BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DOCUMENT FOLDER

Township of Spring :
:
v. : C-20054746
:
Pennsylvania-American Water Company :

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SECRETARY'S BUREAU

ORDER DENYING MOTION TO DISMISS AND SETTING RESOLUTION CONFERENCE

On June 22, 2005, the Township of Spring (Complainant) filed a Formal Complaint with the Commission against Pennsylvania-American Water Company (Respondent), alleging that Respondent has refused to take responsibility for inspection and remediation of sinkholes that opened up following a water main break on February 5, 2005. Complainant further avers that Respondent has refused to take any action to avoid a similar occurrence in the future. Complainant is essentially challenging the adequacy and reasonableness of the service provided by Respondent. As relief, Complainant requests that the Commission direct Respondent to take the following action: (1) install warning and shutoff systems; (2) inspect and repair, if necessary pipes and valves in the Township; (3) conduct subsurface testing, as necessary and identify and remediate damage caused by water main break; (4) remediate damage occurring since the break.

On August 12, 2005, Respondent filed an Answer and New Matter and a Preliminary Motion to Dismiss addressing the various allegations of the Complaint, raising affirmative defenses and moving to dismiss the Complaint on the basis that Complainant lacks standing to bring a complaint before the Commission.

On August 23, 2005, Complainant filed a response to the Preliminary Motion. Complainant filed its Answer to New Matter on August 29, 2005. The Preliminary Motion to Dismiss is now ripe for ruling.

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The Motion to Dismiss cites to 52 Pa. Code § 5.103. Section 5.103 of the Commission's regulations provides for motions other than preliminary or summary judgment or judgment on the pleadings motions. Since this Motion was filed contemporaneously with the Answer, the more appropriate filing would have been a Preliminary Motion under 52 Pa. Code § 5.101, specifically a Motion to Dismiss for lack of standing, pursuant to 52 Pa. Code § 5.101(a)(3).

When considering a motion to dismiss, the Commission must view the Complaint in a light most favorable to the Complainant, and the Complaint should be dismissed only when it appears that the Complainant would not be entitled to relief under any circumstances. Equitable Small Transportation Interveners, 1994 Pa. PUC LEXIS 69; Interstate Traveller Services, Inc. v. Pa. Dept. of Environmental Resources, 406 A.2d 1020 (1979). This is similar to Pennsylvania civil practice with respect to the filing of preliminary objections. Equitable Small Transportation Interveners, *supra.*

The moving party may not rely on its own factual assertions, but must accept for the purposes of disposition of the motion, all well-pleaded, material facts of the other party, as well as every inference fairly deducible from those facts. County of Allegheny v. Commw. of Pa., 490 A.2d 402 (1985); Commw. of Pa. v. The Bell Telephone Co. of Pa., 551 A.2d 602 (Pa. Commw. 1988). The motion may be granted only if the moving party prevails as a matter of law. Roc v. Flaherty, 527 A.2d 211 (Pa. Commw. 1985). Any doubt must be resolved in favor of the non-moving party by refusing to sustain the preliminary objections. Dept. of Auditor General, et al. v. State Employees' Retirement System, et al., 836 A.2d 1053, 1064 (Pa. Commw. 2003) (citing, Boyd v. Ward, 802 A.2d 705 (Pa. Commw. 2002)).

Respondent moves for dismissal of the Complaint on the basis that Complainant, a township, does not have a substantial and direct interest in the damages allegedly suffered by its citizens and therefore lacks standing to bring its Complaint before the Commission.

Standing requires that a party have an interest in the matter that is substantial, direct and immediate. William Penn Parking Garage, Inc. et al. v. City of Pittsburgh, 346 A.2d 269 (1975). These criteria are defined follows:

> A 'substantial' interest is an interest in the outcome of the litigation which surpasses the common interest in procuring obedience to the law. A 'direct' interest requires a showing that the matter complained of caused harm to the party's interest. An 'immediate' interest involves the nature of the causal connection between the action complained of and the injury to the party challenging it and is shown where the interest the party seeks to protect is within the zone of interest sought to be protected by the statute or the constitutional guarantee in question.

George v. Pa. PUC, 735 A.2d 1282 (Pa. Commw. 1999). The question in this case is whether the Complainant's interest in the adequacy and reliability of the water service provided to its residents is substantial, direct and immediate.

Respondent cites to William Penn Parking Garage, *supra*, to support its claim that Complainant lacks standing to bring its complaint. In that case, the Supreme Court of Pennsylvania opined that "[t]he core concept [of standing] . . .is that a person who is not adversely affected in any way by the matter he seeks to challenge is not 'aggrieved' thereby and has no standing to obtain a judicial resolution of his challenge. In particular, it is not sufficient for the person claiming to be 'aggrieved' to assert the common interest of all citizens in procuring obedience with the law." William Penn Parking Garage, 346 A.2d at 280-281.

Complainant relies on Bethlehem Township v. City of Bethlehem, 1990 Pa. PUC Lexis 62 (October 2, 1990) to support its position that it has a direct and substantial pecuniary interest in water service provided to its residents and has a direct, substantial and immediate interest in the protection and enhancement of its residents quality of life. There, the Administrative Law Judge concluded that the township's interest in the adequacy of water service provided to its citizens was substantial, direct and immediate. *Id.* at 9. Additionally, in Franklin Township v. PA Dept. of Environmental Resources, 452 A.2d 718 (1982), the Pennsylvania Supreme Court recognized that a township "has a direct, substantial, and immediate interest in the environment and in the quality of life of its citizenry" and held that the township had standing to challenge the issuance of a permit for a solid waste facility within its boundaries. *Id.* at 723.

Similarly, the adequacy and reliability of water service provided as well as remediation of sinkhole damage caused by the water main break directly affects both the environmental landscape of the township and the quality of life of its residents. This is sufficient to confer upon Complainant a substantial, direct and immediate interest in the subject matter of the Complaint to support the conclusion that Complainant has standing to bring its Complaint.

For the reasons set forth above, Respondent's Preliminary Motion to Dismiss is denied and this case will be set for resolution conference.

The parties are directed to attempt to resolve this matter themselves and are strongly encouraged to participate in this process. This process is consistent with the Commission's regulations at 52 Pa. Code §§ 5.231(a) and 69.391.

Respondent shall contact Complainant no later than September 30, 2005, to set a mutually convenient date, time and location to conduct a conference to discuss the possible resolution of this case. The conference shall occur no later than October 15, 2005. No later than ten days following the conference, Respondent shall file a report with Herbert R. Nurick (mediator), setting forth:

(a) The date, time and location of the conference;
(b) The participants representing each party;
(c) A statement describing whether a full resolution, including withdrawal of the complaint, was achieved; and, if not, whether the parties consent to have this case set for mediation by Commission staff; and
(d) A statement listing any resolved issues, if a full resolution was not achieved.

Should the conference not take place by the due date, Respondent shall file a report with the mediator, no later than October 25, 2005, giving the reason(s) why the due date was not met.

The Commission encourages mediation if the parties cannot reach an agreement through the resolution conference.[1] If the parties do not reach an agreement on their own, consent to mediate, or if mediation is unsuccessful, they are entitled to a hearing, which will include the presentation of oral testimony and other evidence before a Commission Administrative Law Judge, who will consider the case and issue a written decision.[2]

THEREFORE,

IT IS ORDERED:

1. That the Motion to Dismiss filed by Pennsylvania-American Water Company, seeking dismissal of the Complaint filed by the Township of Spring, at PUC Docket No. C-20054746 is denied.

2. That this matter be set for a resolution conference.

3. That Pennsylvania-American Water Company shall contact the Township of Spring no later than September 30, 2005, to set a mutually convenient date, time and location to conduct a conference to discuss the possible resolution of this case.

4. That the resolution conference shall take place no later than October 15, 2005.

5. That Pennsylvania-American Water Company shall file a report addressed to Herbert R. Nurick, Mediation Coordination, Office of Administrative Law Judge, P.O. Box 3265, Harrisburg, PA 17105-3265, no later than ten days following the resolution conference setting forth:

(a) the date, time and location of the conference;
(b) the participants for each party

[1] Mediation is an informal process in which the parties attempt to resolve the case with the help of a mediator. The mediator is a neutral staff member of the Commission who does not give advice, make a decision or represent any party. Instead, the mediator assists the parties in their efforts to come to an agreement.

[2] Should this case proceed to hearing, Complainant will have the opportunity to prove that Respondent has violated a statute, regulations or orders of the Commission. Complainant is cautioned that the burden of proof rests on the Complainant. 66 Pa. C.S. §332(a). Complainant is advised that the LLC will be required to be represented by counsel at the hearing.

(c) a statement describing whether a full resolution, including withdrawal of the complaint was achieved; and, if not, whether the parties consent to have this case set for mediation by Commission staff; and
(d) a statement listing any resolved issued, if a full resolution was not achieved.

6. That, if the resolution conference does not take place by the due date, Pennsylvania-American Water Company shall file a report with the mediator, no later than October 25, 2005 giving the reason(s) why the due date was not met.

7. That, if the parties do not reach an agreement on their own, consent to mediate, or if mediation is unsuccessful, this matter will be set for hearing.

Date: September 9, 2005

Veronica A. Smith
Chief Administrative Law Judge

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
Office of Administrative Law Judge
P.O. BOX 3265, HARRISBURG, PA 17105-3265
December 20, 2005

IN REPLY PLEASE
REFER TO OUR FILE

In Re: C-20054746

(SEE ATTACHED LIST)

Township of Spring v. Pennsylvania-American Water Company

Water Main Break Damage

DOCUMENT
FOLDER

N O T I C E

This is to inform you that a Further Pre-Hearing Conference on the above-captioned case will be held as follows:

Type: Further Pre-Hearing Conference

Date: Tuesday, February 28, 2006

Time: 10:00 a.m.

DOCKETED
DEC 30 2005

Location: Hearing Room 3
Plaza Level
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Presiding: Administrative Law Judge Wayne L. Weismandel
PO Box 3265
Harrisburg, PA 17105-3265
Phone: 717.783.5452
Fax: 717.787.0481

If you are a person with a disability, and you wish to attend the prehearing, we may be able to make arrangements for your special needs. Please call the scheduling office at the Public Utility Commission at least (2) two business days prior to your hearing:

- Scheduling Office: 717.787.1399
- AT&T Relay Service number for persons who are deaf or hearing-impaired: 1.800.654.5988

pc: Judge Weismandel
Cherie Pyle, Scheduling Officer
Beth Plantz
Docket Section
Calendar File

American Water

November 29, 2005

Mediator Herbert Nurick
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
P.O. Box 3265
Harrisburg, PA 17105-3265

05 DEC -5 PM 11:41
PA PUC

Re: Township of Spring v. Pennsylvania-American Water Company
Docket No. C-20054746

Dear Mr. Nurick:

Pennsylvania-American Water Company provides this update to the mediation report filed on November 11, 2005. To date, the parties have been unable to achieve a settlement. At this time, the parties are determining whether formal mediation is appropriate or whether the matter should proceed directly to a hearing before an administrative law judge. We ask that we be given until December 9, 2005 to make such a determination.

If you should have any questions, please feel free to contact me at (717) 531-3362.

Very truly yours,

Seth A. Mendelsohn

Seth A. Mendelsohn

c: Joan E. London Esquire
Harry McMunigal Esquire

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SECRETARY'S BUREAU

Pennsylvania American Water

Seth A. Mendelsohn
Corporate Counsel

800 West Hersheypark Drive
Hershey, PA 17033 USA

T 717-533-5000
F 717-531-3252
E seth.mendelsohn@amwater.com
I www.pawc.com

RWE Group

COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

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DATE: December 20, 2005

SUBJECT: **Township of Spring v. Pennsylvania-American Water Company**
C-20054746

TO: Commission Document Folder

FROM: Herbert R. Nurick
Mediator

DOCKETED
JAN 5 - 2006

Pursuant to Chief Administrative Law Judge Smith's Interim Order, dated September 9, 2005, a report has been submitted to the Mediation Unit.

Please include this memo in the official Commission document folder.

pc: OALJ File
Herbert R. Nurick, Mediator
Beth Plantz
Docketing

Kozloff Stoudt

ATTORNEYS AT LAW PROFESSIONAL CORPORATION

February 3, 2006

E mail jlondon@kozloffstoudt.com

Seth A. Mendelsohn, Esquire
Pennsylvania-American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

Re: Township of Spring
v. Pennsylvania-American Water Company
Pennsylvania PUC No. C20054746
Our File No. 100744-388

Dear Seth.

Enclosed please find an original and one copy of the Request for Production of Documents and Interrogatories Directed to Pennsylvania-American Water Company. Please respond to these discovery requests in accordance with the Public Utility Commission's Rules of Procedure.

Very truly yours,

KOZLOFF STOUDT
Professional Corporation

Joan E. London

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JEL/kab
Enclosure
cc: James J. McNulty, Secretary, Pennsylvania Public Utility Commission (w/encl.)
Harry McMunigal, Esquire (w/encl.)
Jeri Diesinger, P.G., Director of Engineering Services, Township of Spring (w/encl.)
Jay Vaughan, Township of Spring (w/encl.)
Kenneth Zielonis, Esq. (w/encl.)
Dianne E. Dusman, Esq. (w/encl.)
Neil Rahn (w/encl.)
David Singerling (w/encl.)

DOCUMENT FOLDER

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING,	: Docket No. C20054746
Complainant	:
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY,	:
Respondent	: Assigned to: Veronica A. Smith, A.L.J.

REQUEST FOR PRODUCTION OF DOCUMENTS DIRECTED TO PENNSYLVANIA-AMERICAN WATER COMPANY

To: Pennsylvania-American Water Company
c/o Seth Mendelsohn, Esquire

Pursuant to Pa. R.C.P. 4009.11 and 25 Pa.Code Section 1021.102, please furnish at our expense, at our offices of Kozloff Stoudt, 2640 Westview Drive, P.O. Box 6286, Wyomissing, Berks County, Pennsylvania, within thirty (30) days of service hereof, a photostatic copy or like reproduction of the following materials concerning this action or its subject matter which are in your possession, custody or control and which are not

DOCUMENT
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protected by the attorney/client privilege; or, in the alternative, produce the said matter at said time to permit inspection and copying thereof:

1. All items you intend to use as exhibits at hearing or other disposition of this matter.

2. All items referenced in answers to Interrogatories.

3. All maintenance records from the water main in which break occurred for past 10 years.

4. All records or logs as to sinkhole activity in 5 mile radius of water main break.

5. Any incident reports, logs or documentation of the water main break at issue.

6. Any and all photographs, videotapes or audiotapes taken at the water main before, during and after the incident in question.

7. Any expert reports as to causation of the incident in question.

8. Any written observations by employees or contractors working on repair or remediation of the break at issue.

9. Results of any and all testing of water lines within a 2 mile radius of the break from 2003 to the present.

10. Product description of all alarm, signal or warning devices on lines in a 2 mile radius of the break at issue.

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

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Complainant	:
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY,	:
Respondent	: Assigned to: Veronica A. Smith, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that I have this day served a true copy of the foregoing document upon the participants, listed below, in accordance with the requirements of 52 Pa.Code Section 1.54 (relating to service by a participant):

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Harry McMunigal, Esquire
Bingaman Hess
Treeview Corporate Center, Ste. 100
2 Meridian Boulevard
Wyomissing, PA 19610

Seth A. Mendelsohn, Esquire
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

Date: 2/3/06

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire

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By: Joan E. London, Esquire
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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING,	: Docket No. C20054746
Complainant	:
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY,	:
Respondent	: Assigned to: Veronica A. Smith, A.L.J.

INTERROGATORIES TO PENNSYLVANIA-AMERICAN WATER COMPANY

TO. Pennsylvania-American Water Company
c/o Seth Mendelsohn, Esquire

INSTRUCTIONS

You are hereby requested to answer the following interrogatories in writing and under oath within thirty (30) days after service of the interrogatories upon you in accordance with Pennsylvania Rule of Civil Procedure 4003.5. These interrogatories are deemed to be continuing in nature and any information obtained by you subsequent to the filing of your answers to these interrogatories which would have been included in your answers to these interrogatories is to be supplied by the filing of Supplemental Answers. Further, both the party to whom these interrogatories are addressed and any expert who answers such interrogatories have a duty to supplement their responses if they know that the responses were incorrect when made or if they know that the responses, though correct when made, are no longer true.

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Any interrogatories which directly require an answer showing the mental impressions of the Defendants' attorney or his conclusions, opinions, memoranda, notes or summaries, legal research or legal theories need not be answered. Further, any interrogatory which requires an answer which requires the representative of a party, other than the party's attorney, to disclose his mental impressions, conclusions or opinions respecting the value or merit of a claim or defense or respecting strategy or tactics need not be answered. All other information concerning statements, reports, memoranda, correspondence, maps, plans, photographs, investigations, etc., even though made or secured in anticipation of litigation or in preparation for trial must be furnished.

All interrogatories pertaining to expert witnesses must be answered by said expert witness individually and signed by him or, in lieu thereof, the party may attach a report prepared and signed by said expert witness if such report fully answers all interrogatories addressed to such expert.

All answers should be set forth in the space following each enumerated interrogatory. If said space is inadequate for this purpose, the answer may be set forth upon a supplemental sheet attached to the answer.

Any answer requiring an individual response from each Defendant should be separately set forth and identified as the individual response of a particular Defendant.

DEFINITIONS

(a) YOU or YOURS, refers, unless otherwise indicated, to the party served with these Interrogatories. YOU or YOURS shall be construed to mean not only the party served with these Interrogatories, but also its agents, servants, workmen, representatives, employees, contractors, accountants, attorneys, investigators, indemnitors, insurers, consultants and sureties.

(b) PERSON(S) means and includes natural persons, firms, associations, corporations, institutions, partnerships, government agencies, or other organizations cognizable at law, and their agents and employees.

(c) The term DOCUMENT refers, unless otherwise indicated, to all writings of any kind, including the originals and all non-identical copies, whether different from the originals by reason of any notation made on such copies or otherwise (including without limitation correspondence, memoranda, notes, diaries, statistics, letters, telegrams, minutes, contracts, reports, studies, checks, statements, receipts, returns, summaries, pamphlets, books, prospectuses, interoffice and intra-office communications, offers, notations of any sort of conversations, telephone calls,

meetings or other communications, bulletins, printed matter, computer printouts, teletypes, telefax, invoices, work sheets, and all drafts, alterations, modifications, changes and amendments of any of the foregoing), graphic or aural records or representations of any kind (including without limitation, photographs, charts, graphs, microfiche, microfilm, videotape, recordings, motion pictures), and electronic, mechanical or electric records or representations of any kind (including without limitation tapes, cassettes, discs, recordings).

(d) The term IDENTIFY when referring to a document, means to: (a) state the type of document (e.g., letter, journal, record, memorandum; its date, title and identifying number if any; general subject matter; and its present location; (b) state each person who prepared it, each person for whom it was prepared, the known address of each person who presently has custody of the original or copies thereof.

INTERROGATORIES

1. Identify the date of installation of Iroquois Avenue line.

2. Identify any and all maintenance of the main and storage tank serving the 31000 block of Iroquois Avenue, Township of Spring, Berks County, Pennsylvania, within last 10 years.

3. Identify in the past 5 years involved in the incident on February 5, 2005.

a. The date of any and all water main breaks.

b. The location of any and all water main breaks.

c. The date of any and all times that investigation was conducted.

d. The nature of any and all remedial action taken to remedy any such water main breaks.

4. Identify any and all water main breaks in the Township of Spring that you allege were caused by sinkhole activity.

a. Date of such water main break(s).

b. Reason for believe that water main break(s) was/were caused by sinkhole activity.

c. Outcome of any investigation with respect to sinkhole activity as causing such break(s).

5 Do you utilize soil maps in installation and maintenance of lines.

a. Identify any and all soil maps and who prepared them.

b When were the maps dated.

c. When was the last update to map.

6. Do you take soil samples prior to installation of lines.

a. Identify any and all methods used in taking soil samples.

b Identify any and all (and how many) samples were within 2 miles of break at issue.

7. Do you monitor pressure/pressure changes in lines

a. Identify any and all methods of monitoring.

b. How often are the lines monitored

8. Identify any and all warning or signaling devices in the event of sudden drop in pressure

a. Identify the type(s) of warning or signaling devices used.

b. How often are pressure readings reviewed by an employee.

9. On the line at issue, identify any and all types of monitoring devices, if any, were in place on the date of the water main break.

a. Was the monitoring equipment working properly.

10. What was the date of last inspection/maintenance of line.

11. On the date of the water main break, identify the person responsible for the maintenance of lines.

a. Was the responsible person an employee of PAWC.

b. If the answer is yes, how long has said employee been working for PAWC.

c. What training did said person go through regarding monitoring of lines.

12. On the date of the water main break, describe your version of events as to how your employees learned of the break.

a. When did you first learn of loss of water pressure.

b. When did you first make attempts to pinpoint the location of the break.

c. What steps did you take to ascertain location of break.

d How did you finally ascertain the location of the break.

e. Estimate the time from when you first got word of a loss in water pressure until you discovered the water main break.

f. Did you take steps to repair the water main in question.

g. Describe all steps to repair the water main in question.

i. Name any and all employees and addresses of contractors and subcontractors performing repair work on water main.

ii. Steps taken to repair and when taken.

iii. Was the main replaced.

iv. When was the main replaced.

v. Were component parts of broken main preserved.

vi. Current location of component parts.

13. Prior to, at the time of or since main break, have any additional alarms or devices warning of pressure changes been installed on mains.

a. Identify any and all type(s) of device(s).

b. When were any such devices installed.

c. Are the said devices monitored.

d. How/how often are the devices monitored.

14. What is your contention as to what caused the water main break.

a. Identify any and all facts supporting your contentions.

15. Identify and give the address of each and every person assisting in completion of these interrogatories.

16. Identify each expert witness that you plan to have testify on your behalf at the time of trial, and state with respect to each expert witness the name, address and special qualifications of the expert, including, specifically, his/her educational background, academic, professional and vocational background, including the name and address of each such expert's present employer, a job description of each such expert's duties and responsibilities, the job title for that individual, the length of time that each such expert has held the particular position described.

17. Identify any published articles or treatises authored by each expert witness -- such identification should include the title of the article, the publication in which it appeared and the date of publication.

18. State the venue and case title of any other litigation within the last four (4) years in which each expert witness has had his deposition taken in which the expert witness has testified at the time of trial, stating the date of the deposition, the identity of the attorney who took the deposition and a brief description of the subject matter of the litigation; state the venue and case title of any other litigation within the last four (4) years in which the expert witness has testified at the time of trial, state the date of the testimony, and a brief description of the subject matter of the litigation.

19. State the substance of the facts and opinions to which each such expert is expected to testify on your behalf and summarize the grounds upon which each such opinion is based which you expect your expert to offer testimony; and state whether the facts and opinions listed above are contained in a written report, memorandum, or other transcript, and if so, describe the identity of any such document including the name, address, and job title of the present custodian of all such documents.

20. Identify each document reviewed or relied upon by each expert in formulating each and every opinion of the expert relevant to the subject matter of this case.

21. If the opinion of any expert identified above is based in whole or in part on any code or regulation, governmental or otherwise, and to the extent that you have not done so already, identify all such codes and regulations and specifically set forth the specific sections relied upon by such expert.

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
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BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant	: Docket No. C20054746 :
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: : Assigned to: : Veronica A. Smith, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that I have this day served a true copy of the foregoing document upon the participants, listed below, in accordance with the requirements of 52 Pa.Code Section 1.54 (relating to service by a participant):

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Harry McMunigal, Esquire
Bingaman Hess
Treeview Corporate Center, Ste. 100
2 Meridian Boulevard
Wyomissing, PA 19610

Seth A. Mendelsohn, Esquire
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

The Hon. Veronica A. Smith
Administrative Law Judge
Commonwealth of PA
Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Date: 2/3/06

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

February 8, 2006

Email: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

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2006 FEB 10 AM 9:20
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SECRETARY'S BUREAU

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746

Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919

Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371

Our File No. 100744-388

Dear Mr. McNulty:

Enclosed plase find an original and four (4) copies of the Motion of Township of Spring to Join in Respondent's Objections and Compel Answers to OCA Interrogatories Set I, Nos. 1-11 to be filed in the above-captioned matters. Please file the original and return the time-stamped copies to us, and postage-prepaid self-addressed envelope enclosed.

By copy of this letter, copies have been served upon all parties of record as shown on the Certificate of Service.

Very truly yours,

DOCUMENT FOLDER

KOZLOFF STOUDT
Professional Corporation

Joan E London IKAB1

Joan E. London

JEL/kab
Enclosure
cc: Seth A. Mendelsohn, Esquire, Pennsylvania American Water Company (w/encl.)
Harry D. McMunigal, Esquire (w/encl.)
The Hon. Wayne L. Weismandel, Commonwealth of PA PUC (w/encl.)
Richard Fehling, Esquire and Kenneth Zielonis, Esquire (w/encl.)
Mark Bridge, Esquire (w/enclosure)
Neil Rahn, Wagner Farms Homeowners' Association (w/encl.)
Jeri Diesinger, P.G., Township of Spring (w/encl.)
David Singerling, Stonegate Community, Wagner Farms Homeowners Assoc. (w/encl.)

2640 Westview Drive • P.O. Box 6286 • Wyomissing, PA 19610 • Phone: (610) 670-2552 • Fax: (610) 670-2591
www.kozloffstoudt.com

ORIGINAL

RECEIVED

2006 FEB 10 AM 9:20

P.U.C.
SECRETARY'S BUREAU

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive, P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant	: Docket No. C-20054746
vs	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant	: Docket No. C-20054919
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant	: Docket No. C-20055371
vs	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J.

MOTION OF TOWNSHIP OF SPRING TO JOIN IN RESPONDENT'S OBJECTIONS AND COMPEL ANSWERS TO OCA INTERROGATORIES SET I, NOS. 1-11

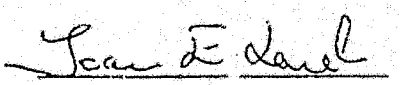
DOCUMENT FOLDER

DOCKETED
NOV 21 2006

Complainant in Docket No. C-2005-4746 in the above-captioned consolidated proceeding, Township of Spring Berks County, joins in the Motion of the Office of Consumer Advocate to Dismiss Respondent's Objections and Compel Answers to Set 1, Nos. 1-11 of the Interrogatories of the Office of Consumer Advocate.

Complainant, Township of Spring, hereby incorporates by reference the averments of fact and arguments of law contained in the Motion to Dismiss Objections of the Office of Consumer Advocate as though the same were set forth herein at length.

KOZLOFF STOUDT
Professional Corporation



Joan E. London, Esquire
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive
P O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant	: Docket No. C-20054746
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant	: Docket No. C-20054919
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant	: Docket No. C-20055371
vs.	:
PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Assigned to: Wayne L. Weismandel, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that I have this day served a true copy of the foregoing document upon the participants, listed below, in accordance with the requirements of 52 Pa.Code Section 1.54 (relating to service by a participant):

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Seth A. Mendelsohn, Esquire
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

Harry McMunigal, Esquire
Bingaman Hess
Treeview Corporate Center, Ste. 100
2 Meridian Boulevard
Wyomissing, PA 19610

Kenneth Zielonis, Esquire
Stevens & Lee, P.C
17 North Second Street, 16th Floor
Harrisburg, PA 17101

Dianne E. Dusman, Esquire
Commonwealth of Pennsylvania
Office of the Consumer Advocate
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, PA 17101-1923

Neil Rahn
3119 South Wagner Circle
Sinking Spring, PA 19608

David Singerling
3128 South Wagner Circle
Sinking Spring, PA 19608

KOZLOFF STOUDT
Professional Corporation

Date: 2/8/06

Joan E. London, Esquire

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

February 21, 2006

Email: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

ORIGINAL

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746
Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919
Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371
Our File No. 100744-388

DOCUMENT FOLDER

Dear Mr. McNulty:

Enclosed please find an original and four (4) copies of the Initial Pre-Hearing Conference Memorandum of the Township of Spring which is to be filed in the above-captioned matters. Please file the original and return the time-stamped copies, postage-prepaid self-addressed envelope enclosed.

By copy of this letter, copies have been served upon all parties of record as shown on the Certificate of Service.

Very truly yours,

KOZLOFF STOUDT
Professional Corporation

Joan E. London /kab/

Joan E. London

RECEIVED
2006 FEB 23 AM 9:12
PA P.U.C.
SECRETARY'S BUREAU

JEL/kab
Enclosure
cc: All Parties of Record (w/enclosure) – VIA E-MAIL AND REGULAR MAIL

ORIGINAL

RECEIVED
2006 FEB 23 AM 9:13
PA P.U.C.
SECRETARY'S BUREAU

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive, P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

DOCUMENT FOLDER

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

DOCKETED

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J

DOCKETED
MAR 0 1 2006

INITIAL PRE-HEARING CONFERENCE MEMORANDUM OF TOWNSHIP OF SPRING

This Initial Prehearing Conference Memorandum is submitted by the Township of Spring, Complainant in the matter docketed to Docket No. C-20054746, in compliance with the Prehearing Conference Order dated February 2, 2006:

1. Designation of Representative

The Township of Spring designates as its representative for purposes of the Service List the following individual:

Joan E. London, Esquire
c/o Kozloff Stoudt, Professional Corporation
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552 (business phone)
(610) 670-9053 (business facsimile)
jlondon@kozloffstoudt.com (business e-mail)

2. Proposed Plan and Schedule for Discovery

a. The Township has served discovery requests in the form of Interrogatories and a Request for Production of Documents on Respondent, Pennsylvania-American Water Company pursuant to Pa.R.C.P. 4009.11 and 25 Pa.Code Section 1021.102. It is expected that any such discovery will be promptly answered.

b. The Township may wish to take depositions of officials of Respondent, Pennsylvania-American Water Company and wishes to take the deposition of any expert named in discovery answers as testifying for or consulting with Respondent. The Township requests sixty (60) days from the date that Respondent provides answers to discovery responses to take such lay witness and expert depositions.

c. The Township may retain an expert witness, in addition to the expert whose report was provided with the Formal Complaint (prepared by Enviroscan, Inc. The Township will produce any report prepared by such expert to parties and counsel.

3. Other Proposed Orders With Respect to Discovery

It should be taken into consideration by Your Honor in rendering an Order governing discovery in this case that materials relating to the water distribution system

cannot be disseminated even to proposed expert witnesses until an appropriate and acceptable Protective Order has been circulated and signed by all counsel and unrepresented parties.

4. Witnesses Expected to be Called by the Township of Spring

a. Jay W. Vaughan, Director of Road Services
Township of Spring
2800 Cornwall Terrace
Reading, PA 19608
(610) 678-5393

Mr. Vaughan will testify to the initial reports of loss of water pressure, initial contacts with Pennsylvania-American Water Company, attempts to locate the water main break, and eventual discovery of the water main break. Mr. Vaughan will testify to his observations of the excavation of the line, and observations of repair measures. Mr. Vaughan will further testify as to soil and ground conditions in the vicinity of Wagner Circle/Iroquois Avenue, sinkhole activity and subsidence since the date of the water main break, and the position of Township officials with respect to preventive measures to prevent recurrence.

b. Jeri Diesinger, P.G., Director of Engineering Services
Township of Spring
2800 Cornwall Terrace
Reading, PA 19608
(610) 678-5393

Ms. Diesinger will testify as to the same items as Mr. Vaughan, above. Ms. Diesinger, furthermore, is a Professional Geologist, and will offer expert opinion testimony as to the causation for the water main break and resultant damage, and as to preventive measures to prevent recurrence.

c. Witness from Enviroscan, Inc.
1051 Columbia Avenue
Lancaster, PA 17603
(717) 396-8922

This witness will testify as an expert witness to the conclusions contained in the report dated March 22, 2005, titled "Final Report, Geophysical Survey, Void/Subsidence Detection/Delineation, Approximately 120' x 120' Survey Area, Creveling Property, 3123 South Wagner Circle, Sinking Spring, PA,

Enviroscan Reference Number 020535." This individual will, further, testify as to recommended preventive measures.

d. Robert and Kristen Creveling
3123 South Wagner Circle
Sinking Spring, PA 19608
(610) 927-4254

Mr. and Mrs. Creveling will testify to the occurrence of the water main break, and the progressive damage to their home, resulting in having to vacate the same. They will testify as to conditions prior to the water main break, and subsequent to the event.

e. Any other parties to the case, as well as any lay or expert witnesses called by any other party to this matter.

f. Complainant, Township of Spring, reserve the right to amend this Memorandum and call any fact or opinion witness, including expert witnesses, with reasonable notice to Your Honor, counsel, and unrepresented parties.

4. **Issues and Sub-Issues to be Addressed**

a. The causation for the water main break at issue. It is the Township's position that the sinkhole location is controlled by the location of concentrated infiltration from the water main break, and that the sinkhole activity was triggered by the water main breakage and consequent loss of 1.5 million gallons of water into the subsurface.

b. The causation of sinkhole activity since the water main break. It is the Township's position that sinkhole activity and subsidence on Iroquois Avenue, Shelley Drive, and on South Wagner Circle since the water main break were caused by the water main break.

c. That Respondent, Pennsylvania-American Water Company has not taken sufficient steps to prevent further damage. It is the Township's position that the area in which Respondent's water lines and mains are located is one that requires subsurface testing to determine what steps need to be taken to support and/or reinforce lines, and requires use of available measures to detect losses of pressure and stop water flow in the event of a future water main break.

d. Complainant, Township of Spring, reserves the right to amend this list to add issues which may arise in discovery.

5. Evidence to be Presented

a. Diagram of new sinkhole activity on Iroquois Avenue, Shelley Drive, and on South Wagner Circle since the water main break on the issues of causation and the need for remedial and preventive measures.

b. Report of Enviroscan, Inc., referenced hereinabove, on the issue of causation.

c. Photographs of excavated line, on the issue of causation.

d. Photographs of damaged street, sidewalk, and homes.

e. Any documentary or physical evidence produced by any other party to this matter.

f. Complainant reserves the right to amend this Memorandum and offer any other evidence adduced in discovery with notice to counsel, and unrepresented parties.

Respectfully submitted,

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

ORIGINAL

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that I have this day served a true copy of the foregoing Pre-Hearing Conference Memorandum upon the participants, listed below, in

accordance with the requirements of 52 Pa.Code Section 1.54 (relating to service by a participant).

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120 (VIA FIRST CLASS U.S. MAIL.)

Seth A. Mendelsohn, Esquire
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033 (VIA FIRST CLASS U.S. MAIL AND E-MAIL)

Harry McMunigal, Esquire
Bingaman Hess
Treeview Corporate Center, Ste. 100
2 Meridian Boulevard
Wyomissing, PA 19610 (VIA FIRST CLASS U.S. MAIL AND E MAIL)

Kenneth Zielonis, Esquire
Stevens & Lee, P.C.
17 North Second Street, 16th Floor
Harrisburg, PA 17101 (VIA FIRST CLASS U.S. MAIL AND E-MAIL)

Dianne E. Dusman, Esquire
Commonwealth of Pennsylvania
Office of the Consumer Advocate
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, PA 17101-1923 (VIA FIRST CLASS U.S. MAIL AND E-MAIL)

Neil Rahn
3119 South Wagner Circle
Sinking Spring, PA 19608 (VIA FIRST CLASS U.S. MAIL AND E-MAIL)

David Singerling
3128 South Wagner Circle
Sinking Spring, PA 19608 (VIA FIRST CLASS U.S. MAIL AND E-MAIL)

KOZLOFF STOUDT
Professional Corporation

Date: 2/21/06

Joan E. London, Esquire

ORIGINAL

COMMONWEALTH OF PENNSYLVANIA

OFFICE OF CONSUMER ADVOCATE
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, Pennsylvania 17101-1923
(717) 783-5048
800-684-6560 (in PA only)

IRWIN A. POPOWSKY
Consumer Advocate

FAX (717) 783-7152
consumer@paoca.org

PLEASE DOCKET

RECEIVED
APR 13 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

April 12, 2006

Via Hand Delivery

DOCUMENT FOLDER

Honorable Judge Weismandel
Administrative Law Judge
PA Public Utility Commission
Commonwealth Keystone Building
400 North Street
P. O. Box 3265
Harrisburg, PA 17105-3265

Re. Spring Township, Complainant
v.
Pennsylvania American Water Company
Docket No. C-20054746

Neil R. Rahn and David Singerling, *et al.*,
Complainants
v.
Pennsylvania American Water Company
Docket No. C-20054919

Wilson School District, Complainant
v.
Pennsylvania American Water Company
Docket No. C-20055371

Dear Judge Weismandel:

Enclosed are two documents. The first is the proposed Protective Order to which we have agreed and the second is "Appendix A" which we routinely have our experts sign to indicate their commitment to comply with the Protective Order (referred to in Para. 3 of the proposed Order.

2006 APR 13 AM 7:49
PA PUC
BA

If you have any questions, please feel free to contact me.

Sincerely,

Dianne E. Dusman
Senior Assistant Consumer Advocate

Enclosures
cc: All parties of record
S8352.doc,1/DED/smn

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Spring Township, Complainant	:	
v.	:	Docket No. C-20054746
Pennsylvania-American Water Company, Respondent	:	
Neil R. Rahn and David Singerling, *et al.*, Complainants	:	
v.	:	Docket No. C-20054919
Pennsylvania-American Water Company, Respondent	:	
Wilson School District, Complainant	:	
v.	:	Docket No. C-20055371
Pennsylvania-American Water Company, Respondent	:	

RECEIVED
2006 JUN 13 AM 7:45
PA PUC
SECRETARY'S BUREAU

PROTECTIVE ORDER AND CONFIDENTIALITY AGREEMENT

AND NOW, this _____ day of _____, 2006, it is hereby ORDERED as follows:

WHEREAS, Pennsylvania-American Water Company (hereinafter referred to as "PAWC") has identified the existence of drawings and/or maps showing the company's distribution system from the location of the water storage tanks to the intersection of Iroquois Avenue and Windmill Road which it deems to be confidential and privileged; and

WHEREAS, PAWC has represented that it is willing to provide copies of the maps and/or drawings only pursuant to the terms of a Confidentiality Agreement upon the hereinafter stated terms and conditions; and

IT BEING REPRESENTED that counsel for PAWC and the parties to this above-entitled action are in agreement as to the terms of said Confidentiality Agreement:

1. PAWC will disclose the maps and/or drawings that it designates "confidential and privileged" to the parties to this suit and their attorneys only, pursuant to this Confidentiality Agreement, and under the conditions that follow. PAWC will mark the maps and/or drawings designated as confidential and privileged under the terms of this Agreement on the face of the maps and/or drawings before providing same to counsel;

2. Any and all of the aforesaid materials disclosed by the PAWC and the contents thereof shall be maintained in confidence by the parties, their respective attorneys, support staff of counsel's law firms, and representatives of the parties' insurers and claims adjusters/administrators, and shall not be photocopied or reproduced by any other means, without the prior consent of counsel for the PAWC and shall be used only for the purpose of this lawsuit and no other purpose;

3. Counsel may permit expert or experts hired by counsel to review the maps and/or drawings subject to this Confidentiality Agreement, but counsel must first obtain from said expert(s) a written statement confirming the expert's agreement to comply with every element of this Confidentiality Agreement. Said expert(s) shall agree that the contents of the maps and/or drawings shall not be disclosed to any other person and said documents shall not be photocopied or reproduced by any other means.

4. With the exception of dissemination to experts in connection with this matter, counsel agree to no other dissemination of the maps and/or drawings or any of the information obtained from the documents, except as set forth specifically in this Agreement.

5. At the conclusion of this matter, copies of PAWC maps and/or drawings received by counsel pursuant to this Confidentiality Agreement shall be returned to counsel for PAWC, upon request, who in turn will return same to PAWC.

6. Counsel agree that the maps and/or drawings provided by PAWC will be viewed only by those individuals with a need to review same in relation to this specific matter.

7. Counsel agree that no copies of the maps and/or drawings will be made or circulated, other than as set forth in this Agreement.

Wayne L. Weismandel
Administrative Law Judge

88332 doc;1/DED/smn

APPENDIX A

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Spring Township, Complainant	:	
v.	:	Docket No. C-20054746
Pennsylvania-American Water Company, Respondent	:	
Neil R. Rahn and David Singerling, *et al.* Complainants	:	
v.	:	Docket No. C-20054919
Pennsylvania-American Water Company Respondent	:	
Wilson School District, Complainant	:	
v.	:	Docket No. C-20055371
Pennsylvania-American Water Company Respondent	:	

TO WHOM IT MAY CONCERN

The undersigned is the_____of _____(name of consulting firm or party). The undersigned has read and understands the Protective Order entered in the above-referenced proceeding, which order deals with the treatment of Proprietary and Confidential information. The undersigned agrees to be bound by, and comply with, the terms and conditions of said Order.

_____
SIGNATURE

_____
PRINT NAME

_____
ADDRESS

_____
EMPLOYER

DATE _____

CERTIFICATE OF SERVICE

Re: Neil R. Rahn and David Singerling, *et al.*
v.
Pennsylvania-American Water Company
Docket No. C-20054919

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Letter to Judge Weismandel, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 12th day of April, 2006.

SERVICE BY FIRST CLASS MAIL, POSTAGE PREPAID

Seth A. Mendelsohn, Esq.
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

Harry D. McMunigal, Esq.
Bingaman, Hess, Coblents & Bell, P.C.
Treeview Corporate Center
2 Meridan Blvd., Suite 100
Wyomissing, PA 19610

Neil Rahn
Stonegate Community
Wagner Farms Homeowners Association
3119 S. Wagner Circle
Sinking Spring, PA 19608

David Singerling
Stonegate Community
Wagner Farms Homeowners Association
3128 S. Wagner Circle
Sinking Spring, PA 19608

Kenneth Zielonis, Esq.
Stevens & Lee
17 N. Second Street
16th Floor
Harrisburg, PA 17101

Joan E. London, Esq.
Kozloff Stoudt
2640 Westview Drive
P. O. Box 6286
Wyomissing, PA 19610

Dianne E. Dusman
Senior Assistant Consumer Advocate

Darlene R. Wong
Assistant Consumer Advocate

Counsel for
Office of Consumer Advocate
555 Walnut Street 5th Floor, Forum Place
Harrisburg, PA 17101-1923
(717) 783-5048
86762 doc,1/DFD/smn

PLEASE DOCKET

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	
v.	:	Docket No.: C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

DOCUMENT FOLDER

PROPOSED ORDER

The application for the deposition of Jay Vahn on Thursday, May 4, 2006 at 10:00 a.m. is hereby granted.

So Ordered this 2ND day of May, 2006.

Wayne L. Weismandel
Administrative Law Judge

RECEIVED
2006 MAY -3 AM 10: 57
SECRETARY'S BUREAU

PLEASE DOCKET

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	Docket No.: C-20055371
v.	:	
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

DOCUMENT FOLDER

PROPOSED ORDER

The application for the deposition of Jerri Diesinger on Thursday, May 4, 2006 at 10:00 a.m. is hereby granted.

So Ordered this 2ND day of May, 2006.

Wayne J. Weismandel
Administrative Law Judge

RECEIVED
2006 MAY -3 AM 10:57
SECRETARY'S BUREAU

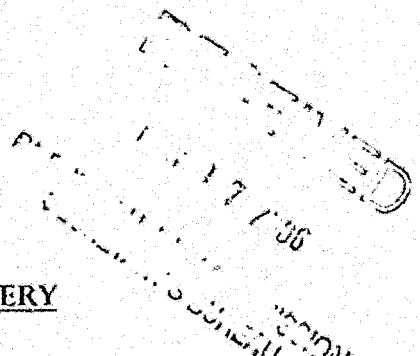
Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

May 17, 2006

Email: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120



VIA UPS OVERNIGHT DELIVERY

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746

Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919

Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371

Our File No. 100744-388

Dear Mr. McNulty:

Enclosed please find an original and one (1) copy of the Direct Testimony of Jeri L. Diesinger, P.G., and Felicia Kegel Bechtel, M.Sc., P.G., Expert Witnesses for Complainant, Township of Spring, Berks County, Pennsylvania, which are to be filed in the above-captioned matters. Please file the original and return the time-stamped copies, in the postage-prepaid self-addressed envelope enclosed.

