic pipe, qualifying people to make joints	192.285	2/6/13
3/6/12	Emergency Plans	192.615c	7/8/13
2/23/12	Test requirements for plastic pipe	192.513	7/9/12
2/23/12	Customer notification	192.16b,c	3/14/13
2/23/12	Test requirements for reinstating plastic lines	192.725	7/9/12
3/15/12	Public awareness	192.616	7/9/12
7/26/12	Reporting safety related conditions	191.23a1	12/20/12
9/13/12	General – Maintenance	192.703c	11/26/12
9/13/12	O&M Manual	192.605a	12/17/12

11/28/12	General - Operations	192.603b	2/1/13
2013			
2/19/13	General – Maintenance	192.703b	
2/19/13	Emergency Plans	192.615a	
3/14/13	Records – Tests	192.517b	4/29/13
8/22/13	O&M Manual	192.605a	1/3/14
8/27/13	O&M Manual	192.605a	10/21/13
10/17/13	O&M Manual	192.605a	1/3/14
2014			
6/16/14	External Corrosion Monitoring	192.465a	

Inspection issues

Date	Violation	Section	Closed
2012			
3/19/12	Customer meters and regulators: Protection from damage	192.355	12/23/13
3/19/12	Recordkeeping	192.807	12/23/13
3/19/12	Plastic pipe: Qualifying persons to make joints	192.285	3/10/14
3/19/12	General - Operations	192.503	12/23/13
4/10/12	Customer meters and regulators: Location	192.353	7/9/14
4/12/12	192.603(b) - General provisions		1/28/14
4/10/12	Excess flow valve installation	192.383b	12/23/13
4/12/12	General - Maintenance	192.603b	1/28/14
4/12/12	General - Maintenance	192.603b	1/28/14
4/10/12	Damage prevention program	192.614c5	1/28/14
4/19/12	Damage prevention program	192.614	1/28/14
4/19/12	Damage prevention program	192.614	1/28/14
8/7/12	Purging of pipelines	192.629a	12/23/13
10/3/12	Inspection of materials	192.307	12/23/13
2013			
9/5/13	O&M Manual	192.605b8	
10/8/13	Line Markers	192.707a1	7/9/14
2014			
1/30/14	General - Test	192.703a	4/11/14
1/30/14	Plastic pipe: Qualifying persons to make joints	192.285d	
3/13/14	External corrosion control: Test leads	192.471a	6/12/14
3/13/14	Damage prevention program	192.614a	6/13/14
3/19/14	Distribution system: Annual report	191.11a	6/9/14
5/28/14	General requirements – Testing	192.503d	
6/11/14	General provisions - Operations	192.603b	
6/11/14	Pressure limiting and regulating stations: Capacity of relief devices	192.743a	
6/11/14	Pressure limiting and regulating stations: Inspection and testing	192.739a	
6/10/14	General provisions - Operations	192.603b	
6/12/14	Marking of materials	192.63a	

i. City of Chicago Permit Compliance

Liberty examined compliance with City of Chicago permitting requirements. The following tables summarize issues arising under those requirements. The number of Chicago permit violations rose from 658 in 2012 to 807 in 2013. The violations include both AMRP and other work. The 2013 violations include 250 resulting from AMRP work. Peoples Gas did not separately identify AMRP violations prior to 2013. The largest violation causes in 2012 consisted of permitting issues (424 cases of no permitting or failure to report openings), with the second largest causes relating to

restoration (73 cases). Main and service installations require substantial surface restoration work. City permits subject restoration work to substantive requirements and time limitations. For 2013, the principal causes remained the same. Permitting issues (unreported openings, lack of permits, failure to extend permits, incorrect locations) accounted for more than 300 of the 807 violations. Restoration issues (untimely or failing to meet permit standards) accounted for a number approaching 200.

Table S.2: 2012 City of Chicago Permit Issues

Root Cause	No.
Contractor repair untimely	18
Contractor received work late	56
Street/sidewalk obstructed	0
No plating/barricades	13
Plating/barricades not secured	8
No permit	170
No permit (B-Box)	0
Working outside of permit	0
Unauthorized closing of street	0
Prior years related (lost)	0
Opening below grade (OBG)	0
Opening not reported	254
Structure failure	0
Street not striped	0
Weather not permitting restoration	0
CBD exception	0
Unsatisfactory restoration	10
Failed to restore sidewalk to CDOT Standards	14
Failed to restore street to CDOT standards	49
Obstructing public way	5
Failing to sawcut before restoring to CDOT Standards	2
Failed to restore opening within 5 days of permit	1
Failed to provide barricade for opening	3
Violated permit terms - incorrect permit	3
Failure to cover manhole	1
Placed equipment in "paid to park" zone without restrict stated in permit	3
Violation of permit - stored material in parkway	2
No permit & failure to restore street to CDOT Standards	4
Failure to plate opening securely	1
Failed to thermoplastic stripe pavement	11
Damaged curb during street excavation	1
Failed to secure plate	3
Slow manual process	24
No restoration agreement	1
Failed to remove plate	1
Total	658
AMRP caused	?

Table S.3: 2013 City of Chicago Permitting Issues

Root Cause	No.
Contractor restoration failed	1
Failed to concrete base opening	7
Failed to maintain non-telecommunication utility access	1
Contractor received work late	9
Contractor restoration untimely	24
Damaged curb during street excavation	0
Failed to plate opening	7
Failed to provide barricade for opening	4
Failed to remove plate	1
Failed to restore basin box	1
Failed to restore opening within 5 days of permit	3
Failed to restore sidewalk to CDOT standards	53
Failed to restore street to CDOT standards	92
Failed to secure plate	18
Failed to stripe pedestrian walkway	1
Failed to thermoplastic stripe pavement	33
Failing to saw-cut before restoring to CDOT Standards	5
Failure to cover manhole	0
Failure to extend permit	30
Failure to maintain street opening to grade	8
Failure to plate opening securely	1
Failure to post sidewalk closing sign & no Company telephone number	6
Failure to secure plate	4
Failure to secure plate & failure to plate opening	1
Material left in street after 5 days of completion of work	2
Grinded not topped due to asphalt plants not open	1
No permit	43
No permit & failure to restore sidewalk to CDOT standards	2
No permit & failure to restore street to CDOT standards	5
No permit on site	3
No permit and failure to sawcut opening	2
Opening bigger then permit states	5
No plate & materials stored in parkway	1
Obstructing public way	15
Opening not reported	231
Placed equipment in "paid to park" zone without restrict stated in permit	1
Permit did not state street openings were going to be made	8
Paving inspector inspected untimely	1
Street cut 1' 1/2' below grade	1
Permit does not state correct location	23
Old opening	5
Manhole below grade	1
Slow manual process	78
System error, RSTIN not complete	1
Violated permit terms incorrect permit	6
Missing valve cover	1

Violation of permit stored material	7
Shared Opening	1
Failure to restore parkway to CDOT Standards	2
Violation of permit terms	13
No inspection created	3
Corrosion core openings	2
Other's opening	1
Failure to remove barricades	1
No stamp in concrete	1
Failed to amend permit for restoration	2
Failed to saw-cut and post signs	1
Failed to maintain parkway opening to grade	1
Failure to post "Sidewalk Closed" signs	1
More openings than permit states	7
No restoration agreement signed for moratorium street	2
Vehicle drove over curb	1
Did not maintain safe temporary restoration of ADA	3
Failure to restore ADA to CDOT standards	1
Slow permitting process	5
Failure to utilize 150' rule	1
Construction debris left, No workers present	2
Work not scheduled or completed in WIMIS	4
TOTALS	807
AMRP CAUSED	250

b. Federal OSHA and Environmental Compliance

The next table summarizes recent-year citations from the U.S. Occupational Health and Safety Administration. Their number and the lack of recurrence recently indicate that they do not reflect current systemic or recurring problems.

Table S.4: OSHA Citations

Date	Citation	Reason	Agency	Status	Pending Actions
8/25/2010	3.14E+08	No shoring. No cave in protection. Repeat downgraded to Serious with fines of \$20,000. Competent person allowed person to work in the opening. Serious downgraded to None with no fine.	OSHA	Closed	Issued 11/18/2010
1/20/2011	3.15E+08	Employees working in roadway without advance warning signs and one lane road sign. Initially issued as Serious but downgraded to Other Than Serious \$3,700.	OSHA	Closed	
4/13/2011	3.15E+08	Shoring Materials, discolored, etc. Serious 1 Citation, items 1a, 1b, 2a, and 2b. Fines in the amount of \$8,800.	OSHA	Closed	All citations vacated

7/23/2012	551758	PGL Central District. Citation 1: Lack of Tabulated data on site, Serious, \$3,300. Citation 2: Improper installation of shoring, Repeat, \$38,500.	OSHA	Closed	Settled at informal conference 9/28/12. Citation 1: Reduced to Other Than Serious, penalty eliminated. Citation 2: Reduced to Serious, penalty reduced to \$15,000.
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c. Actions to Address the Causes of Violations

Violations cannot be completely eliminated on a gas distribution system of the size and nature of the one that Peoples Gas operates in the City of Chicago. Effective management nevertheless requires programs, actions, and performance measurement designed to minimize violations. Good utility practice requires a program for identifying the root causes of recurring problems and for addressing them promptly and effectively. Liberty’s review included an examination of how AMRP management addresses such problems in planning, managing, and executing work.

Permit compliance problems and late or poor quality restoration have caused the bulk of City permit violations. Chapter T: Government Coordination discusses coordination with the City to address issues associated with securing proper permits and with managing overall relationships with the City as they concern the AMRP.

Discussions with the City have led to some changes to address the matter of permit violations. One such change involves the addition of specific restoration inspectors in each of the three, geographically based Shop areas into which Peoples Gas divided its field organizations. The North shop added contractor resources to perform restoration work on a 14-day schedule. Peoples Gas also stopped using a restoration contractor whose poor work had caused numerous violations. Peoples Gas encouraged contractors unable to handle main and service installations and restoration to subcontract some restoration work. This approach added to resources available to handle restoration within applicable time limits.

The changes have positioned Peoples Gas to make improvements in the speed and quality of its restoration efforts following main and service installations. Decreasing the time for completing restoration activities, however, causes indirect and adverse effects. Peoples Gas crews perform back-end work that follows the gas main and installation performed by contractors. The Company crews have had continuing problems in completing meter placement and tie-in work following main and service installations. To the extent that restoration promptly follows main and service installation, late meter placements and tie-ins cause added restoration work. More promptly performing installation restoration thus increases the inefficiencies that late meter placement and tie-in produce.

The number and variety of pipeline safety infractions (which include notices of amendments, inspection issues, and violations) encountered led to the re-institution in 2013 of a self-reporting letter from Peoples Gas to the Illinois Commerce Commission. This change reflects best practice. This letter addresses: (a) the violations that the Company deems to have occurred in each quarter, (b) the Company’s observed reasons for each violation, and (c) corrective actions to prevent reoccurrence. Liberty observed that self-reported infractions and those found by the Illinois Commerce Commission show a slight reduction in numbers. Nevertheless, many of the same types of issues continue to appear.

Examples include missed valve inspections, incomplete or missed leaks or leak rechecks, among others of concern under the pipeline safety regulations. Examinations by Liberty in a 2008 audit for the Illinois Commerce Commission identified valve inspections as an issue. Valve documentation problems continue today. Untimely reporting of new valve installations and incorporation of as-built information into system maps provide examples.

Chapter Q: Field Work Performance describes the field inspections Liberty undertook as part of this investigation. Liberty had field inspectors in the area when an incident caused injury to two Peoples Gas employees. The incident occurred during a gas main re-pressurization. The end cap/coupling blew out due to pressure. A somewhat similar incident in 2010 caused a Company employee fatality.

Another recent incident led to increased requirements when the Company seeks to employ directional drilling (“HDD”) for installing mains and services. It cross-bored (put a gas pipe through) a sewer. Directional drilling makes use of a boring machine to make a hole through which the main or gas service can be pulled. Bores can range in length from 20 feet to thousands of feet. When other underground facilities are present, care must be taken to avoid their location, or to go under them with sufficient clearance to avoid damage. Some companies using best practices not only perform location and marking work, but also use test holes to locate physically the other facilities. Until recently, Peoples Gas did not use test holes.

Peoples Gas agreed to a settlement (see ICC Case 12-0624) regarding a citation for failing to address the possible presence of sewer laterals when performing directional drilling. The settlement produced a fine. The Company also made significant procedural changes when using directional drilling for AMRP work. Crews must now first locate all sewer mains and laterals, use an inserted TV camera to confirm the location, make test holes to refine location, and document the information learned. Following installation, but before activation of the main (*i.e.* gas-in), the Company must video tape the sewer main and laterals to confirm that none have been affected by the gas replacement work. The Company keeps these video tapes to verify no damage to the sewers or laterals during main and service installation.

The federal OSHA violations mainly addressed shoring issues that Peoples Gas appears to have addressed.

Other data Liberty reviewed confirms the existence of continuing safety issues. A comparison of overall worker safety over the course of the AMRP shows acceptable results. However, it has taken exceptionally strong performance by contractor resources to overcome substandard performance by Company employees. Contractor numbers produce good overall results. Some improvement has occurred, but employee safety still falls below targets. This report’s Chapter Q: Field Work Performance addresses management issues underlying employee safety performance.

In addition, the number of leaks being reported and the number and wide variety of self-reported safety violations since 2013 cause concern. The small decrease in the number of violations shows some improvement. The fact that the violations reported each quarter show some of the same causes raises concern, however. The concern surrounds the sufficiency of efforts to address

recurring root causes. The Company only recently instituted a program of formal root cause analysis. Such programs have comprised an integral element of good utility practice for some time.

Safety programs exist at Peoples Gas, but effective control of safety performance requires strong and direct upper management engagement.

d. Field Investigations

A number of the findings resulting from Liberty's field inspections of AMRP work bear directly on compliance with requirements. Liberty's inspection work covered all three of the Peoples Gas Shops into which the Company divided its field operations. Chapter Q describes these inspections fully.

Their observations disclosed a number of contributors to safety and permit noncompliance and to work performance problems. Many, but not all, focused on work performed by Company employees, rather than contractors. These underlying causes have contributed to: incidents creating public safety risks, observed code non-compliance instances, lost-time Peoples Gas employee accidents, and installation efficiency loss.

3. Conclusions

S.1 The number and the severity of the past violations and continuing self-reporting violations indicate a need for management to increase emphasis on compliance with requirements as an integral element of work performance. (Recommendation S.1)

Liberty's work for the Illinois Commerce Commission some five years ago raised concerns about upper management's focus on public safety. The emphasis that management places on instilling an aggressive commitment to safety remains an issue. Certainly, the scope and magnitude of AMRP work brings greater occasion for safety violations and incidents. That change, however, serves only to increase the importance that the Company must place and continue to emphasize regarding public and worker safety. The number and nature of Illinois Commerce Commission safety inspection items and self-reported violations show a continuing need for improvement. The reported violation data and the observation of Liberty's field investigation team merit a re-examination of the approach and programs that assure public and worker safety.

Upper management cites safety as its highest priority. The challenge comes in making that commitment an ingrained and central aspect of work planning, execution, and measurement. Experience to date demonstrates a more reactive than proactive approach to meeting that challenge. Liberty's review of compliance with state and city regulatory requirements (pipeline safety codes in 49 CFR Part 192, related state regulations, and Chicago permit requirements) indicates that Company actions appear driven at least as much by outside forces, as by internal direction. Liberty did not find imminent threats to public or employee safety. It nevertheless remains the case that Peoples Gas needs a stronger source of internal direction to improve its safety performance.