By copy of this letter, copies have been served upon all parties of record as shown on the Certificate of Service.

Very truly yours,

KOZLOFF STOUDT
Professional Corporation

DOCUMENT FOLDER

Joan E London (KAB)

Joan E. London

JEL/kab
Enclosure
cc: All Parties of Record (w/enclosure)

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v.	:	Docket No. C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant v.	:	Docket No.: C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY Respondent	:	

DOCUMENT
FOLDER

DOCKETED
OCT 27 2006

DIRECT TESTIMONY OF JERI L. DIESINGER, P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY

The following is the testimony, on direct examination, of Jeri L. Diesinger, P.G., named by Complainant, Spring Township, Berks County as an expert witness:

Q. Could you please state your full name for the record?

A. Jeri L. Diesinger.

Q. What is your address?

A. My address is 102 Wessex Court, Exeter Township, Berks County, Pennsylvania 19606.

Q. What is your education since graduation from high school?

A. I graduated from the University of Pittsburgh in 1986 with a Bachelor of Science degree in Geology.

Q. Have you had any continuing education since you graduated from college?

A. I have taken continuing education classes, which I have successfully completed. These classes include "Dense Non-Aqueous Phase Liquids," taken at the University of Waterloo in 1993; "Natural Attenuation," taken at the University of Wisconsin in 1998; and courses in ArcView/GIS taken in Pittsburgh in 2000 and at the Pennsylvania State University in State College Pennsylvania in 2002. I also received Master Planner Certification in 2004 from the Center for Community Leadership of Albright College in Reading, Pennsylvania.

Q. Are you currently employed?

A. Yes.

Q. Where are you currently employed?

A. I am currently employed by the Township of Spring, Berks County.

Q. What is your business address?

A. The Township Office address is 2800 Shillington Road, Sinking Spring, Berks County, Pennsylvania 19608.

Q. What is your job title?

A. I am Director of Engineering Services for the Township of Spring.

Q. What are your duties in the position of Director of Engineering Services?

A. I supervise day to day municipal planning, engineering, code enforcement, and related activities. Relevantly to this proceeding, this includes: implementing the recent aerial photography update to the GIS system; maintaining the Township sinkhole informational database and mapping; administering the Township's storm water management programs and preparing annual MS4 reports to be forwarded to the Pennsylvania Department of Environmental Protection; providing ongoing technical support for the Township's Infrastructure Advisory Committee and Traffic Advisory Committee, Township Planning Commission, and Township Board of Supervisors; and, contract administration for large-scale Township improvement projects.

Q. How long have you been working for Spring Township in the capacity of Director of Engineering Services?

A. I have been working for the Township of Spring since November, 2001, and in the position of Director of Engineering Services since May of 2002.

Q. Prior to working for Spring Township, were you employed?

A. Yes.

Q. Where were you employed prior to beginning work for Spring Township?

A. From September of 1999 to May of 2001, I worked for the Moon Township Municipal Authority of Moon Township, Pennsylvania, which is in the western part of the state. In that job, I assisted the Director of Planning and Construction with quality reviews of water line and sanitary sewer construction drawings; prepared technical transmittals and communications with contractors and consultants; developed and maintained a database including for a backflow prevention program and a grease trap program; and provided commercial and residential customer support.

Q. Where did you work prior to Moon Township?

A. Prior to that, from October of 1998 to March of 2000, I worked for Alliance Environmental Strategies, Inc., located in Pittsburgh, Pennsylvania, as an independent consultant, and helped this business, which is a start-up business, to get its certifications, develop a business plan, and market its business.

Q. Where did you work prior to Alliance Environmental Strategies, Inc.?

A. Before that, from June of 1997 to September of 1998, I worked for the Goodyear Tire and Rubber Company in Akron, Ohio as a Senior Environmental Engineer. In that position, I managed all corporate Superfund Program projects nationwide. I also reviewed and summarized engineering reports by third-party consultants. As a member of the Corporate Acquisition Team, I provided technical expertise to corporate and outside legal staff during proceedings with regulatory agencies; and supported environmental due diligence and facilities assessments.

Q. Where did you work prior to Goodyear?

A Prior to that, from July of 1990 to March of 1997, I worked for Baker Environmental, Inc. of Corapolis, Pennsylvania as a Senior Geologist-Activity Manager. In that position, I managed fifteen (15) geologists, environmental scientists, industrial hygienists, and community relations specialists.

Q Where did you work prior to Baker Environmental, Inc.

A Before that, from October of 1987 to July of 1990, I worked for ICF Kaiser Engineers, Inc. of Pittsburgh, Pennsylvania as a field geologist. In that job, I was a participant on one of two teams under the United States Environmental Protection Agency's National Pesticide Program. I also worked as on-site coordinator of field operations for an Ohio Superfund project.

Q. Where did you work before that?

A. My first job after college began in December of 1986, which was as a consulting geologist and marketing coordinator for AMO Pollution Services, Inc. of Canonsburg, Pennsylvania. In that position, I designed a product recovery and

groundwater monitoring program for the Czechoslovakian Embassy in Washington, D.C. I was also the coordinator of all on-site activities at numerous emergency spill sites , and performed environmental assessments in various locations in Pennsylvania and Ohio.

Q. Do you have any licenses or professional certifications?

A. Yes. I am a Professional Geologist and I am registered and licensed as such in the Commonwealth of Pennsylvania.

Q Do you have a license or registration number?

A. Yes. My registration number is PG-001315-G.

Q. When did you receive this license?

A. I received this license in 1995.

Q. Is your license currently active and in good standing?

A. Yes.

Q. What steps do you have to take to keep your license active and in good standing?

A. I must not have any disciplinary actions against my license.

Q. As a professional geologist, have you taken any courses, or had other education or training addressing sinkhole formation and causation.

A. Yes.

Q. What coursework have you taken in the areas of sinkhole formation and/or causation?

A. Course work for my degree included Environmental Geology which encompassed information regarding sinkhole development, mine subsidence, and landslides.

Q. In your capacity as a professional geologist, as well as in your capacity as Director of Engineering Services for the Township of Spring, have you reviewed any materials relating to sinkhole formation in the Township and immediate vicinity?

A. Yes, I have. I have reviewed the map from the United States Geological Survey prepared by W.E. Kochanov in 1988, called the "Topographic and Geologic Survey," showing sinkhole activity in the vicinity of Spring Township and the Borough of Sinking Spring. This map is used by, and was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources, which is now called the Department of Environmental Protection, or DEP, as it is known Mr. Kochanov also authored for DEP a basic book explaining the sinkhole formation process called "Sinkholes in Pennsylvania," which was published in 1999, and is an excellent reference source for people seeking to learn basic facts about the manner in which sinkholes form and grow. In addition, Mr. Kochanov and I have met specifically to discuss sinkhole development within the Township of Spring.

Q. I have what we will mark as Township Exhibit 1. Could you identify this document for us?

A. Township Exhibit 1 is my *curriculum vitae*.

Q. Is your *curriculum vitae* up to date and accurately reflect your education and work experience?

A. Yes.

Q. I assume that you are familiar with the incident which occurred on or about February 5 or 6, 2005, where there was a water main break near the intersection of Iroquois Avenue and Wagner Circle in Spring Township?

A. Yes, I am.

Q. In your capacity as Director of Engineering Services for Spring Township, are you familiar with the area of Iroquois Avenue and Wagner Circle?

A. Yes, I am.

Q. What are some of the features located in the area?

A. There is a fifty six (56) lot residential subdivision known as "Wagner Farms Subdivision" located in the area, namely the homes along Wagner Circle, Martins Drive, Shelley Drive, and Nash Drive. Across Iroquois Avenue from Wagner Circle is the campus of Cornwall Terrace Elementary School and Wilson Southern Junior High School.

Q. Are you familiar with the geological makeup of this area?

A. Yes.

Q Could you describe the geological makeup of this area for us?

A. The geological makeup of the area is very well described in the report prepared by Enviroscan, Inc. for Mr. and Mrs. Creveling, who were the owners of the corner property at 3123 Wagner Circle whose house was rendered uninhabitable by this incident, as well as other published documents. The area is underlain by the Millbach formation of limestone, which is a formation of pinkish to medium gray laminated limestone, with bedrock pinnacles.

Q. We will hear references in testimony to "carbonate rock," and "carbonate geology." Could you please explain these terms so that lay people can understand them?

A. Carbonate rock is simply limestone or dolomite rock.

Q. So, is the area in which the water main break occurred in an area of "carbonate geology"?

A. Yes, it is.

Q. Is carbonate geology prone to sinkhole activity?

A. Yes, it is.

Q. Could you explain to us how areas of carbonate geology, may be sinkhole-prone?

A. Carbonate rock dissolves easily with water, such as rainfall, ground water, and storm water drainage. Over time, this causes erosion and features, which are called karst topography. A sinkhole is formed in a karst area by localized, gradual, or rapid sinking of the land surface to a variable depth; it is characterized by a roughly circular outline and a distinct break in the land

surface.

Q. Can sinkholes develop suddenly?

A. Yes, they can. Also, it should be noted that what appears to be the "sinkhole," and is commonly called the "sinkhole," very often is material that has collapsed into the actual sinkhole which is below the surface.

Q. In your professional opinion, can sinkholes develop as a result of water infiltration due to the failure of utility lines?

A. Yes, they can. In fact, in a 1999 publication from the Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, titled "Sinkholes in Pennsylvania," which was authored by William E. Kochanov, who is a leading expert in the fields of geology and sinkhole/subsidence origin, the failure of utility lines is cited as a source of sinkhole development.

Q. I have here what we will mark as Township Exhibit 2. Is this a copy of the Department of Conservation and Natural Resources Publication to which you just referred?

A. Yes, it is.

Q. I'll turn your attention to Page 1 of this publication. Does this state that a sinkhole is a subsidence feature, and that subsidence can result from subsurface erosion due to the failure of existing utility lines?

A. Yes.

Q. And are you in agreement with that opinion with a reasonable degree of professional certainty?

A. Yes.

Q. On another topic, does the immediate area of Iroquois Avenue and Wagner Circle where the break occurred have a historic propensity for sinkhole activity?

A. Yes and no. I reviewed a map, which came from the United States Geological Survey, which was prepared in 1988 by William Kochanov, showing historic sinkhole activity in the Spring Township and Sinking Spring Borough area. There is no question that the carbonate geology and karst topography of the area are ripe for sinkhole activity. But I found no history, looking at that map, of sinkhole activity at the location of the water main break.

Q. I have a document, which we will mark as Township Exhibit 3. Is this the United States Geological Survey Map to which we just referred?

A. Yes.

Q. And looking at Township Exhibit 3, can you locate the exact area of the water main break which is the subject of these proceedings?

A. Yes.

Q. And can you locate what is now the Wagner Farms Subdivision?

A. Yes.

Q. In your capacity as Director of Engineering Services for Spring Township, have you made any efforts to log sinkhole activity in the Township?

A. Yes, I have.

Q. I have a document that we will mark as Township Exhibit 4. Is this a copy of the sinkhole log.

A. Yes.

Q. Did you prepare this document?

A. Yes.

Q. When did you prepare this document?

A. I created the document in January of 2003 after determining that the Township did not have a summary of sinkhole activities.

Q. How did you go about preparing this document?

A. I added anecdotal, historic information, as well as areas of known sinkholes within Township right-of-ways and sinkholes reported on private property. I continue to update the database with new information as it becomes available, or as reported to the Township.

Q. What was the purpose of preparing this document?

A This information eventually is located on a Geographic Information System

layer labeled "sinkholes" which continues to update the sinkhole development provided by Mr. Kochanov in 1988.

Q What does this document show as far as sinkholes reported to be located in the immediate area of the water main break which is the subject of these proceedings?

A. On September 20, 2004, there was a sinkhole in a back yard between 3113 and 3115 Wagner Circle. This was the sole sinkhole activity of which I am aware in that immediate vicinity prior to the water main break. This is shown on the log. Since the break, there has been considerable sinkhole activity in the vicinity of Wagner Farms. The log shows that on April 6, 2005, there was water under the street and a cave-in at 3117 South Wagner Circle. On April 8, 2005, there was a collapse in the grass strip in the right of way at 3128 South Wagner Circle. On September 4, 2005, a fire hydrant near 3121 South Wagner Circle began to sink. The on October 11, 2005, a sinkhole opened up at 3124 South Wagner Circle.

Q. Throughout these proceedings, Pennsylvania-American Water Company has taken the position that it found a sinkhole on the property of the Wilson School District which was connected to the excavated area of the water main break, and that the cause of the water main break was the Township's not having filled in the prior sinkhole properly. Assuming that there was a pre-existing sinkhole on the school district property where Pennsylvania-American represents that it was, do you believe that this sinkhole was in any way related to the water main break?

A. No, I do not.

Q. You were not present when the water main break was originally excavated, correct?

A. That is correct. I was not present when the water main break was originally excavated.

Q. Did you view a videotape of the freshly excavated area of the break provided in discovery by Pennsylvania-American Water Company?

A. Yes, I did.

Q. I'll mark the videotape as Township Exhibit 5. From watching this tape, could you tell me why, with a reasonable degree of professional certainty, you do not believe the water main break to be related to the pre-existing sinkhole on the Wilson School District property?

A. From viewing the PAWC videotape and from my observations of the open excavation on the morning of February 7th, the distance to the alleged pre-existing sinkhole appears not to be in the immediate vicinity of the break. There was a lack of observable "throats" in the area below the main break and there was no soil disturbance under the pipe except that which was apparently made by the backhoe. The open excavation showed that water appeared to have flowed out sideways, evidenced by what appeared to be collapsed throat areas on the side walls of the excavation. Water flows along the path of least resistance, and there may have been areas of solution cavities already present laterally from the water main which triggered sinkhole development adjacent to the line (west and east) once the large volume of water was produced.

Q. How did you first learn of the water main break that is the subject of these proceedings today?

A. I received a phone call from Jay W. Vaughan, who is the Road Master for the

Township, on Sunday, February 6. He advised me that there had been a water main break near the intersection of Iroquois Avenue and Wagner Circle, and to report directly there on Monday morning, first thing, rather than to my office.

Q. Did you do that?

A. Yes. At about 8:10 a.m. on Monday morning, I met Mr. Vaughan at the site of the water main break.

Q Could you describe the location of the water main break, namely, where exactly was it located, and the type of main?

A. The broken water main was located on the west side of Iroquois Avenue, north of the intersection with Wagner Circle. The main is located across Iroquois Avenue from the parking lot of the Wilson Southern Junior High School/Cornwall Terrace Elementary Complex of the Wilson School District. The main was an eight inch (8") pressurized cast iron water main, located approximately 5 feet) underneath the road bed. It is my understanding that the water is pumped from various wells in the vicinity into two water tanks of approximately 500,000 gallons each, which flow into twelve inch (12") mains. Several blocks from the site of the break, the mains reduce from 12" mains to the 8" pressurized mains.

Q. What did you see when you got to the site?

A. When I arrived, the area around the break had been excavated, and there was a clamp on the section of pipe which was apparently broken.

Q. Were you able to see the area below the water main?

A. Yes.

Q. Did it appear that there was any disturbance of soils below the water main.

A. No, there did not, other than the typical marks from the excavating equipment.

Q. Did you notice anything unusual about the appearance of the area?

A. Yes, I did. Along Iroquois Avenue, I saw that several of the evergreen trees on the Creveling property had sunk and only the very tops of the trees were visible. I understand from speaking with Mr. Vaughan that this was the only way that the break was located, because the break was not the typical water main break where water is visible on the street.

Q. Is the fact that the water was not visible on the street level significant to you in forming a professional opinion as to how the water main break occurred?

A. Yes, it is. From both a geologist's standpoint, as well as that of a person who deals frequently with street and road issues in Spring Township, often, when there is a water main break, the break occurs in such a way that the water comes out vertically, and you see water coming up from the street. Here, it is apparent, when I saw the photographs and videotape, and from what I saw in person, that the water came out in a sideways or lateral direction.

Q. On another subject, are you familiar with American Geotech, Inc.?

A. Yes, I am.

Q. What is American Geotech, Inc.?

A. American Geotech, Inc. is a geotechnical engineering firm with offices in West Lawn, Pennsylvania.

Q Are you familiar with a report prepared by Kim Y. Chung, Ph.D., P.E., of American Geotech, Inc. dated February 22, 2005, and revised on March 8, 2005, relating to this incident?

A. Yes, I am familiar with the report.

Q. Have you reviewed this report?

A. Yes, I have.

Q. I have what we will mark as Township Exhibit 6. Is this a copy of the report of American Geotech, Inc. that you reviewed?

A. Yes, it is.

Q What were the conclusions reached by the report of American Geotech, Inc.?

A. Section D of the American Geotech, Inc. report contains the report's "Findings and Recommendations." This contains ten (10) bullet pointed findings and recommendations for future action, which I will summarize.

The first finding is that there are a total of six (6) current open-up sinkholes and eight (8) susceptible sinkholes.

The second finding is that the broken main location was apparently located above a sinkhole which connects to a previously mended sinkhole underneath

Iroquois Avenue and which may extend to numerous sinkholes at the west and one current sinkhole in the slope of the school parking lot at the east.

The third finding is that the remedial contractor, E. Kuser, Inc., dug a test pit in a "current open up sinkhole opposite to the broken pipe location inside the School parking lot," and that according to Don Kuser of EKI, no solution channel was found inside the test pit.

The fourth finding is that the 8" diameter cast iron water main with high pressure had not been designed for large different (I assume Dr. Chung meant "differential") settlement in this sinkhole area. The report concludes that the broken main was caused by the sinkhole underneath or immediately next to the water main.

The fifth finding is that the recent open up sinkholes were caused by the excessive water drained through the existing solution channels and existing sinkholes injected from the broken main location toward the west to the residential areas and to the northeast to the school area.

The sixth finding is that although the house at 3123 Wagner Circle had a previous minor sinkhole problem, the large quantity of water with its pressure worsened and extensively enlarged the sinkholes and voids underneath the house to a dangerous condition.

The seventh finding also relates to 3123 Wagner Circle specifically. This finding states that American Geotech personnel did EM 31 and GPR (ground penetrating radar) testing and found extensive voids underneath the basement slab. The report recommended additional investigation such as engineering borings outside the house and drilling holes through the basement slab and development

of an economical remedial method to save the house, and that this work should be done immediately.

The eighth recommendation relates to the design of the pressurized main, since this is an area of carbonate geology. The report recommends that special consideration and foundation consultation by an experienced geotechnical engineer should be included in the design of a pressurized water main embedded in carbonate geological areas, with an automatic warning system to be considered in each water tank to ensure the early cutoff of water in the event of excessive drainage.

The ninth and tenth recommendations addressed concerns caused by the loss of a million or more gallons of water in an area of carbonate geology. As shown in Figure 1 of the report, American Geotech, Inc. believes that water was drained through the existing sinkholes or underground solution channels to the west and the northeast according to our estimated routings. Their information also indicates that the some of the water went to the west, two blocks away from Iroquois Avenue, but that the destination of most of the lost water is still unknown. American Geotech, Inc., which is the expert retained by Pennsylvania-American Water Company's insurer, reaches the conclusion that:

> "By experience, this large quantity of water will worsen the existing sinkhole conditions underneath the existing houses in the path of our estimated sinkhole routing as shown in Figure 1. Because of this accidence, chance of future sinkhole activity has greatly increased in this area. It is, therefore, recommended that additional investigation by an experience[d] geotechnical engineer using additional geophysical investigation, engineering borings and small drill holes through the basement slabs for several residential houses immediately to the west of

the broken mains be performed. The sinkhole investigation for the safety of the school building and the parking lot is also recommended."

Q. Do you agree or disagree with the conclusions of the American Geotech, Inc. report?

A. I disagree with a number of the conclusions of the report; however, I also agree with a number of conclusions in this report.

Q. With which of the conclusions do you disagree?

A. I disagree with the second bullet point on Page 4. This bullet point indicates that the broken water main location was apparently located above a sinkhole. I disagree with this conclusion. I spoke with Mr. Vaughan, who was present during the excavation of the water main. Mr. Vaughan was present during excavation of the water main and advised me that there was no evidence of a sinkhole at street level such as subsidence or below the water main such as solution channels or disturbed soils. The photographs that I reviewed also do not show such a sinkhole.

I also do not agree that there was a connection from a pre-existing sinkhole on the Wilson School District property to the area of the water main break.

Q. Was there anything else in the report with which you take issue?

A. This report basically admits that Pennsylvania-American Water Company, which is an established public utility with facilities installed in a known area of carbonate geology and historic sinkholes has an eight inch (8") diameter cast iron water main with high water pressure that had not been designed for large

differential settlement in this sinkhole area as denoted in bullet 4 of the findings and conclusions. I believe that if a large differential settlement below the line had occurred, the road would have shown subsidence and the shear force from the release would have scoured the area below the water main. However, the actual drainage pattern and break did not indicate a downward movement of water and there was no evidence of a downward break or drainage based on visual observation of the excavation by Township personnel, as shown by the photographs and my personal observations.

Q. Are these opinions with respect to the report of American Geotech, Inc. rendered with a reasonable degree of professional certainty as a Professional Geologist?

A. Yes, they are.

Q. To shift gears again, are you also familiar with a report prepared by James Bock, M.Sc., P.G. and Felicia Kegel Bechtel, M.Sc.P.G. of Enviroscan, Inc.

A. Yes, I am familiar with the report of Enviroscan, Inc.

Q. Did you review this report?

A. Yes.

Q. I have a copy of what we will mark as Township Exhibit 7. Is this a copy of the report that you reviewed?

A. Yes, it is.

Q What was the conclusion of that report?

A. The Enviroscan report used a combination of seismic, microgravity, and ground penetrating radar (GPR) data, and found disturbed soils, solution channels, and voids. This report found that other than the water main in question, there was no other source of water than a broken main capable of initiating the soil transport and sinkhole development found here. Additionally, the report found "that the footprints of the sinkholes do not coincide closely with the footprints of subsurface mass deficiencies that may represent the bedrock solution cavities that allow sinkhole activity." Instead, the report found "the largest of the sinkholes is coincident with the reported water main break, and at a distance [from] the inferred bedrock cavities." Enviroscan reached the professional opinion that "the sinkhole location is controlled by the location of concentrated infiltration from the water main break, and that the sinkhole activity was triggered by the water main breakage, and consequent loss of 1.5 million gallons of water into the subsurface."

Q. Do you agree or disagree with the conclusion contained in the report of Enviroscan, Inc. that the sinkhole activity in the area has been caused by the water main break?

A. I agree with the conclusion in the Enviroscan report as to the causation of the sinkholes.

Q. And do you adopt the explanations and conclusions as your own?

A. Yes, I do.

Q. With a reasonable degree of professional certainty as a Professional Geologist, what is your basis for agreement with the Enviroscan report?

A. In general, while sinkholes occur rarely in nature; we humans have changed natural drainage patterns which cause the occurrence on a more frequent basis. Concentration of 1.5 million (pressurized) gallons into a small area, such as a release from a catastrophic water main break, will result in scouring of bedrock and overburden activating future sinkhole development. The Enviroscan report and the American Geotech report both came to the same conclusion.

Q. Do you have an opinion, with a reasonable degree of professional certainty, as to the causation of the sinkhole activity in the Wagner Farms subdivision since the water main break?

A. Yes, I do.

Q. What is that opinion?

A. I believe that the sinkhole activity has been caused by the escape of 1.5 million gallons of water from this water main break. There had not been, prior to the water main break, this level of sinkhole activity. It was only after the break that we saw this activity.

Q. Do you have an opinion, with a reasonable degree of professional certainty, as to the potential for future harm as a result of the water main break?

A. Yes.

Q. What is that opinion?

A. I believe that the water, and its destination, have not been accounted for, and may cause future subsidence, sinkholes, and damage to Township streets and

rights-of-way, as well as homes. I believe this is why it is so important that the testing be conducted in an attempt to determine the scope of the damage. It should be noted that the American Geotech Report provided this conclusion.

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	Docket No.: C-20055371
v.	:	
PENNSYLVANIA AMERICAN WATER COMPANY Respondent	:	

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing **ANSWER OF COMPLAINANT, TOWNSHIP OF SPRING TO RESPONDENT'S INTERROGATORIES**, was served on May 17, 2006 upon the following party(ies) by first class mail and electronic mail:

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KOZLOFF STOUDT
Professional Corporation

Dated: By: Joan E. London

Joan E. London, Esquire
Attorney for Township of Spring

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

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SPRING TOWNSHIP, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : : : : :	Docket No.: C-20054746
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : : : : :	Docket No.: C-20054919
WILSON SCHOOL DISTRICT, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY Respondent	: : : : : : :	Docket No.: C-20055371

DOCKETED
OCT 27 2006

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DIRECT TESTIMONY OF FELICIA KEGEL BECHTEL, M.Sc., P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY

The following is the testimony, on direct examination, of Felicia Kegel Bechtel, M.Sc., P.G., named by Complainant, Spring Township, Berks County as an expert witness:

Q. Could you please state your full name for the record?

A. Felicia Kegel Bechtel.

Q What is your address?

A. My work address is 1051 Columbia Avenue, Lancaster, PA 17603.

Q. What is your education since graduation from high school?

A. I graduated from Bryn Mawr College in 1982 with a Bachelor of Arts degree in Geology. I studied Geology at Yale University on the graduate level as well, and received a Master of Science Degree in Geology from Brown University in 1985.

Q. Are you currently employed?

A. Yes.

Q. Where are you currently employed?

A. I am currently employed by Enviroscan, Inc. of Lancaster, PA.

Q. What is your job title?

A. I am President of Enviroscan, Inc.

Q. Could you describe for us what type of work is performed by Enviroscan, Inc.?

A. Enviroscan, Inc. specializes exclusively in nonintrusive, nondestructive geophysics, which is the science of detecting and mapping underground, underwater, or otherwise hidden objects or features. Geophysics is really the earth science equivalent of medical radiology. Just as radiologists use noninvasive techniques to diagnose internal problems and minimize (and make safer) invasive surgery, geophysicists can detect and delineate subsurface features to minimize (and make safer) intrusive digging or drilling. Most importantly, geophysics can provide early warning of subsurface hazards such as buried utilities, sinkholes, drums, USTs, contaminant plumes, etc., - eliminating costly mid-project surprises.

Enviroscan is a privately owned woman business enterprise (WBE) that is not owned in any part by any firm that does environmental or engineering work. Our sole product is geophysical surveys - which we typically provide to clients worldwide who are geotechnical engineers, civil engineers, environmental scientists, geologists, archaeologists, architects, attorneys, or lay people.

Q. Could you describe your job duties?

A. I direct all operations of the firm. I prepare and approve technical cost proposals, provide final review of all work product, and I design and implement all business development strategies and programs.

Q. How long have you been with Enviroscan, Inc.?

A. I have been with Enviroscan, Inc. since February of 1992.

Q. Could you describe your relevant work experience prior to Enviroscan, Inc.?

A. From February 1991 to April of 1992, I worked as a Geologist as well as Marketing Director for Tethys Consultants, Inc. of Harrisburg, Pennsylvania. There, I performed geologic and environmental studies, and wrote and directed publication of a technical environmental newsletter. I, prior to 1991, had worked in several jobs unrelated to the field of geology. When I was in graduate school, both at Brown University and at Yale University, I worked as a Research and Teaching Assistant in the Department of Geology. Also, in the summer of 1982, I worked as a Research Geologist for Chevron Oil Field Research Company in Los Angeles, California.

Q. Do you have any licenses or professional certifications?

A. Yes. I am a Professional Geologist and I am registered and licensed as such in the Commonwealth of Pennsylvania.

Q. Do you have any professional affiliations?

A. Yes. I am a member of the American Society of Civil Engineers.

Q. Is your certification as a Professional Geologist currently active and in good standing?

A. Yes.

Q As a professional geologist, have you taken any courses, or had other education or training addressing sinkhole formation and causation.

A. Yes.

Q. I have what we will mark as Township Exhibit 8. Could you identify this document for us?

A. Township Exhibit 8 is my *curriculum vitae*.

Q. Is your *curriculum vitae* up to date and accurately reflect your education and work experience?

A. Yes.

Q. Ms. Bechtel, are you familiar with an incident which occurred on or about February 5, 2005, in Spring Township, Berks County, Pennsylvania, where there was a water main break near the intersection of Wagner Circle and Iroquois Avenue?

A. Yes, I am.

Q. How did you become familiar with this incident?

A. Enviroscan was asked by the representatives of Mr. and Mrs. Creveling, the owners of the property at 3123 South Wagner Circle, to perform a geophysical survey of their property.

Q. Did Enviroscan perform the survey?

A. Yes.

Q. When did Enviroscan perform the survey?

A. The survey was performed on February 18, 2005.

Q. What was the reason that Enviroscan was asked to perform the survey?

A. Enviroscan was asked to perform the survey because in the aftermath of the water main break, the house had begun to settle, and large sinkholes developed in their back yard. The house is essentially uninhabitable, and the Crevelings have had to relocate.

Q. Could you describe the site surveyed?

A. The site is a private residence, with an area of 120' by 120'. There has been sinkhole activity observed on the property in close proximity to a water main break, where I understand that approximately 1.5 million gallons of water was lost.

Q. Can you describe the geology underlying the property?

A The property is underlain by the Millbach Formation.

Q. Can you describe the Millbach Formation?

A The Millbach Formation is a pinkish to a medium gray laminated limestone. The Millbach formation typically has well-developed structures, is moderately resistant, and is often characterized by bedrock pinnacles. Additional mapping, compiled by William E. Kochanov in 1988, depicts a number of closed topographic depressions within close proximity to the study area.

Q. In discussions of sinkholes and sinkhole activity, one often hears the term "Karst

Processees." Could you describe Karst Processees in the context of sinkhole formation?

A. Pinnacled bedrock and sinkholes are among the geologic features characteristic of Karst terrains. Karts terrains are terrains underlain by soluble carbonate bedrock such as limestone or dolomite in wet climates. In Karst terrains, infiltrating precipitation dissolves the carbonate bedrock surface, causing top of rock to retreat downward, leaving a soil mantle of soluble clay and silica particles, formerly bonded in the rock. Within the bedrock, percolating water enlarges fractures, bedding plains, etc. to produced solution openings ranging in size form minor seams to caverns.

Q How do sinkholes form within Karst terrains?

A Sinkholes form where a particularly enhanced infiltration into sufficiently wide solution opening (a throat or chimney) washes the soil mantle down into cavities in the underlying rock, which is a process commonly called soil piping. In areas where the residual soil mantle is clay-rich and cohesive, insipient sinkholes may not display any superficial topographic expression, and are present only as air, water or mud-filled voids which may grow or stope upward. Eventually, the overlying soil arch collapses under its own weight or under the weight of an overlying structure or even a passing vehicle. The resulting collapse, sink or "sinkhole" is commonly filled with the remains of the soil arch and may display rock at its base. In some cases, surficial subsidence may keep pace with soil piping at a depth such that a sinkhole forms by progressive deepening of a surficial depression (sometimes called a subsidence sink) rather than by a catastrophic collapse of a stopeing void.

Q. How quickly do sinkholes form?

A. The dissolution of bedrock tends to occur on a timescale measured in thousands to tens of thousands of years. Accordingly, the natural occurrence of new sinkholes is a rare occurrence on a human timescale. However, the concentration of stormwater and excess infiltration due to man's activities can trigger man-made sinkholes virtually anywhere in a Karst terrain even on topographic highs or beneath paved streets or buildings.

Q. To shift gears, I would like to discuss the property of the Crevelings on which you conducted the survey. First, what methods did you use to survey the Creveling property?

A. Enviroscan utilized a combination of seismic refraction, microgravity, and ground penetrating radar.

Q. Can you describe the seismic refraction survey utilized on the Creveling property?

A. In order to determine bedrock depths beneath the study area, Enviroscan performed a seismic refraction survey. Knowledge of bedrock depths is desirable for proper interpretation of microgravity data, and can provide information on the presence of deeply weathered zones indicative of faults or fractures. The seismic refraction survey consisted of two profiles or lines oriented roughly east to west. The principles of seismic refraction are described in Appendix B to the Enviroscan Report (the Introduction to Seismic Refraction), and generally involve measuring the travel times of shock waves traveling from a surficial source (shot point) to a linear array of ground motion sensors (geophones). At a distance from the shot point, the first arrivals of seismic energy are waves that have been refracted along whatever density contrast or

contrasts (called refractors) are present in the subsurface. The travel times of these refracted arrivals can be used to compute a cross sectional profile of the density contrast(s).

For this survey, a Geometrics 24-channel Smartseis seismograph was used to records seismic travel times at linear arrays of Mark Products 9.5 Hertz geophones spaced at constant 5-foot intervals along each of the two lines. Shot points were spaced at approximately 30-foot intervals, but were occasionally adjusted due to site conditions, to provide multi-fold, reversed seismic data. At each shot point, seismic signal was generated with the repeated blows of a 35-lb airless jackhammer. Waveform data were recorded on the internal hard drive of the seismograph, and were transferred to a 3.5 -inch floppy disk for backup. The original seismic waveform data are on permanent file in digital format at Enviroscan. The location of each shot point and geophone was surveyed using a Trimble ATS Robotic Total Station.

Processing and interpretation of the seismic refraction data were completed using the SIP package of computer programs developed for the United States Geological Survey by Rimrock Geophysical. First arrival travel times or first breaks were selected on the waveform data using the automatic picking routine SIPIK (with occasional minor manual adjustment) to ensure consistent and objective picking. From the first arrival times and geophone locations, T-X graphs (contained in Appendix B to the Enviroscan Report) were compiled for each line using the routine SIPIN. In general, the T-X data roughly defined two linear segments consistent with a two-layer stratigraphy (presumed to consist of unconsolidated soils over limestone bedrock). Inversion of the T-X data using the iterative ray tracing routine SIPT2 yielded the statistically best-fitting refractor or layer boundary depths and layer velocities.

The P-wave arrival times, together with the shot point-receiver geometry, were then inverted using SeisOPT Pro. SeisOPT Pro uses a globally optimized mathematical inversion to determine the statistically best-fitting velocity distribution in the plane between the surface receivers and a given set of observation arrival times. The velocity models from SeisOPT Pro are presented as seismic profile cross-sectional images on Figure 2. Note that on each profile section, the vertical scale represents elevation in feet. The horizontal axis represents an along-profile distance in feet. Note that the shot points are labeled to facilitate comparison with the survey layout. The court should note that the shot points are labeled to facilitate comparison with the survey layout. Figure 2 of the Enviroscan Report shows the inferred stratigraphic profiles based on both the SIP and SeisOPT Pro calculations.

Q Did Enviroscan next utilize microgravity measurements?

A. Yes

Q Could you describe the methods used in making the microgravity measures?

A In order to map potential sinkholes/voids or other low-density areas in soil and bedrock, Enviroscan performed microgravity measurements at 10 foot intervals along profile spaced ten feet apart. As shown in Figure 1 of Enviroscan Report. Microgravity meters are capable of measuring the forced gravity with great precision. Worldwide, the acceleration of gravity has been adopted as 980 cm per second squared. However, this is really an average value since the actual measured value of gravity at a given station is dependent upon many factors including elevation, latitude and longitude, positions of sun and moon, attractions of massive landforms near or above the station, density of materials immediately beneath the station or even minute changes in the calibration of the

gravity meter. Because of these minor variations, raw gravity readings are subjected to certain corrections for these factors. Microgravity data that has been corrected are called complete bouguer gravity and if collected and processed properly, should retain only information on the mass or density distribution beneath a survey station.

Elevated bouguer gravity anomalies are caused by subsurface mass excesses such as locally shallow bedrock pinnacles of float blocks in the soil profile or zones of particularly massive bedrock. Low bouguer gravity is caused by mass deficiencies such as lenses of low density soils, locally deep bedrock where soil or filled displaces bedrock in air, water or mud-filled voids. Note that since microgravity alone cannot discriminate between locally deep bedrock and a potential void or low-density soils both representing local mass deficiencies, a precise identification of gravity anomalies sources often requires bedrock depth data from boring or a seismic survey such as described above.

Q. Was such a seismic survey performed?

A. Yes.

Q. Can you tell us how the acceleration of gravity was measured in this case?

A At each station, the acceleration of gravity was measured using a Scintrex CG-35 Autograb Gravimeter. The internal memory of the instrument was used at each station to record the average gravity for a sixty second time period, the standard measure of the average, the reading date and time, and the meter height. A designated station was established at the base station and was occupied approximately every hour and a half to provide drift control data. The elevation and location for each of the microgravity data stations, as well as the seismic shot

point and geophone locations, were surveyed using a Trimble ATS robotic total station.

The gravity data will process by applying the reference ellipsoid, earth tide, drift, free air, and bouguer corrections were applied using standard formulae as computed in the spreadsheet. The resulting bouguer gravity, representing only mass variations beneath individual gravity stations was contoured using the statistical kriging routine in surfer for windows by Golden Software. The bouguer gravity response contours depicted in figure three of the Enviroscan Report.

Q. Was ground-penetrating radar or GPR also utilized by Enviroscan?

A. Yes. In an effort to identify potential voids located beneath the foundation of the Creveling home, Enviroscan also completed a GPR investigation in both the basement and garage of the residence. Scanning was performed using a GSSISIR-2000 GPR Control with a color display and internal hard-drive, utilizing a five hundred megahertz scanning antenna. GPR Systems produced cross-sectional images of subsurface features and layers by continuously emitting pulses of radar frequency energy from a scanning antenna as it is total on a survey profile. The radar pulses are reflected by interfaces between materials with differing dielectric properties. The flections returned to the antennae and are displayed on a video monitor as a continuous cross-section in real time. Since the electrical properties of metal are distinctly different from soil and backfill materials, metallic pipes and other structures produced dramatic and characteristic reflections. Fiberglass, plastic, concrete and terracotta targets as well as subsurface voids, rock surfaces, soil-type changes and concentrations of any type of non-metallic waste also produce recognizable but less dramatic reflections.

For the investigation, variously oriented GPR profiles were collected in both the basement and the garage of the Creveling residence. The orientation of these profiles was determined primarily by the location of stored items in the basement and the garage. The individual radar profiles were examined in the field for variable, high amplitude anomalies of the type commonly associated with voids and/or less dense soils. Areas having this type of anomaly were placed onto a site sketch (Figure 4 to the Enviroscan Report) for later comparison with the process gravity data.

Q. Did Enviroscan also perform a site inspection?

A. Yes. In an effort to identify evidence of preexisting sinkhole activity, or sources of concentrated infiltration of the type that commonly trigger sinkhole activity, Enviroscan also performed a site inspection.

Q What did these site inspections show?

A. The site inspection showed the property to rest upon a topographic high allowing surface water to drain away from the property. All of the impermeable surfaces such as roadways at the residence, also appear to be graded to shed water away from the house. Furthermore, inspection of the basement did not reveal the presence of any water damage of the type that would suggest previous subsurface water problems near the house. There are no reported water or sewer leakages on the property. The most notable local source of concentrated infiltration was the water main breakage discharging approximately 1.5 million gallons of water into the subsurface. The reported location of the water main breakage is adjacent to the largest of the observed sinkholes close to the curb along Iroquois Avenue.

Q. We spoke a moment ago about the seismic refraction analysis, did Enviroscan reach any conclusions as a result of the seismic refraction analysis?

A. The seismic profile suggests the presence of an irregular soil thickness profile with depths locally exceeding 20 feet, created by an irregular limestone bedrock surface. Lower velocity materials, consistent with less dense soil, occur at greater depths within close proximity to the identified sinkholes. This indicates that there may be bedrock solution cavities filled with low density transported soils. Note that bedrock solution cavities develop over thousands of years and would thus represent a pre-existing, although not directly causative condition for sinkhole activity.

Q. Did Enviroscan make any findings as to the microgravity survey?

A. Yes. The microgravity survey results are found at Figure 3 of the Enviroscan Report. Mass deficiencies are represented with increasing shades of red, while mass excesses are represented with increasing shades of blue. The range of gravity values across the entire survey area are is .30 milligals ranging from -.22 to .08 milligals. There are several mass deficient zones located beneath the survey area. In particular, there appear to be two significantly mass deficient zones beneath the northwestern and south central portions of the building. These zones may represent cavities or disturbed zones in the soil mantle, or cavities in the underlying bedrock. Note that if they are bedrock cavities, they do not coincide closely with the footprints of the observed sinkholes.

Q. Did Enviroscan make any findings as a result of the ground penetrating radar survey?

A. Figure 4 of the Enviroscan Report contains the result from the GPR survey

overlain on top of the gravity survey for comparison. To anomalous areas, depicted with orange shading, of the type commonly associated with subsurface voids and/or less dense soils were detected beneath the basement. The anomalies were located within close proximity to cracks in the concrete as well as mass deficient zones mapped during the gravity investigation Due to the presence of steel reinforcing matter within the garage floor, it was not possible to collect any useful radar data in that area.

Q. As a result of your testing and surveying of the site and the Creveling property in particular, have you formed an opinion as to the causation of the sinkhole and the damage to the Creveling property?

A. Yes.

Q. Is this opinion one which that is rendered with a reasonable degree of professional certainty?

A. Yes, this and all of the opinions in the Enviorscan report are rendered with a reasonable degree of professional certainty.

Q. Could you tell us your opinion as to the causation of the sinkhole?

A. The seismic, microgravity and GPR data all display clear evidence of sinkhole activity and sinkhole related features. The seismic data display low velocity zones consistent with disturbed soil and bedrock solution cavities. The gravity data shows subsurface mass deficiencies consistent with either disturbed soils or voids in the soil mantle or bedrock. GPR profiling in the basement also detects anomalously reflective zones whose locations were consistent with the cracking of the basement slab.

Although it is not possible to determine the exact timing of sinkhole related activity at the site based solely on the geophysical data, we can offer the following interpretation based on Enviroscan's extensive experience with sinkholes and similar experience of many other geoscientists.

First of all, and in general, the occurrence of new sinkholes is a rare occurrence on a human timescale in the absence of human alteration of natural drainage, and, conversely, human alteration of natural drainage is the common cause of sinkholes. In this particular case, the roadway above the sinkhole is paved and would have served as a barrier to infiltration. Outside of a water main that traverses the largest sinkhole, Enviroscan is unable to find another source of water capable of initiating soil transport and subsequent sinkhole development. In addition, the footprints of the sinkholes do not coincide closely with the footprints of subsurface mass deficiencies that may represent the bedrock solution cavities that allow sinkhole activity. Instead, the largest of the sinkholes is coincident with the reported water main break, and at a distance from the inferred possible bedrock cavities. Therefore, it is Enviroscan's professional opinion that the sinkhole location is controlled by the location of the concentrated infiltration from the water main break and that the sinkhole activity was triggered by the water main breakage and consequent loss of 1.5 million gallons of water into the subsurface.

Q. There have been references to a report by Enviroscan, I have what was marked as Township Exhibit "7," is this a true and correct copy of the Report of Enviroscan prepared for the Creveling property?

A. Yes, this is a copy of the report and attached exhibits.

Q. And looking at page 10, is that your signature at the bottom?

A. Yes, it is.

Q. These opinions were rendered on March 22, 2005, correct?

A. Yes.

Q. Are these opinions rendered in this report still true and correct to the best of your knowledge, information and belief?

A. Yes, they are.

Q. And were all opinions in this report rendered with a reasonable degree of professional certainty?

A. Yes, all opinions were rendered with a reasonable degree of professional certainty in my capacity as a Professional Geologist.

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D #67934
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	Docket No.: C-20055371
v.	:	
PENNSYLVANIA AMERICAN WATER COMPANY Respondent	:	

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing **ANSWER OF COMPLAINANT, TOWNSHIP OF SPRING TO RESPONDENT'S INTERROGATORIES,** was served on May 17, 2006 upon the following party(ies) by first class mail and electronic mail:

Dianne E. Dusman,
Senior Assistant Consumer Advocate
Commonwealth of Pennsylvania
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Harrisburg, PA 17101-1923

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Wagner Farms Homeowners Assoc.
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800 West Hershey Park Drive
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KOZLOFF STOUDT
Professional Corporation

Dated: By: _____

Joan E. London, Esquire
Attorney for Township of Spring

Exhibit "1"

JERI L. DIESINGER, P. G.
102 Wessex Court, Reading, PA 19606
H: 610-370-9696 C: 484-955-9346

EDUCATION:

University of Pittsburgh, B.Sc. Geology, 1986
Continuing Education:

- Univ. of Waterloo (1993) Dense Non-Aqueous Phase Liquids
- Univ. of Wisconsin (1998) Natural Attenuation
- Chester Engineers, Pittsburgh, PA Seminar (2000) ArcView/GIS
- ESRI, Penn State University, State College, PA (2002) ArcView/GIS
- Berks County Master Planner Certification (2004)

PROFESSIONAL REGISTRATION:

Professional Geologist, Pennsylvania - #PG-001315-G (1995)

EMPLOYMENT HISTORY:

11/2001 to Present — *Township of Spring, Berks County, PA*
Director of Engineering Services, Berks County Master Planner Certification

Supervision of day-to-day municipal planning, engineering, code enforcement, and related activities. Guides staff of five including: Twp. Secretary and Assistant Secretary, Code Enforcement Official, Zoning Officer and Building Inspector. Develops individual performance plans; conducts annual evaluations; Direct responsibility for annual engineering budget preparation and tracking and participant with other Directors on Budget Committee to establish overall Annual General Budget. Coordinates update of pertinent website information with IT personnel. Implemented recent aerial photography update to GIS system. Maintains Township sinkhole informational database and mapping. Administers stormwater management program and prepares annual MS4 reports to PADEP. Provides ongoing technical support for Infrastructure, Traffic Advisory Committees, Planning Commission and Board of Supervisors. Contract administration of large-scale Township improvement projects. Liaison for Board of Supervisors among internal committees and commissions, residents, businesses, developers, consultants, solicitors, media and other municipalities.

5/2001 to 11/2001 — *Relocated to Berks County, PA*

9/1999 to 5/2001 *Moon Twp Municipal Authority, Moon Township, PA*
Administration/Technical Utility Support

Assisted Director of Planning and Construction with quality reviews of waterline/sanitary sewer construction drawings, prepared technical transmittals and communication with contractors/consultants; developed/maintained database including Back-Flow Prevention Program and Grease-Trap Program; Commercial/Residential customer support, miscellaneous administrative support as required.

10/1998 – 3/2000 *Alliance Environmental Strategies, Inc.*
Independent Consultant, Pittsburgh, PA

Start-up of small environmental management firm. Obtained local and state WBE certifications. Created business plan, responsible for all corporate legal, financial, technical and business development issues. Engaged in extensive marketing programs, networking with other small businesses, identifying federal contractor databases, developed private-sector client database, prepared /presented cost and scope proposals.

6/1997 – 9/1998 *The Goodyear Tire & Rubber Company, Akron, OH*
Senior Environmental Engineer

Managed all Corporate Superfund Program projects – a total of 45 to 50 projects at any one time located nationwide with annual budget of $12M for investigations and legal defense. Represented company on 15 Technical and Steering Committees, Group Financial Trustee for two Superfund sites. Coordinated technical focus of environmental projects with legal team to defend company as member of various Potentially Responsible Parties (PRPs). Reviewed and summarized engineering reports by third-party consultants. Member of Corporate Acquisition Team – provided technical expertise to corporate/outside legal staff during proceedings with regulatory agencies, supported environmental due diligence and facilities assessments; prepared/presented monthly status reports to upper-level management, including required changes to reserves, annual budget reviews and project strategies development.

7/1990 – 3/1997 *Baker Environmental, Inc., Coraopolis, PA*
Senior Geologist - Activity Manager

Managed 15 geologists, environmental scientists, industrial hygienists and community relations specialists; conducted staff utilization, planning and tracking; development of individual performance plans; conducted annual evaluations; reviewed weekly time sheets and monthly expense reports. Mentored junior-level staff in office and field procedures; provided senior-level review of all technical documents. Created and monitored internal QA/QC program, reviewed/updated Standard Operating Procedures and designed-implemented in-house environmental field audit program. Formulated strategies for all investigations and cleanup efforts at Naval base Norfolk, provided senior-

level support for 9 concurrent investigations and served as Navy technical representative on Restoration Advisory Board. Prepared monthly progress reports for Naval Base environmental projects, reviewed and edited all departmental progress reports (average 50/month) from other programs located within the Navy's Atlantic Division. Met all mandated deadlines for both field activities and report deliverables. Successfully completed projects on or under budget; received "outstanding" ratings from clients on evaluated projects. Lead and supported preparation for SF 254/255 qualification submittals, private-sector proposals, and cost estimates.

10/1987 to 7/1990 *ICF Kaiser Engineers, Inc., Pittsburgh, PA*
Field Geologist

Participant on one of two teams under EPA National Pesticide Program, sampling and interviews; Oversight of all field operations – UST removal/remediation projects – locations in 15 states - nationwide. Onsite coordination of field operations for Ohio superfund project.

12/1986 to 8/1987 *AMO Pollution Services, Inc., Canonsburg, PA*
Consulting Geologist/Marketing Coordinator

Designed project recovery and groundwater monitoring program for the Czechoslovakian Embassy in Washington, D.C. Expedited proposal developed for, presented to, and approved by the USEPA, Department of the Interior and Embassy officials all within a 24-hour turnaround. Coordinator of all onsite activities at numerous emergency spill sites – responsible for public relations, personnel resources allocation, and completion of shipping manifests. Performed Environmental Assessments in PA and OH. Top sales performer in August 1987 – territory western Pennsylvania border to Harrisburg and from I-80 to southern border.

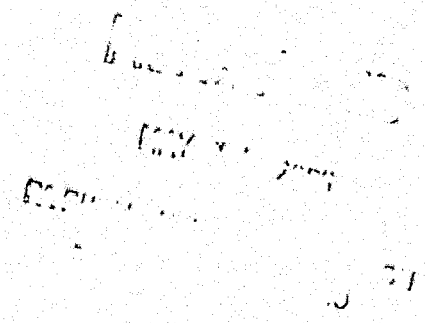
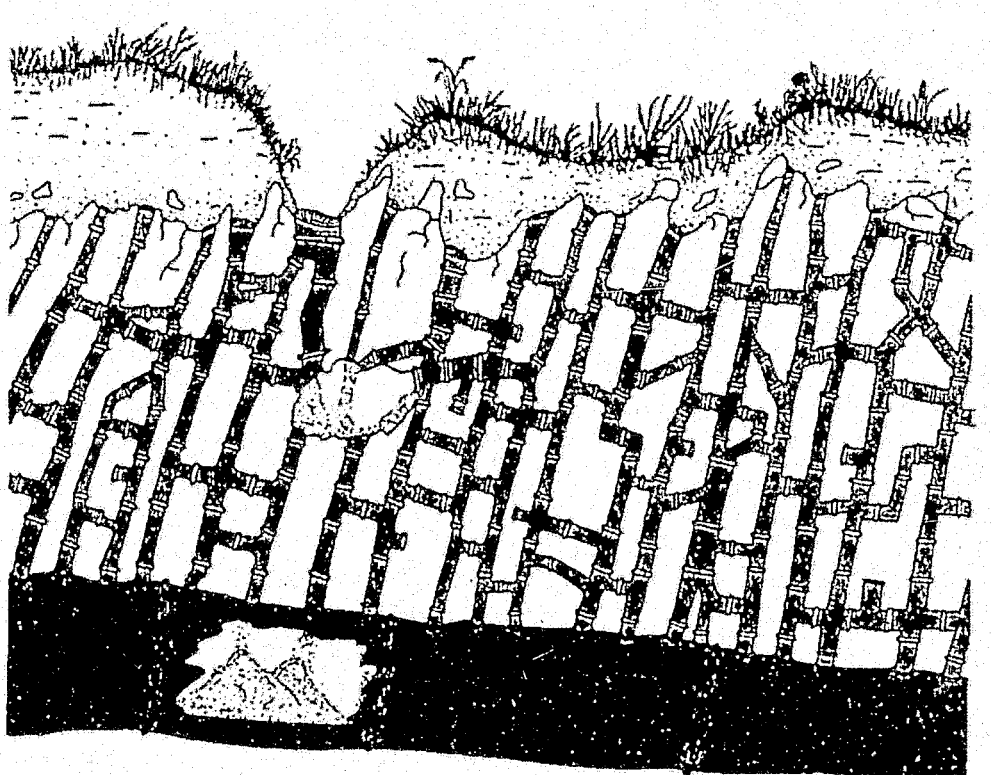


Exhibit "2"

DCNR

Educational Series 11

Sinkholes in Pennsylvania



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DEPARTMENT OF
CONSERVATION AND NATURAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY

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DEPARTMENT OF
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Richard G. Sprenkle, Deputy Secretary
BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY
Donald M. Hoskins, Director

Educational Series 11

SINKHOLES IN PENNSYLVANIA

by William E. Kochanov

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES
HARRISBURG

1999

When reproducing material from this booklet, please cite the source as follows:

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Pennsylvania World Wide Web site: www.state.pa.us
Department of Conservation and Natural Resources
World Wide Web site: www.dcnr.state.pa.us

SINKHOLES IN PENNSYLVANIA

by William E. Kochanov

Introduction

What are sinkholes? A farmer may view them as naturally forming holes that occasionally open up in the fields. Some people see sinkholes as sites for dumping trash. In urban areas, the sudden appearance of a sinkhole is a hazard that can disrupt utility services, hamper transportation, and cause severe damage to nearby structures. In anyone's backyard, a sinkhole is a safety risk to the curious who may find it exciting to explore this new "cave."

Information about sinkholes in Pennsylvania is pertinent to planning for future land development and for the protection of private and public property. It also provides a fascinating story for those who are interested in learning more about geologic conditions and earth processes.

The first 18 pages of this booklet contain an explanation of how sinkholes develop. In order to tell the sinkhole story, it is important to discuss a number of related geologic disciplines. The words used to describe sinkholes and these disciplines may be a bit unfamiliar. However, general explanations are given throughout the booklet to help clarify their meanings. Key words are printed in **bold** type for emphasis. The more important ones are defined in a Glossary that begins on page 29.

The remaining sections, starting with "Sinkholes in the Urban Environment" (page 18), deal with sinkholes and their impact on our environment. This includes recognition of subsidence features and sinkhole repair.

As you read, keep in mind that the formation of sinkholes is part of the natural weathering process and that this process has worked on the bedrock over a very long period of time.

What are Sinkholes?

A **sinkhole** is a subsidence feature. **Subsidence** is the downward movement of surface material; it involves little or no horizontal movement. Subsidence occurs naturally due to the physical and chemical **weathering** of certain types of **bedrock**. Subsidence can also occur as a result of underground mining, excessive pumping of **groundwater**, or subsurface erosion due to the failure of existing utility lines. All of these examples of subsidence can produce surface features that appear similar, but not all are naturally occurring. Some are solely the result of human activities.

Subsidence and the Old Farmhouse

Subsidence usually occurs slowly over a relatively long period of time. Imagine an old, abandoned, two-story, wooden farmhouse. Over a period of time, the wooden crossbeams and joists that support the house dry and begin to deteriorate. As time goes on, the framework that supports the floors loses its integrity, and as support is lost, the floors sag. If this process is allowed to continue, the house eventually collapses due to the removal of the wooden supports. Although the actual subsidence process may have taken a long time, the final collapse of the structure can occur very rapidly.

Sinkhole development is comparable to the subsidence process just described. In the case of a sinkhole, the support for the land surface is gradually removed over a period of time, causing the land surface to sag and finally collapse, leaving a hole or cavity as a result. Overlying surface materials then move downward into the hole.

The mechanism of subsidence can help define a sinkhole. A sinkhole can be defined as a subsidence feature that can form rapidly and that is characterized by a distinct break in the land surface and the downward movement of surface materials into the resulting hole or cavity.

New questions now arise. What causes the underlying support for the land surface to be removed? Where does it go? Do sinkholes occur everywhere?

Case histories of sinkhole occurrence reveal that sinkholes occur only in certain parts of Pennsylvania. By examining these records, we learn that sinkholes are found in areas underlain by **carbonate bedrock**. Large areas of central and eastern Pennsylvania are underlain by this type of bedrock (Figure 1).

We can now add this information to the definition of a sinkhole. A sinkhole is a subsidence feature in an area underlain by carbonate bedrock. It can form rapidly and is characterized by a distinct break in the land surface and the downward movement of surface materials into the resulting hole or cavity.

What is Carbonate Bedrock?

Carbonate bedrock includes **limestone, dolomite,** and **marble**. Limestone and dolomite are **sedimentary** rocks, and marble is a **metamorphic** rock. Marble is present in Pennsylvania, but it is not nearly as common as limestone and dolomite. Although sinkholes are associated with all of these carbonate rock types, limestone will be used as the primary example throughout much of this booklet.

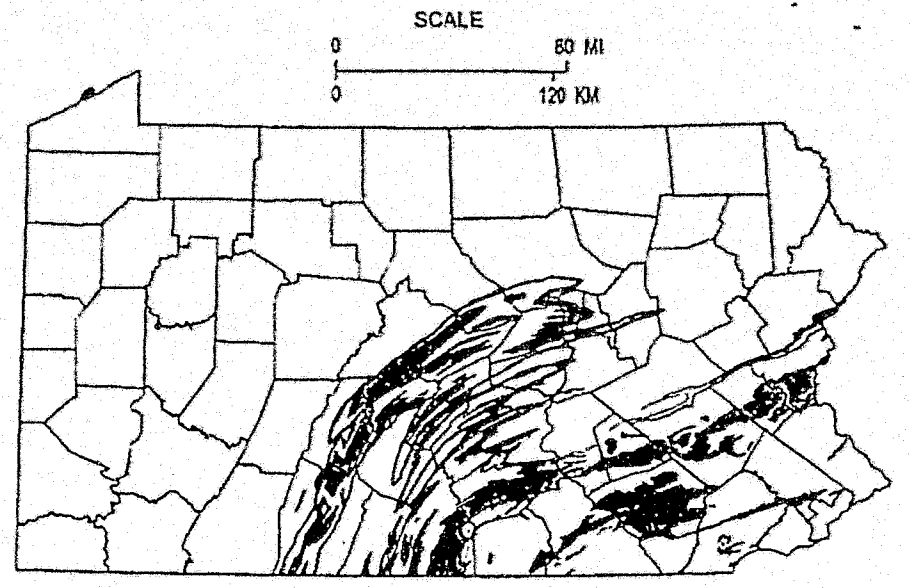


Figure 1. Location of areas where carbonate bedrock occurs in central and eastern Pennsylvania.

Being a sedimentary rock, limestone is composed of grains of sediment, much like the individual sand grains that make up sandstone. The difference is that the sediment grains of limestone are chemically different and are derived from a different source.

Limestone is composed of **carbonate sediment**. Carbonate sediment is commonly found in relatively shallow subtropical and tropical oceans around the world. A good example of a carbonate environment is a coral reef, such as the reefs that lie east of the Florida Keys, or the Great Barrier Reef of Australia.

Ocean-dwelling organisms such as corals, clams, and algae use the various elements within seawater to form a hard, rigid skeleton composed of the **carbonate mineral calcite**. When these organisms die, their skeletons accumulate on the ocean floor as sediment. Movement of this sediment by wave action and ocean currents breaks the sediment into smaller pieces and transports it from one place to another.

The sediment is further reduced in size by the action of burrowing and grazing organisms. The sediment is ingested by these organisms, available nutrients are removed, and the undigested portion of the sediment is returned to the ocean floor.

How Does Carbonate Sediment Become Rock?

When building a brick wall, one needs some type of **cement**, such as mortar or concrete, to hold the bricks together. Similarly, loose, **unconsolidated** sediment needs something to hold the grains together in order for it to become rock. Limestone is the result of carbonate sediment being cemented together, generally by the mineral calcite. This cement can be produced by chemical reactions that take place in the fluids that move through the pore spaces of the sediment after deposition. Cementation is likely to occur when fresh water, as opposed to ocean water, moves through the sediment.

Look at Figure 1 again, and note that there are many places in Pennsylvania where limestone is at the surface. You can see limestone in outcrops along the highway, in fields, or in quarries. How did the limestone get there if it was formed in the ocean?

The answer is that during the earth's history, the continents and the oceans have changed in shape and location. Shallow seas covered all of Pennsylvania in past geologic time and produced layer upon layer of carbonate sediments. These sediments were **lithified** (turned to rock), and the layers were later uplifted, tilted, fractured, folded, and twisted by the forces unleashed during the formation of the Appalachian Mountains. Erosion has worn away most of the ancient mountains, leaving the landscape as we see it today, including exposures of carbonate rock.

Chemical Composition of Carbonate Bedrock

The chief constituent of limestone is the mineral calcite. The chemical composition of calcite is **calcium carbonate** ($CaCO_3$). The rock dolomite is similar to limestone but has dolomite as the dominant mineral. Note that the term "dolomite" is used for both a rock and a mineral. The chemical composition of the mineral dolomite is **calcium magnesium carbonate** [$CaMg(CO_3)_2$]. Also note that the minerals calcite and dolomite have CO_3 as part of their chemical formulas. The CO_3 represents the **carbonate ion**.

Limestone and dolomite rocks are generally not pure calcite or dolomite. In addition to these minerals, they contain minor amounts of impurities, typically **noncarbonate** minerals. Among the more common noncarbonate minerals are clay, quartz, and pyrite.

Acids, Bases, and Limestone

Carbonate rocks have a shared chemical property; they can be dissolved by certain **acids**. When dilute hydrochloric acid (HCl) is placed in contact with limestone, it fizzes. The HCl reacts with the calcium carbonate, breaking it down into **ionic** form and releasing a gas, **carbon dioxide** (CO_2). This release of carbon dioxide is what is observed when the limestone fizzes.

Chemically, limestone is considered a **base**. A base is the chemical opposite of an acid. If an acid is added to a base, the two chemicals will counteract one another. If an acid is added to limestone, the limestone will react until the acid has been neutralized by the limestone. An example of a common acid is household vinegar, which contains 4 percent acetic acid. Acetic acid reacts with limestone the same way as dilute hydrochloric acid but at a much slower rate. The fizz produced by the release of CO_2 may not even be noticeable at first. The chemical reaction rate is slower because the vinegar is a weaker acid.

Acids react differently when placed in contact with limestone and dolomite. If we place an acid of similar strength on samples of both limestone and dolomite, we observe that the limestone reacts more vigorously than the dolomite. Remembering that limestone is mostly calcium carbonate, we can deduce that the more calcium carbonate in a rock, the greater its reaction will be with certain acids.

The **pH** of a substance is a general indicator of whether it is **acidic** or **basic**. A pH of 7.0 is considered neutral. A pH greater than 7.0 is considered basic, and a pH less than 7.0 is considered acidic. The pH also indicates the relative strength of an acid or base. An acid with a pH of 3.5 is ten times as acidic as an acid with a pH of 4.5. To put acid strengths into perspective, the pH value for laboratory-grade concentrated hydrochloric acid is 0.1, whereas household vinegar has a pH of about 3.0. Rainwater in Pennsylvania has an average pH of 4.5, so we see that rainwater is an acid.

What makes rainwater acidic? Within the earth's atmosphere there is a small amount of carbon dioxide gas. The carbon dioxide gas reacts with water to form **carbonic acid**. Carbonic-acid production can increase as carbon dioxide gas in the soil reacts with water infiltrating through the soil (Figure 2). Carbonic acid is a weak acid and reacts with limestone and dolomite. In fact, it is the main acid that dissolves carbonate bedrock.

Beds, Bedding, and Laminae

Sedimentary rock such as limestone is arranged in distinct layers of varying thicknesses. These distinct layers are called **beds**, and the arrangement of these layers, one bed overlying another bed, is called **bedding**. Bedding can be thick or thin. Where the layers are less than 1 centimeter thick, they are called **laminae**.

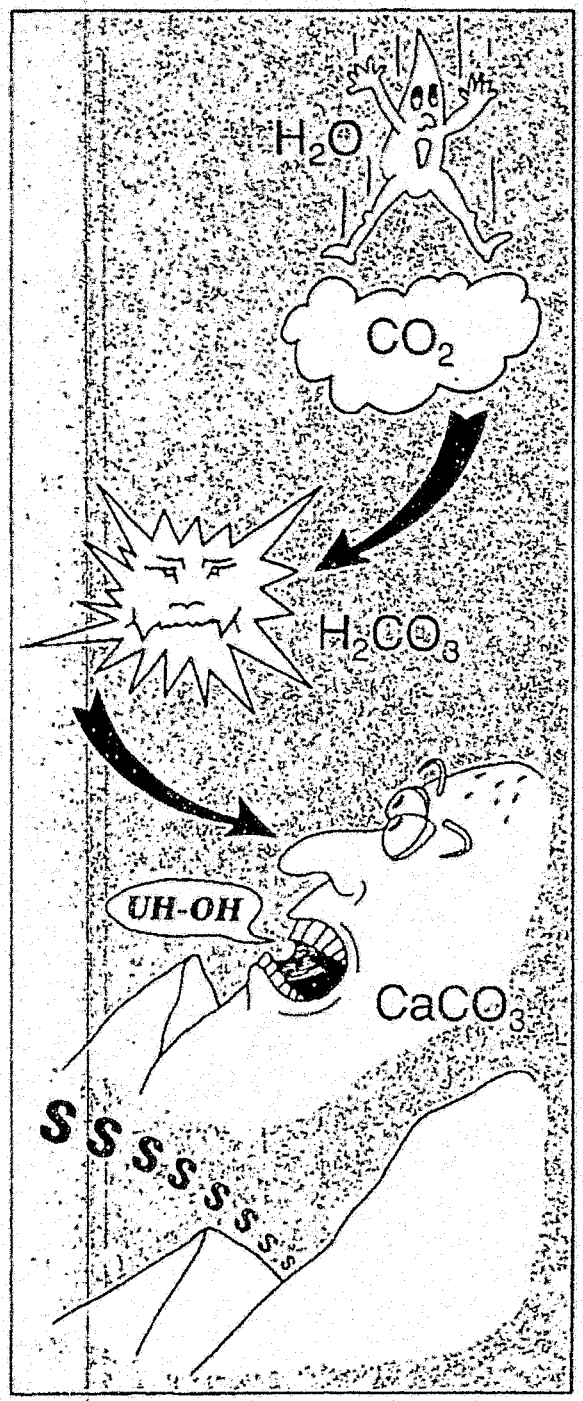
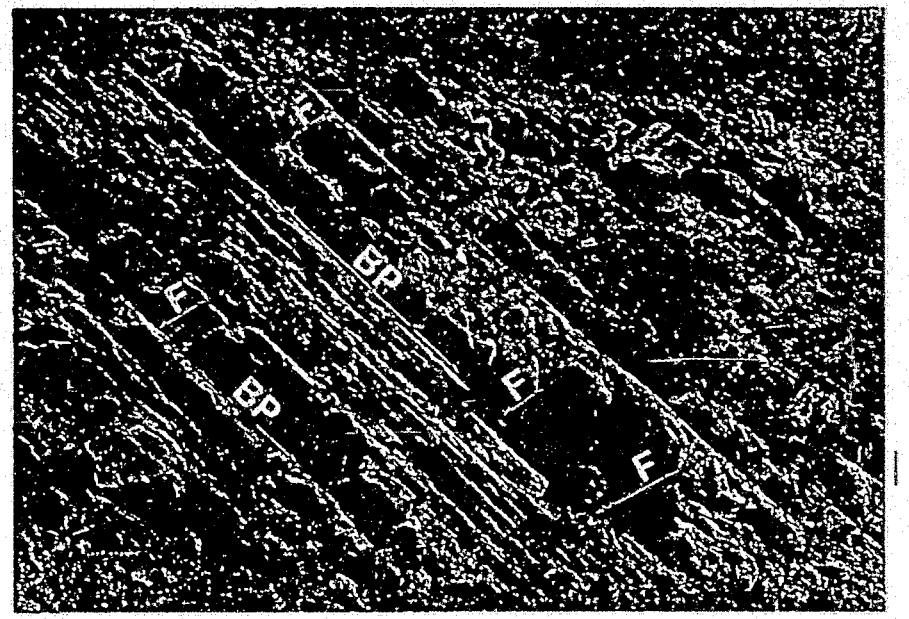


Figure 2. Water (H_2O) combines with carbon dioxide (CO_2) to form carbonic acid (H_2CO_3). This is the acid that dissolves limestone ($CaCO_3$).

Bedding is horizontal in rocks that have not been disturbed since they were deposited as sediment, but in central and eastern Pennsylvania, bedding is commonly tilted. The tilting of the bedrock was caused by the mountain-building forces that were active at various times during Pennsylvania's geologic past. The strong forces have moved the beds from their original horizontal position to an angular position (Figure 3A).

Distinct breaks, or **fractures**, are also common within the bedrock (Figure 3A). Where individual beds meet one another, there are commonly distinct planar surfaces between them called **bedding planes** (Figure 3A). Bedding can be broken and displaced in a horizontal or vertical direction as



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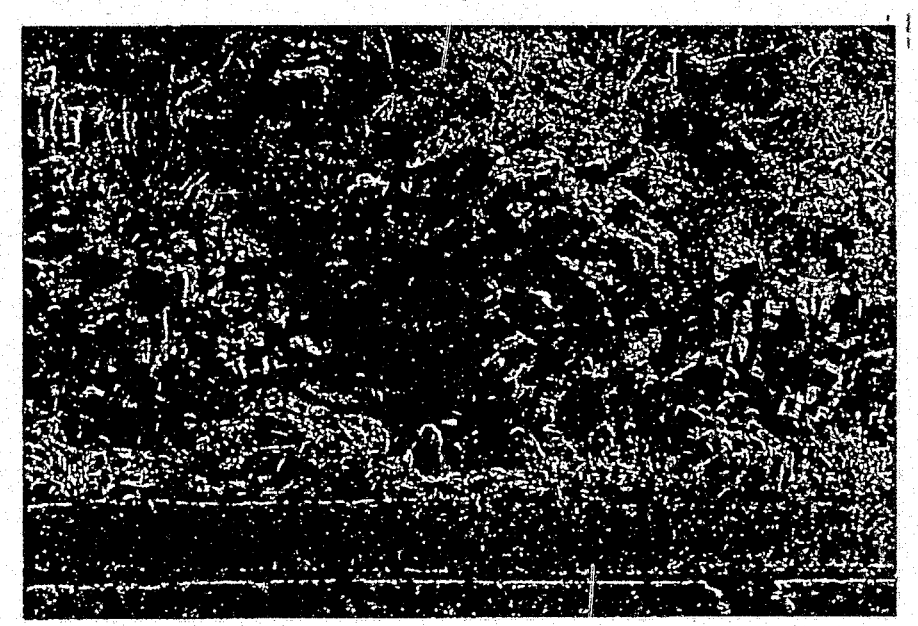

B

Figure 3. A. Tilted limestone beds of various thicknesses. Note fractures (F) and bedding planes (BP). B. Tightly folded beds of limestone.

a result of **faulting**. Sometimes the layers of rock have been folded (Figure 3B). **Folds, faults,** fractures, and bedding planes are all classified as inherent weaknesses within the bedrock.

All of these natural features indicate that limestone is not necessarily a simple rock layer. It can be thick or thin, laminated, folded, faulted, fractured, or it can have various combinations of these characteristics. In addition, layers of limestone can alternate with layers of dolomite or other rock types.

Now imagine the acidic water coming into contact with limestone bedrock. What happens?

If a bed of limestone was just one flat-lying, thick layer of rock, the acidic water would react only with the topmost layer. However, this is not generally the case. Water also enters the natural breaks in the bedrock and moves downward through these fractures.

As the acidic water enters the fractures, it comes into contact with additional surfaces of the limestone and begins to dissolve them. This **dissolution** (dissolving away) widens the fractures. As they get wider, more water can enter. This process is repeated over and over. The acidic water continues to react with the basic limestone bedrock until it is neutralized.

Because water flows along the natural breaks within the limestone bedrock, the surfaces exposed along these breaks are preferentially dissolved. Limestone bedrock normally has many breaks as part of its structure. Fractures may cross one another and intersect laminae and bedding (Figure 4). This may result in uneven dissolution of the limestone bedrock as the acidic water follows different paths. Unusually shaped limestone bedrock may result as the bedrock is dissolved at various levels. Some portions of the carbonate bedrock can appear as abstract sculptures or can become pointed columns called **pinnacles** (Figure 5).

Figure 4. Intersecting fractures.

Figure 5. Pinnacles of limestone exposed on the property of the J. E. Baker quarry in York County. Photograph by Helen Delano.

Not all of the limestone bedrock will be dissolved. Remember that there are noncarbonate minerals within limestone. Carbonic acid has a negligible effect on these minerals; thus, they are not dissolved and remain as insoluble residue. As the process of dissolution continues, these insoluble minerals accumulate on top of the limestone bedrock and become part of the soil. The insoluble minerals also fill the widened fractures and voids that are formed by the dissolution process.

Groundwater and the Plumbing Network

Imagine a plumbing system where the natural breaks in the limestone bedrock (fractures, faults, and bedding contacts) are replaced by pipes (Figure 6). Water migrates downward through the pipes in the limestone bedrock until it meets with other water that has flowed through similar pipes in an area. This meeting place for water is the **water table,** and the water is now called groundwater.

The water table is a dividing line; essentially, above this line, there is little water, and below this line, the ground is saturated (filled) with groundwater. If a drinking glass is filled with sand and then colored water is poured onto the sand, we can see that the water moves downward or **percolates**

Figure 6. Fractures behave as though they were pipes in limestone bedrock and convey water to the water table.

through the sand by means of gravity and accumulates at the bottom of the glass. The same process occurs in nature. Water infiltrates through the soil, then migrates along breaks in the limestone bedrock until it merges with the groundwater. Groundwater then flows laterally, following the natural **gradient** (slope) of the land surface (from high areas to low areas) as it makes its way to **base level**. Groundwater generally flows in the same direction as surface water.

The water-table level fluctuates during the year, depending on how much water is available to replenish what flows away. During periods when the water table is high, the pipes in the limestone bedrock may be filled with water. When the water table is low, the pipes may be open or free of water to a greater depth. In the latter case, as new weakly acidic water enters the open pipes, the acid reacts with the limestone, widening the fracture at a deeper level.

Pipes and Drains

Over time, the entry point of rainwater and surface water into the pipes serves as a drain. These drains complete the plumbing network, conveying water through the fractures (pipes) to the water table (Figure 7).

Not all of the pipes continue to the water table, however. Fractures may not continue all the way through a bed of limestone. In other instances, the composition of the limestone may result in dissolution only in certain parts of the limestone bedrock. As a result, some of the pipes become dead ends, whereas other pipes are open.

The plumbing system in limestone bedrock can be quite complex. Depending upon the orientation and direction of the pipes, groundwater follows the natural gradient of the land in a regular or irregular pattern and can flow to a surface discharge point or points. These discharge points are **springs**, which are common in limestone areas. A substantial area is usually drained by each spring; thus, a spring can be quite large.

In some cases, a stream may enter a drain, flow in the subsurface, and emerge at the surface some distance from where it first entered the drain. These streams are called **disappearing streams**. Names such as Sinking Creek or Lost Creek are common in limestone areas throughout the country.

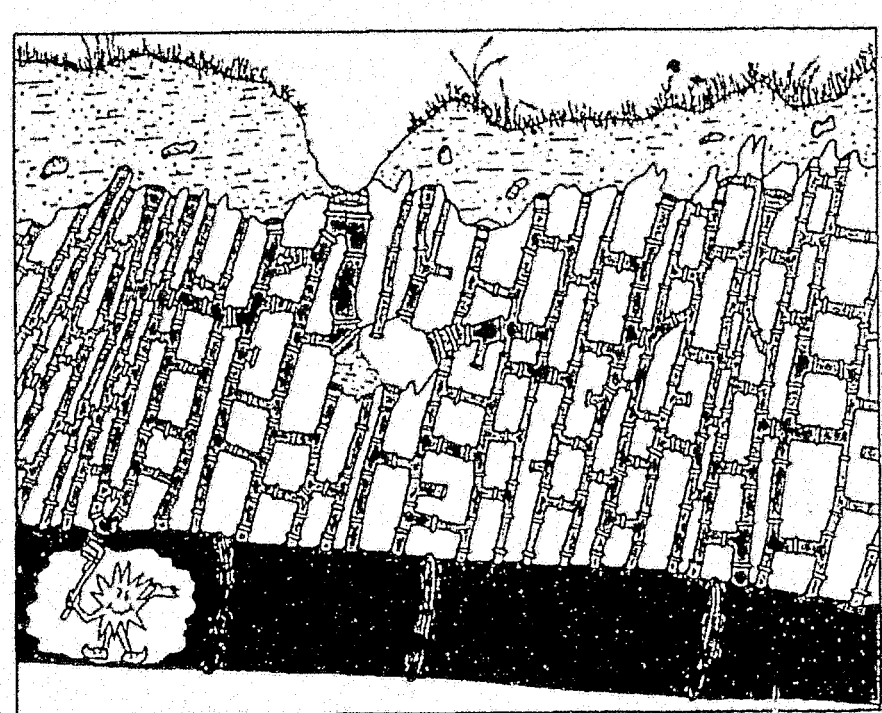

Figure 7. Mr. Carbonic Acid shows off his plumbing network in the limestone bedrock. Groundwater flows through the pipes to get to the water table (the large pipe at the bottom).

Sinkholes and the Plumbing Network

The drains and pipes in our limestone-bedrock plumbing network play an important part in sinkhole development. Remember that subsidence was described previously in the example of the old farmhouse. The farmhouse began to sag after removal of its support, and eventually it collapsed. Now, think about our plumbing network.

First, consider the function of a drain. In a bathtub or sink, the drain is where the water goes once we pull the plug. At one time or another, most of us probably have encountered the nemesis of bathtubs, the clogged drain. We observe in those situations that water will drain very slowly and, at times, not at all. The bathwater just remains there until we use the proper unclogging agent to open the drain.

Clogged drains in limestone bedrock are very common. Soil typically clogs the drains and retards the movement of water into them. Because surface water moves naturally to the drains, the water may collect in the general area of a clogged drain. After a heavy rain or during the spring thaw or snowmelt, standing water may take on the appearance of a pond or a **ghost lake** (Figure 8). After a few days, the impounded water will slowly drain into the subsurface.

Surface water can act as a natural unclogging agent. Over time, surface water periodically flushes material down into the limestone drains.

Subsidence and Piping: the Bathtub Model

Imagine a bathtub filled with soil. The bathtub represents the limestone bedrock, and the soil represents soil in a fracture that has been widened by dissolution of the bedrock (Figure 9). If we slowly add water to the bathtub, the water will infiltrate through the soil and migrate toward the drain (Figure 9A). The water then moistens the soil in the area around the open drain. As a result, the moistened soil begins to lose its cohesive properties and begins to break apart. Some of the soil falls down into the open drain.

As the soil enters the drain, it leaves behind a void or open area in the bathtub soil (Figure 9B). If the water source is removed, this void may remain suspended in the soil profile. If water is continually added to the bathtub, the soil above the void (the roof) is moistened and collapses into the void. As the soil fills the void below it, another void is created directly above it (Figure 9C).

As water continues to enter the bathtub, the process is repeated, and the void migrates toward the surface. As the void gets closer to the surface, the surface may begin to sag (remember the farmhouse sagging as the sup-

Figure 8. These ghost lakes in Lehigh County resulted from a clogge drain. The impounded water may prevent vegetation from growing.

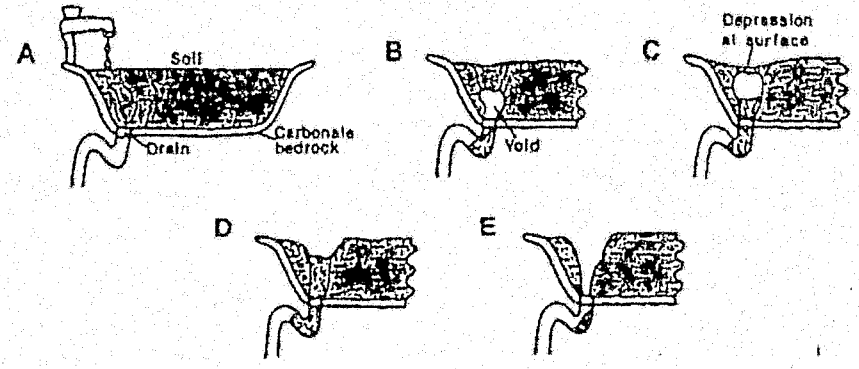

Figure 9. The bathtub model. A. Water infiltrates through the soil B. As soil enters the drain, a void is left behind. C. Over time, the soi moves into the void and the void "migrates" toward the surface. D. Sup port is removed and collapse occurs. E. If enough water is supplied an open connection to the drain results.

port is removed). At some point, the roof of the void cannot support itself, and it finally collapses (Figure 9D). The result is a hole in the ground.

The actual size and orientation of voids in the soil depend on the thickness of the soil and the source of water. If the water source is continual, the flow may keep the void open to the drain in the limestone bedrock (Figure 9E).

This process of moving soil is called **piping**. Keep in mind that once a soil pipe has been established, water will continue to use it. There also may be more than one soil pipe leading to a common drain. Understanding this has a bearing on planning sinkhole repairs, as discussed later.

Remember that the drain in the bathtub may connect to other limestone-bedrock pipes and other drains. Also remember that water that enters the drains flows through the plumbing network and collects at the water table. During and immediately following periods of heavy precipitation, the groundwater level will rise, and then it will lower slowly after the rainfall has ended. This fluctuation of the water table can loosen the soil walls and roof of the void, and pieces can fall off. Conversely, prolonged drought may cause the groundwater level to drop, allowing soil to dry, shrink, and fall into existing voids, perhaps causing further collapse.

Sinkhole Characteristics

Sinkholes come in many different sizes and shapes. They are commonly circular in outline, but they can also be elliptical, linear, or irregular in shape. Sometimes a sinkhole will look as if someone scooped out a hole with a backhoe. In other examples, a sinkhole can resemble a funnel. A tunnel or **throat** may be visible within the hole (Figure 10). The throat represents a soil pipe that leads to the bedrock drain. If the soil overlying the bedrock is thin, bedrock or the bedrock drain may be exposed (Figure 11). If a sinkhole occurs in an urbanized area, utility lines may be exposed (Figure 12).

The size of a sinkhole depends on how much material has been flushed down the drain and on the size of the pipes. On average, sinkholes in Pennsylvania range from 4 to 20 feet in diameter and have approximately the same range in depth. Surface water can induce erosion along the rim of a sinkhole and cause enlargement of the sinkhole to as much as several hundred feet long. Due to the interconnected nature of the karst plumbing system, a group of small sinkholes can also coalesce to form a larger sinkhole (Figure 13).

The shape of sinkholes changes over time. Initially, sinkholes have steep or nearly vertical sidewalls. Portions of the sidewalls can break off over time and fall into the sinkhole. As this process continues, the sinkhole gets larger. If water continues to be added to the sinkhole, it can also get deeper.

Figure 10. A shallow sinkhole showing the throat and soil arch.

Commonly, one side of the sinkhole remains steep, and the opposite side has a more gentle slope; the sinkhole resembles a funnel that has been cut in half along its length. An **arch** of soil may be apparent along the sidewall (Figure 10). This arch forms over the throat of the sinkhole and represents the roof of the void described in the bathtub model.

Initially, the area above the soil arch and throat, the steep side,

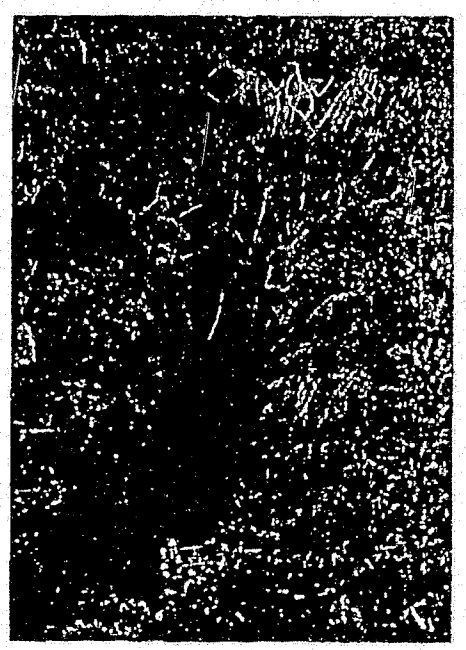

Figure 11. A sinkhole having an open drain.

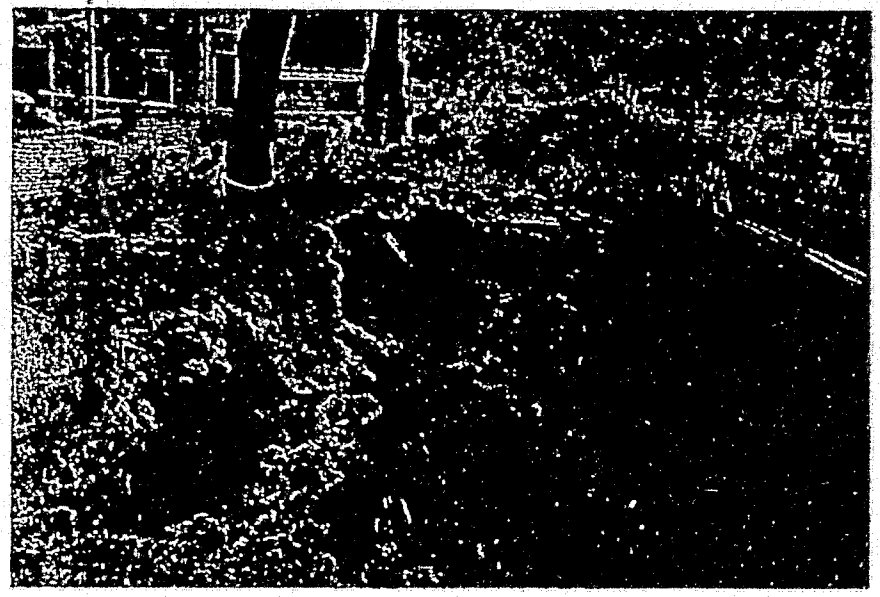

Figure 12. This sinkhole in Dauphin County has exposed a utility pipeline.

is the most stable. Over time, the sides of the sinkhole will continue to fall and fill in the hole. The sinkhole may fill in to the point that it will appear as a **depression** on the land surface, or it may have very little difference in surface relief from the surrounding area. In the latter case, the evidence that there was once a sinkhole is gone. If there is a constant supply of water entering a sinkhole (from a stream, for example), the sinkhole can remain open for years.

Karst Topography

We now know that a sinkhole is a complex subsidence structure formed by a variety of chemical and physical processes. The process of limestone dissolution over a large area results in a distinct landscape that is called **karst topography**. Karst topography includes features such as sinkholes, surface and **closed depressions**, and **caves**.

A Bit About Caves

Caves are probably the most aesthetic of karst features. The dissolution of the limestone bedrock, coupled with both the abrasive action of sediment that is transported by moving groundwater and the lowering of **base level**, forms cave passages along fractures, faults, and bedding planes. Additional chemical processes take place once passages have been developed and form the unique features observed in caves. Sinkholes can occur as a result of the collapse of the roof of a cave, but this is rare. For more information about caves, see White (1976).