Over an extended number of years, Peoples Gas has paid fines and has undergone audits performed both by Company-retained outside firms, and by others working on behalf of regulatory authorities. There have been instances of incomplete response to the conclusions of examinations

of various sorts, until outside authorities have taken strong actions. For example, the City of Chicago stopped construction permits Companywide, pending compliance with certain provisions, such as prompt completion of required restoration work. There have been positive responses to such outside forces, but it remains critical that Peoples Gas strengthen leadership, direction, communication, design, execution, and performance measurement. These actions will confirm that commitments to compliance drive principally from internal values and objectives.

S.2 The Peoples Gas employee accident rates on AMRP work exceed those of contractor personnel, and require an increased focus on safety. (Recommendation S.2)

An outside reviewer (PwC) also observed a lack of definition of and approved processes for quality management. PwC also observed that, while the safety program conformed to industry standards, its results did not meet expectations. Historical worker safety performance by Peoples Gas personnel has fallen significantly below that of AMRP contract resources, and significantly below the goals established for the program. Only exceptional (by comparison) contractor performance has served to keep overall safety performance at expected levels.

4. Recommendations

S.1 Peoples Gas should invigorate its commitment to safety and permit compliance through designation of an executive level “champion,” and institute a comprehensive communications program, set aggressive goals and performance targets, perform regular measurement, perform root cause analysis, and develop responsive action plans. (Conclusion S.1)

Integrays and Peoples Gas resources both must contribute to produce effective safety performance and compliance with permit requirements. The parent has engaged in a number of efforts to standardize operations across its entities. Liberty was unable to find a single, senior-level person responsible for championing AMRP safety and compliance. Increasing the focus on such performance through designating an executive lead with specific responsibility for the AMRP will materially assist in bringing greater structure and attention to safety and compliance performance. A strong executive-level communications program, including top leadership is necessary to underscore the value that the Company places on such performance, its commitment to making tangible, measureable improvements in that performance, and its intention to hold people accountable for securing those improvements.

The Company has proposed the use of a senior-level safety committee. Review by a committee can support safety enhancements, but Liberty believes that it remains essential to place primary responsibility and accountability in a single executive. Primary reliance on a committee (as opposed to using a committee for oversight) will tend to diffuse the sense of personal responsibility that Liberty thinks the history here (going back to the 2008 Liberty audit) shows necessary for preventing a disconnect in the perceived commitment to safety that appears to exist between upper management and those in the three Shops who manage and supervise field work.

The Company should also undertake, and has committed to a reexamination of its approach to safety and of the design and execution of specific programs for ensuring it. This initiative will take time to plan and execute. Peoples Gas needs to give high priority to the reexamination, and commit to prompt changes to address its findings.

The Company should establish quantitative stretch goals for compliance performance, seeking measurable and material improvements year-over-year. This approach will permit a ratcheting up of safety and compliance performance as safety culture changes, as root cause analysis matures, and as measurement and incentives for reaching targets take hold.

The recently adopted use of root cause analysis should form a central part of this enhanced approach to safety. It will take more comprehensive and consistent application of inspection resources, regular use of a consistent set of performance metrics, checklists, and results reporting to support such analysis. A dedicated group should exist, at least for so long as material improvement in performance is possible. That group should perform root cause analyses, and to work with executive leadership and field organizations to identify areas where mitigation will have the greatest impact, and what forms of mitigation will work best.

The result should be focused program-improvement initiatives that dedicate resources, establish milestones, target measurable improvements, and monitor progress. Another short term effort should consist of a structured sharing of techniques, practices, and quantitative results among the three Shop areas, to identify best practices that may have common application. The Company also needs to examine means to make performance measurement more sensitive to safety and compliance performance, and to ensure that individual incentives weight this area sufficiently.

S.2 Peoples Gas should more closely examine the root causes and develop a responsive action plan to improve employee accident rates. (*Conclusion S.2*)

Discussions between Liberty and senior leadership, which began last September, produced consensus on the need for specific organizational and programmatic change to address worker safety. The recommended emphasis on commitment to safety and making a senior executive responsible for championing a safety culture comprises an important first step.

Liberty recommends, and understands that the Company accepts, the need for immediate-term changes while longer term efforts progress. Peoples Gas proposed provisionally to use American Gas Association Best Practices as a method to improve safety performance. Those practices undoubtedly have merit. Following them rigorously should make near term improvements in safety. The Association, however, considers them confidential. Therefore, a broad commitment to use them will not leave the two-year monitoring effort that follows this audit with a clear baseline for measuring the effectiveness of implementation.

Therefore, the Company needs to use the guidelines as a basis for generating a clear set of standards, supporting practices, and measurable milestones and activities. This set must have enough transparency to support implementation monitoring. Moreover, other sources of best practices exist. For example, the Midwest Gas Association provides safety training. Communication with other gas associations, industry meetings, working with regulators, and reaching out to peer companies provides other sources of information.

AMRP contractors have produced worker safety results superior to those of Company workers. Examining the programs, methods, and activities the contractors use can, as Peoples Gas proposes to do, provide information useful in promoting change. The Company has also proposed to record

and regularly analyze safety performance data for longer term use in identifying problem areas and solutions. Liberty recommends the prompt initiation of focused efforts in each of these two areas.

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Chapter T: Governmental Coordination

1. Background

This chapter discusses Liberty’s examination of the relationship and coordination between the AMRP and associated activities and the various governmental and other external entities with which Peoples Gas has primary interactions, including:

- City of Chicago
- State of Illinois
- Railroads
- Chicago Parks District
- Chicago Forest Preserve
- Other utilities.

Effective AMRP performance requires strong coordination with government and other utility infrastructure planners. Such coordination must consider existing and firm city and state planned replacements and new installations. It must also consider less firm goals and objectives. The latter require consideration due to their potential for turning into shovel-ready projects. In general, even where government plans do not include certain older water and sewer facilities, gas infrastructure planning needs to recognize older, poorer performing city and state infrastructure as more likely for future replacement.

Performing an accelerated main replacement program involves a significant amount of traffic and neighborhood disruption. Close compliance with municipal rules and regulations is necessary to minimize disruptions and the costs associated with traffic management.

2. Findings

a. City of Chicago Department of Transportation

Primary interaction between Peoples Gas facilities and the City of Chicago arises from the Company’s location of pipe and other gas infrastructure in the “Public Way” (roads, sidewalks, bridges, and other City transportation infrastructure). The Chicago Department of Transportation (“CDOT”) maintains that infrastructure, and manages and coordinates its use by public and private utilities, contractors, developers and others seeking to locate facilities and equipment, either temporarily or permanently, in the Public Way.

The Chicago Department of Transportation maintains *Rules and Regulations for Construction in the Public Way* (“Rules and Regulations”) in hard copy and online. These rules and regulations set forth the requirements for conducting private activity in the Public Way. Prior to commencement of the AMRP, the Department last updated the Rules and Regulations in 2007. Further revisions came in 2012 and again in 2014. These revisions created the City’s Project Coordination Office, and made a number of substantive changes in requirements. Moreover, as AMRP activity accelerated, the City began more actively to enforce some existing regulations.

i. Office of Underground Coordination

In the early 1990s, after the Chicago flood, the City's Department of Transportation formed the Office of Underground Coordination ("OUC") to act as the distribution agency within the Department's Division of Infrastructure Management. The Office undertook responsibility to coordinate underground construction work, schedules, and traffic flows. The Office of Underground Coordination handles all requests related to existing utility infrastructure. The Office also manages the review and approval of construction in or adjacent to the Public Way.

The Department's Rules and Regulations state that:

The OUC is responsible for the protection of the City's surface and subsurface infrastructure from damage due to plan and programmed construction, installation, and maintenance projects. The intent of OUC membership is to review proposed projects in or adjacent to the right of way prior to construction so that there is minimal damage to existing infrastructure.

The Office of Underground Coordination's more than 25 stakeholders include City agencies and private entities. Members of the Office of Underground Coordination include, among others, Peoples Gas, Commonwealth Edison, Comcast, the Chicago Departments of Water and Sewer Management, a number of agencies of the City of Chicago, and various other parties. These stakeholders review all requests for work in the Public Way to determine the effects of proposed activities on existing facilities. Each member reviews individual requests, comments on those requests, and provides records of existing facilities, and notification of conflicts.

ii. The Project Coordination Office

Stimulated in part by the substantial increase in construction in the Public Way and the associated steep ramp-up in associated permit requests, the Chicago Department of Transportation formed the Project Coordination Office ("PCO") in 2012. The goal was to ... *improve on the coordination of projects, which were previously performed in "silos," with ... no common repository and no traceable record of attempt to coordinate activities.* The Project Coordination Office includes approximately 13 contract engineers, transportation specialists, analysts, and field staff.

The Office identified major stakeholders involved in project coordination. Those entities include:

- Chicago Department of Transportation
- City Department of Water Management
- City Department of Sewer Management
- Peoples Gas
- Commonwealth Edison
- Chicago Transit Authority
- Chicago Park District
- Comcast
- AT&T
- Dept. of Cultural Affairs and Special Events.

iii. AMRP Interfaces with the City of Chicago

Many Peoples Gas activities and programs require substantial engagement with the City of Chicago regarding physical activity on City property. The AMRP's high public profile and large scope impose particularly broad and important interface needs. The other Peoples Gas programs and activities requiring interface typically involve isolated repairs or individualized construction projects. By contrast, the AMRP's citywide nature, spread over the City's 50 wards over the duration of the project, involves groups of entire City blocks at a time.

Peoples Gas interactions with City personnel include a variety of meetings with City officials and representatives, the submission of various planning and design documents, the receipt of various City planning and design documents for City-owned infrastructure, applications for permits, and receipt of citations for violations of City rules and regulations.

iv. Chicago Department of Transportation Permits

Private activity in the Public Way (*e.g.*, opening pavement, blocking or diverting traffic, moving oversized vehicles) requires a permit from the Department of Transportation. Permits typically cover a 30-day period, and provide for two 30-day extensions at no additional charge. Beyond 90 days, the holder must apply for a new permit, and pay attendant charges. For complex projects such as the AMRP, application requires a multi-step process. The process includes certain submissions well in advance of the actual permit request. In recent years, Peoples Gas has received over 10,000 permits per year. Most Company applications cover work unrelated to the AMRP.

The City has granted some of the entities most active in the Public Way, including Peoples Gas, electronic access to the Chicago Department of Transportation computer system. This access enables electronic permit applications. Working with the City's information technology group, Peoples Gas has developed a software application (the "Portal"). This application allows the Company to perform most permitting activities electronically. Peoples Gas has access to the City's maps and engineering drawings and associated paperwork.

A written, Peoples Gas Work Management Information System Arm Web Portal procedure describes the steps necessary to prepare permit applications. Four Peoples Gas Construction Planning Office employees have access to the Portal, as do employees in other offices, including some new service coordinators and O&M staff.

b. State of Illinois

Some roadways in the City of Chicago fall under the authority of the Illinois State Department of Transportation ("IDOT"). Since the AMRP began, the Company has applied for and received 167 Illinois Department of Transportation permits. From the perspective of Peoples Gas and the AMRP, this jurisdiction places an overlay of more stringent traffic control requirements on street-affecting work. The City's maps designate state-jurisdictional streets. Peoples Gas has access to these designations through the electronic portal. Peoples Gas cannot, however, make electronic permit applications for state-jurisdictional streets. The Company hand delivers them, and receives comments back from the State by hand or e-mail.

c. Other Entities

Peoples Gas also requires a small number of permits or similar accommodations for several other uses. They include railroad rights-of-way, park property (from the Chicago Park District), and the Forest Preserve District of Cook County.

Peoples Gas facilities cross railroad rights-of-way at numerous locations. In order to commence AMRP work on these facilities, the Company must work under an existing agreement or acquire a new permit. The latter may involve fees. Since AMRP project inception, Peoples Gas has filed for access permits for approximately 30 railroad crossings. They concern property owned or controlled by some 10 different railroads. Each railroad has its own, unique permitting process. Railroad crossing permits require long lead times and special attention. The Company maintains a spreadsheet database of current or planned railroad crossing applications.

Peoples Gas must acquire special permits for a project any part of which takes place with Chicago Park District or Forest Preserve District property. Each of these two entities has its own permit application form and specific application requirements, such as insurance coverage, submission of project plan and drawings, and applications fees. Park and Forestry permits represent a small number of permit applications annually. Peoples Gas handles them on an ad hoc basis.

d. Peoples Gas External Affairs Office

Prior to 2014, Peoples Gas assigned a single employee (with support from three representatives) to handle external affairs with both the City of Chicago and the State of Illinois. This employee focused primarily on State government activities in Springfield. This combination of responsibilities left management of the relationship with the City not well coordinated. In February 2014, Peoples Gas hired a new Senior Director of Government and Community Relations. This director brought experience in Illinois government, and focused on state government affairs. In mid-2014, the Company also hired a new Manager of Local Government and Community Affairs. This manager brought extensive experience with the City of Chicago. The Company also added an additional analyst, bringing the total number of analysts to four. The Company has assigned the analysts to act as liaisons assigned to address specific City wards.

The new organization, and in particular the focus on the City, came about to enhance communication and collaboration with local government and community stakeholders. Additionally, Peoples Gas External Affairs conducted meetings with Chicago Department of Transportation officials and with Aldermen from time to time.

Recently, the Associate General Counsel, Legal Affairs, coordinated the initiation of a biweekly meeting of senior personnel involved in the relationship with the City. This meeting includes, among others, the Peoples Gas President, the general and the associate general counsel, government and community relations personnel, AMRP project management, the head of Gas Operations, and regulatory personnel. The group has met approximately half a dozen times so far, with a focus on improving overall communication with the City. The group also seeks to develop a coordinated effort to identify, at a high level in the Company, existing and potential problems with the City. Eventually, Legal Affairs hopes to continue the meetings, to maintain coordinated communication with the City and to expand the meeting focus to identify risks.

e. City of Chicago Communications Channels

Peoples Gas uses a number of communications channels with the Chicago Department of Transportation. The channels include electronic exchange of information, meetings, applications for permits, and issuance of citations by the City. Examples of plans, drawings, and other information exchange include submission of capital design projects for review and approval, submission of a five-year Capital Improvement Plan and the City’s sharing of sewer designs with Peoples Gas, when 30 percent complete, to identify potential conflicts.

The Company participates in several different types of meetings with the Chicago Department of Transportation and others parties. Most consist of regularly scheduled meetings, and most address all Peoples Gas activities, not just the AMRP. The next table summarizes regular meetings.

Table T.1: Meetings with Chicago Department of Transportation

Meeting	Frequency	Attendees	Topics
OUC Conflicts	Weekly	All OUC Members	City identifies overlapping footprints on jobs
Permitting	Weekly	PGL, CDOT PCO	Missing permits, follow-ups, special requirements
Weekly Task Force	Weekly	City, all utilities	Emergency Management Center - special City events
Last Friday of the Month	Monthly	PGL, CDOT	All PGL - CDOT Interactions
Dept. Of Water Mgt.	Monthly - First Thursday	CDOT, PGL Engineers	Execution phase meetings
Ad Hoc	As Needed	PGL Project Mgmt	Update on AMRP permitting & related matters

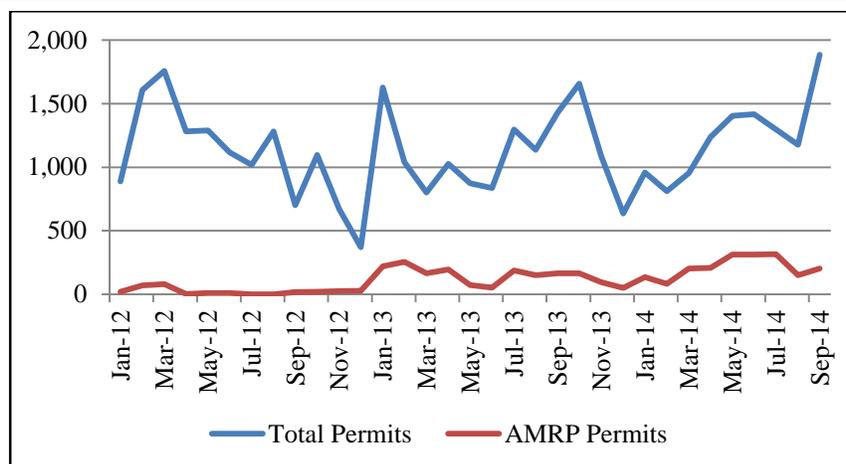
f. Permits from CDOT

The AMRP requires a relatively small percentage of the permits Peoples Gas has acquired from the City. For example, in 2011, Peoples Gas had approximately 5,000 openings for corrosion work in the City Public Way. Comparable data is not available for that year, but for comparison purposes, the Company had acquired approximately 13,450 permits from the City in 2012. Only 1,774 (13 percent) of the permits addressed AMRP work.