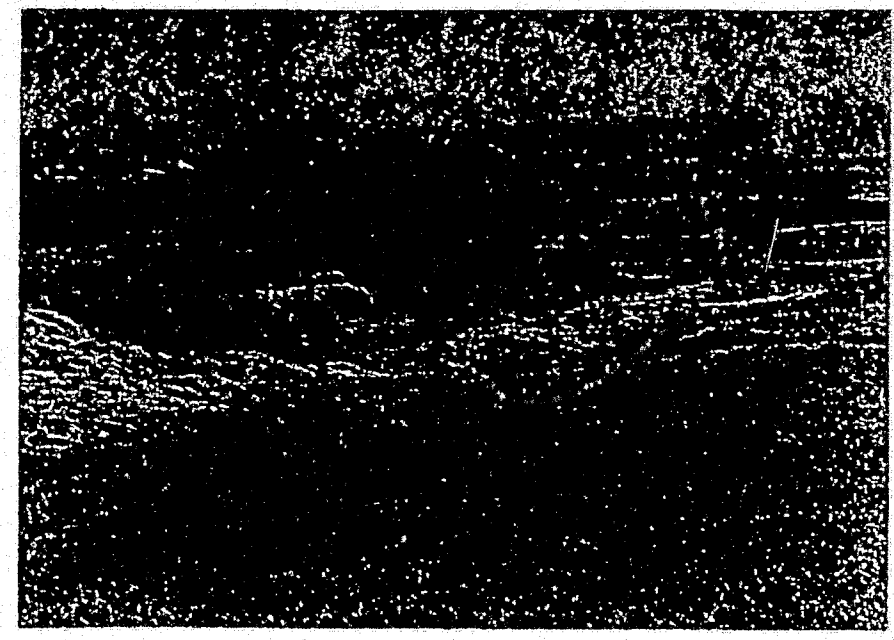

Figure 13. A group of sinkholes in the Saucon Valley of Lehigh County have joined to form a larger sinkhole. Each individual sinkhole was approximately 30 feet in diameter.

Redefinition

To put things into perspective, let's go back to our definition (page 2) and modify it to read, "A sinkhole is a hole formed in a karst area by localized, gradual or rapid sinking of the land surface to a variable depth; it is characterized by a roughly circular outline and a distinct break in the land surface. The collapse feature is a result of soil or related materials being transported by water into voids within carbonate bedrock or in the overlying **regolith**."

Still too technical? How about, "A sinkhole is a roughly circular hole in the ground in an area underlain by limestone bedrock, which varies in depth, acts as a drain for surface water, and is a result of periodic flushing of material (soil, rocks, or other surface materials) by water down into voids either in the limestone bedrock or soil profile."

Does Karst Topography Develop Everywhere?

According to our definition, karst develops in areas underlain by carbonate bedrock. One would think that if we knew where all the carbonate rocks in the state are located, we would have a fairly good idea of where sinkholes can occur. Figure 1 shows that the major carbonate bedrock areas of Pennsylvania are in the central and eastern parts of the state. Do all of these areas have karst topography? Generally, yes.

In addition to those areas shown on the map, some extensive and large caves occur in **calcareous sandstone** bedrock along Chestnut Ridge in southwestern Pennsylvania. There are also some relatively thin units of limestone in western Pennsylvania that exhibit solution features in the form of widened fractures and small caves. In general, however, these thin limestones do not exhibit a well-developed karst topographic surface.

Carbonate rocks are not the same everywhere. Although carbonate rocks may be similar in chemical composition, there are other factors that can influence karst development.

One of the main factors that permit development of karst is the percentage of calcium carbonate (calcite) within a limestone. Generally, the percentages of calcite and dolomite vary widely in different limestones. Variations can even be at the atomic level, where magnesium, manganese, or iron ions can be substituted for calcium ions. These changes in the limestone chemistry can affect the dissolution rate and the volume of limestone that is dissolved.

Shale and sandstone can also be calcareous. That means that there is some percentage of calcium carbonate present in the rock. If dilute hydrochloric acid comes into contact with it, the rock will fizz to some degree. However, since most of the rock is noncarbonate in composition, most of it is unaffected. The larger the percentage of noncarbonate material in a rock, the less it is affected by the dissolution process caused by carbonic acid.

Although dolomite reacts more slowly to carbonic acid than does limestone, it may dissolve to a greater extent. Generally, dolomite is more brittle than limestone and may have a larger number of natural fractures. The fractures provide more pipes, thereby exposing more of the dolomite bedrock to the carbonic acid.

Sinkholes in the Urban Environment

If we add to the information in Figure 1 and show the locations of the larger towns and cities in central and eastern Pennsylvania, we see that large population areas are on or adjacent to areas underlain by carbonate bedrock (Figure 14).

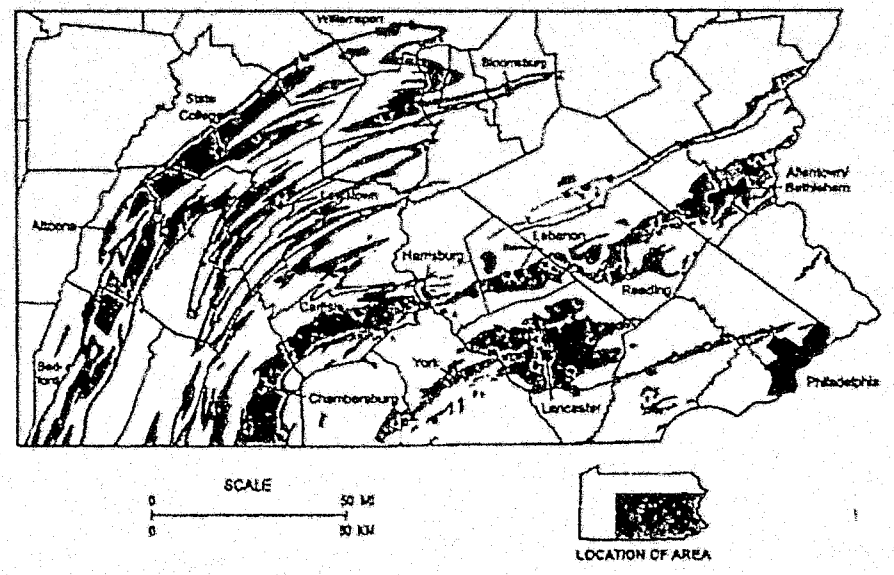

Figure 14. Carbonate bedrock distribution (color) and major population centers in central and eastern Pennsylvania.

When populated areas undergo development, land is cleared, soil and rocks are moved, foundations are dug, utility lines are laid, and roadways are established. The landscape is altered to accommodate residential, commercial, or industrial structures.

Let us consider a residential area that has been developed on karst topography. What are the potential problems? How does urban development interact with karst topography?

Storm-Water Drainage

Storm-water drainage is a major urban concern. Where does the storm water go after a heavy rain? It runs off roofs, down storm gutters, along streets, over parking lots, and then either enters the ground by percolating through the soil or is directed toward a natural or artificial drainageway.

The storm-water-drainage problem is compounded in karst areas by the fact that development reduces the surface area available for rainwater to infiltrate naturally into the ground. A typical residential development having quarter-acre lots may reduce the natural ground surface by 25 percent, whereas a shopping center and parking lot may reduce it by 100 percent. If storm water, gathered over a specific area, is collected and directed into a karst area, the concentration of water may unplug one of the karst drains (Figures 15 and 16).

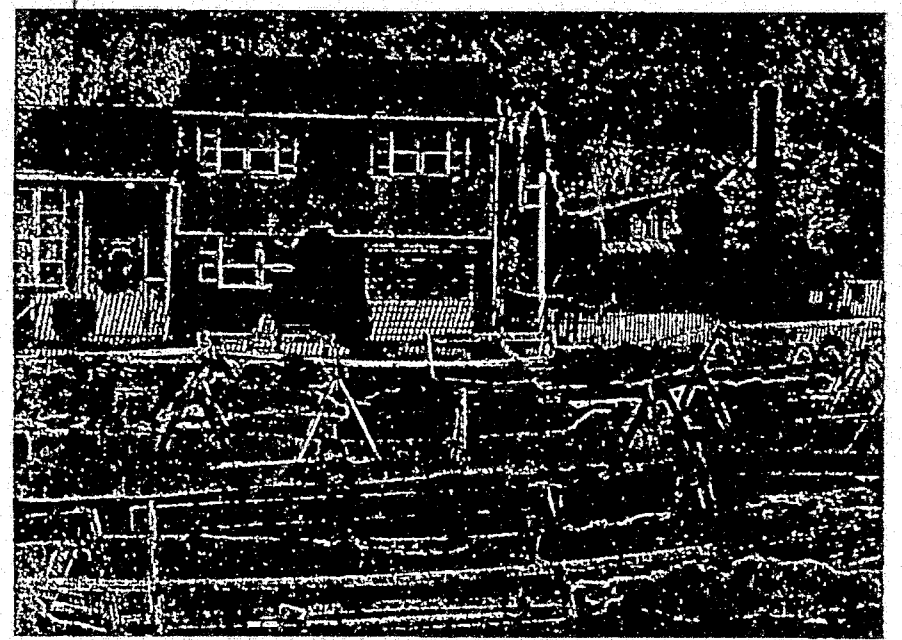

Figure 17. Sudden collapse of a city street attributed to a water-line break in the karst area of Northampton County.

Groundwater Withdrawal

The extraction of carbonate-mineral resources can create problems when mining or quarrying extends below the water table. Surface water and groundwater in such cases must be pumped out of a quarry or deep mine to allow removal of the resource. Large volumes of groundwater are sometimes pumped from the lowest part of a mine, which can affect the level of the water table over a localized area. Aside from affecting the yields of public and private water wells, fluctuations of the water table can affect karst drains and cause subsidence.

Sinkholes can also occur in close proximity to private or public water wells. Water wells are commonly drilled in areas that correspond to fracture zones, the pipes and drains of the karst plumbing network. Local fluctuations in groundwater level caused by pumping from a water well may enhance the migration of voids (as in the bathtub model) or cause flushing of surface materials into subsurface voids.

Groundwater Contamination

Carbonate rocks are important sources of groundwater in Pennsylvania, yielding millions of gallons of water to commercial and domestic wells.

However, because water moves readily from the earth's surface down through solution cavities and fractures, and undergoes very little filtration, groundwater in limestone is easily polluted. It would be easy to contaminate the groundwater by discharging waste materials into a karst drain. This process would be similar to pouring waste down the drain in our homes. The waste enters the drain and is essentially unchanged as it makes its way to the sewer line. Similarly, as waste enters the karst drains, it follows the pipes and enters the water table. If the waste happens to be an organic chemical that does not mix well with water, such as oil or gasoline, contamination can be widespread, and the contaminating substance can remain in the groundwater for a long time.

Contamination of groundwater is not restricted to industrial sources. Other contaminants, such as sewage, fertilizers, herbicides, and pesticides, can be traced back to municipal, agricultural, and household sources. Even storm water may be considered a polluting substance (Commonwealth of Pennsylvania, 1985, 25 Pennsylvania Code § 97.71).

How to Recognize a Developing Subsidence Problem

There are clues that can indicate ongoing subsidence. Within a building, cracks may be evident along walls and floors, particularly in the basement. Cracks may also be noticeable along brick and mortar joints. Gaps may be seen where porches join with a house. Doors and windows may jam and not open and close properly. Keep in mind, however, that other factors that existed during construction, such as soil moisture, soil compaction, and slope of the land surface, can also have a bearing on subsidence and foundation problems.

On the land surface, depressions may be evident, particularly in drainage areas. Depressions may be apparent in yards and streets. Offset or uneven sidewalks and curbs may also be indicative of ongoing subsidence. Large, open cracks may be evident in soil, lawns, sidewalks, parking lots, and streets. Trees and shrubbery may lean noticeably.

Is it a Sinkhole?

A feature that some people interpret as a sinkhole may be something completely different. Knowing the history of a particular piece of property may provide an explanation for those "strange discoveries" that property owners come across now and then. Some items that you may wish to consider are discussed below.

(1) *The age of the structure.* Associated with newer structures may be holes or depressions in the land surface due to natural settling

of soil fill that was deposited or redistributed during construction. Was clean fill used during construction? During the process of construction, organic material such as trees, wood, or even trash may have been buried. Trees may have also been removed so that the stumps and roots were left in the ground. Over time, the organic debris will decompose and leave voids in the soil. These voids may collapse, much like the migrating voids in the bathtub model. In some instances, you may be able to find wood in the hole as evidence that a tree had once been there.

If the structure has been there for some time, it may have gone through any number of modifications. Many houses have used or are using a septic system for sewage disposal or a water well for drinking. If these were abandoned in order to connect to a municipal service, was the septic system removed? Was the well plugged? Aside from the actual septic tank or water-well structures, there are also the pipes to consider. Were the buried pipelines removed? Over time, they may deteriorate and collapse, resulting in surface features that can resemble sinkholes. You may be able to find out answers to some of these questions from your local municipality.

(2) *Drainage areas and springs.* Is the depression or hole in a low-lying area? Does the area hold water on the surface during a storm? Is it wet most of the time? Are there springs in the general area? Do the storm gutters drain in the general direction of the hole?

(3) *Burrowing animals.* Is the hole an animal burrow? Animal burrows are fairly easy to identify. Generally, the hole is small, a few inches to perhaps a foot and a half in diameter. It is common to see ejected material at the entry point, usually soil and bits of rock.

(4) *Abandoned or active underground mines.* Is it an old mine? Subsidence due to underground mining can result in features similar to sinkholes. Knowing the local history of the area can provide valuable information as to whether or not the area had been mined in the past. There are a number of sources that can be used to help track down mining information. Local municipal offices, libraries, or historical societies are good places to start. Another source of information is state and federal government agencies. Agencies that deal exclusively with mining and abandoned mines are listed in the Appendix.

What if you have completed your research and have concluded that the hole is not an abandoned well or mine, or an animal burrow? What is next?

Remember the definition of a sinkhole. The key to identifying a sinkhole area is to consider the location of carbonate bedrock. Is your property in an area underlain by carbonate bedrock? Where can you find out that sort of information? Again, start locally. Talk to your local municipal government. Most municipalities have a board of supervisors or a council that governs activities within a given area. Engineering firms are often employed by a municipality to handle the technical duties associated with permitting, utility design, and land management. These firms may have information on the type of bedrock in your area. Public works and road maintenance offices may also have pertinent information.

If there is still some doubt about the bedrock type in your area, you can go to a library or contact a local or state government office. Depending on the size of your local library, it may or may not have detailed geologic publications that pertain to your area. You may have to go to a library in a larger city or to a college library.

If you find a publication or map that shows the bedrock geology of your area, look for the key words limestone, dolomite, or carbonate. Most maps will be in color, so you can identify an area that is underlain by carbonate bedrock by looking for a particular color. Other maps may be in black and white, and you may have to be more careful in your inspection of the map to locate areas of carbonate bedrock.

At this point, you may have gathered as much information as you can by making a few telephone calls and talking with the neighbors. Let us assume that the collected evidence indicates that a sinkhole is present. Now you have to decide what to do with it.

Safety Precautions

One of the first things to do is to secure the area. If it seems unlikely that you will be filling the hole anytime soon, erect a barricade around it. Sawhorses work fine, as does fencing. Brightly colored flags can be used as warning markers. If possible, cover the hole with a piece of plywood or some other type of firm cover. The main objective is to keep the curious away from the hole, particularly children. It is a good idea to inform your neighbors. If the hole is very large, contact the local police department and ask for assistance in securing the area. Unless there are compelling circumstances, *no one* should enter a sinkhole. This is particularly true for newly formed sinkholes. It is common for the sinkhole sidewalls and pipes to continue to collapse, creating an unstable and dangerous condition.

In addition, remember that the soil pipes that lead to the drain are *not* caves. They *should not* be entered regardless of how safe they may look.

Spelunking, or caving, is an entirely separate issue and is an activity that requires special training in technique and safety.

Does your house use natural gas? If so, the gas company should be notified immediately if any type of disturbance to the line is suspected. All types of home heating systems can be affected by subsidence. The degree of potential danger depends on the magnitude and location of the subsidence event.

Is the sinkhole close to the house or is it a hundred feet away? Is a throat visible? In which direction does the throat trend?

A thorough examination of the property and structures should be done to assess damage, potential damage, and threats to safety. Gather as much data as you can. This will help you when you start making telephone calls. Below is a general discussion of items that may be helpful in repairing a sinkhole.

Repairing a Sinkhole

There is no such thing as a typical sinkhole and, therefore, no standard way to repair one; each one has its own characteristics. It is important to remember that a sinkhole is nothing more than a large natural drain that has suddenly opened. When initiating a repair, the objective is to stop loose material from flushing down into the drain, and then to remove the triggering mechanism.

Sinkholes also serve as major recharge areas for groundwater, particularly in rural areas. Plugging these recharge areas may not be desirable, and alternative methods may need to be employed.

There are normally a number of engineering firms and general contractors listed in local telephone books (see the Appendix for additional information). Some may have experience in evaluating sinkhole damage and in sinkhole repair. Municipalities may be able to help with references. Check with more than one firm and contractor to get estimates. Your homeowner's insurance policy should also be examined to see if your property and house are covered for sinkhole damage.

Repair methods are varied, and the method used may depend largely on economics and location of the sinkhole. The method and materials needed to fill in a small sinkhole in the backyard or in a rural area may be quite different from those needed to repair a sinkhole in the middle of a street in a highly urbanized area. Repair tools can range from heavy machinery to hand shovels. Materials can include concrete, soil, grout, synthetic filter fabrics, and various sizes and mixtures of crushed stone.

It is important to understand the type of material that is being used repair a sinkhole. Filling in a sinkhole with one size of crushed rock may wo initially, but over a period of time, subsidence may reoccur. Recall the batl tub model; unconsolidated materials can loosen over time and continue migrate downward into subsurface voids.

To make a more permanent repair, it is common to combine metho and materials. Plugs constructed of large rocks and concrete or combinatio of filter fabric and different sizes of crushed rock have been used succes fully to repair sinkholes.

It is better to construct the plug directly at the location of the bedroc drain. This allows the plug to be in direct contact with the bedrock, provic ing a better seal. Sinkholes in which no bedrock is encountered, and whe the soil cover is thick, require careful geologic analysis followed by variou types of costly repair, ranging from pressure grouting in the subsurface t driven piles having concrete caps and gravel-mat backfilling.

Once a sinkhole has been filled, the repair is almost complete. To min mize the chances for additional subsidence, the triggering mechanism mus be addressed. As water is generally the primary triggering mechanism, it i necessary to identify and remove to the extent possible the source of th water that may have caused the sinkhole. If the source is the storm gutters you may need to change the discharge point. Keep in mind, however, that b moving the discharge point to another area, you may be shifting the prob lem to another part of your property or to someone else's property.

Prevention of Sinkholes

As with any geological hazard, most often it is the lack of awarenes of the hazard (in this case, subsidence) that leads to the greatest problems This is particularly true in residential development, but it also applies to in dustrial and highway construction. Land may be developed with minimal re gard for the potential problem of sinkhole subsidence.

What can be done to prevent sinkholes or to minimize their impact ir a local area?

(1) *Become informed about the geology of your area.* Find out what is beneath the land surface. Check with libraries, colleges anc universities, county planning commissions, and state and federa agencies for information on the geology of your area. Maps show ing locations of sinkhole-prone areas may be available.

(2) *Ensure that municipalities regularly inspect existing utility lines.* Because moving water is a major triggering mechanism, it is logi-

cal to check water mains and connections, storm sewers, and sewage lines for leaks. This will minimize potential subsidence problems as well as groundwater contamination.

(3) *Ensure that development is regulated.* When there is an understanding of the potential problems that are common to karst areas, development can then proceed in a safe and conscientious manner. Regulation is not meant to discourage development, but to ensure that the proper steps are taken to minimize the potential for future problems. Regulation may mean that special foundations are required for residential and commercial structures, or that utility and storm-water facilities require special design. Specific zoning regulations and storm-water-management plans in karst areas should be established to provide guidance to individuals as well as to minimize future problems. Alternate land use plans could also be considered.

(4) *Maintain sinkhole insurance.* Insurance policies should be checked to determine if your property is covered. Finding out after the fact that your house is not covered by your insurance for damages attributed to subsidence is a hard lesson to learn. Sinkhole insurance could even be included as part of the mortgage process.

In summary, recall that the karst system can be thought of as a plumbing system. The karst system is developed by naturally occurring carbonic acid dissolving the carbonate bedrock along fractures over a long period of time. The drains and pipes of the plumbing network are established by the dissolution of the carbonate bedrock; they provide an entryway for surface water to infiltrate and migrate to the water table. Moving water is the primary triggering mechanism for flushing soil down karst drains and creating sinkholes. Sinkholes can result from the collapse of the roof of a cave, but typically it is the piping of unconsolidated material from one location to another that causes most land-subsidence events.

Sinkhole repair requires two components. The first one is to close the hole, and the second is to remove the triggering mechanism. Plugging the hole is the most common method used for sinkhole repair.

The rule of thumb for developing in a karst area is "look before you leap." Do some investigating before purchasing property. Understand potential or existing problems. If you proceed with development, consult with contractors and other professionals who have experience in karst areas. Preliminary subsurface investigations and carefully implemented construction techniques can eliminate or minimize future problems in a karst area. Sinkhole insurance is available.

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The author also wishes to recognize J. Peter Wilshusen, who describ sinkholes and their impact on Pennsylvania in *Geologic Hazards in Per sylvania* (1979). His efforts brought geologic hazards to the attention of t general public and put information about them in a succinct, easy to rea and understandable format. This booklet expands on his original work.

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Wilshusen, J. P., 1979, Geologic hazards in Pennsylvania: Pennsylvan Geological Survey, 4th ser., Educational Series 9, 56 p.

Glossary

Definitions are modified from Jackson (1997).

Base level. The lowest elevation of the land surface attained as part of th erosion process; can be local or regional in extent.

Bedding. The arrangement of layers of sedimentary rock of varying thic nesses; generally, one layer of rock stacked atop another. One ind vidual layer of rock is called a bed.

Bedding plane. A planar or nearly planar bedding surface that visibly sepa rates one rock layer from another.

Bedrock. Solid rock beneath the regolith.

Calcareous. Having calcium carbonate as part of its composition.

Calcite. A mineral that is composed of calcium carbonate, $CaCO_3$.

Carbonate. A mineral compound having the carbonate ion (CO_3) as par of its structure (for example, calcite); or, a sediment formed by organi or inorganic precipitation of carbonate minerals.

Carbonic acid. An acid (H_2CO_3) formed by the combination of carbon diox ide and water.

Department of the Interior
Office of Surface Mining
20 N. Pennsylvania Avenue
Wilkes-Barre, PA 18701
(717) 826-6681

Information on caves and karst

National Speleological Society
Cave Avenue
Huntsville, AL 35810
(205) 852-1300
Ask for addresses of local Grottoes (Chapters) in Pennsylvania. Local Grottoes have information on caves for a given region, caving methods, and cave safety.

Information on sinkholes and storm-water management in rural areas

Soil Conservation Service
Department of Agriculture
Suite 340
1 Credit Union Place
Harrisburg, PA 17110-2993
(717) 782-3700
Ask for methods of sinkhole repair and storm-water management. Also contact county district office; number in telephone book.

Information on local and regional history and archeology

Pennsylvania Historical and Museum Commission
P.O. Box 1026
Harrisburg, PA 17108-1026
(717) 787-3362

Local historical societies (check telephone book)

Municipal records

Key words to check in the telephone book if you need services (**bold** words are general categories; it helps to talk with a geologist or an engineer having a geological background first)

Building materials—Stone, concrete, and soil

County planning commission

Emergency management

Environmental services

Excavating contractors—Backhoes

Geologists or **engineers**—Under engineers check civil, consulting, environmental, geological, and geotechnical

Insurance

Municipalities—Borough, city, and township

Police

Utility companies—Gas, electric, and water

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Exhibit "3"

Exhibit "4"

Township of Spring - Sinkhole Database

Initial Notification Date	Sinkhole Location	Description	Property Owner	Remediation Contractor	Developer	Comments/Remedy
historic	Sherwood Drive	due to watermain break	in road			
historic	Montello Road					
historic	Merrit Parkway	due to watermain break	in road			
historic	Octagon Avenue	due to watermain break	in road			
historic	in Van Reed Road	near austin's	Twp built "bridge" under rd			historic verbal report - B. Myers
historic	Wilson HS football field	near track	Wilson SD			historic verbal report - J. Dallas
1993-94	Albert Drive	street~40'x70' - several throats	Twp & 505 M/M Shelton	Schlouch, Inc.		historically active area
Fall 2002	Daniel Drive		Twp - Street	Schlouch, Inc.		plugged w/concrete
1/1/2003	Broadcasting Square	Detention Basin #3 - at outfall		Schlouch, Inc	Elysian	
2/3/2003	305 Elmwood - LP	wid 1 x 3', ~ 20 ft back of house	M. Sacher 610-666-9937			reported by owner - in backyard
3/24/2003	Morgan Drive	~ 25 x25 x 10d	Twp - Street	Schlouch, Inc.		cannot find throat, backfilled w/clay, repave
4/16/2003	Luanda	in street - throat toward house		Twp		shot flowable fill into hole
6/5/2003	Morgan Drive	behind 144/146 Bainbridge Crt	Adams and Plank	Schlouch, Inc.	Forino	aligned with PADOT 222 detention basin sinks
6/5/2003	902 Old Fritztown Road	~2 ft diam - 3-4 ft deep	Ramon Torres	private	Greth?	reported by owner - near drive of 900 - private
6/18/2003	1402 Durwood	6-12" diam, ~2 ft deep	Don Gould	private	1960's	Whitfield - backyard - roof drains to yard
6/22/2003	114 Frederick Street	electric utility cave in	susan smolnik?	electric		PPL responsible
6/23/2003	144/142 Bainbridge	extension of earlier sinkhole	Adams	PADOT	Forino	working with PADOT for resolution to problem
7/8/2003	Daniel Drive	intersection Daniel & Regency	Twp	Twp		In street - Twp crew excavated and filled in
7/3/2003	behind Andrew Court	behind Andrew Court	PADOT	PADOT		PADOT notified
9/2/2003	Albert Drive	possible opening or settlement	Twp & 505 M/M Shelton	Twp		In street - Twp crew excavated and filled in
9/2/2003	Shakespeare & Whittier	existing, getting larger	called in by 2627 Whittier	Twp		In street - Twp crew excavated and filled in
10/5/2003	Augusta Dr E @ Martins	at s/e corner of intersection		Twp	Forino	In street - encountered rock, flowable fill
11/4/2003	3509 Kickapoo Drive	28"deep~2' wide at light pole	John Hindman	private	Forino	Notified Jay Vaughan who notified Forino and PPL
1/2/2004	2033 Franklin Place	10' by 6'	Chad Philips-owner	private		Hassler Excavation filled, UG notified
2/7/2004	601 Berks Place	in street - throat toward house	Scott Auman	twp		owner notified Jay - barricaded - owner has sinkhole ins
2/29/2004	904 Evergreen Dr	in side yard	Vicki Shutt	private		reported by owner - twp advised as to remedy/resp
3/1/2004	Merion & Wyoming Drs	at intersection	Twp	Twp		Twp road crew remediation
3/1/2003	Augusta Dr E at Martins	reopening of earlier sinkhole	Twp	Twp		Twp road crew remediation
3/4/2004	Fieldstone Drive	in private street - Reedy Estates	Reedy Estates	private	Kreiders	Brubacher Excavation called to report location
3/5/2004	315 Bard Ave	in rear yard - 20' from home	Kathy Berkon	private		reported by owner -twp advised as to remedy
3/17/04	829 Redwood Dr	on property	Amy Miller	private	Drexelwood	reported by owner -twp advised as to remedy
4/15/2004	1920 Garfield	on property behind curb	Brian Wentzel	private		reported by owner -twp advised as to remedy
4/16/2004	Fritztown Road	in cemetary	Pleasant View Cem. - Paul Albin	private		reported by owner -twp advised as to remedy
4/21/2004	Nicole Way	in vicinity of #109	private	private	Oak Meadows	reported by VP of Association Al Chesney
5/3/2004	3 Stratford Circle	in street	Twp	twp	Cornwall Terr	reported by Candice Sialkowski-resident
5/4/2004	Hillvale Avenue	in street	Twp	twp		Twp road crew remediation
05/03/04	506-504-502 Tomlisa Court	back border of properties	private	private		reported by owner of 506 - twp advised as to remedy
05/05/04	813 Bare Path	in street	Twp	twp		reported by resident - notified Jay Vaughan to check
06/07/04	Spring Commons Offices	Adj to Building 2921	private	private		reported by manager for inclusion in database
06/15/04	140 Halsey	in street - throat toward house	Twp	twp		Twp road crew remediation
07/15/04	417 Merion Drive	in back yard+ three adj. homes	A. Salerno - interior cracking	private	Forino	reported by owner - twp advised as to remedy/resp
07/15/04	3003 Shillington Road	back yard	Larry Street	private		reported by owner - twp advised as to remedy/resp
7/15/2004	419 Merion Drive	back yard+ 3 homes 417-423	Tara Hoffman	private	Forino	reported by owner - twp advised as to remedy/resp
7/15/2004	Paper Mill Road	Large-behind Turkey Hill Store				Notified Jay - Reported by Interns
7/20/2004	1525 Singer Road	12' from home/side yard 1525/1529	Jeff Bessor	private		reported by owner - twp advised as to remedy/resp
7/20/2004	108 Halsey Avenue	back of homes of 108-110	Leslie Conlen	private		reported by owner - twp advised as to remedy/resp
7/20/2004	Halsey Avenue	reopened - in street at #140	Twp	twp		Twp road crew remediation
7/28/2004	23 Howard Street	at back property line	Rick Drake	private		reported by owner - twp advised as to remedy/resp
8/11/2004	3414 Mohegan Drive	front yard at electric box	McDonough	private	Forino	Twp notified electric company
8/20/2004	524 Albert Drive	back yard - 4' x 4' x can't see bottom	Andy Meridith	private		reported by owner - twp advised as to remedy/resp
8/24/2004	400 Augusta Drive East	in street near catchbasin	Neal Holbrook	twp	Forino	Notified Jay - Forino street still private
9/20/2004	3113-3115 South Wagner Circle	in backyard ~ 10' from house	Baltz Family & Ann Farina	private	Grande	reported by owner - twp advised as to remedy/resp
10/1/2004	btw 2407 and 2409 John Henry	along walking trail at sound barrier	rep'd by owner at 2411 John Henry		PADOT	reported by neighbor - notified Jay who called PADOT
12/3/2004	Spring Meadows detention basin	behind new Grant - near Yerger	Spring Meadows - Tom Porsch	private	Spring Meadows	GVC notified Twp and developer

Revised as of - 4/2/2006

Township of Spring - Sinkhole Database

2/5-6/05	3123 S. Wagner Circle	due to water main break - 1 M gals	Traveling Resident	PAWC-EK	Grande	reported by water co. to Twp - remedy by PAWC
3/14/2005	Paper Mill Road near Century	in street PADOT 3021	PADOT	State Rd	PADOT	J.D contacted Bill Wallyoung at PADOT to report
3/31/2005	2525 Jefferson Avenue	in backyard - 5 x 5 - not sure of depth	private-reported by neighbor at 2527	private		
3/31/2005	100 block of Oak Hill	in private road left of entrance	Spring Ridge - Oak Hill	private	Carlino	reported by resident, twp advised to contact HOA
4/6/2005	3117 South Wagner Circle	water under street - cave in	Paul and Valeous Residence	twp	Grande	reported by resident, twp crew repaired (1-call and PAWC)
4/8/2005	3126 S. Wagner Circle	area at water line in grass strip collapsed	in utility r/w - Singerling Residence	twp	Grande	reported by resident, twp crew repaired (1-call and PAWC)
5/17/2005	Spring Meadows detention basin	behind new Giant - near Yerger	Spring Meadows - Tom Porsch	private	Spring Meadows	GVC notified Twp and developer -repaired 5/17/05
7/18/2005	Spring Meadows detention basin	behind new Giant - near Yerger	Spring Meadows - Tom Porsch	private	Spring Meadows	GVC notified Twp and developer -repaired 7/05
7/28/2005	*418 Durwood Drive	11 ft from back of house 6 deep	Wm. Raber	private		reported by owner - twp advised as to remedy/resp
9/4/2005	at hydrant on S. Wagner	large hole at hydrant	in utility r/w 3121 Maher Residence	private	Grande	reported by resident, twp called PAWC - monitoring deterioration
*0/11/2005	3113 Octagon	back yard		private		reported by owner - twp advised as to remedy/resp
*0/11/2005	3124 S. Wagner	in front yard	Vincent Koprva	private	Grande	reported by owner - twp advised as to remedy/resp
*0/11/2005	Oak Hill	in private road	Carlino	private		reported by resident, twp advised to contact HOA
*0/11/2005	1717 Westwood Drive	in backyard		private		reported by resident, twp advised to contact HOA
*0/17/2005	3016 Van Reed Road	in backyard		private		reported by resident, twp advised to contact HOA
*0/20/2005	2411 John Henry Drive	behind home in Twp R/W		Twp		notified Leon Mazurie
*0/17/2005	2513 Garfield	front lawn		private		reported by owner - twp advised as to remedy/resp
*0/17/2005	150 Sage	front lawn		private		reported by owner - twp advised as to remedy/resp
11/22/2005	2505 Overland	Front - behind sidewalk near sewer	Acquil a residence	private		WWTP crew dye-tested line, intact
12/28/2005	1701 Westwood Road	side/back yard area - reopened	Clair Heim	private		reported by owner - twp advised as to remedy/resp
2/2/2006	235 Spohr Road	in street - sinkhole/water main break				reported by Jay Vaughan, ordered One Call and PAWC
2/9/2006	Village Drive	in private street at 1st catch basin	Carlino	private		reported by codes dept
3/1/2006	309 Oak Hill Lane	private, front porch subsiding		private		reported by codes dept
3/10/2006	51 Keppel	in back yard	Rick May	private	Springmont	reported by owner - twp advised as to remedy/resp
3/13/2006	Franklin Place - cul-de-sac	public	Twp	Twp		reported by resident, JLD contacted Jay - working on it
3/13/2006	412 Unsmy Drive	in back yard 20-30 feet from utility box	Randy Templin	private	Fornino?	reported by owner - twp advised as to remedy/resp

* indicates properties in vicinity of PAWC watermain break

VIDEOTAPE
PREVIOUSLY PRODUCED

Exhibit "5"

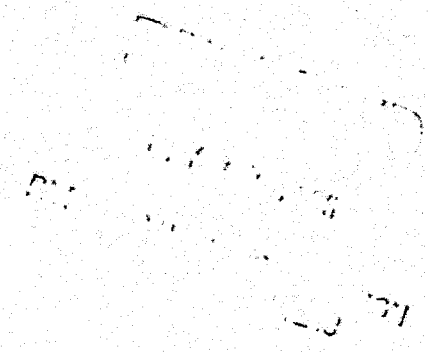

Exhibit "6"

SINKHOLE INVESTIGATION

WATER MAIN BREAK
AT IROQUOIS AVENUE
SPRING TOWNSHIP,
BERKS COUNTY, PA

Prepared For
Travelers
P.O. Box 4370
Reading, PA 19606

Prepared By:

Kin Y. C. Chung, Ph.D., P.E.
Chief Engineer/V.P.

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February 22, 2005 (Rev. 3/8/05)

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FIGURE 2 – GEOPHYSICAL MAPPING BY EM-31 AND GPR

SINKHOLE INVESTIGATION
WATER MAIN BREAK
AT IROQUOIS AVENUE
IN FRONT OF
WILSON SOUTHERN JUNIOR HIGH SCHOOL/
CORNWALL TERRACE ELEMENTARY COMPLEX,
SPRING TOWNSHIP,
BERKS COUNTY, PA

A. INTRODUCTION

American Geotech Incorporated (AGI) has completed a study and investigation for a Pennsylvania American Water Company pressurized water main break happened on late Saturday (February 5, 2005) at Iroquois Avenue in front of the Wilson Southern Junior High School/Cornwall Terrace Elementary Complex (See Figure 1 - Site Plan). Near the break location, several sinkholes around a house (3123 Wagner Circle), at the roadside opposite to the break location and in the School parking area collapsed. Two large water tanks located at south of the Old Fritztown Road and west of Grings Hill Road drained through the break and lost more than 1 million gallons of water.

The Information provided by John Rothwell of PA American Water Company lists blow:

- The cast iron water main at the break section was 8" diameter.
- The 8" diameter water pipe starts from the intersection of Iroquois Ave and the South Wagner Circle. The water pipe size becomes 12" diameter to the Water Tanks in the high ground in the south.
- The normal water pressure varies from 95 to 105 lbs per square inch.
- The break section of the water pipe was buried at 5 ft below grade.
- Water loss on February 5, 2005 was 1 million to 1.5 million gallons.
- Occurrence sequence from 12:00 AM, Sunday, on February 6, 2005 by Pa American Water Company.

- A video tape records the excavation of the broken water main location (3 minutes) and the excavation of the sinkhole opposite to broken water main location.

The study consists of geophysical investigation, sinkhole identification, and topographic survey to obtain a contour drawing and to map the existing and susceptible sinkholes around the area. The scope of work can be summarized below:

- Reviewed site location, geology and hydrogeology.
- Set up grid-point system for geophysical investigation.
- Performed electromagnetic survey (EM31) and Ground Penetration Radar (GPR) geophysical survey at the location of previously collapsed sinkholes and the surrounding areas.
- Due to the extent of the sinkholes, performed a topographic survey for the sinkhole surrounding area. The surveying service also mapped the geophysical findings into drawing.
- Inspected the sinkhole damaged house and surrounding areas.
- Evaluated and analyzed the results
- Prepared a report including the cause of the water main damages and sinkhole and recommendation for sinkhole remediation.

B. GEOPHYSICAL SURVEYS

Geophysical survey consists of Electromagnetic survey and Ground Penetration Radar (GPR) survey. Three sets of grids were established at the school parking lot, around the collapsed sinkholes on the curb of the road, and at the back yard of the residential houses.

AGI conducted this geophysical survey on February 13th to 16th, 2005.

Electromagnetic Survey was performed using an EM-31, manufactured by Geonics Limited of Canada. The EM-31 device measures terrain conductivity by inducing an electromagnetic field into

the ground, using a battery operated transmitter. The electromagnetic field induces in any conductive materials, a secondary magnetic field, or "eddy currents," which are detected by a receiver unit. The secondary magnetic field is wholly dependent on the conductive properties of the terrain in which it is induced. This electromagnetic survey was performed along the grid lines at a spacing of 10 ft. Terrain conductivities were recorded on each line at every 5 feet. This method with this equipment is limited to a depth of up to 20 feet with an effective depth of 15 feet below ground level. The electromagnetic survey was performed in accordance with current Geonics Ltd's EM-31 Operating Manual. Due to the urgency of the survey, the suspected underground objects measured by EM-31 were immediately marked in field and confirmed with GPR. EM-31data was processed using TDS computer program and EM-31 contour map was created as shown in **Figure 2.**

The Ground Penetrating Radar (GPR) is based on radar reflections and velocity of radar pulse propagation, associated with changes in dielectric permittivity of subsurface materials. The receiving antenna detects pulses that are reflected from interfaces where the dielectric constant of the materials change. The receiver converts these electromagnetic signals, only a few nanoseconds in duration, to analog signals tens of milliseconds in duration by a time-domain sampling technique. These signals are transmitted to the Control Unit for amplification and processing. The data, displayed as travel time, is printed on the Graphic Recorder. As the transducer is pulled along a transect line, the computer screen indicates a continuous profile record corresponding to the interfaces found in the subsurface. The GPR survey was used as a non-destructive tool to locate underground objects. The GPR used for this survey was a cart-mounted Ramac/GPR with a 250 MHz antenna manufactured by Mala GeoScience. The GPR was used to verify all susceptible locations selected from the results by EM-31. Most of the susceptible sinkhole and soft overburden areas and possible sinkhole routing were detected and plotted on Figure 2.

C. GEOLOGY

According to the geological maps of "Sinking Spring and Womelsdolf" from Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania, 1981, published by Pennsylvania Geological Survey, fourth series, Harrisburg, PA, the site investigated is underlain by Millbach Formation (Geologic Symbol. Cm included in Cms)

According to the Pennsylvania Geological Survey, Engineering Characteristics of The Rocks of Pennsylvania, Fourth (4^{th}) Series, Revised 1982, the Millbach Formation consists of Pinkish –gray and medium gray, laminated limestone, interbeds of light to medium gray dolomite that weather buff to yellowish gray, approximately maximum thickness is 1,500 ft. Bedding within Millbach is well bedded and thick to massive. Joints have a blocky pattern; well developed; moderately abundant; regularly spaced, having a moderate distance between fractures; open and nearly vertical. Millbach Formation is moderately resistant and slightly weathered to a shallow depth. Sinkholes are numerous. Solution channels provided a secondary porosity of moderate to high magnitude, high permeability. Rock pinnacles are also common in this Formation.

D. FINDINGS AND RECOMMENDATIONS

Based on the information obtained from geophysical surveys, site topographic survey and engineering evaluation, we have the following findings and recommendations:

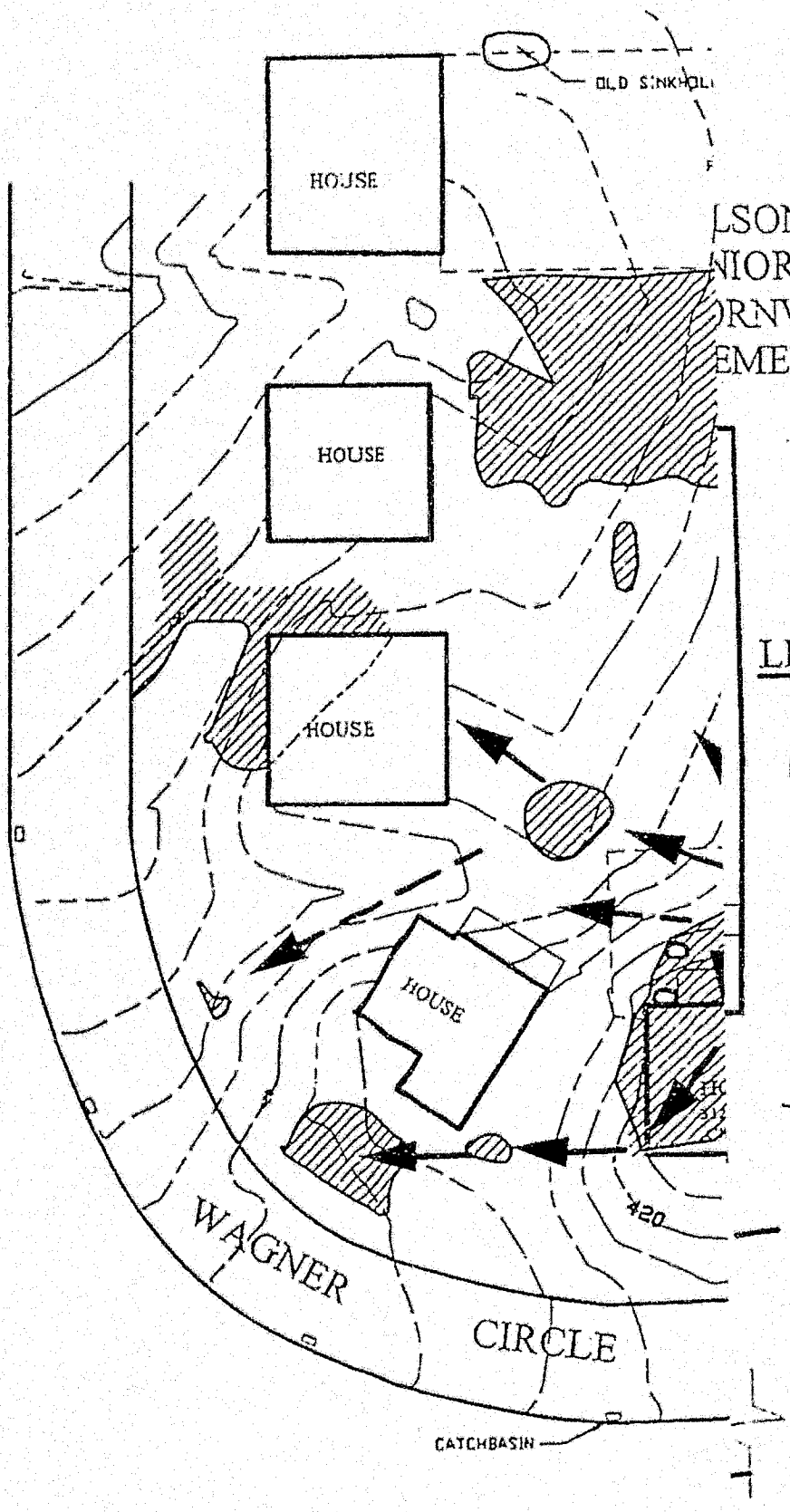
- A detailed topographic and sinkhole map has been prepared in accordance with the results obtained from the geophysical surveys using EM-31 and GPR. A total of 6 current open-up sinkholes and 8 susceptible sinkholes were identified and sinkhole routings were estimated as shown in **Fig. 1**.
- The current broken water main location was apparently located above a sinkhole which connects to the previous mended sinkhole underneath the Iroquois Ave and may extend

to numerous sinkholes at the west and one current sinkhole in the slope of the School parking lot at the east

- One test pit next to the current open-up sinkhole opposite to the broken pipe location inside the School parking lot, was dug by EKI, the remedial Contractor. According to Don Kuser of EKI, no solution channel was found inside the test pit.
- The 8" diameter cast iron water main with high water pressured had not been designed for large different settlement in this sinkhole area. It is reasonably concluded that the broken main was caused by the sinkhole underneath or immediately next to the water main.
- The recent open-up sinkholes were caused by the excessive water drained through the existing solution channels and existing sinkholes injected from the broken main location toward to the west to the residential areas and to the northeast to the School area.
- Although the house at 3123 Wagner Circle had previous minor sinkhole problem, the large quantity of water with pressure did worsen and enlarge extensively the sinkholes and voids underneath the house to dangerous condition. It is close to the level if it can be saved by grouting or un-remediable condition.
- For the house at 3123 Wagner Circle, AGI Geotechnical personnel did EM31 and GPR testing and found extensive voids underneath the basement slab. Additional investigation such as engineering borings outside the house and drilling holes through the basement slab and development of an economical remedial method to save the house are highly recommended. The additional investigation, development of an economical method and remedial work should be initiated immediately.
- It is recommended that special consideration and foundation consultation by an experience geotechnical engineer should be included in design of a pressured water main embedded in carbonate geological areas. Also, an automatic warning system be

considered in each large water tank to ensure the early cutoff excessive water drain is recommended.

- It is a concern about the loss of the 1 million gallons of water that seeped into the ground at this broken water main location. Based on our findings, as shown in Figure 1, water was drained through the existing sinkholes or underground solution channels to the west and to the northeast according to our estimated routings. Information indicates that portion of water came out to the west street, two blocks away from the Iroquois Ave. But, the destination of most of the lost water is still unknown.
- By experience, this large quantity of water will worsen the existing sinkhole conditions underneath the existing houses in the path of our estimated sinkhole routing as shown in Figure 1. Because of this accidence, chance of future sinkhole activity has greatly increased in this area. It is, therefore, recommended that additional investigation by an experience geotechnical engineer using additional geophysical investigation, engineering borings and small drill holes through the basement slabs for several residential houses immediately west of the broken main location be performed. The sinkhole investigation for the safety of the school building and the parking lot is also recommended.



LSON SOUTHERN
NIOR HIGH SCHOOL
ORNWALL TERRACE
EMENTARY COMPLEX

N

LEGEND

- SUSCEPTIBLE SINKHOLE
- RECENT OPENED-UP SINKHOLE
- PREVIOUS MENDED SINKHOLE
- SURVEY CONTOUR (ELEV. AT 420') ELEV. CONTROL ESTIMATED FROM USGS MAP, "SINKING SPRING QUADRANGLE MAP" DATED 1955, REVISED 1987
- SINKHOLE ROUTING

0 50' 100'

SCALE: 1"=50'

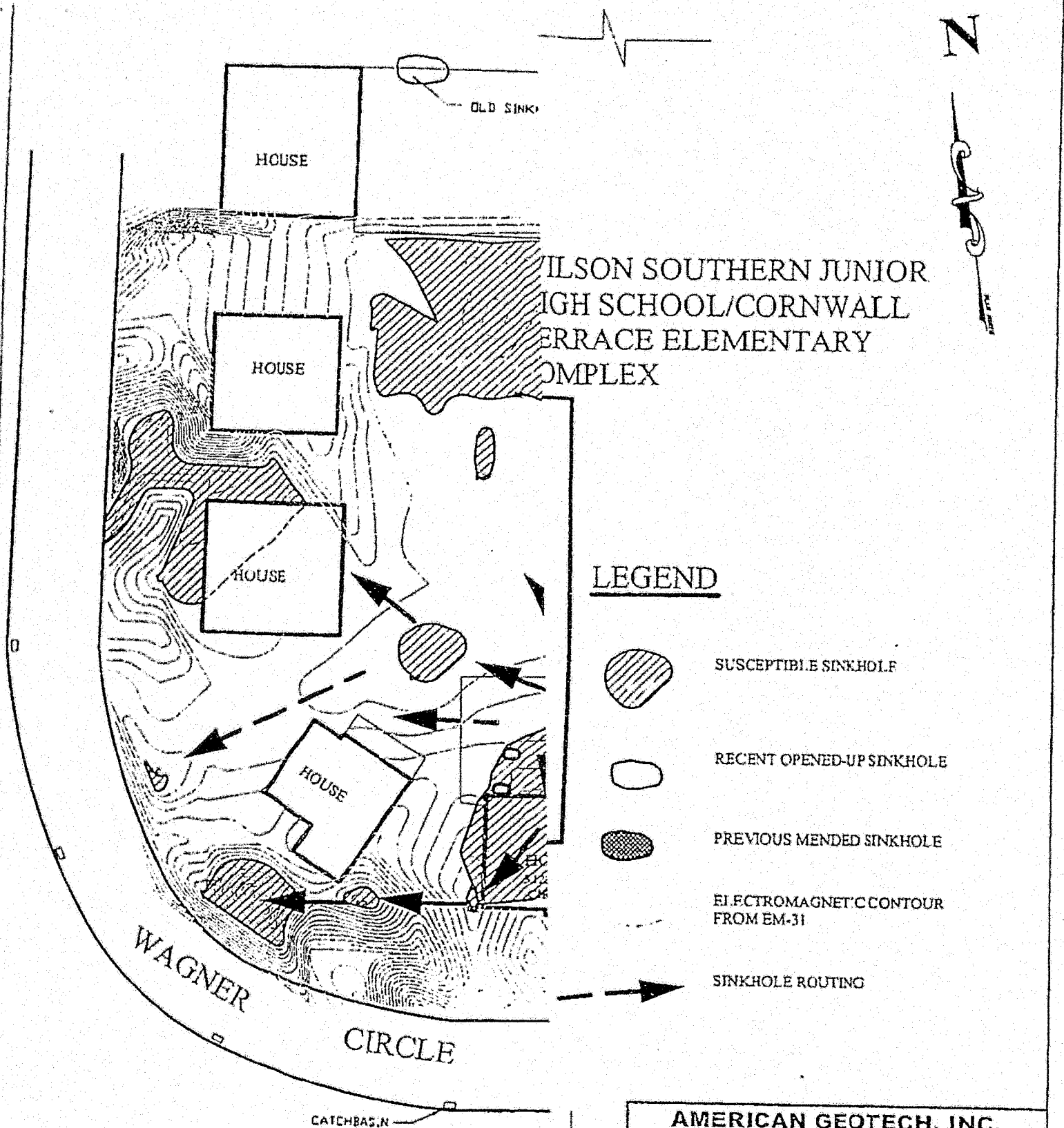
AMERICAN GEOTECH, INC.

Consulting Engineers and Material Testing
[illegible] PA 19606
[illegible]-0055

SINKHOLE INVESTIGATION

CORNER OF IROQUOIS AVE AND WAGNER CIRCLE
SINKING SPRING, PA

Drawn by:	ML	Approved by:	KC
Date:	2/21/05	Date:	2/21/05



AMERICAN GEOTECH, INC.

SINKHOLE INVESTIGATION

CORNER OF IROQUOIS AVE AND WAGNER CIRCLE
SINKING SPRING, PA

Drawn by	ML	Approved by	KC
Date	2/21/05	Date	2/21/05

Ms. Kressler,
I represent Pennsylvania American Water. Your e-mail to Doug DeArment has been referred to me for response. Mr. Lillis' letter has also been referred to me.
Initially, Pennsylvania American Water thanks the Board of Supervisors for its concern into the sinkhole opening and water main break that occurred on February 5-6, 2005. We share the Township's concern about the sinkhole problem and the damage suffered by customers and Pennsylvania American. As such, we have contracted, at our expense, with a geologist to fully investigate the cause of the water main break and the susceptibility of sinkholes in the immediate vicinity. As soon as the geologist's report is released, it will be shared with the Township. I have asked Doug to personally deliver the report to the Township. Given that we have not received the geologist's report, it would be premature for Pennsylvania American to speculate about what the report may conclude. Accordingly, we will not be able to meet with you on March 17th. After the Township and Pennsylvania American has had an opportunity to review the final report, I would ask that your Engineering Director contact Doug directly to discuss its contents. **In the meantime, Pennsylvania American would encourage the Township to conduct its own studies of the sinkhole problem and possible solutions that it may implement.**
We look forward to sharing the report with you as soon as possible. Thanks. Seth.

Seth A. Mendelsohn
Regional Associate Counsel
American Water Southeast Region
800 West Hersheypark Drive
Hershey, Pennsylvania 17033
(717) 531-3362
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Exhibit "7"

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Kochanov, W. E., 1988, Sinkholes and Karst-Related Features of Berks County, PA, Pennsylvania Geologic Survey Open File Report 8801 and 8802, Harrisburg, PA.

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Newton, J.G. (1987) Development of Sinkholes Resulting from Man's Activities in the Eastern United States, U.S. Geological Survey Circular 968

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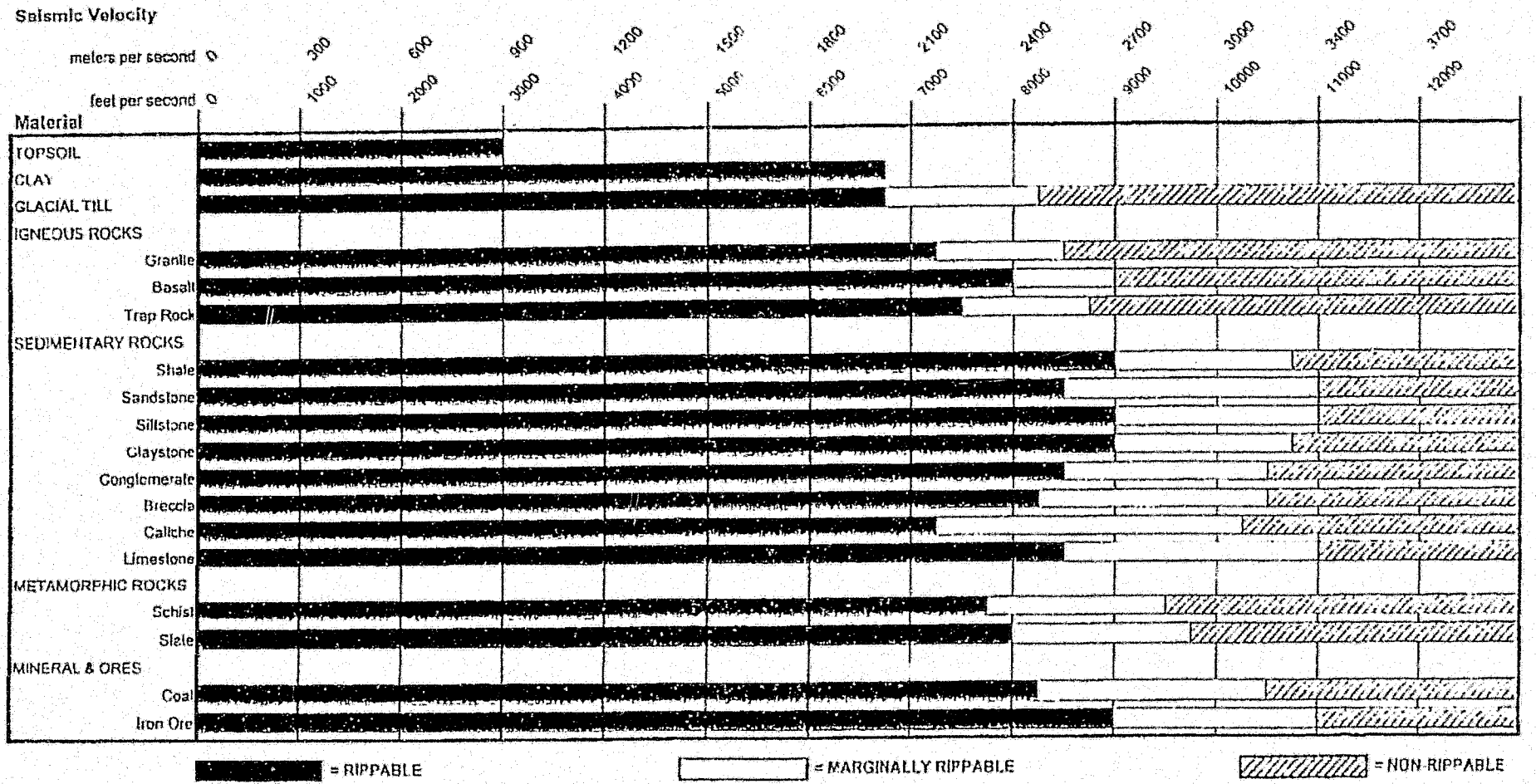
Ripping Chart *

D10N

Multi or Single Shank No. 10 Ripper

Estimated by Seismic P-Wave Velocities



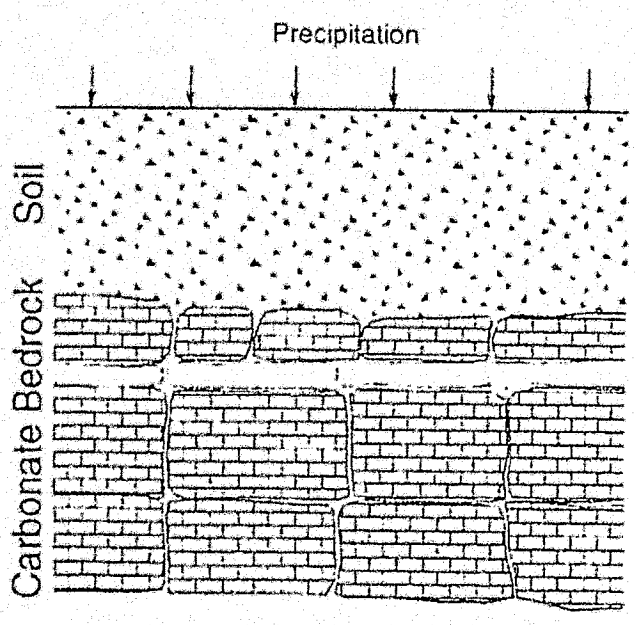
* Caterpillar Performance Handbook Edition 26, Caterpillar, Inc., Peoria, Illinois

Appendix C

Ripping Charts

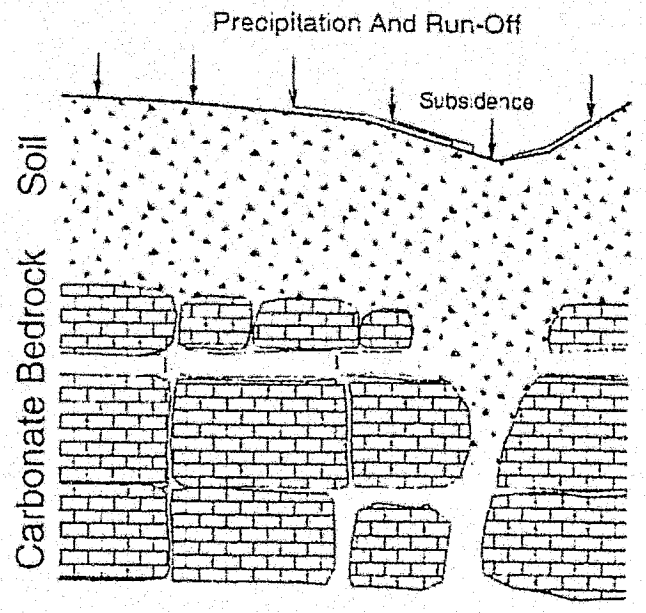
1551 Columbia Avenue • Lancaster, Pennsylvania 17603 • 717/396 8922 • Fax 717/396 8746 • email@enviroscan.com • www.enviroscan.com

I



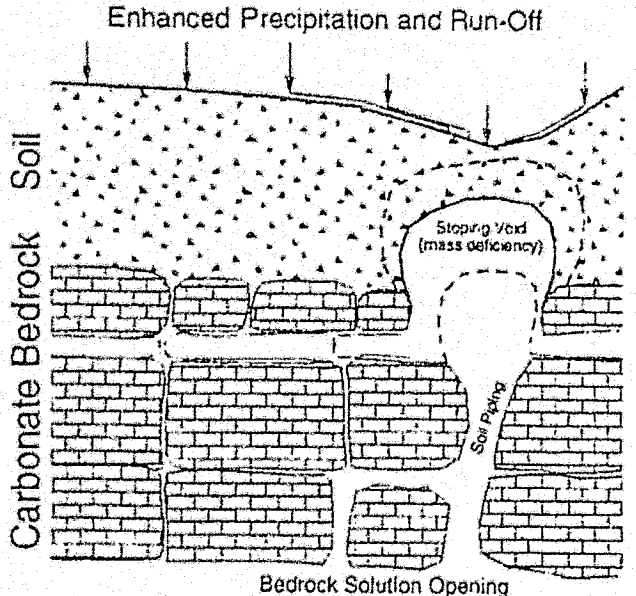
Infiltration

II



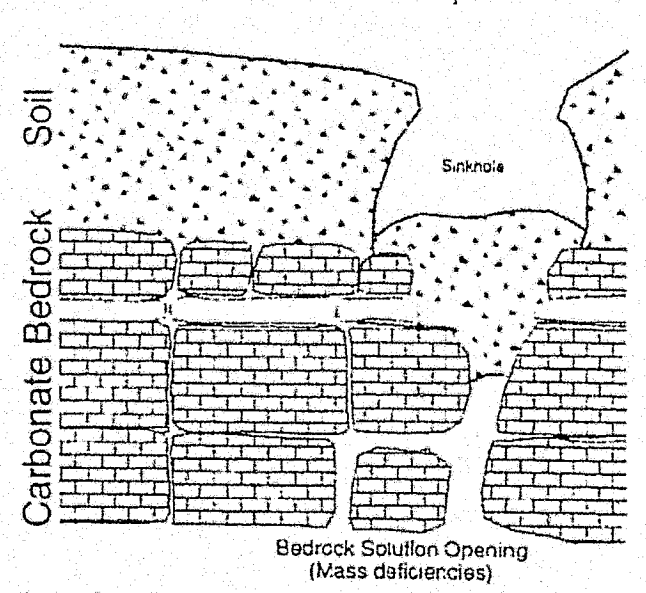
Concentrated infiltration into and Dissolution of Bedrock Cavities (mass deficiencies)

III



Bedrock Solution Opening (Mass deficiencies)

IV



Bedrock Solution Opening (Mass deficiencies)

Typical Time Scale

I — Thousands to Millions of Years

II — Indefinite (may be stable until activated by enhanced precipitation)

III — Hours to Months (may be accelerated by enhanced precipitation)

IV

Schematic Karst Processes

Rev. 01/2001

As depicted in the time-distance (T-X) curve in Figure SR-4, the layered earth structure can be determined by analyzing the seismographic wiggle traces. At distances close to the seismic source, the first wiggle or ground motion (the first arrival after the shot) is due to passage of the direct wave travelling at the velocity of the upper layer. Reflected waves arrive later since they have by definition traveled a greater distance at the same velocity (additional later wiggles are caused by passage of the more slowly travelling S and surface waves). Beyond a distance dictated by the critical angle, the first arrival of seismic energy represents the head wave of the critically refracted ray. These refracted rays also by definition travel a greater distance than the direct wave. However, along part of their path, they have traveled at the higher velocity of the underlying more consolidated layer. At greater distances from the shot point, where the path length in the higher velocity layer becomes significant, the head wave arrivals actually race past the direct wave and become the first arrival (see labeled crossover in Figure SR-4). By extension, it can be shown that if a third layer with even greater velocity lies at greater depth, the head wave from this layer will become the first arrival at a sufficient distance from the shot point.

In conventional seismic refraction, only the first P wave arrivals can be reliably selected on a wiggle trace record. The later reflected P wave arrivals are generally obscured by the slower-travelling S and surface waves, and the very slow air blast or sound wave from the shot. To interpret a seismic refraction record, the first arrival travel times are measured for each wiggle trace and plotted at the appropriate point on a time-distance (T-X) curve (see Figure SR-4). In a plane-layered earth, these first arrivals define a series of line segments, each representing a discrete layer. The seismic velocity of each layer is simply the reciprocal of the slope of the associated line segment. The thickness of each layer can be calculated from the distances where the line segments intersect. The mathematics for these calculations are easily derived, and can be found in any introductory geophysics text.

True geologic strata are rarely perfectly horizontal. The effect of a dipping interface on a travel time curve cannot be recognized using a single shot point. Calculations based on a T-X curve from a single shot point should always be considered as producing apparent depths to interfaces and apparent seismic velocities for all but the uppermost layer. To determine the true depths and dips of interfaces and the true seismic velocities, it is necessary to reverse the seismic line; that is, move the shot point to a location at or beyond the farthest geophone in the spread, and repeat the shot. The calculation of true depths, dips and velocities from reversed seismic lines is also readily performed.

Introduction to Seismic Refraction

by

Timothy D. Bechtel, Ph.D., P.G.

Energy

Mechanical elastic (seismic) waves generated by a hammer blow, weight drop, or explosion.

Sensitivity

Sensitive to elastic properties or moduli – generally strongly correlated with density.

Basic Equipment

Recording Seismograph (generally 24 or more channels); Geophones (one for each channel); Geophone cable; Hammer or weight plus strike plate or explosives; Trigger switch.

Common Applications

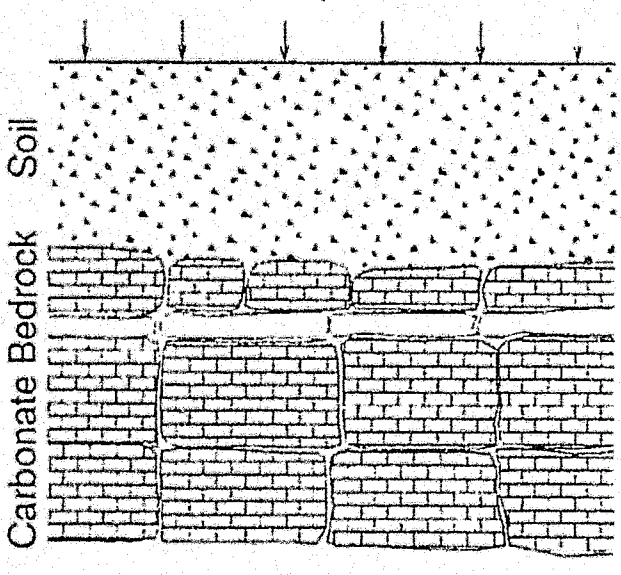
Determination of the depth and dip of soil horizons and bedrock surfaces. Recent processing advances allow some detection and delineation of discrete targets.

Principles

In a uniform isotropic earth, the shock wave from a blow or explosion at the surface travels outward and downward in a hemispherical wave front like a three-dimensional ripple from a pebble in a still pond. At any point on the wave front, a straight line from the shock source to the wave front depicts the path of the seismic wave, and is called a ray path (see Figure SR-1). In reality, there are several independent shock waves; the fast-moving primary, compressional or P wave front; the slower moving secondary, shear or S wave (both of which form hemispherical wavefronts); and several disk-like wave fronts that travel only along the surface of the earth (called surface waves or ground roll). For the purposes of most seismic refraction surveys, only the fastest moving wave front — the P wave — is considered. S-wave refraction is used in selected circumstances where complete determination of elastic moduli is desired – particularly when it may be desirable to eliminate the effects of water saturation.

I

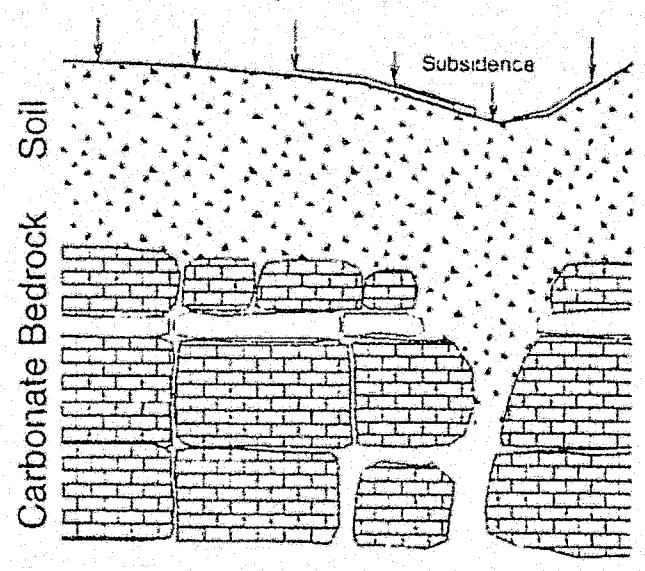
Precipitation



Infiltration

II

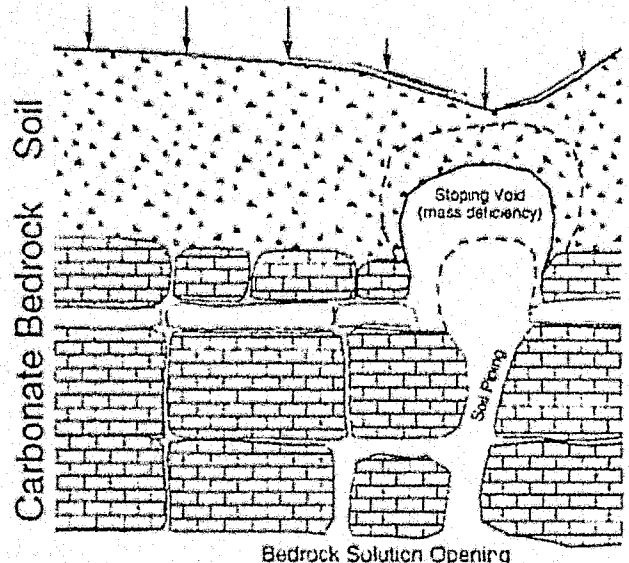
Precipitation And Run-Off



Concentrated Infiltration into and Dissolution of Bedrock Cavities (mass deficiencies)

III

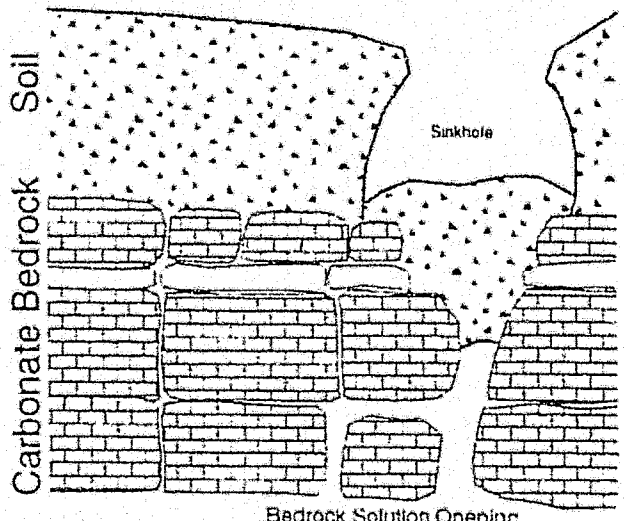
Enhanced Precipitation and Run-Off



Bedrock Solution Opening (Mass deficiencies)

IV

Soil Arch Collapse



Bedrock Solution Opening (Mass deficiencies)

Typical Time Scale

I — Thousands to Millions of Years

II — Indefinite (may be stable until activated by enhanced precipitation)

III — Hours to Months (may be accelerated by enhanced precipitation)

IV

Schematic Karst Processes

Rev. 01/2001

We have enjoyed and appreciated the opportunity to have worked with you. If you have any questions, please do not hesitate to contact me.

Sincerely,
Enviroscan, Inc.

James E. Bock, M.Sc., P.G.
Geophysics Project Manager

Technical Review By:
Enviroscan, Inc.

Felicia Kegel Bechtel, M.Sc., P.G.
President

Enc.: Figure 1: Geophysical Survey Data Coverage
Figure 2: Seismic Refraction Profiles
Figure 3: Bouguer Gravity Data Contours
Figure 4: Ground Penetrating Radar Results
Appendix A: Schematic Sinkhole Formation Processes
Appendix B: Introduction to Seismic Refraction
References

Cc.: Mr. Russel Daniels, Paul Zamrowski & Associates

Microgravity

The color-contoured microgravity survey results are presented in Figure 3. Mass deficiencies are represented with increasing shades of red, while mass excesses are represented with increasing shades of blue. The range of gravity values across the entire survey area is 0.30 milligals, ranging from -0.22 to 0.08 milligals. There are several mass-deficient zones located beneath the survey area. In particular, there appear to be two significantly mass-deficient zones beneath the northwestern and southcentral portions of the building (Figure 3). These zones may represent cavities or disturbed zones in the soil mantle, or cavities in the underlying bedrock. Note that if they are bedrock cavities, they do not coincide closely with the footprints of the observed sinkholes.

Ground Penetrating Radar

The results from the GPR survey are overlain on top of the gravity survey for comparison on Figure 4. Two anomalous areas (depicted with orange shading) of the type commonly associated with subsurface voids and/or less dense soils were detected beneath the basement. The anomalies were located within close proximity to cracks in the concrete as well as mass-deficient zones mapped during the gravity investigation (Figure 4). Due to the presence of steel reinforcing mats within the garage floor, it was not possible to collect any useful radar data in that area.

Conclusions

The seismic, microgravity and GPR data all display clear evidence of sinkhole activity and sinkhole-related features. The seismic data display low velocity zones consistent with disturbed soils and bedrock solution cavities. The gravity data show subsurface mass deficiencies consistent with either disturbed soils or voids (in the soil mantle or bedrock). GPR profiling in the basement also detect anomalously reflective zones whose location were consistent with cracking of the basement slab. Enviroscan recommends that future remediation efforts concentrate within the footprints of the areas having the largest mass deficiencies (depicted with increasing shades of red on Figure 3).

At each station, the acceleration of gravity was measured using a Scintrex CG-3M Autograv gravimeter. The internal memory of the instrument was used at each station to record the average gravity for a 60-second time-period, the standard error of the average, the reading date and time, and the meter height. A designated station was established as a base station and was occupied approximately every hour and a half to provide drift control data. The elevation and location for each of the microgravity data stations, as well as the seismic shotpoint and geophone locations, were surveyed using a Trimble ATS Robotic Total Station.

The gravity data were processed by applying the reference ellipsoid, earth tide, drift, free air, and bouguer corrections were applied using standard formulae as computed in a spreadsheet. The resulting bouguer gravity, representing only mass variations beneath individual gravity stations, was contoured using the statistical kriging routine in SURFER for WINDOWS by Golden Software. The bouguer gravity response contours are depicted in Figure 3.

Ground Penetrating Radar

In an effort to identify potential voids located beneath the building's foundation, Enviroscan also completed a GPR investigation in both the basement and garage of the residence. Scanning was performed using a GSSI SIR-2000 GPR controller with a color display and internal hard drive, utilizing a 500-megaHertz scanning antenna. GPR systems produce cross-sectional images of subsurface features and layers by continuously emitting pulses of radar-frequency energy from a scanning antenna as it is towed along a survey profile. The radar pulses are reflected by interfaces between materials with differing dielectric properties. The reflections return to the antenna and are displayed on a video monitor as a continuous cross section in real time. Since the electrical properties of metal are distinctly different from soil and backfill materials, metallic pipes and other structures produce dramatic and characteristic reflections. Fiberglass, plastic, concrete, and terra-cotta targets as well as subsurface voids, rock surfaces, soil type changes and concentrations of many types of non-metallic wastes also produce recognizable, but less dramatic reflections.

For this investigation, variously oriented GPR profiles were collected in both the basement and the garage. The orientation of these profiles was determined primarily by the location of stored items in the basement and the garage. The individual radar profiles were examined in the field for variable, high amplitude anomalies of the type commonly associated with voids and/or less dense soils. Areas having this type of anomaly were placed onto a site sketch (Figure 4) for later comparison with the processed gravity data.

Microgravity

In order to map potential sinkholes/voids or other low-density areas in soil and bedrock, Enviroscan performed microgravity measurements at 10-foot intervals along profiles spaced 10 feet apart (see Figure 1). Microgravity meters are capable of measuring the force of gravity with great precision. Worldwide, the acceleration of gravity has been adopted as 980 centimeters per second squared (cm/s^2). However, this is really an average value since the actual measured value of gravity at a given station is dependent upon many things including:

- The elevation of the station reading (since higher stations are farther from the center of mass of the earth),
- The latitude and longitude of the station (since the earth is not truly spherical),
- The positions of the sun and the moon (which creates not only the readily observed ocean tides, but small deformations of the entire earth called earth tides),
- Minute changes in the calibration of the gravity meter (called instrument drift),
- The attraction of massive landforms near or obliquely above the station (i.e. the mass of a nearby mountain actually produces a gravitational attraction which can have a significant effect on a precise gravity reading), and
- The density of materials immediately beneath a station.

The variations in gravity due to the first four factors above typically have magnitudes measured in milligals (where 1000 milligals equal one cm/s^2). The fifth and sixth factors are typically measured in microgals (where 1000 microgals equal one milligal). Since the purpose of a microgravity survey is generally to determine factor six above (i.e. the density or mass distribution in the subsurface of a survey site), the raw gridded or profile gravity measurements that comprise a gravity survey must be corrected for factors one through five. This produces a set of numbers (which are generally several parts per billion of the earth's adopted average gravity) that can be interpreted to determine subsurface density of mass distribution (see e.g. Telford, 1990).

Since sinkhole activity is allowed by bedrock cavities, and triggered/driven by infiltrating water, hydraulically active geologic features can act as foci for sinkhole activity. In particular, where open faults, fractures, bedding planes or contacts act as preferred pathways for groundwater infiltration or flow, the water can dissolve networks of solution openings along the fault/fracture/bedding plane/contact. The enhanced infiltration also encourages movement of soil or soil fines into the solution openings, which may cause surficial subsidence and enhanced capture and infiltration of storm water, etc. in a positive-feedback process.

Survey Methods

To fulfill the survey purpose, a combined seismic refraction, microgravity, and GPR survey was completed during the week of March 4, 2005. The principles and scopes of work for each technique are described below.

Seismic Refraction

In order to determine bedrock depths beneath the study area, Enviroscan performed a seismic refraction survey. Knowledge of bedrock depths is desirable for proper interpretation of microgravity data (see below), and can provide information on the presence of deeply weathered zones indicative of faults or fractures. The seismic refraction survey consisted of two profiles or lines oriented roughly east-west (Figure 1). The principles of seismic refraction are described in the accompanying Introduction to Seismic Refraction (Appendix B), and generally involve measuring the travel times of shock waves traveling from a surficial source (shot point) to a linear array of ground motion sensors (geophones). At a distance from the shot point, the first arrivals of seismic energy are waves that have been refracted along whatever density contrast or contrasts (called refractors) are present in the subsurface. The travel times of these refracted arrivals can be used to compute a cross sectional profile of the density contrast(s).

ENVIROSCAN, INC.

March 22, 2005

Ms. Marilyn Reilly
USAA
P.O. Box 88
Hamburg, NJ 07419

RE: Geophysical Survey
Void/Subsidence Detection/Delineation
Approximately 120' x 120' Survey Area
Creveling Property
3123 South Wagner Circle
Sinking Springs, PA
Enviroscan Reference Number 020535

Dear Ms. Reilly:

Pursuant to our proposal dated February 18, 2005, Enviroscan, Inc. (Enviroscan) has completed a combined microgravity, seismic refraction, and ground penetrating radar (GPR) geophysical survey of the above-referenced site. The following report and figures describe the methods and results of the investigation.

Purpose and Background

The site is located at a private residence where sinkhole activity has been observed within close proximity to a recent water main breakage. The site, as designated by the client, measures approximately 120' by 120', and according to mapping, compiled by MacLachlan and others (1975), is underlain by the Millbach Formation The Millbach Formation is a pinkish- to medium-gray laminated limestone (Geyer and Wilshusen, 1982). The Millbach Formation typically has well-developed fractures, is moderately resistant, and is often characterized by bedrock pinnacles. Additional mapping, compiled by Kochanov (1988), depicts a number of closed topographic depressions within close proximity to the study area.

1051 Columbia Avenue • Lancaster, Pennsylvania 17603 • 717/396 8922 • Fax 717/396 8746 • email@enviroscan.com • www.enviroscan.com

OVERSIZED DOCUMENT(S)

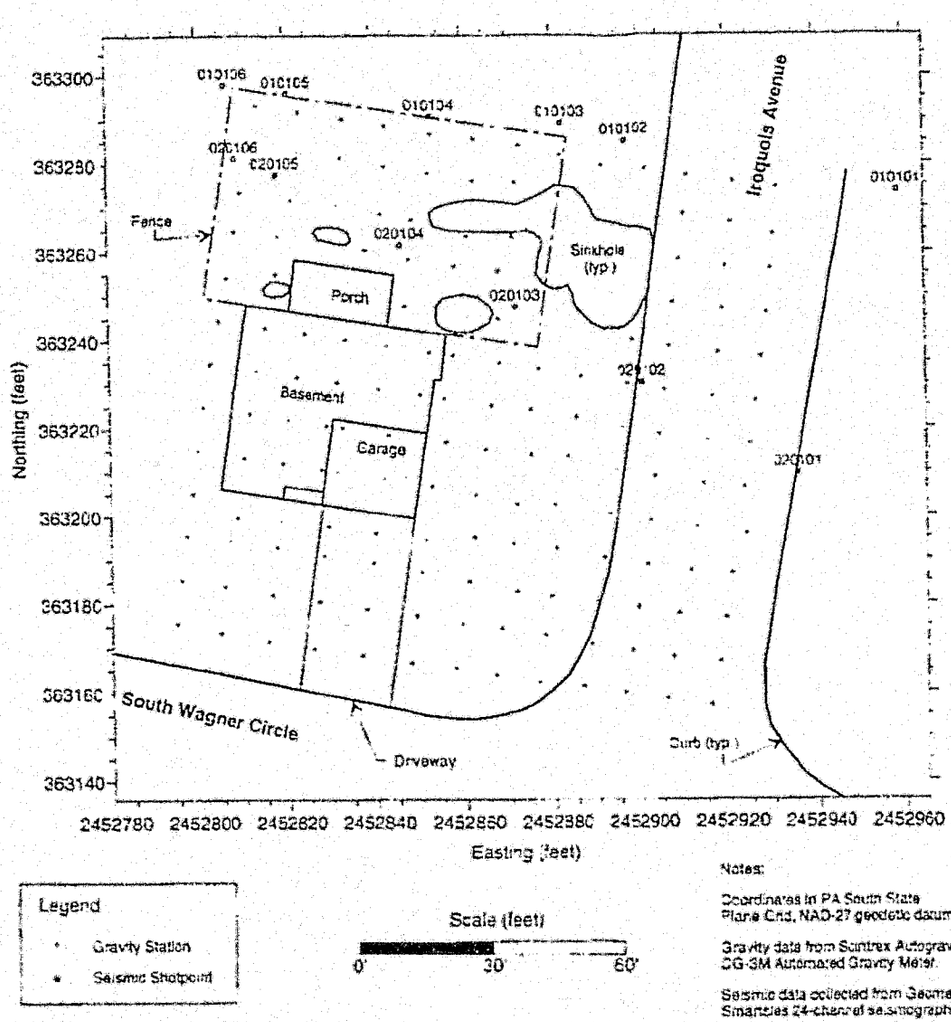
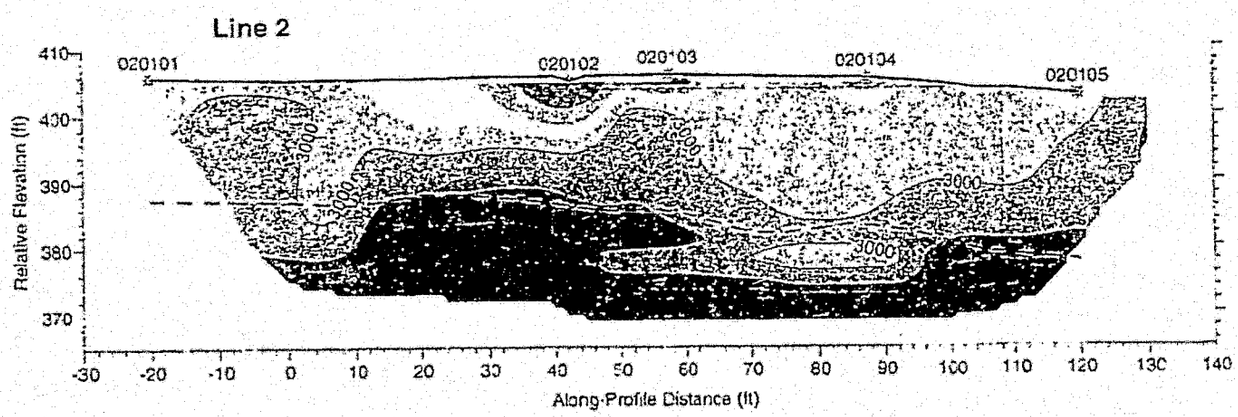


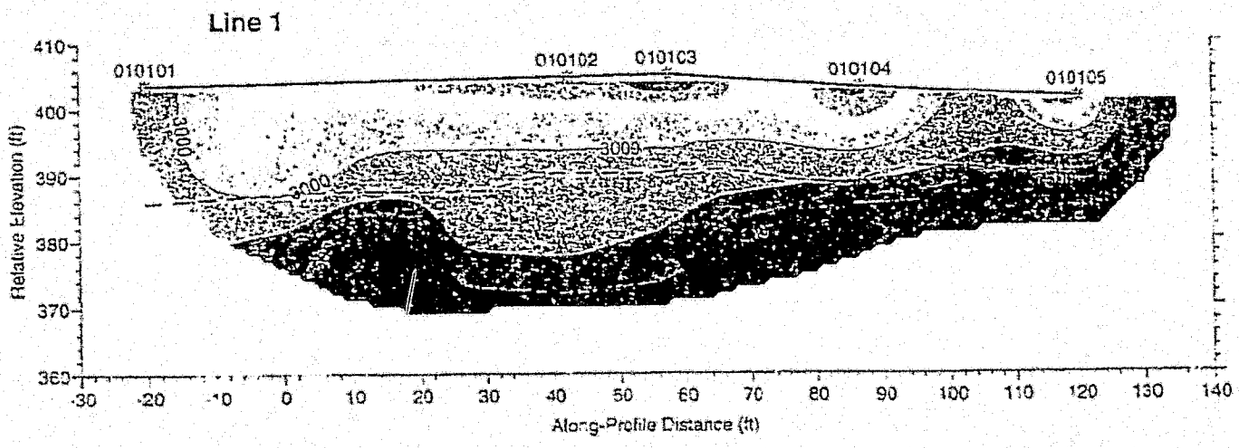
Figure 1

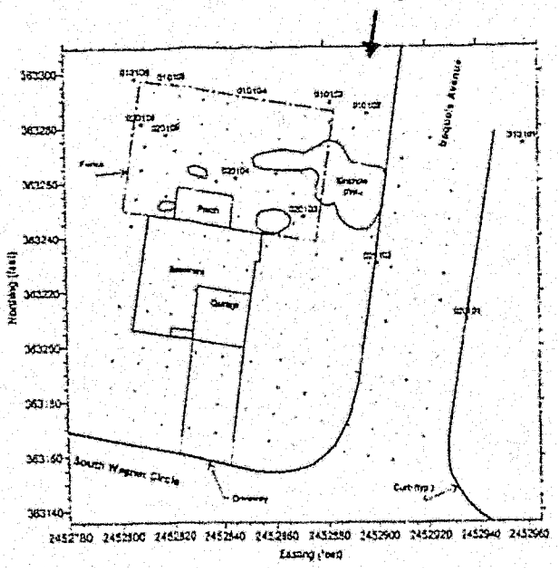
Geophysical Survey
Data Coverage

Creveling Property
3123 South Wagner Circle
Sinking Spring, PA

Enviroscan, Inc.
Project No. 020535
Rev 03/17/05







Notes:

Data from Geometrics, Inc. S24 seismic instrument.