One cannot compare the numbers directly. AMRP permits typically cover multiple City blocks, with multiple openings. Corrosion openings often address individual, small openings (for example, to replace an anode). In many such cases, the Office of Underground Coordination does not get involved, but from a “permit processing” perspective, each data point represents a discreet permit application.

The next graph shows the total numbers of AMRP permits received from the City for the AMRP, on a monthly basis. The data are approximations; precise data is not available. The graph shows that activities other than the AMRP drive most permit needs, when measured by permit numbers.

Figure T.2: AMRP vs. Total Permits from the City of Chicago



The City charges a standard fee for each permit application. The next table provides an excerpt from the Chicago Department of Transportation Permit Fee Schedule for 2015.

Table T.3: City of Chicago Permit Fees

Public Way Openings	Per Opening/Cut	Asphalt Restoration Fee
ADA Ramp installation	\$454 per opening	No Charge
Street / Alley	\$454 per opening	Applicant must restore
Sidewalk	\$454 per opening	No Charge
Parkway	\$226 per opening	No Charge
Soil Borings – Street	\$454 per opening	No Charge
Soil Borings - Parkway	\$226 per block	No Charge
Well Monitoring	\$454 per opening	No Charge

In addition to the base fee, various adders apply for operating equipment, parking vehicles, obstructing lanes, and various other activities in the Public Way. Some permitting fees for planned obstructions to the Public Way run higher in the Central Business District. The table below shows the total cost (in millions of dollars) to Peoples Gas for all permits and for AMRP permits during the years 2011 through September 2014. The AMRP permit cost column represents an approximation, made under the assumption that all permits fees are equal.

Table T.4: Cost of Chicago Department of Transportation Permits

Year	All Permits	AMRP Permits
2014 (Thru Sept)	\$13.0	\$2.2
2013	\$12.1	\$1.6
2012	\$7.7	\$0.2
2011	\$4.4	N/A
Total Program	\$37.2	\$3.9

Obtaining a permit requires two sets of filings through the Portal. During the engineering evaluation phase, Peoples Gas identifies a “project polygon” (essentially the boundaries of the project), and prepares preliminary drawings. After internal review, editing and revision, the

Company creates detailed drawings, and electronically creates a “permit pending” file in the Chicago Department of Transportation database. That filing includes drawings. The Company submits the project information to the Office of Underground Coordination and all its members for identification of potential conflicts with other facilities. The resulting identification of conflicts process (termed the Existing Facility Protection, or “ESP”) must be completed in 30 days. Pending projects typically bring discussion at an Office of Underground Coordination weekly conflicts meeting. After discussion and resolution of conflicts, the project receives Existing Facility Protection approval from the Office of Underground Coordination. Peoples Gas can then finalize the actual permit application.

g. Permits from Illinois Department of Transportation

Illinois Department of Transportation-designated Public Ways involve more stringent traffic control requirements. Peoples Gas has requested and received a relatively small number of Illinois Department of Transportation permits since the AMRP began. The next table summarizes them. This small number compares to the 55,000 Chicago Department of Transportation permits, both AMRP and non-AMRP, received for the same period.

Table T.5: Illinois Permits

Year	Permits Issued
2011	13
2012	92
2013	10
2014	52
Total	167

Peoples Gas does not maintain its own database for Illinois Department of Transportation permits. The Portal does not enable the identification of all Illinois Department of Transportation permitted projects in a specific report. Each individual Illinois Department of Transportation project is designated as such on the application and the permit.

Illinois Department of Transportation interests with respect to permitting concern only traffic management. Its permit applications therefore require (by contrast with City requirements) abbreviated information about pipe installation. The State, however, requires a traffic management plan. These permit applications typically require a 3 to 6 month review, but a traffic review can extend the period by a month. Prior to 2014, Peoples Gas used design consultants to prepare permit requests to Illinois Department of Transportation. However, the Company, determining that it needed better coordination of the submissions, began handling them in-house.

Illinois Department of Transportation permits are effective for 6 months. Up to a week before expiration, they may be extended for another 6 months. If the project extends beyond 12 months, Peoples Gas must reapply for a new permit.

h. City Non-Compliance Citations

Chapter S: Safety and Compliance discusses safety and permit violations in detail. That chapter focuses on their impacts on public and work safety, and on work performance effectiveness and

efficiency. This chapter addresses interfaces with the City on matters of permit compliance. Chicago Department of Transportation inspectors inspect work sites in the Public Way, to ensure compliance with Rules and Regulations. City inspectors who observe a violation may request that the crew involved remedy the problem on the spot, to the extent possible, or may issue a citation. These paper citations, similar to traffic tickets issued to the violator, specify the particular violation(s) observed. Examples include working without a permit, working with an expired permit, improper restoration of pavement or sidewalk, and improper barricades.

Beginning January 1, 2014, Peoples Gas began keeping a “citations dashboard” to improve its ability to identify the root causes of citations. For the month of September 2014, the Company received approximately 585 citations. About 30 percent of them came at AMRP locations. The Company observes that expired permits comprise the largest root cause of non-AMRP violations (representing about 21 percent), followed by unreported openings (*i.e.*, no permit) at 15 percent. Incomplete and non-compliant (relative to City specifications) restoration accounted for over half of AMRP violations.

In an attempt to reduce the numbers of violations and associated citations with respect to project completion, Peoples Gas has been negotiating with Chicago Department of Transportation to provide better definition around restoration requirements and to develop more specific guidelines on acceptable timeframes for certain longer term activities.

3. Conclusions

T.1 In responding to the new work volumes imposed by the AMRP, the City experienced some growing pains associated with infrastructure management.

The AMRP creates a primary programmatic interface between Peoples Gas and the City of Chicago. The nature of AMRP projects causes construction activity to run the lengths of entire city blocks, often on both sides of the street. By the end of the program, the AMRP will involve every ward of the city. These features bring to the AMRP far more attention than do the multitude of other repair or replacement projects and ongoing O&M work that neighborhoods typically experience. Significant problems at the outset of the AMRP served to aggravate the disruptions and public irritations that work on such a large scale inevitably produces.

Both the City and Peoples Gas acknowledge that when the Company began the AMRP in 2011, the City was not equipped to handle the volume and complexity of the permitting work load. Considering the poor management of the AMRP and the volume of permit requests, Department of Transportation personnel have characterized the first AMRP year (2011) as extraordinarily difficult. The City fairly promptly rewrote its Rules and Regulations, making changes in 2012, and following them with a more comprehensive, 2014 revision. The creation of the City’s Project Coordination Office came in 2014 as well.

T.2 The Chicago Department of Transportation’s perception of Peoples Gas performance has been very negative, although it may be beginning to improve. (*Recommendation T.1*)

From the Department’s perspective, the relationship with Peoples Gas is defined by much more than the AMRP. The corrosion group made some 5,000 openings in the Public Way in 2011. Thus,

while some of the observations below are AMRP-specific, many apply more generally to all operations.

Chicago Department of Transportation personnel observed that:

- Peoples Gas is very “siloeed,” with poor communications across Company operations groups.
- The performance of the three Shops into which Peoples Gas divided its field operations varies considerably.
- Information conveyed by the Department of Transportation to Company managers does not make it to the field.
- Permit applications are not synchronized with construction.
- Permits stay open and active far too long.
- Peoples Gas is slow to update its databases. The Company often applies for permits to repair or service pipe it has replaced (*e.g.*, it applies for permits to replace anodes on legacy steel pipe replaced under the AMRP).
- Peoples Gas does not have enough crews to meet its schedules.
- Some areas of normal O&M operations present problems much more significant than does AMRP work.
- Restoration has continued as one of the most contentious and problematic issues. This issue results in part from the City’s approach of considering AMRP projects “open” until retirements of replaced facilities are made and final restoration is complete. The Company by contrast considers them complete at an earlier stage. Thus, if a project takes many months for final completion, a common occurrence, pavement, parkway, sidewalk, or lawn restoration either languishes or is only partially addressed. (Note that the broader issue of restoration is discussed elsewhere in this report, in this report’s Chapter Q: Field Work Performance).
- Overall, the City expects a higher level of project management and control than the Company has been able to deliver.

On a more positive note, Chicago Department of Transportation observed that:

- Communications improved substantially in 2014
- There have been some recent positive management changes
- The Department is now able to give Alderman complaints directly to Peoples Gas to address, rather than having to be the intermediary.
- The Department is willing to give the Company credit for trying to address the problems that work creates for the City.

Reorganizing External Affairs and hiring new, experienced staff in that office spawned improvement in relationships with the City and Chicago Department of Transportation. The separation of state and City liaison functions between two employees created a dedicated City liaison for the first time. The new liaison and executive management have engaged more actively with the City. This change has created the opportunity for continuing relationship improvement. The newness of this approach and structure and the history of relationships with the City make it essential for Peoples Gas to continue concerted efforts to promote a fully effective relationship with authorities responsible for AMRP permitting and compliance.

Fundamentally, however, the relationship with the City and the Chicago Department of Transportation has been and will continue to be a function of the management and execution of the AMRP and all other Peoples Gas construction and maintenance activities in the Public Way. Overall, communications with Chicago Department of Transportation and the City have improved, and show promise of further improvement. However, there is a limit to what even the most effective communications can accomplish. Beyond a certain point, which the Company appears to be approaching rapidly, improving relationships with the City will depend upon improving performance in the field. Ultimately, what is needed is good project planning, scheduling, management and execution, not just of the AMRP but of all interactions with the City and Chicago Department of Transportation.

T.3 The Peoples Gas methods for managing permit applications and compliance have not been adequate to meet the needs of the AMRP. (Recommendations T.2 and T.3)

The City’s permitting function serves important public interests, and comprises a complex operation. Nobody makes more permit applications to the City than Peoples Gas does. Many parties request permits from the City for a variety of reasons. Applications range from nonrecurring, single applications by small contractors, to the thousands that Peoples Gas seeks annually. The next table summarizes the numbers of permits issued in total and to Peoples Gas alone.

Table T.6: City Of Chicago Permits Issued

Year	Total	To Peoples Gas		AMRP #
		(Number)	(% of Total)	
2014 (9 mos.)	107,957	12,889	11.9	1,919
2013	126,179	15,316	12.1	1,774
2012	121,041	15,006	12.4	N/A
2011	111,780	13,031	11.7	N/A

The City’s permitting operation requires it to undertake a significant level of effort to address an average of over 2,000 permits per week. Moreover, the City roughly estimates that more than half of all permits involve some form of excavation. The resulting level of disruption magnifies the burden on the City to ensure that its processes protect public interests; e.g., traffic flow, motorist and pedestrian safety, and the integrity of City facilities. Thus, it becomes incumbent on Peoples Gas to ensure that it does all it can to support City efforts, and to understand and be responsive to City needs.

Liberty found that Peoples Gas does not maintain a data base of permit applications. A proper tracking system, which such a database would support, should form a basic tool for managing a repetitive activity with thousands of individual elements.

Three analysts in the AMRP Construction Planning office spend full time handling AMRP permit applications. They maintain various records to track permit applications, but no database of AMRP or non-AMRP permit applications exists. Tellingly, the data on permit numbers that this chapter reports comes not from the Company, but from the Chicago Department of Transportation, which derives the information from City invoices to Peoples Gas for permit fees.

Part of the reason for the absence of a database comes from the Peoples Gas scheduling approach. The Company prepared formal project schedules only for the construction portions of work. Computerized schedules did not capture the planning and engineering phases of work. Doing so would enable the Company to capture permitting information for management and analysis. Chapter H: Schedule Planning addresses scheduling in detail.

The lack of a database presents a number of problems:

- Analysts must individually track the permits they follow, in order to ensure timely processing, and to follow-up with the City if they are delayed for any reason.
- Chicago Department of Transportation permits are “date stamped” on the date of issuance, with no record of the date of submission on the permit. Peoples Gas does not maintain a database of permit applications. Therefore, the Company cannot provide basic management control and analytic data, such as the average time from submission to granting a permit, the range of response times, or even how many permits are outstanding at a given time. The Company cites delays by the City in processing permit applications on occasion. Because Peoples Gas does not maintain a database of applications, however, it has no way to determine processing times by the City except on a case by case basis.
- Peoples Gas analysts manually track certain permits identified to them as critical, but employ no formalized reporting or tracking system.
- The permitting process does not link to project schedules.

One manifestation of this absence of a management tool is that important items get overlooked. A great many of the citations and associated fines issued by the City to Peoples Gas, discussed later in this chapter, result from lack of or expired permits.

Moreover, it is clear that the limitations described above apply to a great, and perhaps greater extent, to non-AMRP activities. The resulting problems necessarily have an impact on the overall relationship with the City and, in turn, the needs of the AMRP.

T.4 Peoples Gas does not take advantage of the reporting capabilities of the Chicago Department of Transportation system. (*Recommendation T.4*)

The City maintains an in-house database of permit applications from all entities. The City uses this database to coordinate and track permit-related activities and status. That system cannot substitute for the database that Peoples Gas needs, but it nevertheless generates a number of regular, periodic internal reports. Some of them may prove useful to AMRP management. Chicago Department of Transportation personnel expressed to Liberty a willingness to provide relevant reports to Peoples Gas through the Portal, and to consider providing custom reports. The Company has not made overtures to the City to take advantage of this potential tool for ensuring effective coordination with the City.

The Department’s computer system, to which Peoples Gas gains access through the Portal system, has limitations. The lack of application-date tracking provides an example of these limitations. The Company has accepted this limitation, rather than developing its own database to track those dates, as well as other relevant information.

For example, the City's system contains a flaw that introduces errors into addresses involving the crossing of intersections. Most AMRP applications include intersection crossings. Permits in these cases thus issue with incorrect addresses. Peoples Gas must request and receive the needed corrections. Both the Chicago Department of Transportation and the Company acknowledge this problem. Peoples Gas has not developed a good work-around. The City expects this problem to be remedied with an upgrade to its system, now anticipated in early 2015.

Peoples Gas also believes that limitations on administrative staffing at the Chicago Department of Transportation impedes permitting processes. Without investigating the accuracy of this perception, Liberty nevertheless believes that prior performance problems at Peoples Gas and historically poor communications between the Company and the Chicago Department of Transportation make discussion and resolution of that perceived roadblock difficult.

T.5 Peoples Gas has an appropriate process for managing the permitting of rail crossings, but does not enter all relevant data into its tracking tool. (*Recommendation T.5*)

Since AMRP inception, Peoples Gas has processed approximately 30 rail crossings with some 10 different railroads. These crossings include AMRP and non-AMRP activities. Peoples Gas determines the need and prepares applications for those permits on a case-by-case basis. Such applications typically require long lead times and processes unique for each railroad, and sometimes for each crossing. The Company tracks the status of the applications and related activities with a spreadsheet.

The small number of railroad crossings and related permits and the individualized requirements of each railroad would render a standard application procedure ineffective. For the same reasons, the simple spreadsheet database appears appropriate. However, not all elements of the database maintained by the Company are complete. In most cases the database does not indicate when the status of each application was last reviewed, and does not provide for future review or due dates. It also does not indicate the responsible person(s) in the organization.

T.6 Peoples Gas is cited extensively for non-compliance with Chicago Department of Transportation Rules and Regulations for both AMRP and non-AMRP work. (*Recommendation T.6*)

Peoples Gas provided a partial database of citations dating back to 2008. It demonstrates that the Company has been cited for violations many hundreds of times, perhaps over a thousand times per year by Chicago Department of Transportation inspectors. In 2013, total fines associated with citations approached a half million dollars for the year.

The results indicated by the citations dashboard in 2014 and the citation database, although incomplete, support the City's statements, summarized earlier, that restoration represents a chronic problem area. The largest numbers of violations appear to be related to restoration, followed by no permit or working outside the limitations of the permit. Chapter S: Safety and Compliance addresses the planning, scheduling, and work performance issues that contribute to such permit violations.

T.7 The AMRP has not generated an abnormally high level of traffic management concerns.

Discussions with the City did not identify the management of traffic to be a significant problem area. Liberty's field investigation team also did not observe notable traffic flow or management issues during visits to construction sites. Note that Liberty did not audit for compliance with specific Chicago Department of Transportation traffic regulations, compliance with the Americans with Disabilities Act ("ADA"), or other City ordinances. The team limited its field observations about traffic to general conditions associated with minimizing traffic obstructions and promoting public and worker safety.

4. Recommendations

T.1 Peoples Gas needs to continue to focus on improving communications and relationships with the City and with its Department of Transportation, but must recognize that it will take improved permitting and work performance to create and sustain relationships at the level needed to optimize AMRP performance. (Conclusion T.2)

Peoples Gas has made substantial strides in addressing the issues it has with the City, through designation of a specific liaison and resultant activities. The internal meetings focusing on City-related activities also show high level attention to the relationship. Permanent and meaningful change will require a continuing priority on relationship improvement. However, as important as communications and relationships with the City may be, Peoples Gas performance in the field becomes the more important factor going forward. Improving performance in meeting permitting requirements and expectations comprises a more significant driver of the relationship with the City and of success in carrying out the AMRP, as other chapters of this report address.

T.2 Peoples Gas should expand the scope of AMRP project schedules to incorporate permitting requirements. (Conclusion T.3)

Chapter H: Schedule Planning addresses the lack of integration in AMRP project schedules, which have included only construction activities. Project scheduling needs to integrate permitting needs and requirements. A complex long-term project with many thousands of individual activities requires a sophisticated, integrated management control system that tracks individual component projects end to end. From a management control perspective, there is no bright line between phases such as planning, engineering and construction. Precursor activities in one phase often prove critical to the following phase. Permitting should not be considered a parallel activity, but an integral part of the end-to-end set of processes needed to effectively and efficiently manage AMRP projects. Permitting should form a central part of the scheduling process.

T.3 Peoples Gas should develop a database of permit applications. (Conclusion T.3)

Peoples Gas cannot expect to rely on the Chicago Department of Transportation database as its management tool. The City designed it to meet the needs of the Chicago Department of Transportation's permitting operation, not the business of constructing and maintaining a gas system. The Chicago Department of Transportation database is not under Peoples Gas control, does not include a number of parameters that Peoples Gas should be tracking, and cannot be validated by the Company. A spreadsheet database can be developed and implemented very

quickly, on a going-forward basis, to improve the Company's knowledge and control over its permitting operations.

The permit database should include all permit applications to the Chicago Department of Transportation. From the Department's perspective, the distinction between AMRP and non-AMRP work is not material.

T.4 Peoples Gas should work with the Chicago Department of Transportation to determine which existing and potential reports from the Department's system are available and which could be provided to Peoples Gas. (Conclusion T.4)

Department representatives indicated to Liberty the existence of regular internal reports of permitting activity that it could provide to the Company. It may be able to create some custom reports as well. The Company would be well served to meet with the Department to explore that option, for the purposes of better managing its construction and operations and understanding the City's perspective on Company activities. Reports from the City are not a substitute for a Company database, but will help until one is developed, and will enable Peoples Gas to see what the City sees on a continuing basis.

T.5 Peoples Gas should improve the database of rail crossing permits. (Conclusion T.5)

The relatively simple spreadsheet database of railroad permits serves AMRP needs generally. However, it is incomplete and not up-to-date. It operates as a "side record," as opposed to a formal project management tool. The "one-off" nature of rail crossing permits and their long lead times create sources of potential gaps (e.g., in identifying critical activities and milestone dates). The Company should clean up the database, and keep it current.

T.6 Peoples Gas should improve its database of citations. (Conclusion T.6)

Fundamentally, Peoples Gas needs to improve its management and construction practices to reduce dramatically the number of citations. However, in the meantime and even with a much reduced number of citations, a database is a fundamental management tool to provide feedback to management and to the Shops and crews as to how the Company is performing in complying with applicable rules and regulations. As with the permit database, the citations database operates as a side record rather than a tool embedded in AMRP management processes.

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Chapter U: Customer Coordination

This chapter addresses the methods used to gain access to customer premises to change meters and to cut services over to new supply facilities. It also examines the sources of customer complaints about impacts of the AMRP and Peoples Gas methods for responding to those complaints.

1. Background

New main and service installation can cause significant disruption to neighborhoods. The work affects residents, municipalities, and those using the streets. Peoples Gas construction crews must interrupt street and driveway parking, and dig up lawns and sidewalks. In many cases, Peoples Gas crews can only restore property temporarily, until weather cooperates sufficiently to permit concrete pours, sod laying, and replanting. Even when a main replacement project goes smoothly and on schedule in a community, it still brings substantial public inconvenience. Programs to accelerate main replacement magnify this impact, thus heightening the risk to program success and Company image.

Effective and timely communications about planned work and progress in performing it form a critical component of any large project in populated areas. A program like the AMRP magnifies the challenges, because it: (a) has a broad impact on customers and communities, and (b) depends on customer cooperation for prompt and effective work completion. The AMRP involves large scale relocation of inside meters, regulators, and shut-off valves to the outside. It also requires installation of new service piping to connect to new mains. The multi-step process for accomplishing work requires considerable coordination with customers in gaining access to meters for moving, cutting over, and relighting gas service.

The quality of customer experience during the project offers a principal measure of AMRP success, and ultimately the Company's image in the community and with public officials. Minimizing the negative impacts that this experience brings requires well-planned and comprehensive efforts. Such efforts must explain the work process, highlight the benefits that work completion will bring, and keep customers and other stakeholders informed about progress. An effective process for responding to questions, issues, and complaints must exist. In order to maintain good customer rapport, Peoples Gas also needs to demonstrate flexibility in responding to varying customer needs. Flexibility may require scheduling crews to work evenings and weekends, or by-appointment, particularly for customers unavailable during normal business hours.

Managing customer communications effectively requires development of a communications plan that identifies the range of customer expectations and needs and communications materials to address each.

Liberty examined how Peoples Gas has identified the range of customer needs and expectations and the sufficiency of efforts to meet them.

2. Findings

As expressed in Peoples Gas AMRP Communications Plan:

The AMRP program is the largest infrastructure improvement project ever undertaken by Peoples Gas, and it will touch a significant portion of the Chicago community whether directly through construction to replace lines that serve homes and businesses,

or through resulting ancillary traffic disruptions, or through cost of service. Given the magnitude and visibility of the program, Peoples Gas recognizes the criticality of effectively communicating the impacts and benefits to stakeholders across its service area.

The AMRP Communications Team created a Communications Plan and templates to assist with communication of the program prior to kickoff in 2011. The AMRP project charter designated a Communications Team responsible for internal and external AMRP-related communications. Specific deliverables defined in the charter included a project Communications Plan, communications materials and a “revised and updated” process for communicating about AMRP to all stakeholders.

The goal of the overall communications effort for the AMRP program is to maintain Peoples Gas’ image with the community, and to look for opportunities to enhance the company’s image where possible.

Peoples Gas published a draft AMRP Communications Plan in May 2011, prior to the launch of the program. The draft Plan identified and discussed:

- Communications Objectives and Goals
- Key messaging
- Communications materials to be developed and material review protocols
- Media Relations and Governmental Affairs protocols
- Public Relations and Media events and potential sponsorship opportunities
- Communications protocols
- Goals, strategy, concerns, messaging for each key stakeholder
- Internal and external communications strategies and tactics
- The need to develop a program to handle escalated complaints
- Existing communications channels that can be leveraged
- The need to define measures to determine success in achieving goals and objectives of the Plan
- Plan for AMRP kick-off/ribbon cutting to introduce program to employees and recognize work-to-date.

However, Peoples Gas did not keep the plan up-to-date. Moreover, the three Peoples Gas district field organizations (the “Shops”) did not adopt the plan fully. The Communications Team created the Plan, and facilitated communications processes in the field. Management, however, allowed the Shops to deviate from the plan, and continue with a business-as-usual approach for AMRP meter-access communications.

a. Access to Customer Premises

Peoples Gas requires access to customer homes and buildings at least twice during the main upgrade process: (a) first for service markings, and (b) second to move the meter and connect to the new gas main. In some cases, the Company requires a third appointment to locate and check the sewer line.

A month before contractor construction crews begin work in a neighborhood, the Company mails introductory letters and an informational flyer to customers. These materials explain the program and set expectations. This process begins when a block permit is ordered for a neighborhood. First, Peoples Gas’ customer information system, identifies all affected accounts within a neighborhood, and mails the introductory letters.

A week later, Peoples Gas sends a follow-up letter requesting an appointment to mark-out the service. The letters instruct customers to call the Contact Center or visit the website to set an appointment. Peoples Gas intends to move indoor meters to the outside of customer premises. Service marking thus also identifies the most logical outside location for the meter. Construction contractors generally follow within a month to lay the new main and services.

Peoples Gas Shops have responsibility for moving the meter and for hooking it up to the newly built service. The shops set appointments for this process differently. The North and Central Shops prefer to set appointments directly. For instance, a crew moving into a neighborhood, contacts customers by going door-to-door. District supervisors will also make calls to customers after-hours and on weekends. Posters, flyers, and other leave-behind materials refer customers to Shop phone numbers or personal cell phone numbers to schedule appointments.

The South Shop prefers that Peoples Gas Contact Center schedule customer appointments, using standard letters sent to customers listing the Contact Center’s toll-free number.

b. Customer Complaints

Peoples Gas received more than 4,000 complaints related to the program from 2012 through last fall. The Company reports that the number now surpasses 5,000. Property damage and restoration top the list of AMRP customer complaints, as seen in the table below.

Table U.1: AMRP Complaints Received

Complaints Received	2012	2013	2014	Total
AMRP Field Employee Complaint	36	12		48
AMRP Restoration Complaint	277	85		362
Construction Complaints and Inquiries				0
Field Employee Complaint		37	133	170
Inquiries		101	115	216
No Parking Sign/Car Tow		16	24	40
Property Damage		575	918	1493
Restoration		773	866	1639
Safety Concerns		173	311	484
Construction Inquiry Voice Mail		140	257	394
Total	313	1,912	2,624	4,849

As of October 31, 2014, more than 600 complaints remained “in progress” while another 400 awaited assignment for processing. The Company reports that those awaiting assignment have

since dropped to 200. Last October, the total number of active complaints was 1,036. The Company reports that this number has dropped to 870.

For a variety of reasons, construction-related customer complaints have soared. Peoples Gas created a group to respond initially to customer complaints. Company policy calls for contact with customers within 24 to 48 hours of complaint receipt. Insufficient staffing and a growing volume of complaints, however, have prevented this group from acknowledging or “opening” complaints from customers for six to eight weeks.

Peoples Gas does not conduct root cause analysis to identify and resolve process-related complaints. Lack of root cause analysis and follow-up results in many repeat issues and continuing customer complaints. In addition, the AMRP Project Management Office does not use complaint trending to rank or penalize contractors. Peoples Gas prepares no contractor performance scorecards.

Peoples Gas does not ask for customer feedback or measure customer satisfaction in response to work performed. As a result, much of the AMRP customer communications operate reactively, in response to complaints from stakeholders or issues encountered in the field.

3. Conclusions

U.1 Peoples Gas failed to update its draft AMRP Customer Communications Plan until recently and the Company has not monitored use of its Plan protocols and procedures in the field. (Recommendation U.1)

Peoples Gas updated its 2011 draft AMRP Customer Communications Plan in December 2014. However, the revised AMRP Communications Plan fails to address several items, including:

- Protocols and strategies for dealing with uncooperative customers
- Process to update customer needs and expectations as the project progresses
- Process to gather customer feedback and measure customer satisfaction.

The Company did not finalize the plan prior to program launch. It has also not updated it to reflect changes to the communications process or materials in the intervening three years. Considering the risks to Company image and customer satisfaction, Peoples Gas should review and update this program-specific communications plan annually to address customer notification and public communication in regards to meter access and cut over, including templates and prepared communications addressing these needs. The Company has stated that an update is now underway.

U.2 AMRP communications techniques have been inconsistent. (Recommendation U.2)

Peoples Gas requests appointments for service mark-outs through a standard letter process, and the Contact Center schedules them. However, each Shop individually handles requests to schedule appointments to move meters. This approach may prove easier for the Shops to manage. It can, however, cause confusion for customers, who set the first appointment through the Contact Center. A month or so later Shop personnel go door-to-door to set appointments with customers. In some cases, no letter or other communication informs customers about the process from end-to-end.

This approach causes problems in addition to inconsistency in the customer experience. Customers may not be home, or unwilling to answer the door. Door-to-door delivery of brochures involves

significant costs. The Peoples Gas field employees going door-to-door also do not have the customer-service “soft skills” training necessary for making such contacts effective.

The Shops record appointments on handwritten lists. The Shops do not document appointments appropriately in the Peoples Gas customer information system (known as “Cfirst”). The Contact Center therefore has no record of these appointments. Customer Service Representatives thus do not have the information that enables them effectively to answer questions or reschedule appointments.

U.3 Peoples Gas’ communications processes for setting service marking appointments have become more appropriately coordinated as AMRP work has progressed.

Peoples Gas initially planned to make communications with customers 90 days prior to contractor construction. However, the Company soon fell behind schedule marking services, in major part due to lack of well-coordinated customer communications. Difficulties in scheduling customer appointments left many services unmarked as contractor crews moved into an area. This circumstance caused service installation delays. Peoples Gas realized that it needed another approach to communicate with customers to arrange service markings.

During the second year of AMRP work, the Company decided to mark services in the fall and winter, well prior to spring construction. This blanket approach proved successful in marking services. However, markings got too far ahead of construction, and in some cases the markings were lost or destroyed requiring re-marking and causing delays.

The following year brought a more coordinated approach to service marking. This approach employed a series of four letters, sequenced to begin a month prior to construction. The first letter introduced the program, asked for cooperation in accessing the meter, and attempted to set expectations for project timing and ultimately, restoration. Subsequent letters asked customers to set appointments, and, for unresponsive customers, warned of pending service disconnection.

The use of this approach continues, and appears to work better for customers and contractors.