Seismic models from SIP by Rimrock Geophysics and SeisOpt Pro by Optim, LLC.

Legend

- Seismic Shotpoint
- Inferred Top of Rock (SIP)

Soil and/or Fill Material | Weathered Rock | Bedrock

500 1000 2000 3000 6000 9000 15000 25000

Seismic Velocity (feet/sec: Seis Opt Pro)

Figure 2 Seismic Refraction Profiles

Creveling Property
3123 South Wagner Circle
Sinking Spring, PA

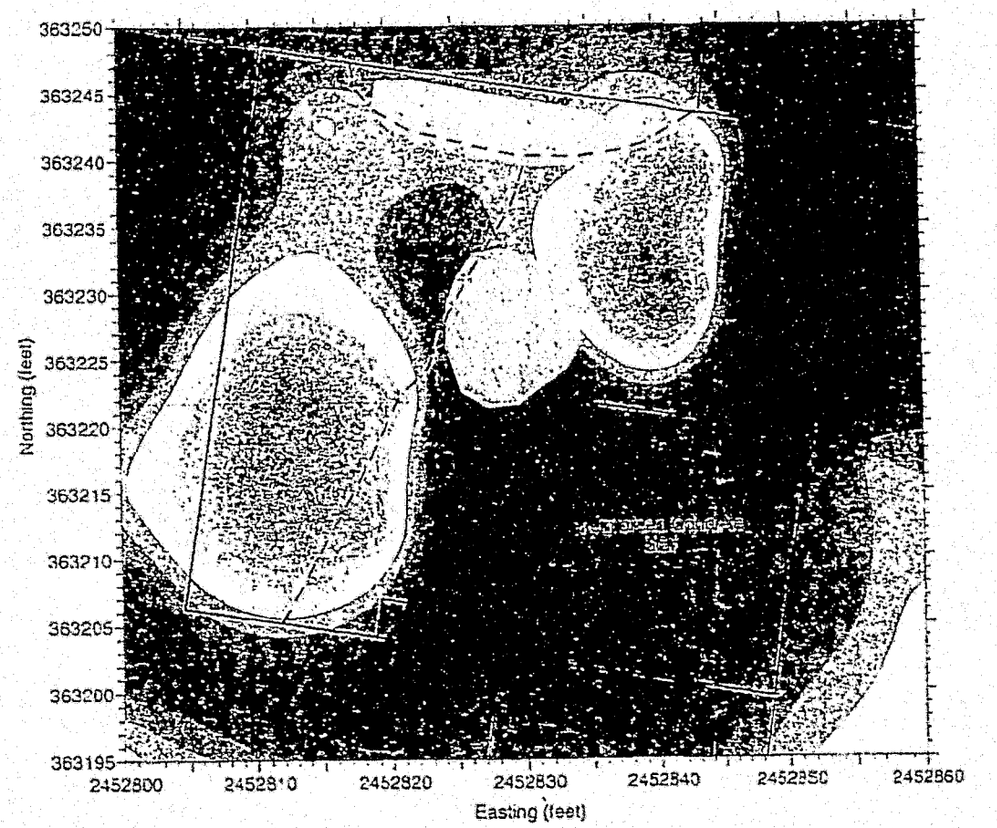
Envirescan, Inc.
Project No. 020535
Rev 03/18/05

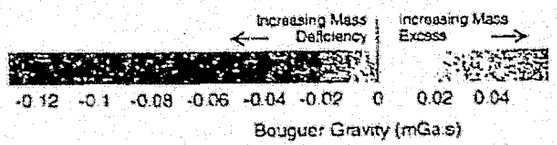
Figure 4

Ground Penetrating Radar Results

Creveling Property
3123 South Wagner Circle
Sinking Spring, PA

Enviroscan, Inc.
Project No. 020535
Rev 03/17/05





Notes:

Coordinates in PA South State Plane Grid, NAD-27 geodetic datum.

Gravity data from Scintrex Autograv CG-3M Automated Gravity Meter.

GPR data from a GSSI SIR2000 GPR controller with a 500-megahertz scanning antenna

Legend

- Gravity Station
- GPR Anomaly Area

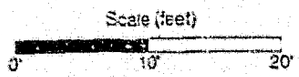


Exhibit "8"

Felicia Kegel Bechtel, M.Sc., P.G.

ENVIROSCAN, INC

Copyright 2003
Monday, May 15, 2006

Home
About Us
Mission
People
Affiliations
Range
Our Clients
Our Services
Marine Surveys
Well Logging
Geophysics
Navigation
Position Fixing
Work Areas

FELICIA KEGEL BECHTEL, M.Sc., P.G.

EDUCATION

M.Sc., Geology, 1985, Brown University, RI

Graduate Work in Geology, 1982, Yale University, CT

B.A., Geology, 1982, Bryn Mawr College, PA

EXPERIENCE

February 1992 - Present: ***President***, Enviroscan, Inc., Lancaster, PA.

Direct all operations of a geophysical contracting firm. Prepare and approve technical and cost proposals. Provide final review of all work products. Design and implement all business development strategies and programs.

February 1991 - April 1992: ***Geologist/Marketing Director***, Tethys Consultants, Inc., Harrisburg, PA.

Performed geologic and environmental studies. Managed all corporate marketing activities. Wrote and directed publication of technical environmental newsletter.

April 1990 - January 1991: ***Market Research Director***, Ball Advertising and Marketing, Lancaster, PA.

Designed and managed all phases of market research projects for agency clients — particularly consultants, engineers, and financial institutions.

July 1989 - March 1990: ***Client Relations Manager***, PA Higher Education Assistance Agency, Harrisburg, PA.

Coordinated all transactions and communications between financial lending institutions and PHEAA. Developed and managed servicing/new marketing activities of lender representatives.

December 1987 - June 1989: ***Marketing Officer and Product Manager***, Rhode Island Hospital Trust National Bank, Providence, RI.

Managed development, advertising, marketing, and maintenance of credit and deposit products for retail banking division.

June 1985 - December 1987. ***Product Manager***, Fleet Bank, Providence, RI.

Managed development, advertising, marketing, and maintenance of credit and deposit products for retail divisions of Fleet Bank and its affiliates.

September 1982 - May 1985. ***Research and Teaching Assistant***, Departments of Geology, Brown and Yale Universities.

May 1982 - September 1982. ***Research Geologist***, Chevron Oil Field Research Company, Los Angeles, CA.

PROFESSIONAL REGISTRATIONS AND AFFILIATIONS

Certified Professional Geologist (PG) in Pennsylvania

Member, American Society of Civil Engineers

1051 Columbia Ave., Lancaster, PA 17603 • ph. 717-396-8922 • fx. 717-396-8746 • emailf@enviroscan.com

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

May 25, 2006

Email: jlondon@kozloffstoudt.com

Pennsylvania Public Utility Commission
ATTN: Dawn Imes
Commonwealth Keystone Building
P.O. Box 3265
Harrisburg, PA 17105-3265

ORIGINAL

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746
Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919
Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371
Our File No. 100744-388

Dear Ms. Imes:

Enclosed please find two additional copies of the Direct Testimony of Jeri L. Diesinger, P.G., and Felicia Kegel Bechtel, M.Sc., P.G., Expert Witnesses for Complainant, Township of Spring, Berks County, Pennsylvania, which was filed May 18, 2006. Also enclosed please find an original and four copies of a Certificate of Service, as requested.

Very truly yours,

KOZLOFF STOUDT
Professional Corporation

DOCUMENT FOLDER

Joan E. London

JEL/kab
Enclosure

BTL

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

May 18, 2006

Email: jlondon@kozloffstoudt.com

RECEIVED
2006 MAY 22 AM 9:4
PA P.U.C.
SECRETARY'S BUREAU

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746

Neil R. Rahn and David Singerling, et al
v. Pennsylvania-American Water Co.
Docket No. C-20054919

Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371

Our File No. 100744-388

Dear Mr. McNulty:

Enclosed please find the Enviroscan Report which is an exhibit to the Direct Testimony of Jeri L. Diesinger, P.G., and Felicia Kegel Bechtel, M.Sc., P.G., Expert Witnesses for Complainant, Township of Spring, Berks County, Pennsylvania, which was filed yesterday in the above-captioned matters (the report was inadvertently missing the even sides). Also enclosed please find a copy of Exhibit "3."

By copy of this letter, copies have been served upon all parties of record as shown on the Certificate of Service.

Very truly yours,

DOCUMENT FOLDER

KOZLOFF STOUDT
Professional Corporation

Joan E London
11/17/31

Joan E. London

JEL/kab
Enclosure
cc: All Parties of Record (w/enclosure)

2640 Westview Drive • P.O. Box 6286 • Wyomissing, PA 19610 • Phone: (610) 670-2552 • Fax: (610) 670-2591
www.kozloffstoudt.com

3d

ENVIROSCAN, INC.

RECEIVED

MAY 22 2006

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Final Report
Geophysical Survey
Void/Subsidence Detection/Delineation
Approximately 120' x 120' Survey Area
Creveling Property
3123 South Wagner Circle
Sinking Springs, PA
Enviroscan Reference Number 020535

C-20054746
C-20054919
C-20055371

DOCUMENT
FOLDER

DOCKETED
NOV 0 2 2006

Prepared For: USAA
Prepared By: Enviroscan, Inc.
March 22, 2005

1051 Columbia Avenue • Lancaster, Pennsylvania 17603 • 717/396-8922 • fax 717/396-8746 • email@enviroscan.com • www.enviroscan.com

ENVIROSCAN INC.

March 22, 2005

Ms. Marilyn Reilly
USAA
P.O. Box 88
Hamburg, NJ 07419

RE: Geophysical Survey
Void/Subsidence Detection/Delineation
Approximately 120' x 120' Survey Area
Creveling Property
3123 South Wagner Circle
Sinking Springs, PA
Enviroscan Reference Number 020535

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Purpose and Background

The site is located at a private residence where sinkhole activity has been observed within close proximity to a recent water main breakage. The site, as designated by the client, measures approximately 120' by 120', and according to mapping, compiled by MacLachlan and others (1975), is underlain by the Millbach Formation The Millbach Formation is a pinkish- to medium-gray laminated limestone (Geyer and Wilshusen, 1982). The Millbach Formation typically has well-developed fractures, is moderately resistant, and is often characterized by bedrock pinnacles. Additional mapping, compiled by Kochanov (1988), depicts a number of closed topographic depressions within close proximity to the study area.

1051 Columbia Avenue • Lancaster, Pennsylvania 17603 • (717) 396-6926 • fax (717) 394-6948 • enviro@enviroscan.com • www.enviroscan.com

Karst Processes

Pinnacled bedrock and sinkholes are among the geologic features characteristic of karst terranes — i.e. terranes underlain by soluble carbonate (limestone or dolomite) bedrock in wet climates. In karst terranes, infiltrating precipitation dissolves the carbonate bedrock surface, causing the top-of-rock to retreat downward leaving behind a soil mantle of the insoluble clay and/or silica particles formerly bonded in the rock (see Appendix A, panels I and II). Within the bedrock, percolating water enlarges fractures, bedding planes, etc. to produce solution openings ranging in size from minor seams to scenic caverns.

Sinkholes form where particularly enhanced infiltration into a sufficiently wide solution opening (often called a throat or chimney) washes the soil mantle down into cavities in the underlying rock — a process commonly called soil piping. In areas where the residual soil mantle is clay-rich and cohesive, incipient sinkholes may not display any surficial topographic expression, and are present only as air-, water-, or mud-filled voids which may grow or "stope" upward (see Appendix A, panel III). Eventually, the overlying soil arch collapses under its own weight or under the weight of an overlying structure or passing vehicle. The resulting collapse sink or "sinkhole" is commonly filled with the remains of the soil arch and may display rock at its base (see Appendix A, panel IV). In some cases, surficial subsidence may keep pace with soil piping at depth such that a sinkhole forms by progressive deepening of a surficial depression (sometimes called a subsidence sink) rather than by catastrophic collapse of a stoping void.

Note that the dissolution of bedrock occurs on a time scale measured in thousands to tens of thousands of years. Therefore, the natural occurrence of new sinkholes is a rare occurrence on a human time scale (see Newton, 1987). However, concentration of storm water and excess infiltration due to man's activities can trigger man-made sinkholes virtually anywhere in a karst terrane — even on topographic highs or beneath paved streets or buildings.

Since sinkhole activity is allowed by bedrock cavities, and triggered/driven by infiltrating water, hydraulically active geologic features can act as foci for sinkhole activity. In particular, where open faults, fractures, bedding planes or contacts act as preferred pathways for groundwater infiltration or flow, the water can dissolve networks of solution openings along the fault/fracture/bedding plane/contact. The enhanced infiltration also encourages movement of soil or soil fines into the solution openings, which may cause surficial subsidence and enhanced capture and infiltration of storm water, etc. in a positive-feedback process.

Survey Methods

To fulfill the survey purpose, a combined seismic refraction, microgravity, and GPR survey was completed during the week of March 4, 2005. The principles and scopes of work for each technique are described below.

Seismic Refraction

In order to determine bedrock depths beneath the study area, Enviroscan performed a seismic refraction survey. Knowledge of bedrock depths is desirable for proper interpretation of microgravity data (see below), and can provide information on the presence of deeply weathered zones indicative of faults or fractures. The seismic refraction survey consisted of two profiles or lines oriented roughly east-west (Figure 1). The principles of seismic refraction are described in the accompanying Introduction to Seismic Refraction (Appendix B), and generally involve measuring the travel times of shock waves traveling from a surficial source (shot point) to a linear array of ground motion sensors (geophones). At a distance from the shot point, the first arrivals of seismic energy are waves that have been refracted along whatever density contrast or contrasts (called refractors) are present in the subsurface. The travel times of these refracted arrivals can be used to compute a cross sectional profile of the density contrast(s).

For this survey, a Geometrics 24-channel Smartseis seismograph was used to record seismic travel times at linear arrays of Mark Products 9.5 Hertz geophones spaced at constant 5-foot intervals along each of the two lines. Shot points were spaced at approximately 30-foot intervals, but were occasionally adjusted due to site conditions (see shot point locations on Figure 1) to provide multi-fold, reversed seismic data. At each shot point, seismic signal was generated with the repeated blows of 35-lb airless jackhammer. Waveform data were recorded on the internal hard drive of the seismograph, and were transferred to a 3.5-inch floppy disk for backup. The original seismic waveform data are on permanent file in digital format at Enviroscan. The location of each shot point and geophone was surveyed using a Trimble ATS Robotic Total Station.

Processing and interpretation of the seismic refraction data were completed using the SIP package of computer programs developed for the U.S. Geological Survey by Rimrock Geophysical. First arrival travel times or first breaks were selected on the waveform data using the automatic picking routine SIPIK (with occasional minor manual adjustment) to ensure consistent and objective picking. From the first arrival times and geophone locations, T-X graphs (see Appendix B) were compiled for each line using the routine SIPIN. In general, the T-X data roughly defined two linear segments consistent with a two-layer stratigraphy (presumed to consist of unconsolidated soils over limestone bedrock). Inversion of the T-X data using the iterative ray tracing routine SIPT2 yielded the statistically best-fitting refractor or layer boundary depths and layer velocities.

The P-wave arrival times, together with the shot point-receiver geometry, were then inverted using SeisOPT Pro. SeisOPT Pro uses a globally optimized mathematical inversion to determine the statistically best-fitting velocity distribution in the plane between the surface receivers and a given set of observed arrival times. The velocity models from SeisOPT Pro are presented as seismic profile cross-sectional images on Figure 2. Note that on each profile section, the vertical scale represents elevation in feet. The horizontal axis represents an along-profile distance in feet. Note that the shot points are labeled to facilitate comparison with the survey layout. Figure 2 shows the inferred stratigraphic profiles based on both the SIP and SeisOPT Pro calculations.

Microgravity

In order to map potential sinkholes/voids or other low-density areas in soil and bedrock, Enviroscan performed microgravity measurements at 10-foot intervals along profiles spaced 10 feet apart (see Figure 1). Microgravity meters are capable of measuring the force of gravity with great precision. Worldwide, the acceleration of gravity has been adopted as 980 centimeters per second squared (cm/s^2). However, this is really an average value since the actual measured value of gravity at a given station is dependent upon many things including:

- The elevation of the station reading (since higher stations are farther from the center of mass of the earth),
- The latitude and longitude of the station (since the earth is not truly spherical),
- The positions of the sun and the moon (which creates not only the readily observed ocean tides, but small deformations of the entire earth called earth tides),
- Minute changes in the calibration of the gravity meter (called instrument drift),
- The attraction of massive landforms near or obliquely above the station (i.e. the mass of a nearby mountain actually produces a gravitational attraction which can have a significant effect on a precise gravity reading), and
- The density of materials immediately beneath a station.

The variations in gravity due to the first four factors above typically have magnitudes measured in milligals (where 1000 milligals equal one cm/s^2). The fifth and sixth factors are typically measured in microgals (where 1000 microgals equal one milligal). Since the purpose of a microgravity survey is generally to determine factor six above (i.e. the density or mass distribution in the subsurface of a survey site), the raw gridded or profile gravity measurements that comprise a gravity survey must be corrected for factors one through five. This produces a set of numbers (which are generally several parts per billion of the earth's adopted average gravity) that can be interpreted to determine subsurface density of mass distribution (see e.g. Telford, 1990).

To arrive at a number representative of the subsurface mass distribution, raw gravity readings are subjected to the following corrections:

Reference ellipsoid correction – corrects for the non-spherical shape of the earth based on the latitude and longitude of a station

Earth tide correction – corrects for deformation of the earth under the gravitational influence of the sun and moon

Drift correction – corrects for slow changes in the calibration of a gravity meter based on repeated measurements at a fixed base station

Free air correction – corrects for the elevation of a station above (or below) mean sea level based on a surveyed station elevation

Bouguer slab correction – corrects for the density of the hypothetical slab of material between the station elevations and mean sea level based on an assumed average terrain density

Terrain correction – corrects for the oblique attraction of nearby landforms and the assumed average landform density.

Microgravity data that have been corrected as described above are called complete bouguer gravity, and if collected and processed properly, should retain only information on the mass or density distribution beneath a survey station.

Elevated bouguer gravity anomalies are caused by subsurface mass excesses such as locally shallow bedrock pinnacles or float blocks in the soil profile, or zones of particularly massive bedrock. Low bouguer gravity is caused by mass deficiencies – e.g. lenses of low-density soils, locally deep bedrock (where soil or fill displaces bedrock), and air-, water-, or mud-filled voids. Note that since microgravity alone cannot discriminate between locally deep bedrock and a potential void or low-density soils (both representing local mass deficiencies), precise identification of gravity anomaly sources often requires bedrock depth data from borings or a seismic survey (such as described above).

At each station, the acceleration of gravity was measured using a Scintrex CG-3M Autograv gravimeter. The internal memory of the instrument was used at each station to record the average gravity for a 60-second time-period, the standard error of the average, the reading date and time, and the meter height. A designated station was established as a base station and was occupied approximately every hour and a half to provide drift control data. The elevation and location for each of the microgravity data stations, as well as the seismic shotpoint and geophone locations, were surveyed using a Trimble ATS Robotic Total Station.

The gravity data were processed by applying the reference ellipsoid, earth tide, drift, free air, and bouguer corrections were applied using standard formulae as computed in a spreadsheet. The resulting bouguer gravity, representing only mass variations beneath individual gravity stations, was contoured using the statistical kriging routine in SURFER for WINDOWS by Golden Software. The bouguer gravity response contours are depicted in Figure 3.

Ground Penetrating Radar

In an effort to identify potential voids located beneath the building's foundation, Enviroscan also completed a GPR investigation in both the basement and garage of the residence. Scanning was performed using a GSSI SIR-2000 GPR controller with a color display and internal hard drive, utilizing a 500-megaHertz scanning antenna. GPR systems produce cross-sectional images of subsurface features and layers by continuously emitting pulses of radar-frequency energy from a scanning antenna as it is towed along a survey profile. The radar pulses are reflected by interfaces between materials with differing dielectric properties. The reflections return to the antenna and are displayed on a video monitor as a continuous cross section in real time. Since the electrical properties of metal are distinctly different from soil and backfill materials, metallic pipes and other structures produce dramatic and characteristic reflections. Fiberglass, plastic, concrete, and terra-cotta targets as well as subsurface voids, rock surfaces, soil type changes and concentrations of many types of non-metallic wastes also produce recognizable, but less dramatic reflections.

For this investigation, variously oriented GPR profiles were collected in both the basement and the garage. The orientation of these profiles was determined primarily by the location of stored items in the basement and the garage. The individual radar profiles were examined in the field for variable, high amplitude anomalies of the type commonly associated with voids and/or less dense soils. Areas having this type of anomaly were placed onto a site sketch (Figure 4) for later comparison with the processed gravity data.

Site Inspection

In an effort to identify evidence of pre-existing sinkhole activity, or sources of concentrated infiltration of the type that commonly trigger sinkhole activity, Enviroscan also performed a surficial site inspection. The property rests upon a topographic high allowing surface water to drain away from the property. All of the impermeable surfaces (i.e. paved roadways, etc) at the residence also appear to be graded to shed water away from the house. Furthermore, inspection of the basement did not reveal the presence of any water damage of the type that would suggest previous subsurface water problems near the house. There are no reported water or sewer leakages on the property. The most notable local source of concentrated infiltration was the water main breakage, as reported to Enviroscan by Marilyn Reilly, discharging approximately 1.5 million gallons of water into the subsurface. The reported location of the water main breakage is adjacent to the largest of the observed sinkholes, close to the curb along Iroquois Avenue.

Results

Seismic Refraction

Figure 2 represents the best-fitting seismic models for the two profiles. The seismic profiles suggest the presence of an irregular soil thickness profile – with depths locally exceeding 20 feet, created by an irregular limestone bedrock surface. Note that the inferred bedrock surface along each profile represents an average or smoothed approximation of an actually even more irregular soil-rock interface (see Appendix B, Figure SR-5). Lower velocity materials, consistent with less dense soils, occur at greater depths within close proximity to the identified sinkholes. This indicates that there may be bedrock solution cavities filled with low density transported soils. Note that bedrock solution cavities develop over thousands of years, and would thus represent a pre-existing and allowative (although not directly causative) condition for sinkhole activity.

Microgravity

The color-contoured microgravity survey results are presented in Figure 3. Mass deficiencies are represented with increasing shades of red, while mass excesses are represented with increasing shades of blue. The range of gravity values across the entire survey area is 0.30 milligals, ranging from -0.22 to 0.08 milligals. There are several mass-deficient zones located beneath the survey area. In particular, there appear to be two significantly mass-deficient zones beneath the northwestern and southcentral portions of the building (Figure 3). These zones may represent cavities or disturbed zones in the soil mantle, or cavities in the underlying bedrock. Note that if they are bedrock cavities, they do not coincide closely with the footprints of the observed sinkholes.

Ground Penetrating Radar

The results from the GPR survey are overlain on top of the gravity survey for comparison on Figure 4. Two anomalous areas (depicted with orange shading) of the type commonly associated with subsurface voids and/or less dense soils were detected beneath the basement. The anomalies were located within close proximity to cracks in the concrete as well as mass-deficient zones mapped during the gravity investigation (Figure 4). Due to the presence of steel reinforcing mats within the garage floor, it was not possible to collect any useful radar data in that area.

Conclusions

The seismic, microgravity and GPR data all display clear evidence of sinkhole activity and sinkhole-related features. The seismic data display low velocity zones consistent with disturbed soils and bedrock solution cavities. The gravity data show subsurface mass deficiencies consistent with either disturbed soils or voids (in the soil mantle or bedrock). GPR profiling in the basement also detect anomalously reflective zones whose location were consistent with cracking of the basement slab. Enviroscan recommends that future remediation efforts concentrate within the footprints of the areas having the largest mass deficiencies (depicted with increasing shades of red on Figure 3).

Although it is not possible to determine the exact timing of sinkhole-related activities at this site based solely on the geophysical data, we can offer the following interpretation based on Enviroscan's extensive experience with sinkholes, similar experience of many other geoscientists, as well as Newton (1987). First of all, and in general, the occurrence of new sinkholes is a rare occurrence on a human timescale in the absence of human alteration of natural drainage, and conversely, human alteration of natural drainage is a common cause of sinkholes. In this particular case, the roadway above the sinkhole is paved and would have served as a barrier to infiltration. Outside of a water main that traverses the largest sinkhole, Enviroscan was unable to find another source of water capable of initiating soil transport and subsequent sinkhole development. In addition, the footprints of the sinkholes do not coincide closely with the footprints of subsurface mass deficiencies that may represent the bedrock solution cavities that allow sinkhole activity. Instead, the largest of the sinkholes is coincident with the reported water main break, and at a distance form the inferred possible bedrock cavities. Therefore, it is Enviroscan's professional opinion that the sinkhole location is controlled by the location of concentrated infiltration from the water main break, and that the sinkhole activity was triggered by the water main breakage, and consequent loss of 1.5 million gallons of water into the subsurface.

Limitations

The geophysical survey described above was completed using standard and/or routinely accepted practices of the geophysical industry and equipment representing the best available technology. Enviroscan does not accept responsibility for survey limitations due to inherent technological limitations or unforeseen site-specific conditions. Note that the measurements reflect conditions at the locations of actual survey stations, and that interpolation of data and interpretations between survey stations can be highly speculative in karst terranes. Note also that since soil piping/sinkhole activity can be triggered virtually anywhere in karst terranes under the influence of significant changes in surface or subsurface hydraulics (e.g. re-grading, stormwater re-routing, etc.) Enviroscan cannot make any warranties concerning the future occurrence or distribution of sinkhole activity. However, we make every effort to identify and notify the client of such limitations or conditions.

We have enjoyed and appreciated the opportunity to have worked with you. If you have any questions, please do not hesitate to contact me.

Sincerely,
Enviroscan, Inc.

James E. Bock, M.Sc., P.G.
Geophysics Project Manager

Technical Review By:
Enviroscan, Inc.

Felicia Kegel Bechtel, M.Sc., P.G.
President

Enc.:
- Figure 1: Geophysical Survey Data Coverage
- Figure 2: Seismic Refraction Profiles
- Figure 3: Bouguer Gravity Data Contours
- Figure 4: Ground Penetrating Radar Results
- Appendix A: Schematic Sinkhole Formation Processes
- Appendix B: Introduction to Seismic Refracnon
- References

Cc.: Mr. Russel Daniels, Paul Zamrowski & Associates

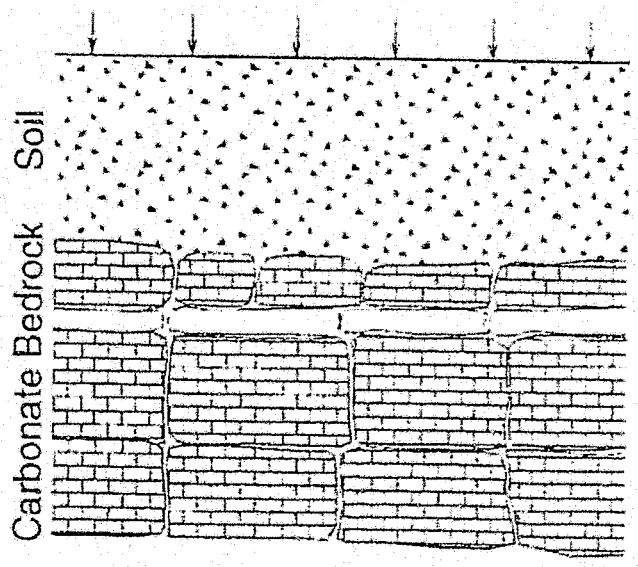
Appendix A

Schematic Sinkhole Formation Processes

105 Columbia Avenue • Lancaster, Pennsylvania 17603 • 717/396-6922 • Fax 717/396-8746 • email@enviroscan.com • www.enviroscan.com

I

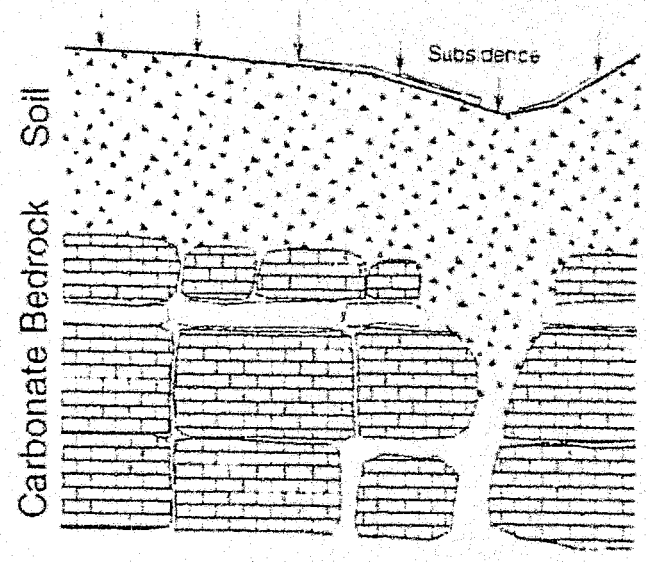
Precipitation



Infiltration

II

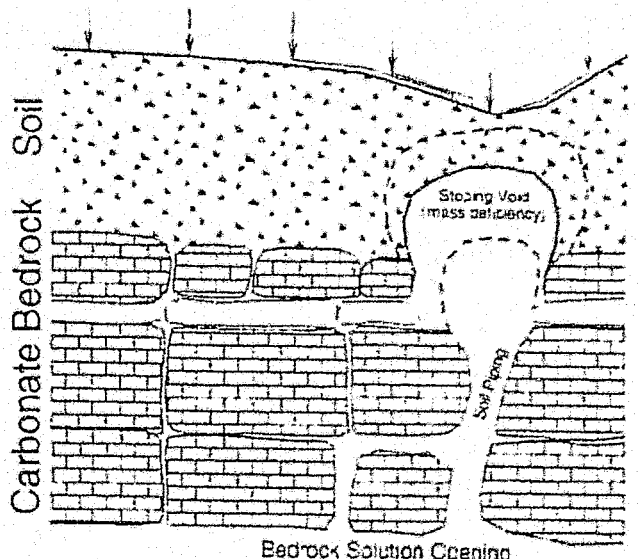
Precipitation And Run-Off



Concentrated Infiltration into and Dissolution of Bedrock Cavities (mass deficiencies)

III

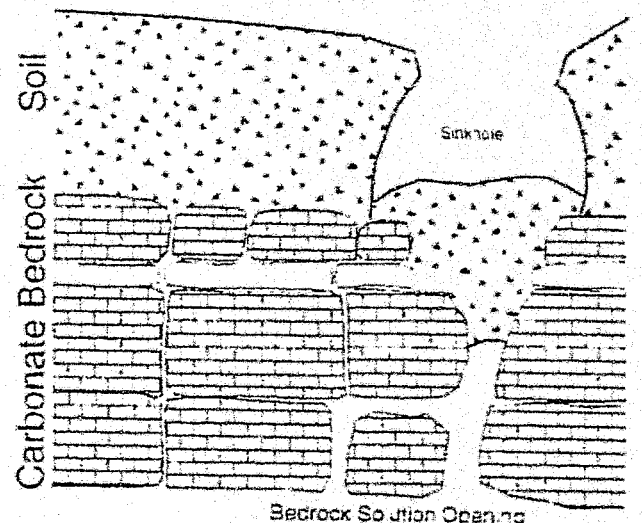
Enhanced Precipitation and Run-Off



Bedrock Solution Opening (Mass deficiencies)

IV

Soil Arch Collapse



Bedrock Solution Opening (Mass deficiencies)

Typical Time Scale

I	II	III	IV
Thousands to Millions of Years	Indefinite (may be stable until activated by enhanced precipitation)	Hours to Months (may be accelerated by enhanced precipitation)	

Schematic Karst Processes

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Appendix B

Introduction to Seismic Refraction

135 Colorado Avenue • Lancaster, Pennsylvania 17603 • 717/396-8922 • Fax 717/396-8746 • email@enviroscan.com • www.enviroscan.com

Introduction to Seismic Refraction

by

Timothy D. Bechtel, Ph.D., P.G.

Energy

Mechanical elastic (seismic) waves generated by a hammer blow, weight drop, or explosion.

Sensitivity

Sensitive to elastic properties or moduli – generally strongly correlated with density.

Basic Equipment

Recording Seismograph (generally 24 or more channels); Geophones (one for each channel); Geophone cable; Hammer or weight plus strike plate or explosives. Trigger switch.

Common Applications

Determination of the depth and dip of soil horizons and bedrock surfaces. Recent processing advances allow some detection and delineation of discrete targets.

Principles

In a uniform isotropic earth, the shock wave from a blow or explosion at the surface travels outward and downward in a hemispherical wave front like a three-dimensional ripple from a pebble in a still pond. At any point on the wave front, a straight line from the shock source to the wave front depicts the path of the seismic wave, and is called a ray path (see Figure SR-1). In reality, there are several independent shock waves; the fast-moving primary, compressional or P wave front; the slower moving secondary, shear or S wave (both of which form hemispherical wavefronts); and several disk-like wave fronts that travel only along the surface of the earth (called surface waves or ground roll). For the purposes of most seismic refraction surveys, only the fastest moving wave front — the P wave — is considered. S-wave refraction is used in selected circumstances where complete determination of elastic moduli is desired – particularly when it may be desirable to eliminate the effects of water saturation.

In a layered earth, the hemispherical P shock wave defined by the radially distributed P ray paths are deflected according to the laws of optics (Snell's Law) at interfaces between materials with differing seismic velocities (i.e. densities or elastic properties). Figure SR-2 depicts the deflection of ray paths due to an increase in P velocity at a bedding plane. The type of deflection that a ray path will undergo is dependent upon the angle at which it strikes the interface, and falls into one of four categories:

1) Some direct rays (green in Figures SR-2 and SR-3) travel parallel to the ground surface at the seismic velocity of the upper layer, do not strike the underlying interface, and consequently are not deflected.

2) Reflected rays (purple in Figures SR-2 and SR-3) arise where direct rays strike the interface, and a portion of the energy is reflected symmetrically back towards the surface.

3) The portion of the energy of the incident direct wave that is not reflected upward is refracted, or bent as it crosses the interface – making refracted waves in the lower layer (red in Figures SR-2 and SR-3).

4) At a precise angle called the critical angle, the incident ray is refracted directly along the interface, and travels at the higher seismic velocity of the lower layer (see Critically Refracted Wave in Figure SR-3). As this critically refracted or head wave races along beneath the interface, it generates a secondary elastic disturbance that travels back to the surface along ray paths that define a wave front analogous to the bow wake of a ship. These returning rays again travel at the slower velocity of the upper layer.

To perform a refraction survey, a linear array of ground motion sensors or geophones is spaced out from the seismic source or shot point, forming a geophone spread. Each geophone is connected to a separate channel in a seismograph which records a wiggle trace representing the ground motion resulting from the passage of the various seismic rays.

As depicted in the time-distance (T-X) curve in Figure SR-4, the layered earth structure can be determined by analyzing the seismographic wiggle traces. At distances close to the seismic source, the first wiggle or ground motion (the first arrival after the shot) is due to passage of the direct wave travelling at the velocity of the upper layer. Reflected waves arrive later since they have by definition traveled a greater distance at the same velocity (additional later wiggles are caused by passage of the more slowly travelling S and surface waves). Beyond a distance dictated by the critical angle, the first arrival of seismic energy represents the head wave of the critically refracted ray. These refracted rays also by definition travel a greater distance than the direct wave. However, along part of their path, they have traveled at the higher velocity of the underlying more consolidated layer. At greater distances from the shot point, where the path length in the higher velocity layer becomes significant, the head wave arrivals actually race past the direct wave and become the first arrival (see labeled crossover in Figure SR-4). By extension, it can be shown that if a third layer with even greater velocity lies at greater depth, the head wave from this layer will become the first arrival at a sufficient distance from the shot point.

In conventional seismic refraction, only the first P wave arrivals can be reliably selected on a wiggle trace record. The later reflected P wave arrivals are generally obscured by the slower-travelling S and surface waves, and the very slow air blast or sound wave from the shot. To interpret a seismic refraction record, the first arrival travel times are measured for each wiggle trace and plotted at the appropriate point on a time-distance (T-X) curve (see Figure SR-4). In a plane-layered earth, these first arrivals define a series of line segments, each representing a discrete layer. The seismic velocity of each layer is simply the reciprocal of the slope of the associated line segment. The thickness of each layer can be calculated from the distances where the line segments intersect. The mathematics for these calculations are easily derived, and can be found in any introductory geophysics text.

True geologic strata are rarely perfectly horizontal. The effect of a dipping interface on a travel time curve cannot be recognized using a single shot point. Calculations based on a T-X curve from a single shot point should always be considered as producing apparent depths to interfaces and apparent seismic velocities for all but the uppermost layer. To determine the true depths and dips of interfaces and the true seismic velocities, it is necessary to reverse the seismic line; that is, move the shot point to a location at or beyond the farthest geophone in the spread, and repeat the shot. The calculation of true depths, dips and velocities from reversed seismic lines is also readily performed.

Capabilities

Conventional seismic refraction can yield accurate measurements of depths and attitudes of soil horizons, groundwater tables, and other relatively distinct and planar strata. Modern computer analysis of multi-fold seismic refraction data (i.e. with many and overlapping shot points) can provide delineation of undulating or even irregular (as opposed to simply planar) interfaces. The latest generation of computer processing techniques require very high-fold data, but in favorable conditions, are capable of resolving even discrete targets such as foundation elements, tunnels or cavities, and can resolve gradational boundaries as well as distinct interfaces. The seismic P-wave velocities of materials are generally an indication of relative density or compaction. S-wave refraction data (collected using specialized geophones, shock sources and field procedures) can provide S-wave velocities that bear a well-constrained empirical relationship to standard penetration test (SPT) N values and therefore bearing capacity. For surveys where matching P- and S-wave velocities are determined, the dynamic elastic moduli of subsurface materials can be calculated (including Poisson's Ration, Young's or Bulk Modulus, and Shear Modulus or Rigidity).

Limitations

Seismic data is collected at spaced geophones, and therefore does not provide continuous profile data. If geophones are spaced too widely, thin layers can be missed entirely.

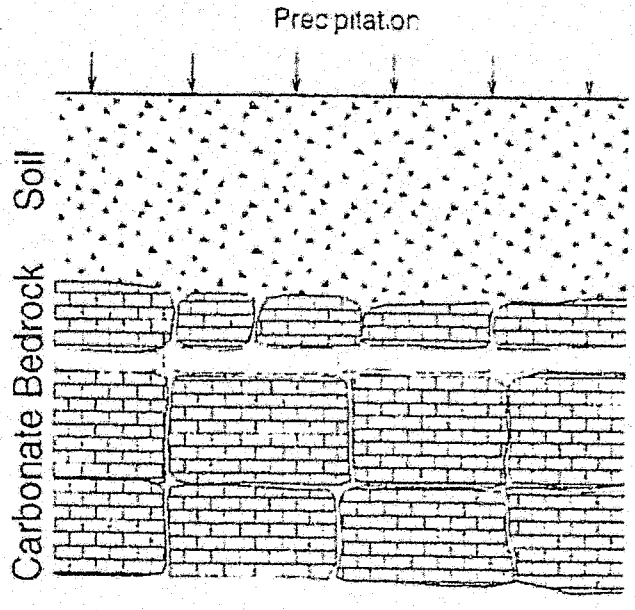
Conventional refraction interpretations are only accurate where the velocity of strata increase with depth. Velocity inversions not only alter the data, but are particularly insidious since the presence of a low velocity zone at depth is not apparent in first arrival data. The latest generation of computer processing techniques do allow detection and delineation of laterally restricted low velocity zones (e.g. tunnels, cavities, gravel lenses, etc.).

Sharp or dramatic interface relief such as limestone pinnacles cannot always be resolved even with very tight geophone spacing. Therefore, refraction profiles of expectedly irregular interfaces should be assumed to represent somewhat smoothed versions of actual relief (see e.g. Figure SR-5).

Seismic records can contain noise due to heavy machinery vibrations, vehicular traffic, and sometimes even wind or distant earthquakes. Care must be taken to identify potential sources of seismic noise prior to beginning a survey.

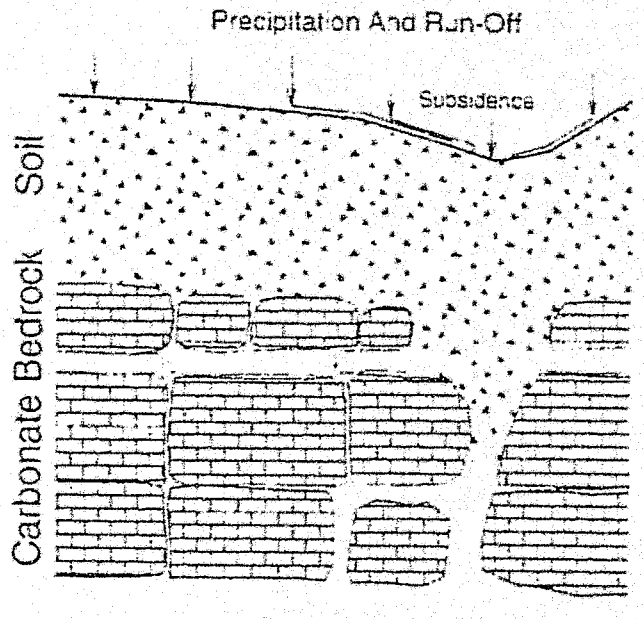
The effective survey depth is limited to approximately 1/5 of the greatest shotpoint to geophone distance. Therefore, very deep surveys may require impractically long lines (requiring consideration of other geophysical techniques such as seismic reflection).