U.4 The Customer Service organization adequately supports the AMRP meter access appointment setting process, but the customer information system does not facilitate the process from end-to-end. (*Recommendation U.3*)

An external vendor, iQOR, has provided call center services for Peoples Gas since 2011. The Integrys Business Support Customer Service organization provides for training, handling escalated issues, and monitoring Call Center quality and performance. Customer service representatives receive AMRP-specific training to support inquiries, enable appointment setting, and handle complaints. Customers can schedule appointments for service markings or meter moves by calling a toll-free number that reaches the Contact Center. Representatives undergo training to ask for any special access instructions, inform customers of the process, and update the customer record as needed with owner information. After-hours, the Company’s telephone system (“IVR”) can assist callers in setting appointments and can take messages regarding the program. The website assists with AMRP communications, providing program brochures, frequently asked questions, and scheduling appointments.

Peoples Gas uses its customer information system (linked to a geographic information system) to identify accounts within a neighborhood scheduled for AMRP work. The system selects customers for a series of letters explaining the program and asking for assistance in moving the meter. The customer information system also records the sending of these letters to customers. However, Peoples Gas has not integrated the customer information system with its field work management system. Field management thus implemented a standalone database to track letters to customers, manage appointment availability, confirm appointments, and track “in service” status after service activation by a Peoples Gas crew. However, the Customer Service organization and the Contact Center do not have access to this field database. The corporate information systems organization does not manage or support the work management database.

Integrays plans to replace Cfirst (the customer information system) within the next two years, as part of an initiative (called “the Integrays Customer Experience,” or “ICE”), to provide a common billing system for all operating companies.

U.5 Peoples Gas has not consistently scheduled off-hour appointments for customers unavailable during normal business hours. (*Recommendation U.2*)

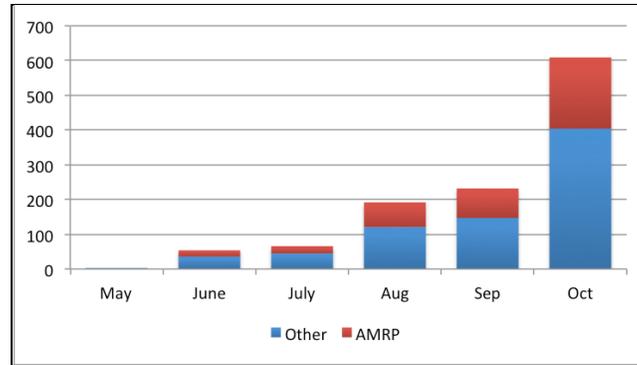
The Company recently limited the availability of after-hours appointments to move meters. The letter requesting a customer appointment offers hours from Monday through Friday, between 8 am to 7:30 pm. It also offered Saturday appointments from 8 am to 3:30 pm. However, from August through October 2014, Peoples Gas Shops were not permitting the scheduling of Saturday appointments. This restriction frustrated many customers, and increased complaints and special handling requests.

U.6 Peoples Gas’ AMRP complaint handling group is overwhelmed by the volume of complaints. (*Recommendation U.4*)

Peoples Gas established the Construction Complaints group (reporting to the Division Street Radio Room in Gas Operations) in 2012 to coordinate complaint resolution. Currently, this group has insufficient staff to handle the volume of complaints received. Peoples Gas policy stipulates that customers will be contacted within 24 to 48 hours of their complaints, in order to gather as much information as possible about the situation. However, the Construction Complaints Team has not met this goal.

As of October 31, 2014, 400 AMRP-related complaints remained pending. Peoples Gas received some of them in June 2014. The Company reports that those numbers have fallen by about half since then. The Construction Complaints group handles all construction complaints, including those related to the AMRP. A large number experience significant delay in getting assigned for handling. Some customers who voiced complaints in June 2014 have not yet heard from a Peoples Gas complaint-handling representative.

Figure U.2: Unopened Construction Complaints (Awaiting Assignments)



A complaint may take weeks or months to resolve, depending upon its nature. As of last fall, it had taken an average of 103 days to complete complaint processes. The Company reports that this duration has since fallen to 81 days.

Clearly the pace of assignment and resolution is unacceptable.

U.7 Peoples Gas does not measure the AMRP customer experience. (Recommendation U.5)

Peoples Gas routinely measures transactional customer service, both in the Contact Center and in the field. The Company also participates in the JD Power and Associates Residential Customer Satisfaction program. The Company does not, however, specifically track customer satisfaction with AMRP-related work.

Peoples Gas attempted to measure satisfaction with AMRP very early in the program. It discontinued measurement, citing difficulties due to the length of the AMRP customer experience. Months can pass between construction and restoration. Peoples Gas is not measuring customer satisfaction with the AMRP program.

4. Recommendations

U.1 Peoples Gas should alter the AMRP Communications Plan. (Conclusion U.1)

Peoples Gas revised its Communications Plan for AMRP in December 2014. This effort had been underway since July 2014. While the updated Communications Plan reflects project revisions to date, it fails to address the findings of this chapter. Specifically, the most recent Communications Plan requires amendment to discuss:

- Protocols and strategies for dealing with uncooperative customers
- Process to update customer needs and expectations as the project progresses
- Process to gather customer feedback and measure customer satisfaction

Following Plan modification to address these concerns, Peoples Gas should communicate the Plan throughout the organization and train contractors and employees on its use.

U.2 Peoples Gas should standardize the process to set AMRP customer appointments. (Conclusions U.2 and U.5)

Peoples Gas should standardize the appointment setting process and the Contact Center should set all appointments to facilitate a one-stop experience for customers. The Company should use the customer system to set and track appointments. These changes will provide a more consistent experience for customers. Peoples Gas should also consistently offer options for after-hours and weekend appointments to accommodate customers who need them.

U.3 Peoples Gas should ensure that the Customer Information System fully supports AMRP communications processes. (Conclusion U.4)

Integrays plans to replace Cfirst within the next two years. Whether or not that replacement takes place, Peoples Gas should make sure that its customer information system supports the AMRP communications process. In addition, Peoples Gas should integrate its customer information system with its field work management system. Sound integration will allow Peoples Gas to track field progress and communicate that progress across the organization and to customers. This integration will eliminate the need to maintain a standalone database in the field and improve Customer Service responsiveness.

U.4 Peoples Gas should adequately resource the AMRP Complaints Handling Group, and should monitor complaint resolution performance and the root causes of customer complaints, for the purpose of identifying improvement opportunities. (Conclusion U.6)

The Construction Complaints group has insufficient staffing, considering the current volume of pending and active complaints. The group needs additional manpower to open and assign complaints. The Company should contact customers within 24 to 48 hours to acknowledge receipt of the complaint. Additionally, management should monitor complaint resolution to ensure proper investigation of issues and effective resolution by the responsible organizations. Peoples Gas should address this problem as soon as possible.

Peoples Gas should investigate the root cause of AMRP-related customer complaints, and complaints from other stakeholders. These root cause analyses should drive improvement in policy, procedure, protocol, and communication.

U.5 Peoples Gas should measure on a regular basis: (a) customer satisfaction with AMRP, and (b) the effectiveness of AMRP Communications and Customer Service. (Conclusion U.7)

Peoples Gas should begin measuring customer satisfaction with the AMRP process. An AMRP project can extend over weeks and months. Peoples Gas should measure satisfaction for individual components of the process, such as customer letters, program information, website, appointment setting, service marking, service installation, meter installation, and restoration.

Peoples Gas should measure and track satisfaction with program components to identify opportunities to improve the customer experience and internal policies and procedures.

In order to measure the effectiveness of AMRP Communications and Customer Service, Peoples Gas needs to identify and routinely chart performance against specific metrics. These metrics should include, but not be limited to, customer satisfaction, complaints per customer, missed or late appointments (by Peoples Gas), average time to respond to inquiries and complaints, and time to resolve complaints. Performance should be trended and reported along with other Project Management Office metrics on a weekly or monthly basis throughout the life of the program.

Part Five: Monitoring

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Chapter V: Monitoring

1. Background

Liberty's work scope includes development of a method to allow the Illinois Commerce Commission to monitor AMRP program costs and progress. Peoples Gas issues a monthly AMRP Status Report of about 50 pages. The Company does not provide this report to the Illinois Commerce Commission. The Company also produces weekly production curves. Peoples Gas also submits monthly and annual filings reporting on the Qualifying Infrastructure Plant Surcharge. The first annual filing came in April 2014. These reports do not provide (nor does their intent include) material suitable to meet Illinois Commerce Commission cost and schedule monitoring.

Two forms of regulatory monitoring involving the AMRP bear discussion, given the nature of Liberty's conclusions and recommendations about reporting performed for purposes of AMRP management, control, and oversight.

- **Implementation Monitoring:** The Commission anticipates a two-year program of monitoring of actions by the Company to implement the recommendations of this report.
- **Program Performance Monitoring:** The size, importance, and length of the AMRP makes the transparency of central program measures important to the Commission and to public stakeholders. The current status, forecasts, and threats facing program costs, schedule, and degree of safety risk mitigation form the most important of these elements.

Implementation Monitoring will rely on outside consultant services. Program Performance Monitoring does not fall within the scope of those outside services. The need for performing this second form of monitoring merits attention to the question of the availability of Commission Staff resources. This report addresses the significant cost, schedule, and risk mitigation uncertainties that face the AMRP. This report also addresses the broad and deep set of changes that Peoples Gas needs to make to provide sufficient management, control, and oversight of the program. Some of the key changes will likely take most or all of the two-year recommendation monitoring period. Following full implementation, the program will still face substantial risk. While the recommendations of this report to be fully implemented, those risks will remain even higher, thus underscoring the importance of Program Performance Monitoring and the need for identifying methods to give Commission Staff the ability to perform it.

This report chapter focuses on the development of a process for Program Performance Monitoring. The reasonably straightforward process for designing Implementation Monitoring will occur (and monitoring will begin under it) following acceptance of this report. Designing the second form faces unusual difficulty. A significant number of this report's conclusions and recommendations about AMRP management, control, and oversight address program and project performance data collection and reporting. Moreover, changes in underlying program elements (*e.g.*, cost estimating and scheduling) must also occur to enable reporting scope and quality to reach the desired levels.

Were it not for the need for such improvements, the process of designing Program Performance Monitoring for execution by the Illinois Commerce Commission would also prove more straightforward. Current AMRP reporting by Peoples Gas, however, makes its reporting (and therefore monitoring by the Commission) problematic. Only after such reporting improves

substantially will answers to cost, schedule, and risk mitigation questions provide meaningful insights into AMRP status, progress, and what the prospects are for the longer term.

Reporting that serves regulatory monitoring needs should build from the same information and systems that support AMRP program and project reporting. Such commonality is critical to making Program Performance Monitoring meaningful and accurate. The nature, structure, and quality of AMRP program and project reporting will remain “under development” for much and in some respects probably all of the two-year Implementation Monitoring period. These aspects of reporting will change as Peoples Gas completes implementation of this report’s relevant recommendations, which means that the specifics of longer term Program Performance Monitoring will likely change as well.

The combination of the AMRP’s long length, vital contribution to public safety, massive costs, and integration with parallel programs (increasing delivery system pressure and relocating meters to outside locations) appear likely to continue to make outside reporting and monitoring of cost, schedule, and success in reducing safety risk important well after the end of the Implementation Monitoring period. What form that longer term reporting will need to take should consider a number of factors that may change in the next two years. They include stakeholder input, any factors that a change in control of Peoples Gas may occasion, and future levels of Commission Staff available for performing longer-term monitoring, for example. The Staff resources question has particular importance in developing a long-term monitoring program that meets Commission needs, but matches the resources available to execute it.

2. Program Performance Monitoring Objectives and Guidelines

Liberty considered the following objectives in the design of Program Performance Monitoring:

- Monitor deviations from the cost and schedule performance required for success of the AMRP
- Understand the factors causing such deviations
- Assess the degree of safety risk mitigation actually achieved as a function of the resources expended to produce that level of mitigation
- Measure the changes in operating costs (and benefits) achieved through execution of the AMRP and the other programs managed in conjunction with it
- Obtain information from Peoples Gas management on the actions being taken to correct deviations from expectations
- Establish mechanisms for monitoring management’s effectiveness in the overall execution of the program.

Designing a performance monitoring program for the Illinois Commerce Commission must take into account that at this time Peoples Gas’ AMRP reporting and management will not support the Commission’s ability to accomplish even moderately detailed monitoring. However, if Peoples Gas aggressively and successfully executes the initiatives it has stated to Liberty, these circumstances will improve. The important needs that Peoples Gas must fill, for purposes relevant to Program Performance Monitoring include:

- A credible AMRP plan from which to measure

- A program management organization having the capability for insightful analysis of project performance
- Management processes for formally responding to project issues as or before they become “problems.”

Judging or designing a report requires particular attention to its purpose. The effectiveness of management and of AMRP oversight raise the matter of primary interest here. This focus suggests two types of reports: those whose purpose seeks to facilitate management or oversight of the program, and those that exist simply to keep people informed.

A report’s design intent should align with its users’ expectations and intended use. The first challenge thus becomes what the Illinois Commerce Commission should logically expect from Peoples Gas reporting and, more importantly, what it seeks to do with the information. The temptation to start with a list of performance indicators may produce a wrong focus. Indicators often have questionable value, for a variety of reasons. Take as an example the bulk performance of AMRP in 2014. At mid-year, bulk performance on main and service installations fell well behind schedule. A literal interpretation of the curves would suggest no way to make up the gap. Peoples Gas reported that production would catch up, and reach planned levels by the end of the year. However, if this observation had validity, it would also call into question the value the performance indicator had in the first place. Such an indicator can only become accurate after the 365th day of the year. Liberty cautions against over-reliance on performance *indicators*, emphasizing instead the role of performance *insights*. Insights go beyond the data to supporting analysis of precisely what is happening and why.

One should not anticipate a fixed set of reporting requirements that remains for 20 years. The AMRP will remain fluid and dynamic. The issues it raises will change. The information priorities of the Illinois Commerce Commission and its stakeholders (in terms of needed insights into the program) may change as well. Monitoring mechanisms should remain flexible. The change process needs to be continuous. Readers of the reports should revisit reporting requirements after the issuance of each report. The quarterly reporting recommended below supports this level of frequency in ensuring that reporting stays abreast of changing issues, priorities, and work progress.