I



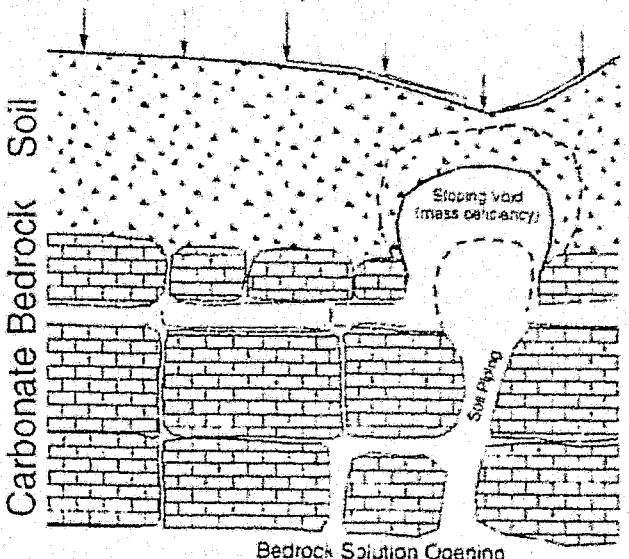
Infiltration

II



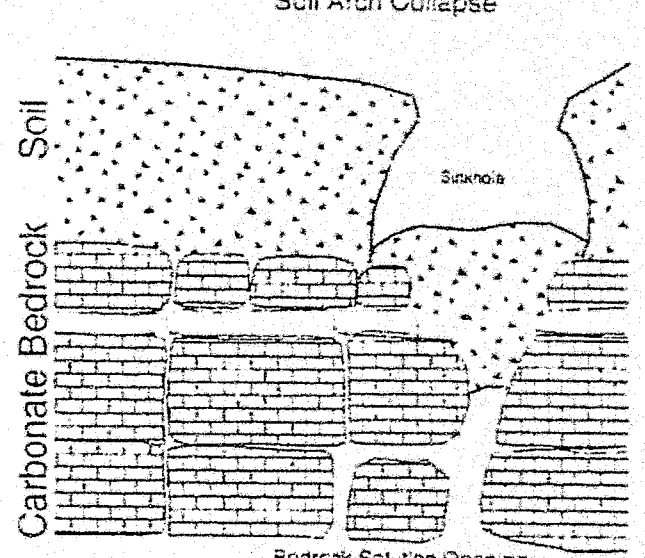
Concentrated Infiltration into and Dissolution of Bedrock Cavities (mass deficiencies)

III



Bedrock Solution Opening (Mass deficiencies)

IV



Bedrock Solution Opening (Mass deficiencies)

Typical Time Scale

I — Thousands to Millions of Years

II — Indefinite (may be stable until activated by enhanced precipitation)

III — Hours to Months (may be accelerated by enhanced precipitation)

IV

Schematic Karst Processes

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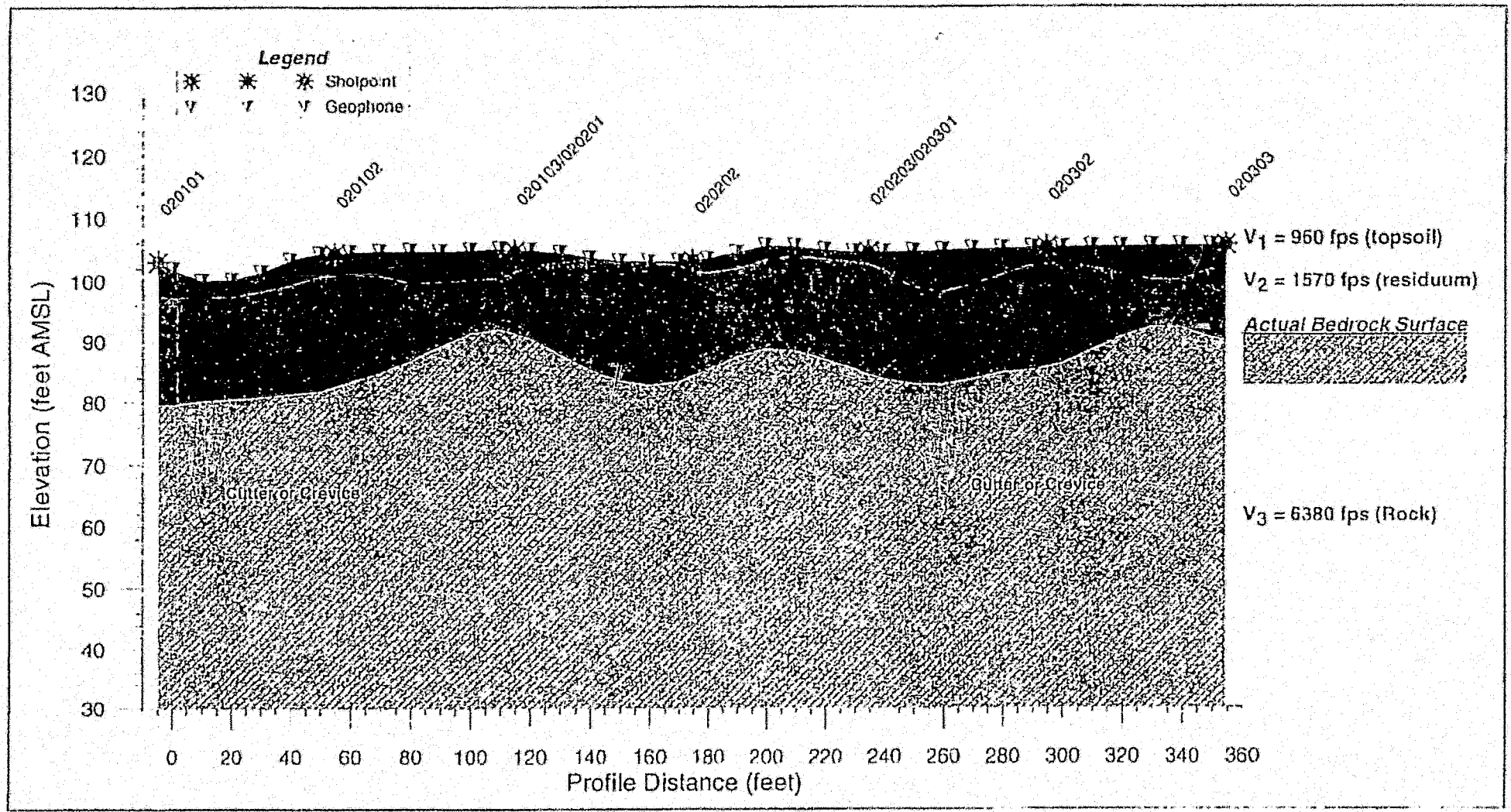


Figure SR-5 **Example Karst Terrane Seismic Profile** Revised 01/2001

Appendix C

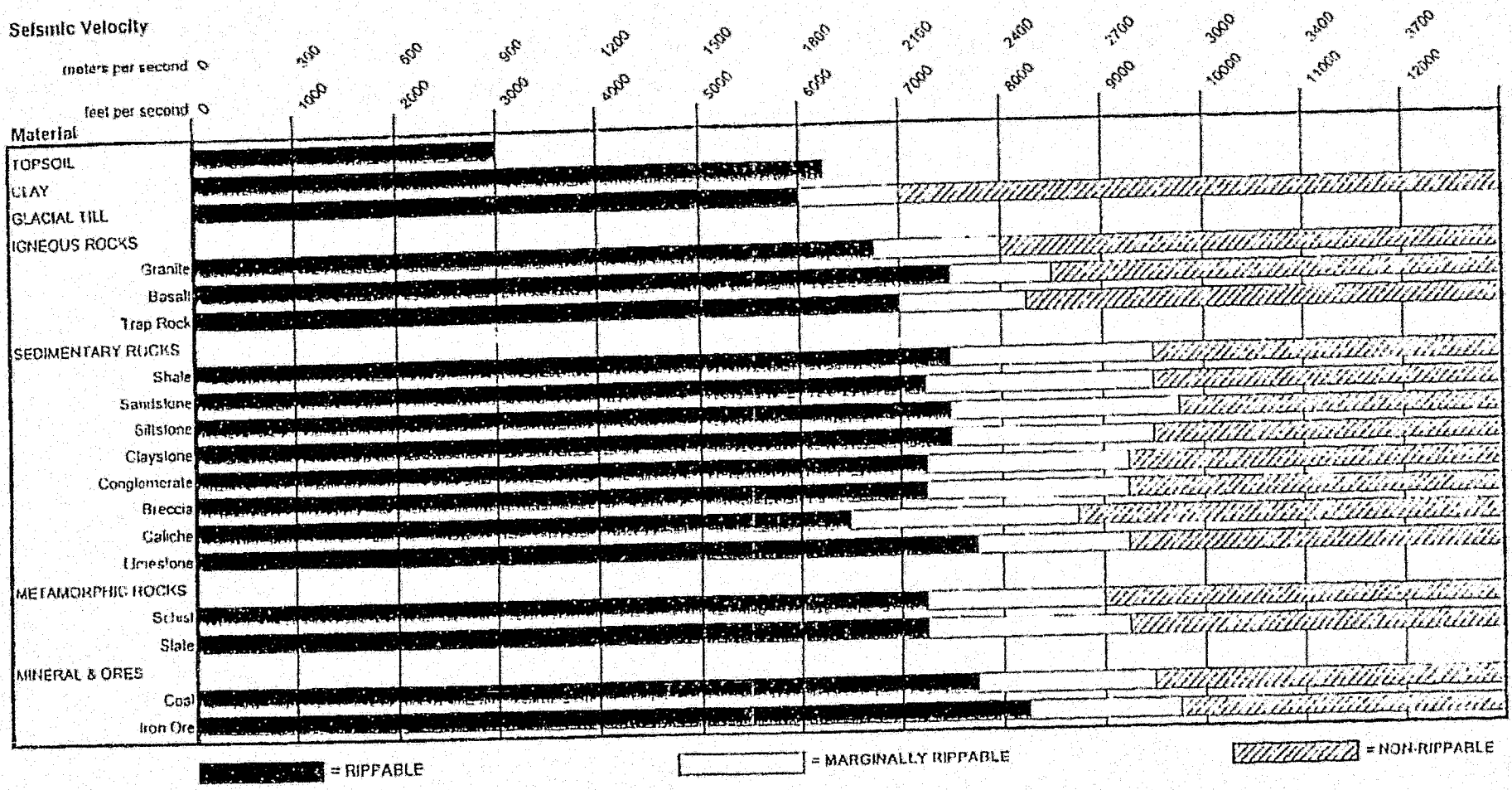
Ripping Charts

Ripping Chart *

D9R

Multi or Single Shank No. 9 Ripper

Estimated by Seismic P-Wave Velocities



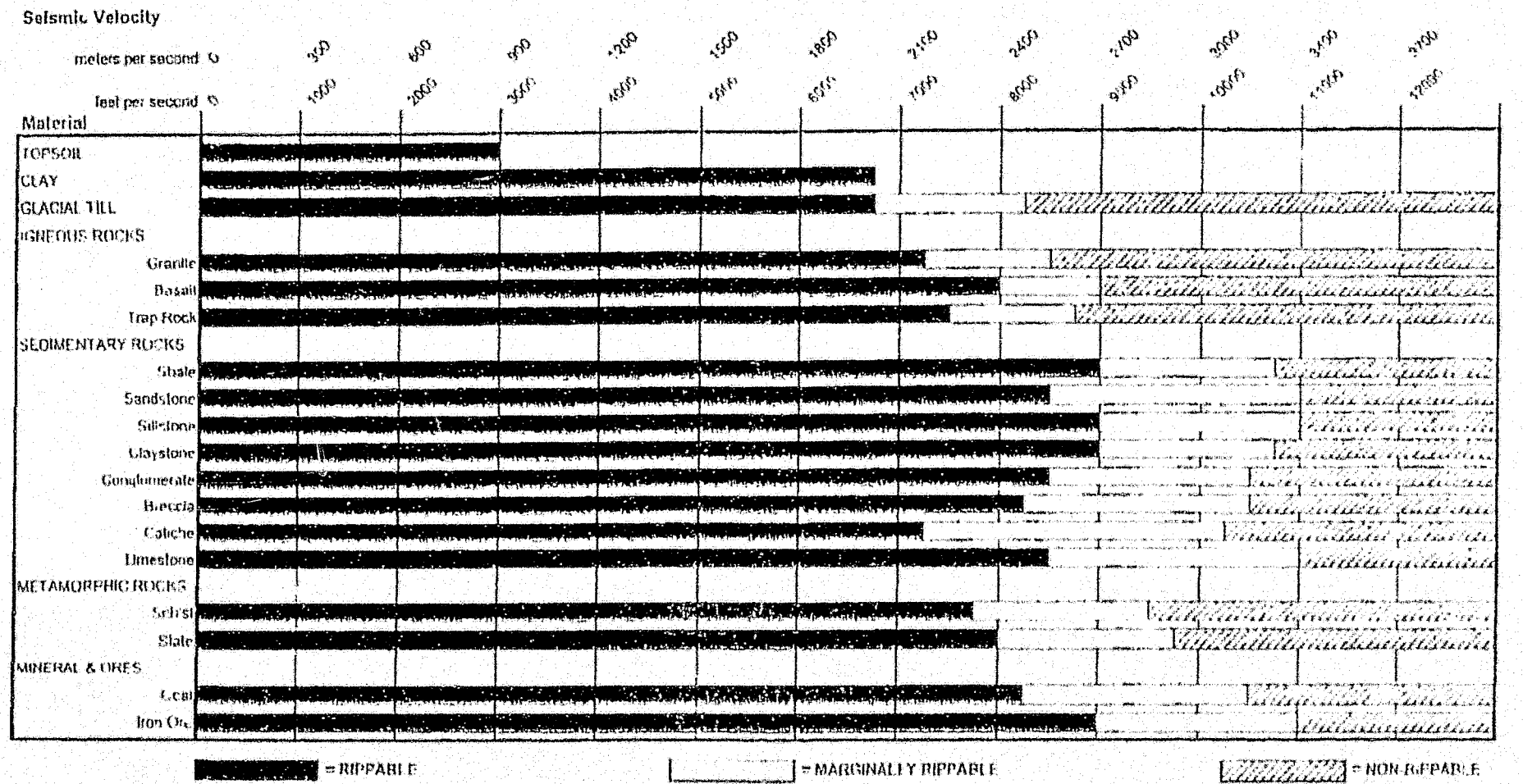
* Caterpillar Performance Handbook, Edition 26, Caterpillar, Inc., Peoria, Illinois

Ripping Chart *

D10N

Multi or Single Shank No. 10 Ripper

Estimated by Seismic P-Wave Velocities

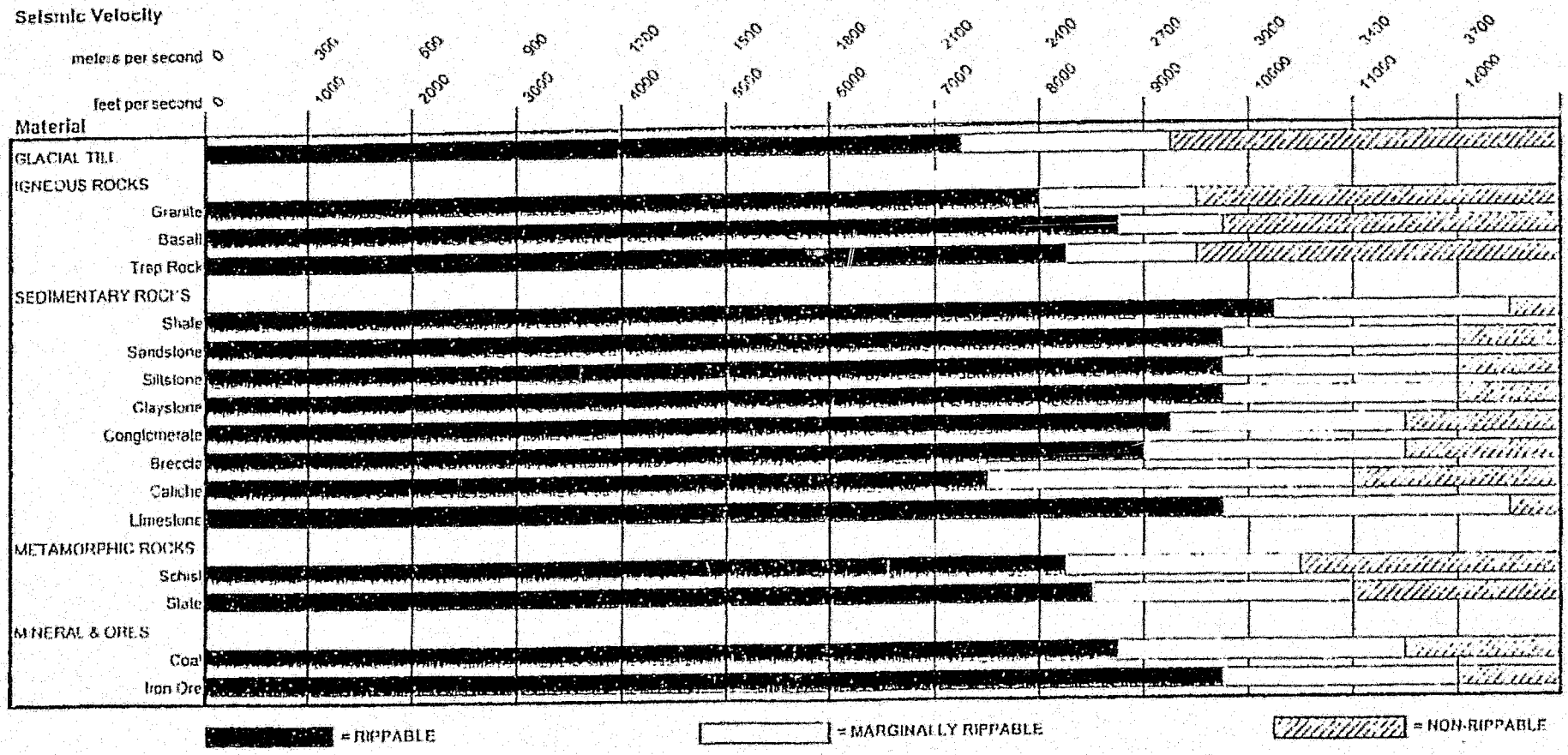


* Caterpillar Performance Handbook Edition 26, Caterpillar Inc., Peoria, Illinois

Ripping Chart *

D11N

Multi or Single Shank No. 11 Ripper
Estimated by Seismic P-Wave Velocities



* Caterpillar Performance Handbook Edition 26, Caterpillar, Inc., Peoria, Illinois

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Attorney I.D. #67934
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P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP,	:	
Complainant	:	
v.	:	Docket No.: C-20054746
	:	
PENNSYLVANIA AMERICAN WATER COMPANY,	:	
Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL	:	
Complainants	:	
v.	:	Docket No.: C-20054919
	:	
PENNSYLVANIA AMERICAN WATER COMPANY,	:	
Respondent	:	
WILSON SCHOOL DISTRICT,	:	
Complainant	:	Docket No.: C-20055371
	:	
v.	:	
	:	
PENNSYLVANIA AMERICAN WATER COMPANY	:	
Respondent	:	

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing DIRECT TESTIMONY OF FELICIA KEGEL BECHTEL, M.Sc., P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY, was served on May 17, 2006 upon the following party(ies) by first class mail and electronic mail:

Dianne E. Dusman,
Senior Assistant Consumer Advocate
Commonwealth of Pennsylvania
Office of the Consumer Advocate
555 Walnut Street, 5th Fl., Forum Place
Harrisburg, PA 17101-1923

Neil Rahn
Stonegate Community
Wagner Farms Homeowners Assoc.
3119 S. Wagner Circle
Sinking Spring, PA 19608

Mark Bridge, Esquire
Nancy Longo, Esquire
101 East Lancaster Avenue
Wayne, PA 19087

David Singerling
Stonegate Community
Wagner Farms Homeowners Assoc.
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Seth Mendelsohn, Esq.
Pennsylvania American Water Co.
800 West Hershey Park Drive
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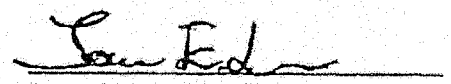
KOZLOFF STOUDT
Professional Corporation

Dated: By: 

Joan E. London, Esquire
Attorney for Township of Spring

C-20054746 et al

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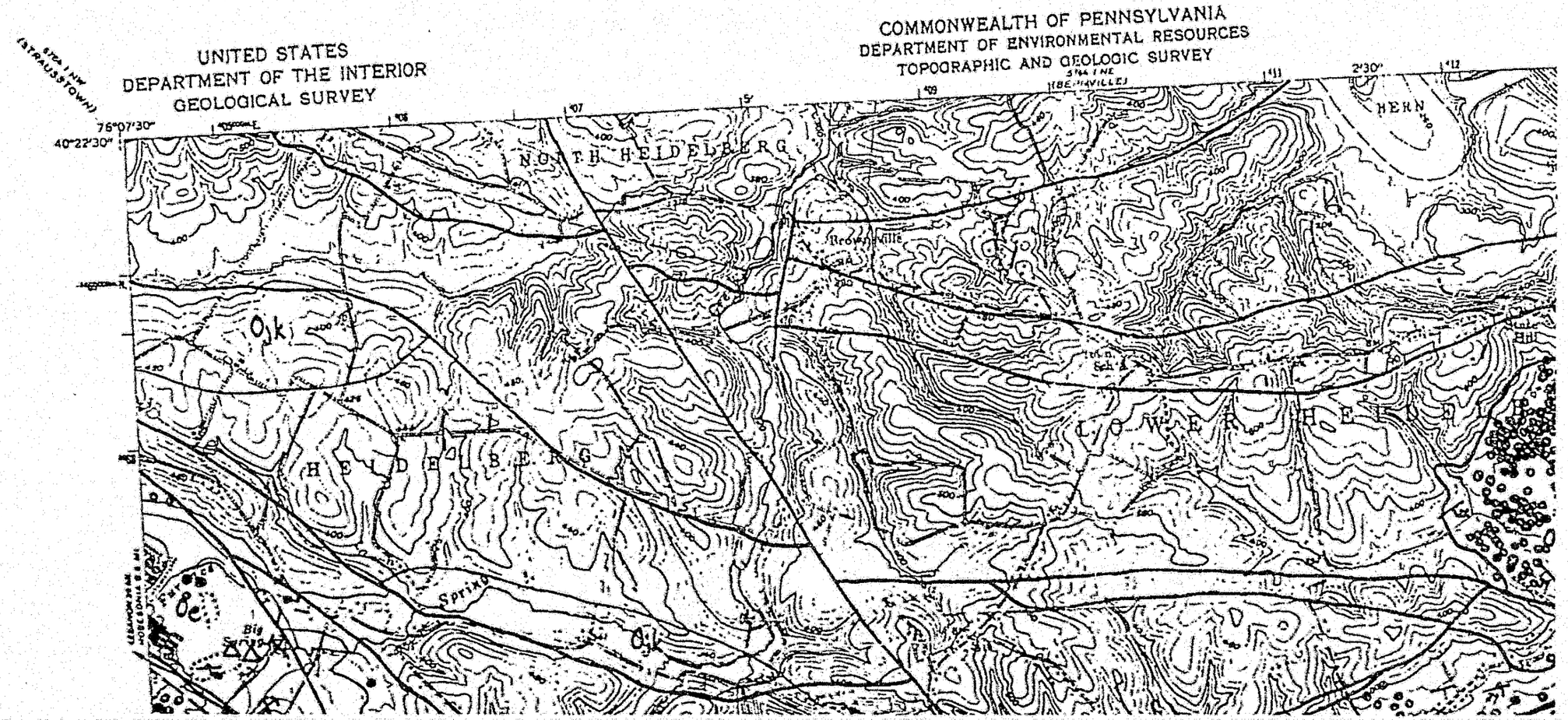

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BINGAMAN HESS

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RALPH J. ALTHOUSE, JR.
RETIRED

LLEWELLYN R. BINGAMAN
1907-1996
RAYMOND K. HESS
1919-2005
J. WENDELL COBLENTZ
1911-2003
JAMES F. BELL
1921-1988

June 6, 2006

VIA FEDERAL EXPRESS

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

RE: Neil R. Rahn, David Singerling, et al v. PA American Water; No.: C-20054919
Township of Spring v. PA American Water; No.: C-20054746
Wilson School District v. PA American Water, No.: C-20055371
Our File No.: 10176-1041

Dear Secretary McNulty:

Enclosed please find for filing an original and one copy of Respondent's, Pennsylvania American Water Company, Prehearing Conference Memorandum. Kindly file the original, time-stamp the extra copy and return it to me in the enclosed self-addressed, postage paid envelope.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

BINGAMAN HESS

Harry D. McMunigal

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JUN 06 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

HDM:PLT:mny
Enclosures
cc(w/enc.): Mr. Neil Rahn (neilrr@comcast.net)
Mr. David Singerling (davidsingerling@netzero.net)
Dianne E. Dusman, Senior Assistant Consumer Advocate (ddusman@paoca.org)
Joan E. London, Esquire (jlondon@kozloffstoudt.com)
Kenneth Zielonis, Esquire (kz@stevenslee.com)
Nancy E. Longo, Esquire(nlongo.bridgelaw@verizon.net)

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	Docket No.: C-20055371
v.	:	
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

PENNSYVLANIA AMERICAN WATER COMPANY'S
PREHEARING CONFERENCE MEMORANDUM

A. **WITNESSES AND AREAS OF TESTIMONY:**

1. John Rothwell, Network Supervisor, Pennsylvania American Water Company, 920 Mt. Home Road, Sinking Spring, PA 19608;

Areas of Testimony:

- Involvement and responses to the subject water main break,
- Work and maintenance on the entire water distribution system;
- Safety and reliability of the water system;
- Causation of the water main break;
- Appropriateness of all PAWC systems and processes regarding leak detection;
- Appropriateness of all PAWC systems and processes for shut-down in the event of a leak;
- PAWC reasonable procedure with equipment and maintenance of lines;
- PAWC practices and procedures in maintaining a safe and reliable system,

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AUG 31 2006

- Information regarding sinkhole activity in the area;
- History of no prior repair to the main on Iroquois Avenue;
- Prior sinkhole repair noted in the area that was discovered by PAWC while excavating the water main on Iroquois Avenue;
- Prior sinkhole repair not performed by PAWC or predecessor company.

2. Brian J. Hassinger, P.E., Southeast Region Director of Network, Pennsylvania American Water Company, 800 West Hersheypark Drive, Hershey, PA 17033;

Areas of Testimony:

- Involvement and responses to the subject water main break;
- Work and maintenance on the entire water distribution system;
- Safety and reliability of the water system;
- Causation of the water main break;
- Appropriateness of all PAWC systems and processes regarding leak detection;
- Appropriateness of all PAWC systems and processes for shut-down in the event of a leak;
- PAWC reasonable procedure with equipment and maintenance of lines;
- PAWC practices and procedures in maintaining a safe and reliable system.

3. Jay W. Vaughan, Director of Road Services, Township of Spring, 2800 Shillington Road, Reading, PA 19608;

Areas of Testimony:

- Visual inspections of the accident scene;
- Knowledge of Spring Township of sinkholes in/or around the subject area;
- Areas of inquiry covered in the deposition testimony provided on May 4, 2006.

4. Jerri L. Diesinger, P.G., Director of Engineering Services, Township of Spring, 2800 Shillington Road, Reading, PA 19608;

Areas of Testimony (Fact Witness):

- Visual inspections of the accident scene;
- Knowledge of Spring Township of sinkholes in/or around the subject area;
- Areas of inquiry covered in the deposition testimony provided on May 4, 2006.

5. Craig Clauser, P.E., President, Craig Clauser Engineering Consulting, Inc., 1610 Hunter Circle, West Chester, PA 19380;

Areas of Testimony:

- Metallurgical analysis of the subject pipe and circumstances surrounding the break;
- Rebuttal of conclusions reached by Complainants' experts.

6. Eric P. Grindrod, P.G., Director, Geoenvironmental Services, Spotts, Stevens, McCoy, Engineers & Consultants, 1047 N. Park Road, P.O. Box 6307, Reading, PA 19610-0307,

Areas of Testimony:

- Geological causation and considerations of the subject water main break;
- General geological conditions of the subject area;
- Causation of the subject break;
- Post-break geological conditions of the general area;
- Rebuttal of conclusions reached by Complainants' experts;
- Post-break testing and remediation.

7. Richard L. Kanaskie, P.G., C.S.E.O., Geologist, Spotts, Stevens, McCoy, Engineers & Consultants, 1047 N. Park Road, P.O. Box 6307, Reading, PA 19610-0307;

Areas of Testimony:

- Geological causation and considerations of the subject water main break;
- General geological conditions of the subject area;
- Causation of the subject break;
- Post-break geological conditions of the general area;
- Rebuttal of conclusions reached by Complainants' experts;
- Post-break testing and remediation.

8. Any and all witnesses listed by any parties in their Prehearing Conference Memoranda

9. Any and all witnesses needed generally for purposes of rebuttal to testimony provided by Complainants' witnesses.

Pennsylvania American Water Company reserves the right to supplement this list of witnesses upon reasonable advance notice.

BINGAMAN, HESS, COBLENTZ & BELL, P.C.

By: _____

Harry D. McMunigal, Esquire
Attorney I.D. No.: 38386
Treeview Corporate Center, Suite 100
2 Meridian Blvd., Wyomissing, PA 19610
610.374.8377
Attorney for Respondent -
Pennsylvania American Water Company

Seth Mendelsohn, Esquire, Corporate Counsel
Pennsylvania American Water Company
800 West Hershey Park Drive
Hershey, PA 17033

RECEIVED
JUN 0 6 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant v.	: : :	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : :	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v.	: : :	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : :	
WILSON SCHOOL DISTRICT, Complainant v.	: : :	Docket No.: C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY Respondent	: : :	

CERTIFICATE OF SERVICE

I, Harry D. McMunigal, Esquire, hereby certify that a true and correct copy of the foregoing Pennsylvania American Water Company's Prehearing Conference Memorandum was served on June 6, 2006 upon the following party(ies) as noted:

(via email: ddusman@paoca.org)
Dianne E. Dusman,
Senior Assistant Consumer Advocate
Commonwealth of Pennsylvania
Office of the Consumer Advocate
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, PA 17101-1923

(via email: neilrr@comcast.net)
Neil Rahn
Stonegate Community
Wagner Farms Homeowners Association
3119 S. Wagner Circle
Sinking Spring, PA 19608

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JUN 8 R 2006
PA PUBLIC UTILITY COMMISSION

(via email: davidsingerling@netzero.net)
David Singerling
Stonegate Community
Wagner Farms Homeowners Association
3128 S. Wagner Circle
Sinking Spring, PA 19608

(via email: jlondon@kozloffstoudt.com)
Joan E. London, Esquire
Kozloff Stoudt
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610

(via email: kz@stevenslee.com)
Kenneth Zielonis, Esquire
Stevens & Lee
17th N. Second Street, 16th Floor
Harrisburg, PA 17101

(via email: nlongo.bridgelaw@verizon.net)
Nancy E. Longo, Esquire
Mark M. Bridge, Esquire, P.C.
101 East Lancaster Avenue, Suite 304
Wayne, PA 19087

Dated: 6/6/06

BINGAMAN, HESS, COBLENTZ & BELL, P.C.

By: _____

Harry D. McMunigal, Esquire
Attorney I.D. No.: 38386
Treeview Corporate Center, Suite 100
2 Meridian Blvd.
Wyomissing, PA 19610
610.374.8377
Attorney for Respondent -
Pennsylvania American Water Company

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JUN 06 2006

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

June 7, 2006

Email: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

2006 JUN -8 PM 8:54
PA PUC
SECRETARY'S BUREAU

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746
Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919
Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371
Our File No. 100744-388

Dear Secretary McNulty:

Enclosed please find an original and four (4) copies of the Pre-Hearing Conference Memorandum of the Township of Spring. Please file the original and return the extra copy to my attention in the enclosed self-addressed, postage prepaid envelope.

By copy of this letter, copies have been served upon Administrative Law Judge Wayne L. Weismandel and all parties of record as shown on the Certificate of Service.

Very truly yours,

DOCUMENT FOLDER

KOZLOFF STOUDT
Professional Corporation

Joan E. London

JEL/kab
Enclosure
cc: Administrative Law Judge Wayne L. Weismandel (w/enclosure)
All Parties of Record (w/enclosure)

3

2640 Westview Drive • P.O. Box 6286 • Wyomissing, PA 19610 • Phone: (610) 670-2552 • Fax: (610) 670-2591
www.kozloffstoudt.com

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
2640 Westview Drive, P O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

RECEIVED
2006 JUN -8 AM 8:54
PA P.U.C.
SECRETARY'S BUREAU

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : Assigned to: : Wayne L. Weismandel, A.L.J.
NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : Assigned to: : Wayne L. Weismandel, A.L.J.
WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : Assigned to: : Wayne L. Weismandel, A.L.J.

PRE-HEARING CONFERENCE MEMORANDUM OF TOWNSHIP OF SPRING

This Prehearing Conference Memorandum is submitted by the Township of Spring, Complainant in the matter docketed to Docket No. C-20054746:

DOCUMENT FOLDER

DOCKETED
NOV 07 2006

Witnesses and Areas of Testimony Expected to be Called by the Township of Spring

1. Jay W. Vaughan, Director of Road Services
Township of Spring
2800 Cornwall Terrace
Reading, PA 19608
(610) 678-5393

Mr. Vaughan will testify to:

a. his position with the Township, job duties, and personal knowledge regarding conditions of roads and rights-of-way in the Township;

b. his receipt of the initial reports of loss of water pressure and low water pressure

c. his contacts with Pennsylvania-American Water Company ("PAWC") regarding the complaints of low water pressure,

d. his personal knowledge of PAWC's attempts to locate the water main break, and eventual PAWC's discovery of the water main break at Iroquois Avenue and Wagner Circle.

e. his observations of the area of the water main break, including the condition of the property of the Crevelings;

f. his observations of the excavation of the water line,

g. his observations of repair measures by PAWC and their employees, agents, and contractors,

h. his knowledge of and investigation into to soil and ground conditions in the vicinity of Wagner Circle/Iroquois Avenue,

i. any personal knowledge (or lack thereof) regarding allegations of the Township having filled a sinkhole in the vicinity of the water main break in question

j. his personal knowledge of sinkhole activity and subsidence since the date of the water main break,

k. the position of Township officials with respect to preventive measures to prevent or abate recurrence, and,

l. any areas of inquiry raised by other parties at the time of the hearing, or which were raised in Mr. Vaughan's deposition.

2. Jeri L. Diesinger, P.G., Director of Engineering Services
Township of Spring
2800 Cornwall Terrace
Reading, PA 19608
(610) 678-5393

Ms. Diesinger will testify to the following:

a. any and all of the items which are the subject of the testimony of Jay Vaughan, as listed above,

b. her position with the Township and work history with the Township,

c. expert opinion testimony as to the causation for the water main break and resultant damage, and as to preventive measures to prevent recurrence, as set forth in her written direct examination testimony, which was previously submitted.

3. Felicia Kegel Bechtel, M.Sc., P.G.
Enviroscan, Inc.
1051 Columbia Avenue
Lancaster, PA 17603
(717) 396-8922

Ms. Bechtel will testify to the following:

a. her professional experience and qualifications,

b. to the conclusions contained in the report dated March 22, 2005, titled "Final Report, Geophysical Survey, Void/Subsidence Detection/Delineation, Approximately 120' x 120' Survey Area, Creveling Property, 3123 South Wagner Circle, Sinking Spring, PA, Enviroscan Reference Number 020535," as set forth in her written direct examination testimony, which was previously submitted.

4. Any other parties to the case, as to their personal knowledge with respect to liability and/or damages.

5. Any lay or expert witnesses called by any other party to this matter.

6. Complainant, Township of Spring, reserves the right to amend this Memorandum and call any fact or opinion witness, with reasonable notice to Your Honor, counsel, and unrepresented parties.

KOZLOFF STOUDT
Professional Corporation

Joan E. London

Joan E. London, Esquire
2640 Westview Drive
P.O. Box 6286
Wyomissing, PA 19610
(610) 670-2552

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2006 JUN -8 AM 8:55
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
Attorney I.D. #67934
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Wyomissing, PA 19610
(610) 670-2552

SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING,	: Docket No. C-20054746
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID	: Docket No. C-20054919
SINGERLING, *et al.*,	:
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT,	: Docket No. C-20055371
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing Pre-Hearing Conference Memorandum, were served on June 7, 2006 upon the following party(ies) as noted:

(via email: ddusman@paoca.org)
Dianne E. Dusman,
Senior Assistant Consumer Advocate
Commonwealth of Pennsylvania
Office of the Consumer Advocate
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, PA 17101-1923

(via first class mail)
David Singerling
Stonegate Community
Wagner Farms Homeowners Association
3128 S. Wagner Circle
Sinking Spring, PA 19608

(via email: kz@stevenslee.com)
Kenneth Zielonis, Esquire
Stevens & Lee
17th N. Second Street, 16th Floor
Harrisburg, PA 17101

(via email: HDMcMunigal@bhcb.com)
Harry D. McMunigal, Esquire
Bingaman, Hess, Coblentz & Bell
Treeview Corporate Center, Suite 100
2 Meridian Blvd.
Wyomissing, PA 19610

(via e-mail: bridgelaw@msn.com)
Mark M. Bridge, Esquire
101 East Lancaster Avenue, Suite 304
Wayne, PA 19087

(via First Class Mail)
Neil Rahn
Stonegate Community
3119 S. Wagner Circle
Sinking Spring, PA 19608

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire

COMMONWEALTH OF PENNSYLVANIA

OFFICE OF CONSUMER ADVOCATE
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, Pennsylvania 17101-1923
(717) 783-5048
800-684-6560 (in PA only)

IRWIN A. POPOWSKY
Consumer Advocate

FAX (717) 783-7152
consumer@paoca.org

PLEASE DOCKET

June 7, 2006

2006 JUN -9 PM 4:15
SECRETARY'S BUREAU

Via Hand Delivery

Honorable Judge Weismandel
Administrative Law Judge
PA Public Utility Commission
Commonwealth Keystone Building
400 North Street
P. O. Box 3265
Harrisburg, PA 17105-3265

Re: Spring Township, Complainant v. Pennsylvania American Water Company
Docket No. C-20054746

Neil R. Rahn and David Singerling, *et al.*, Complainants v. Pennsylvania American Water Company
Docket No. C-20054919

Wilson School District, Complainant v. Pennsylvania American Water Company
Docket No. C-20055371

Dear Judge Weismandel:

Enclosed please find the Office of Consumer Advocate's Second Prehearing Memorandum in the above-captioned case.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

DOCUMENT FOLDER

Darlene R. Wong
Assistant Consumer Advocate
Attorney I.D. #87381

Enclosures
cc: All parties of record
88352 doc,1/DED/smm

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No. C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN and DAVID SINGERLING, ET AL, Complainants	:	
v.	:	Docket No C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	
v.	:	Docket No . C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

THE OFFICE OF CONSUMER ADVOCATE' S
SECOND PREHEARING CONFERENCE MEMORANDUM

This Second Prehearing Conference Memorandum is submitted by the Office of Consumer Advocate (OCA), Intervenor, in the above-captioned matter. The OCA has intervened in support of the Formal Complaint of Mr. Neil Rahn and Mr. David Singerling.

DOCUMENT FOLDER

DOCKETED
NOV 0 7 2006

I. FINAL LIST OF WITNESSES

Pursuant to the ALJ's Scheduling and Briefing Order of March 6, 2006 ("Scheduling and Briefing Order"), the OCA provides its final list of witnesses and a summary of their proposed testimony.

Witness (employment)	Address	Summary of Testimony
Mr. Neil Rahn Met-Ed Test Technician, Senior (retired)	3119 S. Wagner Circle Sinking Springs, PA 19608	Mr. Rahn will testify regarding the facts and events that occurred on February 5-6, 2005, the effect of the main break on the service and properties of the Stonegate community (Wagner Farms Homeowners Association), contacts with the Company subsequent to the loss of service, and the subsequent sinkholes that occurred in the area.
Mr. David Singerling Carpenter Technology Corp. Production Department Manager (retired)	3128 S. Wagner Circle Sinking Springs, PA 19608	Mr. Singerling will testify regarding the facts and events that occurred on February 5-6, 2005, the effect of the main break on the service and properties of the Stonegate community (Wagner Farms Homeowners Association), contacts with the Company subsequent to the loss of service, and the subsequent sinkholes that occurred in the area
Ms. Rose Ruggiero	3119 S. Wagner Circle Sinking Springs, PA 19608	Ms. Ruggiero will testify regarding the facts and events that occurred on February 5-6, 2005, the effect of the main break on the service and properties of the Stonegate

		community (Wagner Farms Homeowners Association), contacts with the Company subsequent to the loss of service, and the subsequent sinkholes that occurred in the area.
Mr. Bruce Dickinson	3109 N. Wagner Circle Sinking Springs, PA 19608	Mr. Dickinson will testify regarding the facts and events that occurred on February 5-6, 2005, contacts with the Company subsequent to the loss of service, and the subsequent sinkholes that occurred in the area.
Mr. Alan King	303 Shelly Drive Sinking Springs, PA 19606	Mr. King will testify regarding the facts and events that occurred on February 5-6, 2005, the effect of the main break on the service and properties of the Stonegate community (Wagner Farms Homeowners Association), contacts with the Company subsequent to the loss of service, and the subsequent sinkholes that occurred in the area.
Dr. Donald M. Hoskins, P.G. Geologist Consultant (self-employed)	5403 Rodgers Avenue Harrisburg, PA 17112	Dr. Hoskins will be available for cross-examination regarding his written direct testimony submitted on May 17, 2006.
Mr. Terry L. Fought, P.E. Engineer Consultant (self-employed)	780 Cardinal Drive Harrisburg, PA 17111	Mr. Fought will be available for cross-examination regarding his written direct testimony submitted on May 17, 2006.
Mr. John Rothwell PAWC Network Supervisor	920 Mt. Home Road Sinking Spring, PA 19608	The OCA intends to conduct cross-examination of Mr. Rothwell based upon his oral direct testimony at the hearings. The OCA

		anticipates that such testimony will include the Company's response to the main break and the Company's actions and omissions as they relate to providing safe and adequate service under 66 Pa.C.S. § 1501.
Mr. Brian J. Hassinger, P.E. PAWC Southeast Region Director of Network	800 West Hersheypark Drive Hershey, PA 17033	The OCA intends to conduct cross-examination of Mr. Hassinger based upon his oral direct testimony at the hearings. The OCA anticipates that such testimony will include the Company's response to the main break and the Company's actions and omissions as they relate to providing safe and adequate service under 66 Pa.C.S. § 1501.
Mr. Craig Clauser, P.E. Craig Clauser Engineering Consulting, Inc.	1610 Hunter Circle West Chester, PA 19380	The OCA intends to conduct cross-examination of Mr. Clauser based upon his written direct testimony of June 9, 2006. The OCA anticipates that such testimony will include the cause of the main break and the Company's actions and omissions as they relate to providing safe and adequate service under 66 Pa.C.S. § 1501.
Mr. Richard L. Kanaskie, P.G., C.S.E.O. Spotts, Stevens, McCoy Engineers & Consultants	1047 N. Park Road P.O. Box 6307 Reading, PA 19610-0307	The OCA intends to conduct cross-examination of Mr. Kanaskie based upon his written direct testimony of June 9, 2006. The OCA anticipates that such testimony will include the cause of the main break and the Company's actions and omissions as they relate to providing safe and adequate service under 66 Pa.C.S. § 1501.

Mr Eric P. Grinrod, P.G. Geoenvironmental Services Director Spotts, Stevens, McCoy Engineers & Consultants	1047 N. Park Road P.O. Box 6307 Reading, PA 19610-0307	The OCA intends to conduct cross-examination of Mr. Grinrod based upon his written direct testimony of June 9, 2006. The OCA anticipates that such testimony will include the cause of the main break and the Company's actions and omissions as they relate to providing safe and adequate service under 66 Pa.C.S. § 1501.

The OCA proposes that PAWC's customers be allowed to testify first, with Mr. Rahn, Mr. Singerling, Ms. Ruggiero, and Mr. Dickinson testifying on June 26, 2006. Mr. King is unavailable on June 26, 2006; however, the OCA is in the process of determining whether Mr. King would be available to testify on June 27, 2006.