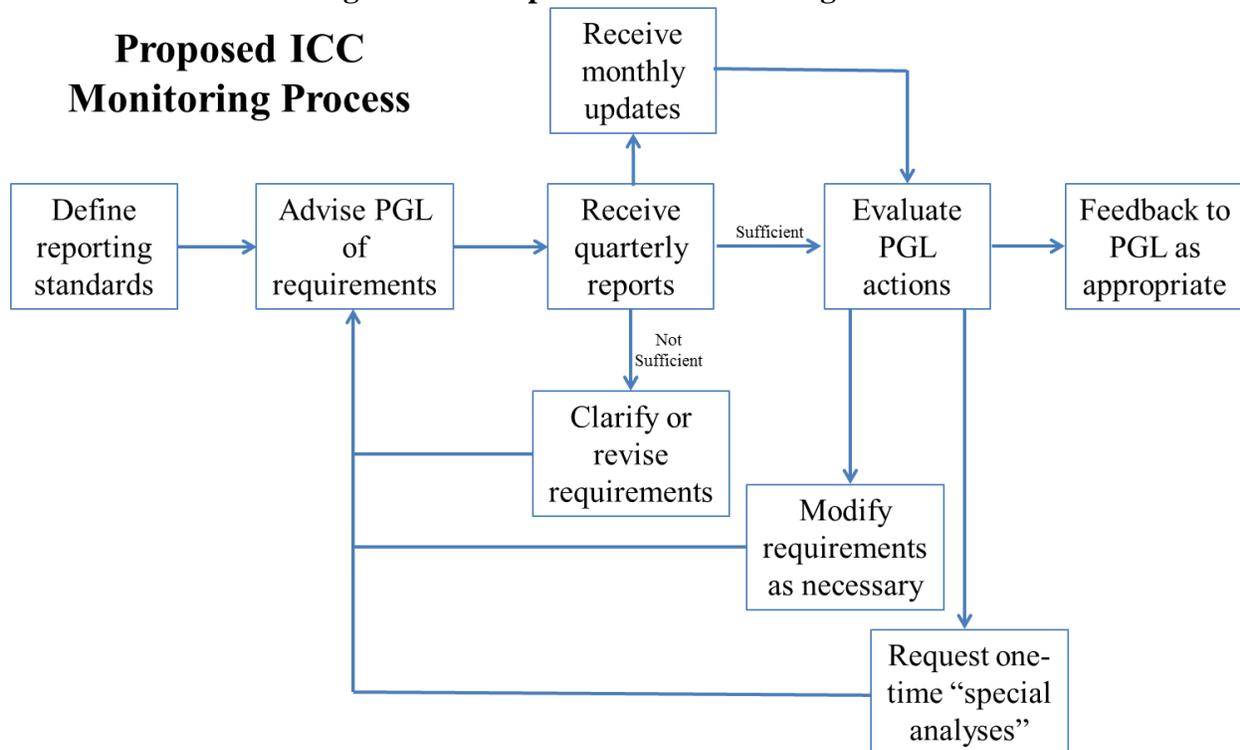
Liberty also finds value in reasonably frequent “special analyses.” These “white papers” may contain only a few pages. Their importance lies in providing more in-depth analysis of issues that arise from reviewing standard reports. Peoples Gas may volunteer such an analysis, to address a particular area of emerging interest. The Commission may request one in response to a specific concern, or simply to gain more background in understanding a critical area. Chosen and prepared carefully, these special analyses can become a particularly valuable report feature.

Project reports are usually lengthy. They can aggregate a mass of data, charts and graphs, text, colors, and dashboards. Too much detail dilutes the value of important material, which can become difficult even to locate. Accordingly, content should reach a level and focus designed to allow outside monitoring to accomplish its objectives. The length of the report should also respect the fact that the objectives of regulators and stakeholders should stop short of the day-to-day workings of the program.

One needs to contain reporting to what will keep reporting effective. Monthly reports would prove too frequent, except perhaps during the period in which efforts remain underway to redefine them as part of the implementation of this report’s recommendations. A quarterly report certainly becomes more optimum after what will hopefully prove a reasonably short transition period for making the program management, control, and oversight changes warranted. Analyses performed and corrective actions identified by Peoples Gas would come quarterly.

3. Recommended Program Performance Monitoring Process Flow

Figure V.1: Proposed ICC Monitoring Process



The process charted above requires an initial definition of outside reporting standards for Peoples Gas. The Company will begin delivery of regular reports in response. Meeting full requirements immediately is not likely, thus suggesting a brief trial-and-error period. The “not sufficient” path shown in the figure illustrates how such a conclusion by the Illinois Commerce Commission report reviewers will lead to clarified or revised instructions for Peoples Gas, with the cycle continuing as needed to complete an initial shakedown.

The Illinois Commerce Commission can test Company responsiveness to program trends and issues if Peoples Gas produces credible and responsive analyses (quarterly, supplemented by special analyses as required). Such information provides a baseline for evaluating Company identification of issues and its effectiveness in constructing plans to deal with them. The process recommended also permits feedback, as appropriate, to Peoples Gas. The Commission may at this point seek added information to fill gaps in the quality of the Company’s analysis. Where Peoples Gas commits to corrective actions, monthly updates to monitor such actions should occur. During review of the regular report, Commission readers should also consider what, if any, changes should apply for subsequent quarterly reports. For example, for a substantial problem raised in the first

quarter's report, the requirements for that topic may expand for future reports. Also at this time, the Commission might identify the need for one or more "special analyses."

4. Report Content

a. Program Cost

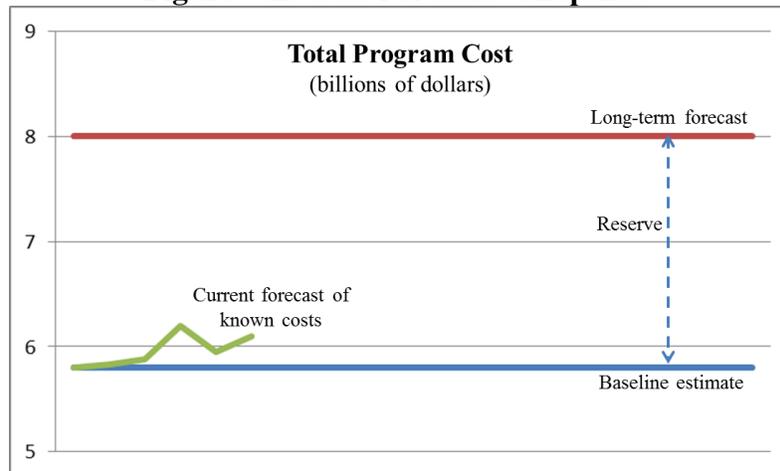
Cost reporting should begin with the use of five categories, pending development of the capability at Peoples Gas to provide meaningful data, and subject to continuing visitation:

- Long-term programmatic costs
- Annual expenditures
- Unit production rates
- Earned value indicators
- Contractor costs and change orders.

The single most important parameter over the long term is overall program cost. "Super-projects" tend to have the common attribute of continuing and substantial cost overruns. Given that cost growth seems inevitable on such projects, how one prepares a reasonable estimate and, more importantly, how one controls cost growth become material questions. Liberty's recommended approach consists of:

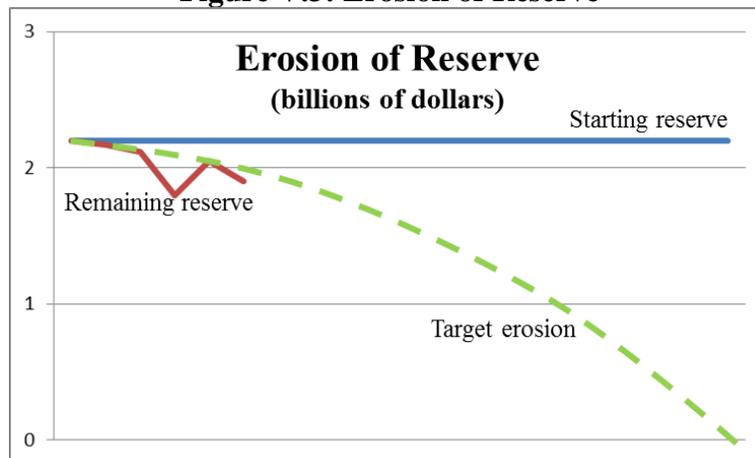
- An estimate prepared using traditional methods. This base estimate, termed "known costs," should result from a working model (not yet in existence for the AMRP), in order to permit tracking and reforecasting on a continuing and meaningful basis.
- A judgment process then drives a projection of potential growth in the estimate over program life. A variety of methods (including probabilistic estimating, growth from similar projects, the experience of those estimating the growth, or any other means deemed feasible for a "ball park" estimate) can drive this projection. Its goal is not precision, which must prove impossible under any circumstances. Rather, the intent is to gauge approximate upside potential. Application of this growth potential establishes a more reasonable baseline, and communicates a more meaningful perception to the Commission and other stakeholders.
- The difference between the two estimates can be characterized as a "reserve" or a "contingency."
- The "known costs" form the control base for the day-to-day management of the project. Near-term budgets and plans must all align with this estimate. This estimate forms the baseline for managing costs and it serves as the measurement basis for reporting deviations.
- On a real-time basis, as new information becomes available, the model drives re-forecasts of the various cost elements. Independently, the issuance of a cost-trend alert communicates that the baseline estimate of known costs may be in motion. Such alerts should issue as soon as possible, even in the absence of compelling data, in order to permit prompt execution of any warranted management response. In any event, the real-time model begins to reflect a changing perception of "known costs." Periodically, once per quarter for purposes of the monitoring at issue here, the Company would provide a snapshot of the model. The resulting graphic might look like the next figure, which uses hypothetical numbers.

Figure V.2: Cost Forecast “Snapshot”



The rate of reserve erosion becomes the chief focus. The next table shows a way to depict that erosion. One should tend to exercise conservatism at the start, in order to preserve contingency for as long as possible. This approach also recognizes the likelihood that growth becomes more likely at the back end than the front (making the saving of reserves appropriate). Others prefer a straight-line target. The key information lets the reader see the degree to which the control base has been violated and the long-term forecast faces threat.

Figure V.3: Erosion of Reserve



Twenty years identifies a theoretically applicable dimension for the AMRP. Such a long time frame, however, weakens the usefulness of the analysis. An alternate time frame in place of or in addition to a 20-year outlook makes sense. For example, cutting off the 20-year charts at 5 years would make the data more credible.

Actual expenditures offer a second and more popular cost indicator, but do not necessarily have value in their own right. This indicator offers more benefit as: (a) a sanity check on the total cost forecast, and (b) a near-term schedule indicator. In the former instance, focus should lie on the degree to which funds expenditure conform to the cost plan. A mismatch can call the forecast into question. The data tells whether resource “burn” occurs at rates demanded by schedule.

The current annual expenditure curve that Peoples Gas reports show should suffice, if accompanied by analysis. Reports should contain planned expenditures, actual expenditures, and forecasted year-end expenditures. To the extent that deviations emerge, they require analysis at an appropriate level.

Unit rates, or productivity, comprise a third key family of cost data. The cost per unit for mains, services, and meters, for example, deserves continuing attention. Such data will offer an early warning signal of growth in the long-term forecast. Peoples Gas should provide summary data and insightful analysis on planned and actual productivity for the current year and for the program to date. Such analysis should include schedule considerations as well. For example, an observed lag in productivity calls for an analysis of impact on schedule and steps to mitigate delays.

Earned value presents another productivity topic of interest. For example, completing 10 units of production “earns” the number of hours corresponding to the budget for that work. Comparing actual hours spent with hours earned provides a good indicator of productivity, or effectiveness. Sophisticated management systems can collect this data at very detailed (low) levels, and aggregate it at increasingly summarized levels to provide management with valuable measures of performance. A project the size of the AMRP calls for the use of sophisticated management tools. Peoples Gas does not employ them now.

Contractor costs comprise a fifth important cost area. Contracting much of the work on a fixed price or unit price basis can lead to the erroneous belief that such costs have less variability, and become the contractor’s problem to manage. Contractor costs can vary in a number of significant ways; *e.g.*, (a) bid prices out of line with assumptions in the project estimate, and (b) contract changes in excess of those anticipated and allowed for in the estimate. Neither of these two exposures has visibility at this time. Change orders and their near- and long-term impacts on total program costs warrant attention. Peoples Gas should provide data and insightful analysis of the following:

- Weighted average ratio of final contract price to initial award value for completed contracts
- Number and dollar amount of change orders requested this year
- Number and dollar amount of change orders approved this year.

b. Program Schedule

Liberty recommends starting with four schedule categories:

- Bulk production curves
- Long-term schedule projection (retirement curve or similar)
- Resource plans
- Simplified and clarified program quantity tables.

Bulk production curves form the staple for near-term schedule analysis. The reporting of such curves should continue, but not in the detail now offered in AMRP reports. Three annual S-curves (mains, services, and meters) should suffice. Each chart should include plan, actual, and a year-end forecast. Should significant deviations appear, as happened throughout 2014, reporting should contain analysis of them. That analysis should, in a clear way, communicate at least:

- The reasons for significant deviations at a root cause and responsible organization level
- A plan for recovery, including responsible parties, specific commitments regarding resources and dates, and how the Company will manage and enforce those recovery plans
- Any longer-term impacts to the overall program cost forecast and schedule.

From a long-term schedule perspective, the Illinois Commerce Commission should have special interest in the progress towards replacement of all leak-prone pipe, which comprises the fundamental 20-year objective. There exists here a parallel with the treatment of costs described earlier. Reserves or contingencies generally do not find their way into schedule analysis to the same extent as costs. That lack presents problems for Commission oversight. If costs grow materially, schedule impacts become more likely. The relationship between cost and schedule growth should remain an important point of observation, and subject to periodic analysis.

Peoples Gas offered a version of the long-term schedule measure, but it does not bear scrutiny. The Company offers a plot of “AMRP Program Retirement” in the monthly report. Contrary to other schedule indicators, this metric shows the program on target. Management has not updated the chart in two years. Yet its presentation continues in this frozen state. Continued use of a chart showing this information makes sense, provided that it undergoes continuing update.

From a schedule management perspective, the size of the workforce, often reflected in a “force report,” presents a key item of concern. Peoples Gas reports the workforce in terms of “number of monthly full-time equivalent jobs created.” This metric does not bear on work performance. Management does not relate the size of the workforce to the plan in any way. The lack of any correlation precludes judgment about whether the reported figures support schedule, or show consistency with the cost estimate.

Resources have special value as a leading indicator. Deviations can predict schedule breakdowns well in advance. A credible resource plan needs to exist, along with transparency when actual staffing does not support that plan. Ordinarily, a plot of manpower on a planned, actual, and forecasted basis would suffice. Here, however, recent performance suggests problems with the resource categories of contractors, Peoples Gas construction, and Peoples Gas engineering.

A number of the current monthly report’s charts have continuing usefulness. That determination, however, requires greater clarity in their definitions, sourcing, and accuracy. At the present time, the data is contradictory and confusing. Further, the widespread use of “program years” presents a confusing distinction without apparent meaning. Peoples Gas should discontinue it.

c. Safety and Quality

Two other areas, safety and quality, also warrant discussion in the context of Commission monitoring. Public and employee safety should form a part of the monitoring mechanism. Public safety comprises the reason for the program in the first place. Safety also serves as a project management indicator.

Safety usually (but not always) produces consensus more readily among utilities, labor, and regulators. Accordingly, one would expect easier development of a mutually agreeable monitoring program for this subject. The safety information reported in Peoples Gas monthly report, as all

other topics, lacks analysis. The charts and tables do not send apparent or actionable messages. A simple paragraph of analysis could easily replace most of the data with considerable value added.

AMRP reporting does not address public safety. Determining meaningful measures of public safety in the utility business is not easy and this topic is open to discussion with the Company. In any event, this topic deserves monitoring to assure it remains high on the Company's priority list. Liberty recommended cooperative work with the Company (which Implementation Monitoring will provide an avenue for performing) to identify methods for relating work and dollars spent to reduction in public safety risk, and to ensure that leak reduction data gets reported accurately and in ways that relate to meaningful safety metrics.

Meaningful high-level measures of quality are not plentiful. Peoples Gas focuses on the number of non-conformance reports ("NCRs"). This is appropriate, but the data provided currently is inadequate. For Illinois Commerce Commission monitoring purposes, and for analysis purposes, Peoples Gas should modify the data as follows:

- Provide trend information that places the data in context. At present, one cannot judge whether the numbers represent good or bad performance, or improving or deteriorating performance.
- Normalize the data to a work measure (for example, pipe installed in the period, person-hours expended, dollars expended), in order to account for work level variations.
- Discuss non-conformances having a significant safety, cost, or schedule impact.
- Include in the analyses, as applicable, examination of patterns or groupings of non-conformances.

Outside reporting should also address the degree to which gas main and service replacements succeed in meeting risk reduction goals and metrics. Such information should play a central role in verifying that work focuses on the facilities producing greatest risk. Reporting should also consider operating cost changes, as part of ongoing review of the economic costs and benefits that AMRP and related work are producing.

5. Recommendations

V.1 Peoples Gas should work promptly to identify the AMRP reporting changes that it proposes to implement near term, and tailor them to meet the reporting cycles and content this chapter describes as appropriate for supporting the monitoring needs of the Illinois Commerce Commission.

The Company's stated intent to revise AMRP reporting substantially makes it efficient to finalize external reporting requirements concurrently with Peoples Gas changes to AMRP reporting. Common timing can make effective use of the very early stages of the two-year monitoring program to verify that reporting improvement has occurred, and to coordinate the data sources and timing of AMRP reports with those that will serve external reporting needs.

The Illinois Commerce Commission has already established a two-year monitoring program intended to examine implementation by Peoples Gas of the recommendations contained in this report. This report makes many recommendations that seek important changes in AMRP (and related program) data collection, reporting, and analysis of cost, schedule, and leak-risk mitigation.

The pendency of the changes recommended means that Peoples Gas will likely continue making changes to report structure and content through much of that two-year period. The dilemma this transition period imposes arises from the fact that the Illinois Commerce Commission and stakeholders have current needs for assessing AMRP status. This report, for example highlights the great uncertainty that now exists with respect to the AMRP's three principal drivers: (a) the total duration likely required for removing all high-risk pipe from the system, (b) how much that elimination will end up costing customers, and (c) the degree to which replacements under current prioritization and planning methods have succeeded and will succeed in reducing the leaks that create substantial safety risks.

Therefore, even though reporting changes will likely continue for some time, working promptly to create at least an interim structure, content, and cycle has substantial importance. Peoples Gas needs immediately to address management reporting changes, to make reporting to the Illinois Commerce Commission and stakeholders meaningful now, rather than far down the road. The AMRP's schedule, cost, and risk mitigation uncertainties require meaningful public reporting to commence as soon as possible.

At the same time, one must recognize that the effectiveness of Program Performance Monitoring will depend significantly on consistency of information used for both internal and external reports, and on reasonably concurrent report timing and data vintage. Thus, the at least interim Illinois Commerce Commission reporting system that needs to begin immediately, must incorporate the ability to grow more robust as Peoples Gas continues to address the management reporting needs that Liberty's report recommends.

To that end, an appendix to this report chapter provides a set of guidelines and reporting templates recommended for use in designing AMRP reports. Peoples Gas should immediately begin development of a Commission reporting structure and content in accord with the guidelines and reporting templates provided. First steps in the two-year monitoring program should include a work session with the Company to ensure full understanding of reporting cycle, structure, and content, and to expedite the creation of a report that the Company can begin providing as soon as possible.

Other factors subject to present uncertainty also have consequence for the design of Program Performance Monitoring. First, Peoples Gas may (or may not) soon have a new owner. Substantive and reporting conditions often accompany regulatory approval of changes of control. Second, stakeholders have expressed significant interest in the AMRP. To the extent that stakeholders raise reporting, monitoring, or transparency issues about the program, it appears logical to consider their views in designing a long-term outside monitoring and reporting program.

In any event, a Program Performance Monitoring program needs to match four key elements:

- Program objectives ultimately deemed appropriate by the Commission
- The specific Company reporting requirements established
- What expectations and requirements apply to the analysis and response to those reports
- The availability of sufficient Commission resources to examine reports and to undertake the dialogue with the Company and the analysis needed to respond to reported information.

Chapter V Appendix: Program Performance Monitoring Guidelines

The Accelerated Main Replacement Program (“AMRP”) of Peoples Gas has very high public safety priority. The Company must implement the program timely, cost effectively, and in a manner that reduces the safety risks of leak-prone pipe with dispatch. Accordingly, the Illinois Commerce Commission requires continuing information on a regular basis about the costs of the program, the schedule under which the replacements occur, and the risk reduction results that the program seeks designed to achieve. These guidelines and accompanying templates outline the Illinois Commerce Commission’s requirements for periodic reporting by Peoples Gas on the progress and performance of the AMRP.

The recommendations that Liberty has made to improve AMRP management, control, and oversight call for a series of changes addressing AMRP reporting for use by program management and by senior executive and board of director oversight. Making those changes will take time. This document generally describes long-term Illinois Commerce Commission Program Performance Monitoring needs. On an interim basis, Peoples Gas may not prove able to support each reporting item or template provided below. The Company needs to find ways to the meet reporting needs identified in this document as best it can on an interim basis. It must also act expeditiously to establish a sound, accurate, long-term basis for meeting those needs.

General Direction

The requirements presented below represent today’s program priorities and challenges. They will no doubt change as the project moves forward. Completing the AMRP involves massive effort to address issues and challenges over a long time. Circumstances are likely to prove fluid over so long a period. Surprises prove common on “super-projects” or pogroms like the AMRP. The Illinois Commerce Commission needs flexibility in redefining its needs as time passes and as performance trends emerge. Peoples Gas will need to remain responsive as the Commission’s needs evolve.

The Company manages replacement work in common with work to increase system pressure and to relocate meters from inside to outside locations. The reporting addressed in this document needs to cover the AMRP alone. Peoples Gas must disaggregate information to exclude information addressing these other sources of work and expenditure, which the Qualifying Infrastructure Plant Surcharge now addresses.

This document defines specific data requirements, but does not invite a simple presentation of that data. Reporting must also include:

- Insightful analysis of the data with an eye to identifying issues of performance and opportunities for improvement. Peoples Gas should have or obtain the skills necessary to perform such analyses in support of its AMRP management needs. The required analysis require a level of explanation sufficient to inform the Illinois Commerce Commission of threats to the overall project costs and schedule, the risks and challenges that emerge, and deviations from expected performance.

- To the extent that regular reports identify problems, opportunities, and issues, Peoples Gas must define their impacts, including magnitude of potential resulting cost increases or schedule delays.
- Most importantly, Peoples Gas must discuss options considered or implemented for mitigation of such deviations. Reporting must include action plans identifying responsible people, required deliverables, scheduled due dates, and post-implementation conditions expected. Such plans require enough detail to enable objective assessment of their implementation. Where plans require additional resources or commitments, Peoples Gas must describe and quantify them.
- Progress against corrective action plans shall be reported in subsequent monthly reports.

The Plan

Before constructing monthly reporting requirements, a program framework with performance requirements must exist. This framework needs to address a plan for the year and for the total AMRP. Peoples Gas must provide, by June 1, 2015 for the initial report and by January 1 for subsequent years, the following information:

AMRP - Initial Required Planning Basis for Monthly Reports				
Category	Measure	Actual thru 12/31 of prior year	Planned this year	Planned for total program
Cost	AMRP expenditures			
Production	Miles of main installed			
	Miles of main retired			
	Services installed			
	Meters installed			
Resources	Program Management - Internal			
(in hours)	Program Management - Contractors			
	Engineering - Internal			
	Engineering - Contractors			
	Construction - Internal			
	Construction - Contractors			
Operational Results	Leaks			
	Leaks per mile of remaining leak-prone pipe			

Specific Content of Monthly Report

Program Summary Level

At the program summary level, Peoples Gas must report on a template that mirrors the annual plan.

Monthly Reporting at the Program Summary Level							
Category	Measure	Plan for this month	Actual for this month	Planned thru this month	Actual thru this month	Planned for the year	Forecast for the year
Cost	AMRP expenditures						
Production	Miles of main installed						
	Miles of main retired						
	Services installed						
	Meters installed						
Resources (in hours)	Program Management - Internal						
	Program Management - Contractors						
	Engineering - Internal						
	Engineering - Contractors						
	Construction - Internal						
	Construction - Contractors						
Operational Results	Leaks						
	Leaks per mile of remaining leak-prone pipe						

Category Level Support Data

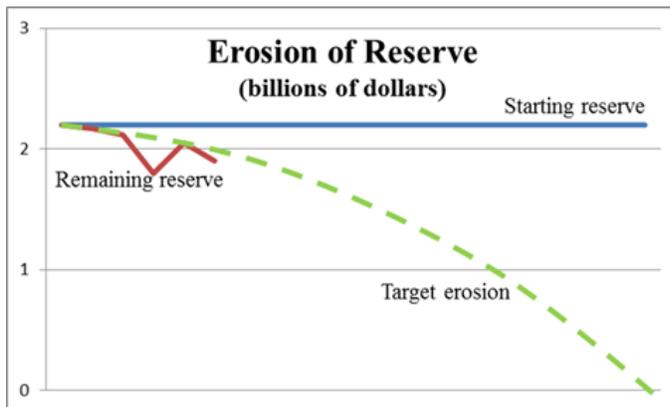
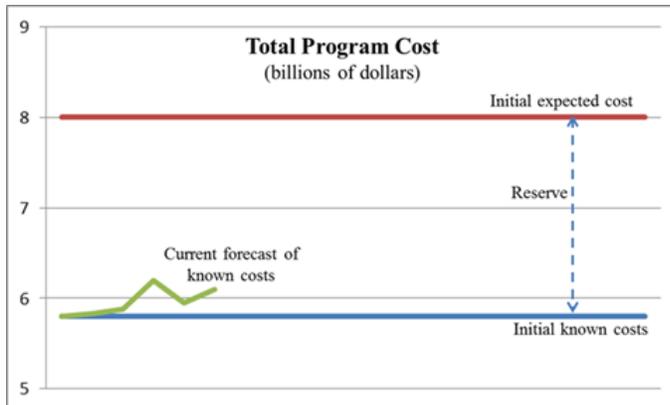
1. Cost - Expenditures

The “AMRP Expenditures” line should be supported by similar data broken down by major cost elements. The AMRP estimating process should identify and structure the applicable cost elements. Liberty would anticipate perhaps 8-15 elements, each of which should have a plan for management of the associated costs. Each plan should be consistent with the magnitude, risk, and controllability of the subject costs. The same six columns from the summary level table should apply, with the total of all cost elements equaling the entries on the summary level table.

2. Cost – AMRP Forecast

Considerable uncertainty surrounds final AMRP cost. With billions of dollars at stake, it becomes essential to track that bottom line cost and to manage it as far as practicable. Liberty has proposed a method, which absent a present alternative from the Company, should apply to regular reports.

The approach begins with a traditionally prepared estimate, except for treating amounts for allowances for unforeseen events or contingencies as minimal. The resulting estimate becomes “known costs” or “the base estimate.” Peoples Gas then needs to apply best efforts to estimate likely growth in the known costs. The assignment of a projected final cost amount should follow rational analysis by Peoples Gas managers, including consideration of growth so far, risk analysis of exposure areas, experience on other large, long-term projects, and other factors and projections by knowledgeable analysts. Such a final estimate will not necessarily produce a high confidence level, but will prove suitable for its intended purpose here. That purpose is to establish of a target against which to track and report future costs.



The difference between known costs and the final projection bears the term “management reserves.” As the program progresses and new costs become identified, known, are identified, the known costs increase and the remaining reserves decrease, as the accompanying chart illustrates. Peoples Gas should monitor the erosion of reserves with the intent of determining when and by how much projected cost should change. Should new known costs become identified at too rapid a pace (causing reserve erosion at too fast a pace), it will eventually become clear that holding to the final forecast has become unwise. At that point, Peoples Gas would need to prepare a new estimate of known costs and a new projection for final costs.

This type of cost reporting approach can tend to break down over long periods. Accordingly, Peoples Gas may wish to present an erosion chart using a shorter timeframe, such as five years. Such an alternative will work. The focus, however, must remain on total program cost, and the Company must present any shorter term conclusions presented in terms of their ultimate effect on total AMRP costs.

3. Production

Peoples Gas must support annual summary level production data with S-curves, similar to those in use in its present monthly report. The S-curves should cover the same line items as the summary level report. They should plot the plan for the year, actuals to date, and the forecast for the remainder of the year.

All performance data (cost, production, and resources) requires integration and consistency. For example, to the extent production lags schedule, Peoples Gas might present an accelerated forecast.

Report Appendix A: Investigation Review Area and Report Chapter Cross-Reference Table

Investigation Review Area	Report Chapter
1. Peoples Gas' understanding of its delivery infrastructure condition	C: The Peoples Gas Distribution System
2. Miles of gas main replaced to date under the program	D. AMRP Definition and Status
3. Miles remaining to be replaced and required annually to meet a 20-year program duration	D. AMRP Definition and Status
4. Gas mains and lengths intended for replacement each year	D. AMRP Definition and Status F: Risk Assessment
5. Determination of schedule likely to be required for program completion	B: Report Summary H: Schedule Planning
6. Likely annual and total program costs	B: Report Summary D. AMRP Definition and Status H: Schedule Planning
7. Development of a method for Commission monitoring of AMRP cost and progress	V: Monitoring
8. Appropriateness of program and project planning and scheduling	E: Plan for Management H: Schedule Planning
9. Program and project cost estimating methods and accuracy	G: Cost Planning K: Cost Estimating
10. Managing City permits and communication; material procurement	M: Procurement and Contracting R: Work Management Q: Field Work Performance T: Government Coordination
11. Program budgeting process and relationship to construction scheduling	N: Executive Oversight Part Two (Chapters E through I)
12. Methods and factors considered in prioritizing replacements	F: Risk Assessment
13. Program and project management methods and practices	E: Plan for Management
14. Facility engineering and design	Q: Field Work Performance
15. Constructions standards for new facilities installed	Q: Field Work Performance
16. Construction methods, policies, and practices; right-of-way acquisition	F: Risk Assessment
17. Oversight of work quality and conformance to specifications	Q: Field Work Performance



18. Conformance of work to plans, designs, and construction and materials standards	Q: Field Work Performance
19. Use of subsurface investigation services and geophysical techniques	C: The Peoples Gas Distribution System Q: Field Work Performance S: Safety and Permit Compliance
20. Procedures and practices for addressing unexpected field conditions	C: The Peoples Gas Distribution System Q: Field Work Performance S: Safety and Permit Compliance
21. Methods for gaining access to indoor meters and cutting over services	Q: Field Work Performance U: Customer Coordination
22. Quality and appropriateness of construction materials	Q: Field Work Performance
23. Materials purchasing policies, procedures, and practices	M: Contracting and Procurement
24. Construction contract award policies, procedures, and practices	M: Contracting and Procurement
25. Contractor experience, qualifications, and training	M: Contracting and Procurement Q: Field Work Performance
26. Permit acquisition methods and timing	T: Government Coordination
27. Relationship and communications with other public and business entities	T: Government Coordination U: Customer Coordination
28. Information and schedule sharing and plan coordination with the City of Chicago	T: Government Coordination
29. City of Chicago issues regarding Peoples Gas and its work practices	T: Government Coordination
30. Inspections of active Peoples Gas AMRP construction sites	Q: Field Work Performance
31. Violations and failures to follow government safety standards	S: Safety and Compliance
32. Reasonableness, prudence, and used and useful nature of all aspects of Peoples Gas' AMRP	B: Report Summary
33. Policies and practices for calculating reductions in operation and maintenance costs	F: Risk Assessment



Report Appendix B: List of Recommendations

Part One: Overview

Chapter C: The Peoples Gas Distribution System

- C.1 Peoples Gas should include as an element of the neighborhood work planning process an evaluation of the merits of taking an exception to the double decking approach. *(Conclusion C.4)*
- C.2 Peoples Gas should more thoroughly study and report on the causes of extremely high reports of contactor damage incidents. *(Conclusion C.5)*
- C.3 Peoples Gas should undertake measures to verify the operability of external service shutoff valves. *(Conclusion C.5)*
- C.4 Peoples Gas should examine the ability to address low pressure and single-contingency outage risks in the neighborhood program. *(Conclusion C.5)*
- C.5 Peoples Gas should test both services and mains to 100 psig. *(Conclusion C.5)*
- C.6 Analyze and report on the precise nature and numbers of corrosion leaks, and determine whether protected and coated steel mains are experiencing corrosion leaks. *(Conclusion C.6)*

Chapter D: AMRP Definition and Scope

- D.1 As part of the new planning effort now underway, Peoples Gas should provide a clear and unambiguous description of the AMRP, including quantities for all parameters important to management of the project. *(Conclusions D.1 and D.2)*
- D.2 Peoples Gas should accompany regularly reported performance data with insightful analysis in order to make the data immediately meaningful to management oversight and supportive of timely and responsive improvement and corrective initiatives and activities. *(Conclusions D.1 and D.3)*
- D.3 Peoples Gas should provide a realistic schedule assessment based on an effective program plan. *(Conclusions D.1 and D.6)*
- D.4 Peoples Gas should prepare a soundly derived, detailed resource plan and provide for full coordination between the annual budget and resulting resource requirements. *(Conclusions D.1 and D.7)*
- D.5 In light of apparent decreases in productivity, Peoples Gas should promptly complete an analysis of productivity associated with the installation of meters. *(Conclusions D.1 and D.8)*
- D.6 Peoples Gas should promptly complete a new program cost estimate consistent with good estimating practices. *(Conclusions D.1 and D.9)*



Part Two: AMRP Planning

Chapter E: Plan for Management

- E.1 Peoples Gas should complete a full replacement of the plan for management (the Project Execution Plan) addressing all key elements of AMRP management and control. (*Conclusion E.1*)
- E.2 Current developmental plans for a new Project Execution Plan should specifically address prior failures and how they will be avoided in the new plan. (*Conclusion E.1*)
- E.3 Peoples Gas should prepare a long-term AMRP management resource plan that specifically addresses: (a) requisite skills needed both on an immediate and on a longer term basis, (b) current gaps in internal capabilities, (c) the optimum balance of owner versus contractor personnel, (d) acquisition and development of resources, and (e) succession plans. (*Conclusions E.2, E.3, and E.4*)
- E.4 Peoples Gas should move toward a project organization that makes significantly more use of dedicated resources under a strong project manager approach. (*Conclusion E.5*)
- E.5 Peoples Gas should prepare a specification for a new program management function, correcting the weaknesses in the current process. (*Conclusion E.6*)
- E.6 Peoples Gas should assign a project manager to most, if not all, AMRP neighborhood projects. (*Conclusion E.7*)

Chapter F: Risk Assessment

- F.1 Peoples Gas should develop, staff, and implement a data quality control program. (*Conclusion F.3*)
- F.2 Peoples Gas should develop a database of soils data already collected, and populate it further with soils data taken at new excavations. (*Conclusions F.4*)
- F.3 Peoples Gas should conduct a structured study of alternative criteria and weightings for the Main Ranking Index and for the neighborhood approach. (*Conclusions F.5 and F.6*)
- F.4 Should Peoples Gas not change the current criteria and weightings, the Company should develop additional measures to reduce leak rates further. (*Conclusions F.5 and F.6*)
- F.5 Peoples Gas should determine on system, segment, and neighborhood bases the level of acceptable risk and metrics that will support appropriate adjustments in replacement rates. (*Conclusion F.7*)
- F.6 Peoples Gas should develop a cost model that addresses O&M costs associated with AMRP and related work. (*Conclusion F.7*)

Chapter G: Cost Planning

- G.1 Peoples Gas should develop a new Cost Plan Model that includes comprehensive measurement bases and critical assumptions regarding scope, quantities, productivity, labor costs, unit costs, and regulatory requirements; a reserve should be included as part of the overall program costs. (*Conclusions G.1, G.2, G.3, G.4, and G.5*)
- G.2 Peoples Gas should establish a Cost Trend Program to monitor potential, major cost-affecting items. (*Conclusion G.3*)



Chapter H: Schedule Planning

- H.1 Peoples Gas should develop a Scheduling Master Plan. (*Conclusion H.1*)
- H.2 Peoples Gas should develop a complete project schedule for every new project, and it should address all aspects of the work required, from engineering to construction and through completion. (*Conclusion H.2*)
- H.3 Peoples Gas should resource-load schedules to address all physical work resources (including internal workforce and contractors) and construction inspectors. (*Conclusion H.5*)
- H.4 Peoples Gas should regularly perform schedule variance analyses to identify recurring or systemic issues, and plan corrective actions. (*Conclusion H.6*)
- H.5 Peoples Gas should complete promptly its efforts to ensure that construction schedules become quantity-based for the internal workforce and for contractors. (*Conclusion H.3*)

Chapter I: Resource Planning

- I.1 Peoples Gas should develop a long-term resource staffing plan that reflects the numbers, skills, and experience needs of all key positions. (*Conclusions I.1, I.2, I.3, I.4, and I.6*)
- I.2 Peoples Gas should develop the in-house capability to replace gas mains and install services on a larger and more long-term basis. (*Conclusion I.5*)
- I.3 Peoples Gas should act immediately to address the need for sufficient internal resources to perform back end AMRP work as planned and scheduled. (*Conclusion I.2*)
- I.4 Peoples Gas should bring enhanced productivity measurement and management to resource planning. (*Conclusion I.7*)
- I.5 Peoples Gas should more closely monitor contractor resources and production. (*Conclusion I.2*)
- I.6 Peoples Gas should establish a centralized resource planning group or function. (*Conclusions I.1, I.2, I.3, I.5, and I.6*)
- I.7 Peoples Gas should evaluate regularly the performance (*e.g.*, wage rates, quality, productivity, expertise, safety, dependability) of the internal and external workforce. (*Conclusion I.2*)

Part Three: AMRP Management and Control

Chapter J: Scope Control

- J.1 AMRP management should promptly design and implement a two-pronged scope control process: (a) at the program level, and (b) at the individual project level. (*Conclusion J.1*)

Chapter K: Cost Estimating

- K.1 Peoples Gas should establish a cost estimating capability by formulating a clearly communicated cost estimating philosophy, formalizing a cost estimating process, preparing procedures, and developing effective tools. (*Conclusions K.1 and K. 3*)



- K.2 Peoples Gas should maintain and keep updated a set of historical databases that address cost estimating variables. (*Conclusion K.2*)
- K.3 Peoples Gas should perform project cost estimate reconciliations to understand major cost deviations, analyze performance and document lessons learned. (*Conclusion K.4*)
- K.4 Peoples Gas should expand the development of cost estimates at the individual project level and at the program level. (*Conclusion K.5*)
- K.5 Peoples Gas should establish a centralized cost estimating organization to maintain and sharpen the cost estimating skills. (*Conclusions K.2 and K.3*)

Chapter L: Cost Management

- L.1 Peoples Gas should implement a holistic cost management program. (*Conclusions L.1, L.2, and L.4*)
- L.2 Peoples Gas should establish a structured, well defined approach to managing AMRP costs at three levels: the long-term total program outlook, the individual project level, and the annual budget view. (*Conclusion L.2*)
- L.3 Peoples Gas should define appropriate roles for cost management professionals, including all activities, responsibilities, and accountabilities important to holistic cost management. (*Conclusion L.3*)
- L.4 Peoples Gas should establish a cost support organization that: (a) resides organizationally at a level and in a place consistent with treating cost management as a high program priority, (b) serves the cost management needs of all levels of management, (c) develops a force of skilled cost professionals and assures those skills are continuously improved, and (d) has overall accountability for the development and implementation of the cost management program. (*Conclusion L.3*)
- L.5 Peoples Gas should provide training for managers, supervisors and cost support personnel in cost management techniques consistent with the holistic approach. (*Conclusion L.5*)
- L.6 Peoples Gas should continue aggressively to pursue the recommendations made by Liberty in discussions leading to the interim report. (*All conclusions from this chapter*)

Chapter M: Procurement and Contracting

- M.1 Peoples Gas should develop a formal strategy to ensure that the Company gets above-average terms and below-average pricing in view of the long-term opportunities afforded by the AMRP. (*Conclusion M.2*)
- M.2 Peoples Gas should regularly include in program monthly reports information showing procurement fulfillment and past due rates. (*Conclusion M.3*)
- M.3 Peoples Gas should develop a formal strategy to ensure that the Company gets optimum terms and pricing in view of the long-term opportunities afforded to contractors by the AMRP. (*Conclusion M.4*)
- M.4 Peoples Gas should determine those contract administration tasks that it considers required, and assure that the Project Management Office executes those tasks. (*Conclusion M.2*)
- M.5 Peoples Gas should apply a program of enhanced management oversight to the contract change process. (*Conclusion M.3*)



- M.6 The Project Management Office should implement enhanced analysis of its results in managing contract changes. (*Conclusion M.4*)
- M.7 The Supply Chain and Project Management organizations should require contractors to provide key data that supports their plans and bids. (*Conclusion M.5*)
- M.8 The Project Management Office should link the results of its contractor evaluation program to future bid evaluations and awards. (*Conclusion M.6*)

Chapter N: Executive Oversight

- N.1 Peoples Gas should clearly define and document the AMRP governance roles of the Executive Steering Committee with mission statements, charters, and roles and responsibilities for project oversight, monitoring and decision authority. (*Conclusion N.4*)
- N.2 Peoples Gas should promptly execute its current plans to provide for more regular and effective oversight of AMRP and for follow-through and corrective actions to address performance shortfalls. (*Conclusion N.5*)
- N.3 Peoples Gas should substantially enhance the completeness and accuracy of AMRP performance information provided to the boards of directors, and ensure its consistency with information used by AMRP program management and provided to the small executive group with designated responsibility for program oversight. (*Conclusion N.6*)
- N.4 Peoples Gas should expand top-level AMRP performance metrics and reports to include more actionable information, and to compare actual performance with plans and budgets meaningfully. (*Conclusion N.7*)
- N.5 Peoples Gas should upgrade AMRP performance metrics to include annual or cumulative progress versus the long-term (20-year) plan goals and metrics for the executive oversight group and the boards. (*Conclusion N.8*)
- N.6 Peoples Gas should employ outside assistance in designing and implementing the initiatives it committed to undertaking to improve AMRP management, control, and oversight. (*Supported generally by conclusions throughout this report*)

Chapter O: Reports and Analysis

- O.1 The AMRP Project Management Office should overhaul its approach to reporting, with emphasis on defining and meeting the needs of managers and staff. (*Conclusion O.1 and O.5*)
- O.2 Management should establish a framework for performance improvement based on analysis of project performance and corrective actions. (*Conclusion O.2*)
- O.3 In the course of its current improvement initiatives, Peoples Gas should redefine and reestablish its standards for program performance. (*Conclusions O.3*)
- O.4 The Project Management Office should establish a culture and a regular, defined, comprehensive program that provides insightful analysis of program performance, and should acquire the capability to perform such analyses. (*Conclusion O.4*)
- O.5 Peoples Gas should expand the role of its project controls professionals to allow for more analysis of project progress and performance and, in turn, support of management by facilitating corrective action. (*Conclusion O.7*)



Chapter P: Auditing of AMRP Costs

- P.1 Peoples Gas should conduct a comprehensive assessment of AMRP risks associated with potential mismatches between work performed and work charged, and develop an ongoing program of annual testing designed to mitigate the risks identified. *(Conclusion P.1)*
- P.2 Peoples Gas should provide for dedicated, executive level sponsorship of the three-year materials and equipment control initiatives program and provide a regular method of reporting progress to the Illinois Commerce Commission. *(Conclusion P.4)*
- P.3 Peoples Gas should promptly: (a) correct the potential gap that exists with respect to ensuring the accuracy of material and equipment costs charged to the AMRP, (b) develop a method for reliably and accurately determining independently the magnitude of any error in AMRP material and equipment costs being included in rate recovery, and (c) devise and implement a similarly independent testing program to verify that no material risk exists with respect to AMRP costs subject to rate recovery. *(Conclusion P.5)*

Part Four: Managing Work in the Field

Chapter Q: Field Work Performance

- Q.1 Peoples Gas should address a number of construction standards' needs, and should enhance training, documentation, and auditing in a number of areas related to construction standards. *(Conclusion Q.2)*
- Q.2 Peoples Gas should adopt measures to ensure consistent use of construction inspection checklists, develop a structured program for analyzing the information they produce to identify and respond to field performance issues disclosed, and clearly empower inspectors to halt unsafe work. *(Conclusion Q.3)*
- Q.3 Peoples Gas needs promptly to conduct short-term and long-term analyses of its requirements for skilled and experienced field resources, develop incentives for moving personnel into new positions and incenting senior workers to remain, and ensure that training and development efforts anticipate (and not merely react to) vacancies. *(Conclusion Q.5)*
- Q.4 Identify and pursue means to increase the stability in and the numbers of field supervision and inspection personnel. *(Conclusion Q.6)*
- Q.5 Clarify responsibilities for key field roles and institute training programs to support them more fully. *(Conclusions Q.7 and Q.8)*
- Q.6 Peoples Gas should examine the benefits of equipping technicians with sub-meter accurate GPS devices in areas that have line of sight to satellites. *(Conclusion Q.10)*

Chapter R: Work Management

- R.1 Peoples Gas should establish a formal continuous improvement program under the Impact Team to promote a culture of and an emphasis on seeking innovations to improve efficiency in the installation of mains, services, and meters. *(Conclusion R.2)*



- R.2 Peoples Gas should assign a project control engineer or cost analyst to each of the three Shops to handle the analysis of all AMRP construction work performed by the internal workforce and contractors. *(Conclusion R.3)*
- R.3 Peoples Gas should assign a single manager to coordinate AMRP-level permitting improvement initiatives and to monitor and measure permitting for the duration of the program. *(Conclusion R.4)*

Chapter S: Safety and Compliance

- S.1 Peoples Gas should invigorate its commitment to safety and permit compliance through designation of an executive level “champion,” and institute a comprehensive communications program, set aggressive goals and performance targets, perform regular measurement, perform root cause analysis, and develop responsive action plans. *(Conclusion S.1)*
- S.2 Peoples Gas should more closely examine the root causes and develop a responsive action plan to improve employee accident rates. *(Conclusion S.2)*

Chapter T: Government Coordination

- T.1 Peoples Gas needs to continue to focus on improving communications and relationships with the City and with its Department of Transportation, but must recognize that it will take improved permitting and work performance to create and sustain relationships at the level needed to optimize AMRP performance. *(Conclusion T.2)*
- T.2 Peoples Gas should expand the scope of AMRP project schedules to incorporate permitting requirements. *(Conclusion T.3)*
- T.3 Peoples Gas should develop a database of permit applications. *(Conclusion T.3)*
- T.4 Peoples Gas should work with the Chicago Department of Transportation to determine which existing and potential reports from the Department’s system are available and which could be provided to Peoples Gas. *(Conclusion T.4)*
- T.5 Peoples Gas should improve the database of rail crossing permits. *(Conclusion T.5)*
- T.6 Peoples Gas should improve its database of citations. *(Conclusion T.6)*

Chapter U: Customer Coordination

- U.1 Peoples Gas should alter the AMRP Communications Plan. *(Conclusion U.1)*
- U.2 Peoples Gas should standardize the process to set AMRP customer appointments. *(Conclusions U.2 and U.5)*
- U.3 Peoples Gas should ensure that the Customer Information System fully supports AMRP communications processes. *(Conclusion U.4)*
- U.4 Peoples Gas should adequately resource the AMRP Complaints Handling Group, and should monitor complaint resolution performance and the root causes of customer complaints, for the purpose of identifying improvement opportunities. *(Conclusion U.6)*
- U.5 Peoples Gas should measure on a regular basis: (a) customer satisfaction with AMRP, and (b) the effectiveness of AMRP Communications and Customer Service. *(Conclusion U.7)*



Part Five: Monitoring

Chapter V: Monitoring

- V.1 Peoples Gas should work promptly to identify the AMRP reporting changes that it proposes to implement near term, and tailor them to meet the reporting cycles and content this chapter describes as appropriate for supporting the monitoring needs of the Illinois Commerce Commission.