II. OUTSTANDING DISCOVERY

On May 2, 2006, the OCA served PAWC with OCA Set III interrogatories. PAWC filed objections to OCA Set III on May 12, 2006, along with limited answers. On May 22, 2006, the OCA filed a Motion to Dismiss Respondent's Objections and Compel Answers to OCA Interrogatories Set III, Nos. 3, 4, 6, 9, 11, & 15-21. In ALJ Weismandel's June 1, 2006 Order Granting In Part And Denying In Part Motion To Compel, the ALJ directed that, within seven days of that Order, PAWC must provide full and complete answers to OCA Set III, Nos. 3, 4, 6[1], 9, 11, 15, 17, 20(a-d)[2] and 21a. As such, PAWC is compelled to provide those responses by June 8, 2006. The OCA currently is awaiting answers to OCA Set III, Nos. 3, 4, 6, 9, 11, 15, 17, 20(a-d) and 21a, pursuant to that Order.

[1] Response to be limited to the time period of January 1, 2000 to the date of the answer.
[2] Response to be limited to insurance policies in effect on February 5-6, 2006.

On May 3, 2006, the OCA served PAWC with OCA Set IV interrogatories via email and first-class mail. PAWC served its answers to OCA Set IV on May 12, 2006. To the OCA's questions regarding tank level, tank alarm, and pressure data, PAWC responded that, "Pennsylvania American Water Company is unable to access information on the SCADA system." On May 25, 2006, the OCA filed a Motion to Compel full and complete answers to OCA Set IV, Nos. 3, 4, and 9. On June 5, 2006, PAWC filed Supplementary Answers to OCA Set IV in which PAWC provided an answer to Interrogatory No. 9, and committed to providing answers to Interrogatory Nos. 3 & 4 by June 14, 2006. On June 6, 2006, ALJ Weismandel issued an Order Granting Motion to Compel, and ordered PAWC to provide answers to OCA Set IV, Nos. 3, 4, & 9 by June 13, 2006. The OCA currently is awaiting answers to OCA Set IV, Nos. 3 & 4, pursuant to that Order.

III. Surrebuttal Testimony

The ALJ's Scheduling and Briefing Order of March 6, 2006 notes that the question of whether written surrebuttal of expert witnesses is allowed will be decided at the Second Prehearing Conference. As noted in the ALJ's Scheduling and Briefing Order, written surrebuttal of expert witnesses, if allowed, would be served on or before Thursday, June 22, 2006.

The OCA submits that written surrebuttal is preferable to oral surrebuttal for several reasons. First, written surrebuttal will allow for technical and other difficult issues to be presented more thoroughly and understandably than would be possible through oral surrebuttal. Issues addressed by surrebuttal may be new issues that have been raised for the first time by the Company in its rebuttal due on June 9, 2006. Second, written surrebuttal will enable hearings to

proceed in a more streamlined and orderly fashion, reducing hearing room time. Third, written surrebuttal will allow the other parties to prepare more concise cross-examination questions in advance of the hearings, which also should reduce time required for hearings.

IV. Other Issues

The OCA reserves the right to amend the information provided in this memorandum as the hearing approaches.

Respectfully Submitted,

Dianne E. Dusman
Senior Assistant Consumer Advocate
Darlene R. Wong
Assistant Consumer Advocate

Counsel for:
Irwin A. Popowsky
Consumer Advocate

Office of Consumer Advocate
555 Walnut Street 5th Floor, Forum Place
Harrisburg, PA 17101-1923
(717) 783-5048
June 7, 2006
00089130.doc

CERTIFICATE OF SERVICE

Re: Neil R Rahn and David Singerling, *et al.*
v.
Pennsylvania-American Water Company
Docket No. C-20054919

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Second Prehearing Conference Memorandum upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 7th day of June, 2006.

SERVICE BY ELECTRONIC MAIL & FIRST CLASS MAIL, POSTAGE PREPAID

Seth A. Mendelsohn, Esq.
Pennsylvania American Water Company
800 West Hersheypark Drive
Hershey, PA 17033

Harry D. McMunigal, Esq.
Bingaman, Hess, Coblents & Bell, P.C.
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Stonegate Community
Wagner Farms Homeowners Association
3119 S. Wagner Circle
Sinking Spring, PA 19608

David Singerling
Stonegate Community
Wagner Farms Homeowners Association
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Sinking Spring, PA 19608

Kenneth Zielonis, Esq.
Stevens & Lee
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Joan E. London, Esq.
Kozloff Stoudt
2640 Westview Drive
P. O. Box 6286
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Senior Assistant Consumer Advocate
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ddusman@paoca.org
Darlene R. Wong
Assistant Consumer Advocate
Attorney I.D. # 87381
dwong@paoca.org
Counsel for
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555 Walnut Street 5th Floor, Forum Place
Harrisburg, PA 17101-1923
(717) 783-5048
86762 doc,1/DED/smn

BINGAMAN HESS

ATTORNEYS AT LAW

DAVID E. TURNER
MARK G. YODER
KURT ALTHOUSE
LYNNE K. BEUST
HARRY D. McMUNIGAL
PATRICK T. BARRETT
ERIC J. FABRIZIO
ELIZABETH D. McMUNIGAL
MAHLON J. BOYER
THOMAS A. ROTHERMEL*
*Also admitted in NJ

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RALPH J. ALTHOUSE, JR.
RETIRED

LLEWELLYN R. BINGAMAN
1907-1996
RAYMOND K. HESS
1919-2005
J. WENDELL COBLENTZ
1911-2003
JAMES F. BELL
1921-1988

June 7, 2006

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

ORIGINAL

Attn. Shirley

RE: Neil R. Rahn, David Singerling, et al v. PA American Water; No.: C-20054919
Township of Spring v. PA American Water; No.: C-20054746
Wilson School District v. PA American Water, No.: C-20055371
Our File No. 10176-1041

Dear Shirley:

Pursuant to your request, enclosed please find three extra copies of Respondent's, Pennsylvania American Water Company, Prehearing Conference Memorandum. Kindly mark these copies received as of June 7, 2006 and return one copy to me in the self-addressed, postage paid envelope which was previously forwarded to you.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

BINGAMAN HESS

Harry D. McMunigal

HDM:PLT:mny
Enclosures

COPY

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PA P.U.C.
SECRETARY'S BUREAU

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2005 JUN -8 AM 8:54
P.A.P.U.C.
SECRETARY'S BUREAU

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No.: C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No.: C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	Docket No.: C-20055371
v.	:	
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

PENNSYVLANIA AMERICAN WATER COMPANY'S PREHEARING CONFERENCE MEMORANDUM

A. WITNESSES AND AREAS OF TESTIMONY:

1. John Rothwell, Network Supervisor, Pennsylvania American Water Company, 920 Mt. Home Road, Sinking Spring, PA 19608;

Areas of Testimony.

- Involvement and responses to the subject water main break;
- Work and maintenance on the entire water distribution system;
- Safety and reliability of the water system;
- Causation of the water main break;
- Appropriateness of all PAWC systems and processes regarding leak detection,
- Appropriateness of all PAWC systems and processes for shut-down in the event of a leak;
- PAWC reasonable procedure with equipment and maintenance of lines;
- PAWC practices and procedures in maintaining a safe and reliable system,

- Information regarding sinkhole activity in the area;
- History of no prior repair to the main on Iroquois Avenue;
- Prior sinkhole repair noted in the area that was discovered by PAWC while excavating the water main on Iroquois Avenue;
- Prior sinkhole repair not performed by PAWC or predecessor company.

2. Brian J. Hassinger, P.E., Southeast Region Director of Network, Pennsylvania American Water Company, 800 West Hersheypark Drive, Hershey, PA 17033;

Areas of Testimony:

- Involvement and responses to the subject water main break;
- Work and maintenance on the entire water distribution system;
- Safety and reliability of the water system;
- Causation of the water main break;
- Appropriateness of all PAWC systems and processes regarding leak detection;
- Appropriateness of all PAWC systems and processes for shut-down in the event of a leak;
- PAWC reasonable procedure with equipment and maintenance of lines;
- PAWC practices and procedures in maintaining a safe and reliable system.

3. Jay W. Vaughan, Director of Road Services, Township of Spring, 2800 Shillington Road, Reading, PA 19608;

Areas of Testimony:

- Visual inspections of the accident scene;
- Knowledge of Spring Township of sinkholes in/or around the subject area;
- Areas of inquiry covered in the deposition testimony provided on May 4, 2006.

4. Jerri L. Diesinger, P.G., Director of Engineering Services, Township of Spring, 2800 Shillington Road, Reading, PA 19608;

Areas of Testimony (Fact Witness):

- Visual inspections of the accident scene;
- Knowledge of Spring Township of sinkholes in/or around the subject area,
- Areas of inquiry covered in the deposition testimony provided on May 4, 2006

5. Craig Clauser, P.E., President, Craig Clauser Engineering Consulting, Inc., 1610 Hunter Circle, West Chester, PA 19380;

Areas of Testimony:

- Metallurgical analysis of the subject pipe and circumstances surrounding the break;
- Rebuttal of conclusions reached by Complainants' experts.

6. Eric P. Grindrod, P.G., Director, Geoenvironmental Services, Spotts, Stevens, McCoy, Engineers & Consultants, 1047 N. Park Road, P.O. Box 6307, Reading, PA 19610-0307;

Areas of Testimony:

- Geological causation and considerations of the subject water main break;
- General geological conditions of the subject area;
- Causation of the subject break;
- Post-break geological conditions of the general area;
- Rebuttal of conclusions reached by Complainants' experts;
- Post-break testing and remediation.

7. Richard L. Kanaskie, P.G., C.S.E.O., Geologist, Spotts, Stevens, McCoy, Engineers & Consultants, 1047 N. Park Road, P.O. Box 6307, Reading, PA 19610-0307;

Areas of Testimony:

- Geological causation and considerations of the subject water main break.
- General geological conditions of the subject area;
- Causation of the subject break;
- Post-break geological conditions of the general area;
- Rebuttal of conclusions reached by Complainants' experts;
- Post-break testing and remediation.

8. Any and all witnesses listed by any parties in their Prehearing Conference Memoranda.

9. Any and all witnesses needed generally for purposes of rebuttal to testimony provided by Complainants' witnesses.

Pennsylvania American Water Company reserves the right to supplement this list of witnesses upon reasonable advance notice.

BINGAMAN, HESS, COBLENTZ & BELL, P.C.

By: _____

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Attorney I.D. No.: 38386
Treeview Corporate Center, Suite 100
2 Meridian Blvd., Wyomissing, PA 19610
610.374.8377
Attorney for Respondent -
Pennsylvania American Water Company

Seth Mendelsohn, Esquire, Corporate Counsel
Pennsylvania American Water Company
800 West Hershey Park Drive
Hershey, PA 17033

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : : : : : :	Docket No.: C-20054746
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	: : : : : : :	Docket No.: C-20054919
WILSON SCHOOL DISTRICT, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY Respondent	: : : : : : :	Docket No.: C-20055371

CERTIFICATE OF SERVICE

I, Harry D. McMunigal, Esquire, hereby certify that a true and correct copy of the foregoing Pennsylvania American Water Company's Prehearing Conference Memorandum was served on June 6, 2006 upon the following party(ies) as noted:

(via email: ddusman@paoca.org)
Dianne E. Dusman,
Senior Assistant Consumer Advocate
Commonwealth of Pennsylvania
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(via email: neilrr@comcast.net)
Neil Rahn
Stonegate Community
Wagner Farms Homeowners Association
3119 S. Wagner Circle
Sinking Spring, PA 19608

(via email. davidsingerling@netzero.net)
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(via email: jlondon@kozloffstoudt.com)
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Nancy E. Longo, Esquire
Mark M. Bridge, Esquire, P.C.
101 East Lancaster Avenue, Suite 304
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Dated: 6/6/06

BINGAMAN, HESS, COBLENTZ & BELL, P.C.

By: _____

Harry D. McMunigal, Esquire
Attorney I.D. No.: 38386
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Pennsylvania American Water Company

2006 JUN -8 AM 8:54
SECRETARY'S BUREAU

Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

June 22, 2006

Email: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

DOCUMENT FOLDER

VIA UPS OVERNIGHT DELIVERY

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746
Neil R. Rahn and David Singerling, et al
v. Pennsylvania-American Water Co.
Docket No. C-20054919
Wilson School District
v. Pennsylvania-American Water Co
Docket No. C-20055371
Our File No. 100744-388

Dear Mr. McNulty:

Enclosed please find an original and one (2) copies of the Sur-Rebuttal Testimony of Jeri L. Diesinger, P.G., and Felicia Kegel Bechtel, M.Sc., P.G., Expert Witnesses for Complainant, Township of Spring, Berks County, Pennsylvania, which are to be filed in the above-captioned matters. Please file the original and return the time-stamped copies, in the postage-prepaid self-addressed envelope enclosed.

By copy of this letter, copies have been served upon all parties of record as shown on the Certificate of Service.

Very truly yours,

RECEIVED
JUN 22 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

KOZLOFF STOUDT
Professional Corporation

Joan E London
1/6481

Joan E. London

JEL/kab
Enclosure
cc: All Parties of Record (w/enclosure)

RECEIVED

JUN 2 2 2006

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	Docket No.: C-20054746
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	Docket No.: C-20054919
WILSON SCHOOL DISTRICT, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY Respondent	:	Docket No.: C-20055371

ORIGINAL

SUR-REBUTTAL TESTIMONY OF FELICIA KEGEL BECHTEL, M.Sc., P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY

Complainant, Township of Spring, Berks County, Pennsylvania, submits the following sur-rebuttal testimony of Felicia Kegel Bechtel, M.Sc., P.G.:

Q. Ms. Bechtel, have you reviewed the direct examination of Craig D. Clauser, P.E and Richard L. Kanaskie, P.G., C.S.E.O., submitted by Pennsylvania-American Water Company?

A. Yes, I have.

Q. Do you agree with all of the conclusions contained in Mr. Kanaskie's report?

A. No. I do not agree with all of the conclusions reached by Mr. Kanaskie

Q. Lets discuss the Kanaskie report. First, you agree that the subsurface is marked by limestone rock, correct?

A. Yes.

Q. And is the area prone to sinkhole activity?

A. Yes, under certain conditions that we will discuss.

Q Did you review the portion of Mr. Kanaskie's report where he discussed causes other than a water main break which could influence the development of sinkholes, on Pages 7-10 of his report?

A. Yes, I did.

Q. Did you, in particular, review the portion of the report that addresses leakage from pipelines, on Pages 7-8, where Kanaskie reviews part of Mr. Fought's testimony on acceptable leakage standards?

A. Yes.

Q. Do you believe that even an acceptable level of leakage from water lines can cause sinkhole activity?

A. Yes, I do. Whether or not a level of leakage is acceptable according to industry standard is irrelevant to whether it can cause sinkholes if the lines are in an area prone to sinkhole activity, because it can. Limestone, when exposed to water will chemically react, and will, over time, dissolve, and this is part of the process that can lead to the development of sinkholes. Any probability of leakage needs to be monitored, and leakage needs to be remediated.

Q. Is there a means of monitoring such leakage available.

A. Yes, there is. It is known as "acoustic leak detection."

Q. Was acoustic leak detection available as of February of 2005?

A. Yes, it was. It has been available for at least fifteen years, and likely longer than that. I am aware of acoustic leak detection, because it is a service offered by Enviroscan.

Q. Would it be cost-prohibitive for a company of the size of Pennsylvania-American Water Company?

A. No, it would not have been cost-prohibitive.

Q. Do you have an opinion, with a reasonable degree of professional certainty, that if the sinkhole was caused by a slower leak from lines, rather than from the water main break, whether Pennsylvania-American Water Company could have prevented the break and loss of water?

A. Yes, I do.

Q. And what is that opinion.

A. My opinion is that prevention of leakage into the ground, in an area of known limestone rock and known sinkhole activity, should have been a priority. This can be accomplished by either double piping lines and mains in areas known for sinkhole formation, or by, at very least, monitoring the system through methods such as acoustic leak detection, and tightening the system were necessary to prevent leaks causing this type of event. The methods that Pennsylvania-American was using at the time, such as monitoring tank levels and sounding of lines, were not sufficient.

Q. Have you reviewed Mr. Kanaskie's testimony on Page 8, where he states that infiltration through the roadway contributed to sinkhole conditions?

A. Yes, I have.

Q. Do you have an opinion as to this statement?

A. Yes.

Q. What is your opinion as to the correctness or incorrectness of this statement?

A. I disagree with it.

Q. What is the basis of this disagreement, with a reasonable degree of professional certainty?

A. Asphalt road surfaces are generally impervious. My experience with Ground Penetrating Radar (GPR) has been that it does not provide as good a picture through a wet clay surface. When there have been extremely wet conditions, we have not gotten a clear picture using GPR on pervious surfaces. When, however, we use it under the streets in the same conditions, the picture is clear, meaning that the soil underneath is dry. It is highly unlikely in my opinion that there has been anything near the level of

infiltration through the surface of Iroquois Avenue as contained in the Kanaskie testimony. I do not, therefore, believe that such infiltration was a cause of the sinkhole activity.

Q. I would like to call your attention to the portion of Mr. Kanaskie's testimony on Pages 12 and 13, where Mr. Kanaskie offers the opinion that there is no geological basis for Pennsylvania American Water Company to perform testing and identify subsurface features throughout the Wagner Farms development as a response to the subject water main break. Have you reviewed this portion of Mr. Kanaskie's testimony?

A. Yes, I have.

Q. Do you have an opinion as to whether this is correct?

A. Yes, I do. I do not agree with his conclusion.

Q. What is the basis for your disagreement?

A. To give an example, Enviroscan performed sub-surface testing in Millersville, Pennsylvania in a case where a sinkhole opened after a water main break. The borough repaired the sinkhole, and then hired Enviroscan to perform non-invasive subsurface testing using Ground Penetrating Radar (GPR) over the water lines, to show where there were potential sinkholes forming, but not yet opened. This survey was able to show where there was incipient activity.

To explain further, sinkholes are inherently driven by the movement of water. Where there is a leak or loss of water to occur, with sinkholes appearing at the same location or in the approximate path of the water (which we know to be toward the farthest point down-gradient at which the water table intersects with the ground

surface), it is highly unlikely that sinkholes in this circumstance would be a pre-existing condition.

I further disagree with Mr. Kanaskie's point that the occurrence of sinkholes is an inherent risk of building in areas prone to geologic hazards, with the implication that this should be accepted as a risk and really no one's fault, like a tsunami or a hurricane if you live on the coast. This is actually more akin to forest fires in his analogy. Just like sinkholes, yes, there are naturally occurring forest fires caused by lightening strikes. Most, however, are caused by human carelessness, such as by not putting out campfires, or improper disposal of cigarettes. No one says, though, that forest fires have to be a natural consequence of human enjoyment of nature. People can camp and hike in the woods, but they just have to do so carefully, and with respect for the surrounding environment, topography, and naturally occurring conditions (including drought and conditions ripe for forest fires). It is the same with development, with its concomitant need for utilities, in areas where there are conditions ripe for sinkhole development. When installing utilities that can leak water, this requires care, such as support of lines, prevention of water leakage, and monitoring and remediation where there is leakage. Sinkholes caused by man's activity do not have to occur.

Q. Even after reviewing the reports of Mr. Clauser and Mr. Kanaskie, do you still stand by your conclusions from your direct testimony, with a reasonable degree of professional certainty, based upon your education, experience, and training as a geologist?

A. Yes, I do.

KOZLOFF STOUDT
Professional Corporation

Dated: June 22, 2006

By: _____
Joan E. London, Esquire
Attorney for Township of Spring

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Professional Corporation
By. Joan E. London, Esquire
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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	Docket No.: C-20054746
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	Docket No.: C-20054919
WILSON SCHOOL DISTRICT, Complainant v. PENNSYLVANIA AMERICAN WATER COMPANY Respondent	:	Docket No.: C-20055371

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing SUR-REBUTTAL TESTIMONY OF FELICIA KEGEL BECHTEL, M.Sc., P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY, was served on June 22, 2006 upon the following party(ies) by first class mail and electronic mail:

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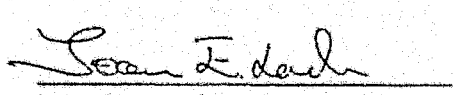
Seth Mendelsohn, Esq.
Pennsylvania American Water Co.
800 West Hershey Park Drive
Hershey, PA 17033

KOZLOFF STOUDT
Professional Corporation

Dated: June 22, 2006

By: 
Joan E. London, Esquire
Attorney for Township of Spring

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP,	:	
Complainant	:	
v.	:	Docket No.: C-20054746
	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY,	:	
Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL	:	
Complainants	:	
v.	:	Docket No.: C-20054919
	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY,	:	
Respondent	:	
WILSON SCHOOL DISTRICT,	:	
Complainant	:	Docket No.: C-20055371
	:	
v.	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY	:	
Respondent		

ORIGINAL

SUR-REBUTTAL TESTIMONY OF JERI L. DIESINGER, P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY

Complainant, Township of Spring, Berks County, Pennsylvania, submits the following sur-rebuttal testimony of Jeri L. Diesinger, P.G.:

Q. Ms. Diesinger, have you reviewed the direct examination of Richard L. Kanaskie, P.C., C.S.E.O., and Craig D. Clauser, P.E., submitted by Pennsylvania-American Water Company?

A. Yes, I have.

Q. Do you agree with all of the conclusions contained in these reports?

A. No. I do not.

Q Lets begin with Mr. Clauser's report. With what items do you especially disagree in Mr. Clauser's report?

A. Mr. Clauser offers the opinion that the failure occurred as a single, catastrophic event. However, if the failure had, in fact, occurred as a single catastrophic event, I believe that there would have been evidence of a large sinkhole remaining beneath the pipeline. I personally saw the excavation site first thing, Monday morning, February 6, 2005, and saw no evidence of a sinkhole underneath the pipe. Jay Vaughan reported, both to me and in his deposition, that the excavation was opened sometime in the late afternoon on Sunday, February 5. Based on my knowledge of road construction work in the Township, I believe that there would not have been sufficient time to excavate to expose the damaged pipe, remediate a sinkhole if one existed beneath the pipeline, allow time for the flowable fill material to set and then back fill to approximately 18 inches below the pipe line by the time Township representatives arrived at the excavation site early on Monday morning, February 6. Mr. Vaughan did not identify

the presence of a sinkhole beneath the pipeline, nor did he see signs of a remediated sinkhole. I arrived about an hour later (approximately 8 a.m.) to find the pipe clamped in one place and no evidence of a sinkhole underneath.

Q. Is there anything else you wish to discuss relating to Mr. Clauser's testimony?

A. No, I will defer to Mr. Fought on the remainder of Mr. Clauser's testimony. Although I deal with engineering issues on a daily basis and work closely with our outside engineers, I am not a professional engineer, and Mr. Fought is. My disagreement with respect to Mr. Clauser's testimony is based upon my personal observations, my discussions with Jay Vaughan, and my knowledge, experience, and training as a Professional Geologist.

Q. Let's then discuss Mr. Kanaskie's direct examination testimony, since Mr. Kanaskie, like yourself, is a Professional Geologist. First, are there points with which you are in agreement with Mr. Kanaskie?

A. Yes. I agree that the area of the water main break supports the type of geology indicative of karst terrain and therefore, development of sinkholes. The Kochanov map was prepared in 1988 from aerial photographs of earlier time periods. At the time of map preparation, the Wagner Farms/Stonegate Subdivision (area west of the break) was a planted field and the subdivision was not approved until May 1998. An aerial photograph in the Township's possession, dated 1997, does not indicate the presence of sinkholes in the vicinity of the 2005 water main break. Introduction of water, such as through a water main break or leakage from lines in the vicinity which could accelerate the formation of one or more sinkholes in this area. However, I agree with Ms. Bechtel

that sinkholes based upon human activity such as introduction of water lines are avoidable if proper care is used to avoid breakage of and leakage from lines. I also agree with Mr. Kanaskie that a rock ledge or pinnacle trending roughly east-west from western curb line toward center of the road is evident in photos. However, this is where I begin to disagree. There are two similar photos, one showing backfill immediately beneath the gas transmission line and one photo shows what Mr. Kanaskie identifies as "clay solution channel soils." This soil appears to be similar to flowable fill used in remediation of sinkholes and also the soil that Mr. Kuser, who did the excavation work brought to my office several days later to be used as backfill in the water line excavation.

Q. Mr. Kanaskie, among others testifying for Pennsylvania American Water Company, have addressed what they consider to be evidence of a previously repaired sinkhole. Are you personally aware of any prior repairs by the Township to any sinkholes in the immediate vicinity of the subject water main break?

A. No I am not, and I have discussed this matter with Jay Vaughan, who is a Township Supervisor and is our roadmaster. However, according to Figure 1 of the American Geotech report, what is described as a previous sinkhole is located to the northeast of the water main break and is approximately 30 to 35 feet center to center. The Township has no record of the previous sinkhole either in documentation or anecdotally.

Q. Mr. Kanaskie offered testimony as to changes in temperature and in the water table - naturally occurring events, as ultimately causing the water main break. Do you have an opinion as to this testimony?

A. Yes, I do.

Q. What is your opinion, with a reasonable degree of professional certainty?

A. Regarding Mr. Kanaskie's testimony as to his opinion on the cause of the water main break (Page 6), wet conditions resulting from pipe leakage, infiltration, naturally occurring springs or seeps, a perched water table, etc., were impacted by the sudden cold snap which caused a deeper frost layer. The water table fluctuates depending on amount of water introduced into the subsurface whether by precipitation, inflow or infiltration. By Mr. Kanaskie's own testimony (Page 10, Line 13), "this frost action can move a pipe just enough to facilitate a leak/break." There was a very mild and wet period and then a quick drop in temperature in the weeks preceding the break which caused localized frost action. This break was one of several water main breaks over that particular weekend.

Q. In Mr. Kanaskie's testimony, and, in fact, in Jay Vaughn's testimony, there was discussion of the direction of water flow, and the fact that water did not appear on the street, and that this was not characteristic of usual water main breaks. Do you have an opinion on this issue?

A. Yes.

Q. With a reasonable degree of professional certainty, what is that opinion?

A. Regarding Mr. Kanaskie's testimony regarding flow direction (Page 11), I agree that a frost layer may have contributed to why the road showed no immediate sign of deflection; however, the majority of past water main breaks within the Township have triggered surface failures in the past. I, however, absolutely do not agree with the statement that *"concrete plugs may have also diverted the water to the west. Since the plugs were located just east of the water main they acted as a dam that retarded water from flowing east and pushed it west"*. The Township believes that the force of the pressurized water traveled east and west, reflecting the documented strike of the local bedrock, as evidenced by the sinkhole which developed at both locations (in the school parking lot and toward the Creveling property located to the west).

Q. Mr. Kanaskie testified to a detention pond in the vicinity as contributing to the sinkhole. Do you have an opinion on that issue?

A. Yes, I do.

Q. With a reasonable degree of professional certainty, what is your opinion on this issue?

A. Regarding the Martins Farm/Oak Meadows detention basin where sinkholes are known to occur, this is a privately maintained facility; however, the Township contacts the property management company when maintenance is required. The Martins Farm/Oak Meadows detention basin was constructed in 1994, and receives stormwater from the Wagner Farms/Stonegate subdivision which was constructed in 1998. Based on documented orientation of bedrock in the vicinity, if water was introduced into the subsurface through opened sinkholes within the detention basin, most likely the water

would follow a similar path trending east/west, and should not significantly affect the area of the water main break"

Q. On another subject, Mr. Kanaskie testified that subsurface testing would not be useful. Do you have an opinion on this topic?

A. Yes.

Q. What is your opinion, with a reasonable degree of professional certainty?

A. I disagree. Subsurface testing was recommended by the American Geotech, Inc., who had been retained by Pennsylvania American. It is in the American Geotech report, and the concept is wholeheartedly endorsed by the Township. By expanding the area of interest to beyond the immediate location of the break, the Township would be able to provide a measure of reassurance to the school, the municipal officials and the Township residents in those areas showing a greater mass density index and be able to advise where a decreased mass density index is indicated. A suite of data collection is recommended, including microgravity, ground penetrating radar and seismic refraction. Information obtained from this wider area of study would provide a means to remediate if necessary and plan for future incidents.

Q. Even after reviewing the reports of Mr. Clauser and Mr. Kanaskie, do you still stand by your conclusions from your direct testimony, with a reasonable degree of professional certainty, based upon your education, experience, and training as a geologist?

A. Yes, I do.

KOZLOFF STOUDT
Professional Corporation

Dated: June 22, 2006

By: _____
Joan E. London, Esquire
Attorney for Township of Spring

KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP,	:	
Complainant	:	
v.	:	Docket No.: C-20054746
	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY,	:	
Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL	:	
Complainants	:	
v.	:	Docket No.: C-20054919
	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY,	:	
Respondent	:	
WILSON SCHOOL DISTRICT,	:	
Complainant	:	Docket No.: C-20055371
	:	
v.	:	
	:	
PENNSYLVANIA AMERICAN WATER	:	
COMPANY	:	
Respondent	:	

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that a true and correct copy of the foregoing **SUR-REBUTTAL TESTIMONY OF JERI L. DIESINGER, P.G., EXPERT WITNESS FOR COMPLAINANT, SPRING TOWNSHIP, BERKS COUNTY**, was served on June 22, 2006 upon the following party(ies) by first class mail and electronic mail:

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Harry D. McMunigal, Esquire
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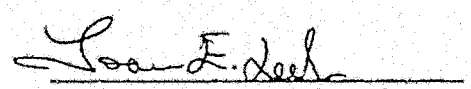
Seth Mendelsohn, Esq.
Pennsylvania American Water Co.
800 West Hershey Park Drive
Hershey, PA 17033

KOZLOFF STOUDT
Professional Corporation

Dated: June 22, 2006

By: 
Joan E. London, Esquire
Attorney for Township of Spring

COMMONWEALTH OF PENNSYLVANIA

PLEASE DOCKET

OFFICE OF CONSUMER ADVOCATE
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, Pennsylvania 17101-1923
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IRWIN A. POPOWSKY
Consumer Advocate

FAX (717) 783-7152
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July 7, 2006

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PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Via Hand Delivery

Honorable Judge Weismandel
Administrative Law Judge
PA Public Utility Commission
Commonwealth Keystone Building
400 North Street
P. O. Box 3265
Harrisburg, PA 17105-3265

Re: Spring Township, Complainant v. Pennsylvania American Water Company
Docket No. C-20054746

Neil R. Rahn and David Singerling, *et al.*, Complainants v. Pennsylvania American Water Company
Docket No. C-20054919

Wilson School District, Complainant v. Pennsylvania American Water Company
Docket No. C-20055371

Dear Judge Weismandel:

Enclosed please find the Office of Consumer Advocate's Subpoenas in the above-captioned case.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Dianne E. Dusman

Dianne E. Dusman
Senior Assistant Consumer Advocate
Attorney I.D. #38308

Enclosures
cc: Brian Hassinger, Pennsylvania-American Water Company
John Rothwell, Pennsylvania-American Water Company
James J. McNulty, Secretary
All parties of record
88352 doc;1/DED/smn

06 JUL 10 AM 8:40
PA PUC

BA

PUC-291

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION

In the Matter of:
Neil R. Rahn, David Singerling, *et al.*
v.
Pennsylvania-American Water Company

Docket No. C-20054919

SUBPOENA

To: Brian Hassinger, c/o Pennsylvania-American Water Company, 800 West Hershey Park Drive, Hershey, PA 17033
(Name and Address)

Pursuant to the authority of this Commission under §§309, 331(d)(2) and 333(j) of the Public Utility Code:

1. YOU ARE ORDERED by the Commission to come to Hearing Room #3,

Commonwealth Keystone Building, 400 North Street, Harrisburg, PA 17120
(place)

on June 30, 2006, at 9:00 a.m. o'clock, in the above case, to testify
(date)

on behalf of the Office of Consumer Advocate and to remain until excused;

2. And bring with you and produce the following: _____

This subpoena is issued subject to the provisions of 52 Pa. Code §5.421 (with regard to issuance, notice, service and witness fees).

BY THE COMMISSION

JUL 10 PA PUC

Date June 28, 2006

Wayne L. Weismandel
Administrative Law Judge

Commonwealth of Pennsylvania)
) SS:
County of DAUPHIN)

AFFIDAVIT OF SERVICE

Before me, the undersigned authority, personally appeared DIANNE E. DUSMAN who, being duly sworn according to law, deposes and says that ~~he/~~she served a true and correct copy of the within SUBPOENA upon HARRY McMUNIGAL, COUNSEL FOR PENNSYLVANIA-AMERICAN WATER CO./ BRIAN HASSINGER by handing the same to him/~~her~~ at HEARING ROOM 3, KEYSTONE BLDG HARRISBURG, PA on the 30TH day of JUNE, 2006 at 9:00 a.m. ~~p.m.~~

Dianne E. Dusman
(Signature)

Sworn to and subscribed before me
this 7th day of July, 2006

Susan J. Henry
Notary Public

NOTARIAL SEAL
SUSAN J. HENRY, Notary Public
Harrisburg, Dauphin County
My Commission Expires Oct. 8, 2006

PUC-291

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION

In the Matter of:
Neil R. Rahn, David Singerling, *et al.*
v.
Pennsylvania-American Water Company

Docket No. C-20054919

SUBPOENA

To: John Rothwell, c/o Pennsylvania-American Water Company, 800 West Hershey Park Drive, Hershey, PA 17033
(Name and Address)

Pursuant to the authority of this Commission under §§309, 331(d)(2) and 333(j) of the Public Utility Code:

1. YOU ARE ORDERED by the Commission to come to Hearing Room #3,

Commonwealth Keystone Building, 400 North Street, Harrisburg, PA 17120
(place)

on June 30, 2006, at 9:00 a.m. o'clock, in the above case, to testify
(date)

on behalf of the Office of Consumer Advocate and to remain until excused;

2. And bring with you and produce the following: _____

This subpoena is issued subject to the provisions of 52 Pa. Code §5.421 (with regard to issuance, notice, service and witness fees).

BY THE COMMISSION

Date June 28, 2006

Wayne L. Weismandl
Administrative Law Judge

RECEIVED
06 JUL 10 AM 8:41
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Commonwealth of Pennsylvania)
) SS:
County of DAUPHIN)

AFFIDAVIT OF SERVICE

Before me, the undersigned authority, personally appeared DIANNE E DUSMAN who, being duly sworn according to law, deposes and says that ~~he~~/she served a true and correct copy of the within SUBPOENA upon HARRY C. McMUNIGAL, COUNSEL FOR PENNSYLVANIA-AMERICAN WATER CO. / JOHN ROTHWELL by handing the same to him/~~her~~ at HEARING ROOM 3, KEYSTONE BLDG, HARRISBURG PA on the 30th day of June, 2006 at 9:00 a.m./~~p.m.~~

Dianne E. Dusman
(Signature)

Sworn to and subscribed before me
this 7th day of July, 2006

Susan J. Henry
Notary Public

NOTARIAL SEAL
SUSAN J. HENRY, Notary Public
Harrisburg, Dauphin County
My Commission Expires Oct. 8, 2006

CERTIFICATE OF SERVICE

Re: Neil R. Rahn and David Singerling, *et al.*
v.
Pennsylvania-American Water Company
Docket No. C-20054919

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Subpoenas upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 7th day of July, 2006.

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August 18, 2006

James J. McNulty, Secretary
PA Public Utility Commission
Commonwealth Keystone Bldg.
400 North Street
Harrisburg, PA 17120

ORIGINAL

DOCUMENT FOLDER

RE: Spring Township v.
Pennsylvania American Water Company
Docket No. C-20054746

Neil R Rahn and David Singerling v.
Pennsylvania-American Water Company
Docket No. C-20054919

Wilson School District v.
Pennsylvania American Water Company
Docket No. C-20055371

Dear Secretary McNulty:

Enclosed please find for filing an original and nine (9) copies of the Office of Consumer Advocate's Main Brief in the above-captioned proceeding.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Dianne E. Dusman

Dianne E. Dusman
Senior Assistant Consumer Advocate
Attorney I.D. # 38308
DDusman@paoca.org

2006 AUG 18 PM 4:10
PA PUC
SECRETARY'S BUREAU

Enclosures
cc: Hon. Wayne L. Weismandel, ALJ
All parties of record
86761.doc;1/DED/smn

ORIGINAL

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Spring Township	:	
v.	:	Docket No. C-20054746
Pennsylvania American Water Company	:	
Neil R Rahn and David Singerling, et al.	:	
v.	:	Docket No. C-20054919
Pennsylvania-American Water Company	:	
Wilson School District	:	
v.	:	Docket No. C-20055371
Pennsylvania American Water Company	:	

MAIN BRIEF
OF THE
OFFICE OF CONSUMER ADVOCATE

DOCUMENT
FOLDER

DOCKETED
AUG 22 2006

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Dated: August 18, 2006

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I. INTRODUCTION

It is rare that the operation of a regulated public utility results in serious personal injury or property damage In the instant case, however, a Pennsylvania-American Water Company (PAWC) customer's home was destroyed as a direct result of a variety of utility actions or inactions which, taken together, constitute inadequate, unreasonable, unsafe and inefficient service in violation of Section 1501 of the Public Utility Code, 66 Pa.C.S. §1501.

As set forth fully below, the Complainants and Intervenor OCA together have overwhelmingly sustained their burden of proving that, in multiple ways, PAWC violated Section 1501 by failing to provide safe, adequate, reasonable and efficient service. They have also proved that PAWC violated pertinent regulations by failing to report an incident of such an unusual nature to the Public Utility Commission (PUC) or the Department of Environmental Protection (DEP) The Commission's broad powers to regulate public utilities fully enable it to order, as an equitable remedy, that PAWC repair the damage that was a direct cause of the Section 1501 violations and to perform a Ground Penetrating Radar (GPR) study of the areas beneath the streets, homes and PAWC's distribution system in the area immediately adjacent to the break. These areas lay in the path of the 1.5 million gallons of water that escaped from the broken 8-inch main. Such a study is the only way to determine the extent of any other subsurface damage that may have been caused, but which cannot be observed at the surface, and to ensure the safety of PAWC "customers, employees and the public."

The OCA would add that it is atypical in a formal complaint proceeding where inadequate and unreasonable utility service has been alleged that the *absence* of evidence offered may be just as important for the Commission to consider as that offered by the parties. Typically, if a utility's quality of service is challenged, the company will call knowledgeable

company personnel as witnesses to demonstrate why and how the utility's actions in the circumstances alleged amounted to safe, adequate, reasonable and efficient service. Indeed, in its Initial Prehearing Conference Memorandum of February 21, 2006, counsel for PAWC listed ten Company witnesses that it intended to call, one witness from its subcontractor EKI, Inc., and three outside expert witnesses. The issues that PAWC "intend[ed] to address" were the safety and reliability of the water system; causation of the water main break; the appropriateness of all PAWC systems and processes regarding leak detection; the appropriateness of all PAWC systems and processes for shut-downs in the event of a leak, and so on. PAWC Initial Prehearing Memorandum at 3.

Ultimately, PAWC called not *one* Company witness in defense of these very serious Formal Complaints, filed by the Township of Spring, the Wilson School District and a group of 23 customers whose properties lie adjacent to the Iroquois Avenue main break area. PAWC relied solely on two expert witnesses who addressed only the issue of the cause of the main break, claiming that a sinkhole must have opened up beneath the main. Neither expert said a word about the safety or reliability of the operation of PAWC's system in the Penn Water District. PAWC therefore has utterly failed to defend the very serious allegations of unsafe service.

II. STATEMENT OF QUESTIONS

A. Did PAWC provide inadequate and unsafe service, in violation of the Public Utility Code, when it allowed a PAWC-owned and operated main to rupture, causing sinkholes to develop when 1.5 million gallons of water escaped from its system?

Suggested Answer: Yes.

B. Do PAWC's response, actions and omissions after the main break violate Section 1501 regarding a utility's obligation to provide safe and reasonable service?

Suggested Answer: Yes.

C. Did PAWC violate Section 1501 regarding a utility's obligation to provide safe, adequate, reasonable service and efficient service when it:

- failed to respond timely and competently to low tank alarms;
- failed to perform leak detection procedures in accord with well-established Company standards and to keep records for locating and repairing leaks in a sinkhole-prone area;
- failed to undertake normal precautions to protect its distribution infrastructure in a sinkhole-prone area;
- failed to report the main break and associated damage to PUC and DEP, thus depriving those agencies of an opportunity to order a prompt investigation;
- Failed to create, maintain and preserve documentary evidence that would have been material to the issues raised in this proceeding; and
- failed to engage in a reasonable investigation into possible damage and hazards that may have been created from the release of 1.5 million gallons of water under pressure into the ground in the span of 20 minutes?

Suggested Answer: Yes.

D Does PAWC have an obligation to investigate known and possible hazardous conditions in PAWC's service territory that were due to a main break in its system in order to ensure the safety of its customers, employees and the public?

Suggested Answer: Yes.

E. Does PAWC have an obligation to its customers, employees and the public to remedy known and possible hazardous conditions to its own distribution system, public property and its customers' properties in its service territory that resulted from the main break?

Suggested Answer: Yes.

F. Does PAWC have an obligation to its customers, employees and the public to investigate whether subsurface damage occurred, beyond the damage to the Creveling home and property, on South Wagner Circle, Shelly Drive, and Nash Road?

Suggested Answer: Yes.

G. Does PAWC have an obligation to its customers, employees and the public to exercise reasonable prudence to protect its system from main breaks and other harm in an area known to be prone to sinkhole collapses?

Suggested Answer: Yes.

III. STATEMENT OF THE CASE

A. Introduction

Three Formal Complainants, the Township of Spring, Wilson School District and a group of twenty-three customers allege a reliability, safety, or quality problem with the utility service provided to them by PAWC. The Complainants and Intervenor OCA have shown that on February 5, 2005, a PAWC water main broke, releasing approximately 1.5 million gallons of water, within 20 minutes, into the subterranean structures beneath three streets within a residential neighborhood known as Stonegate, causing property damage and sinkholes. Tr. 731-32 (tanks empty in 20 minutes); Amended Formal Complaint of Neil R. Rahn and David Singerling, et al., ("Amended Complaint") at ¶ 4. Complainants seek an Order determining that PAWC violated the Public Utility Code and the Commission's regulations, and directing that PAWC undertake a geophysical survey of the specific affected area, South Wagner Circle, Shelley Drive and the southern side of Nash Road, to assess further sinkhole risk and to repair any damage caused by the main break. This area would encompass nineteen homes, portions of three streets and an open lot and this limited study is estimated to cost approximately $29,000. OCA St. 2 at 11; Tr. 606.

B. Summary of Relevant Testimony Fact Witnesses

Wagner Farms Homeowners' Association has as members the residents of the development that is known as "Stonegate" in Sinking Spring, Berks County. By direction of the Presiding Officer, Neal Rahn and David Singerling are the designated representatives of the customer group. The Stonegate community is comprised of 155 homes on North and South Wagner Circle, Nash Road, Shelley Drive, and a portion of Martin's Road in Spring Township, Berks County, Pennsylvania. Tr. 123-24, 173. *See also* Amended Complaint at Attachment B

(map). The specific remedy requested by the OCA on behalf of twenty of PAWC's customers[1] in the Stonegate community is motivated not simply by the practical concern for the need to repair any voids created by the risk of PAWC's water entering their property, but also by the customers' concern for their health and safety. Tr. 135; Amended Complaint, ¶ 5; Complaint List Addendum.[2] These PAWC customers primarily request that a geophysical study be conducted of South Wagner Circle, Shelley Drive and Nash Road, a portion of the Stonegate community. Second, the Complainants request that PAWC undertake those repairs that, as a result of the study, are required because of hazardous conditions that were caused by PAWC's main break. This request for relief includes a request that voids beneath the Creveling household, which virtually allexpert witnesses for all of the parties have agreed are directly due to PAWC's Iroquois main break, must be remediated.

Direct testimony by Township Engineer Jeri Diesinger indicates that between 1988 and 2003, no sinkholes appeared in the area of Township, based upon mapping and other documents. Tr. 250. Mr. Jay Vaughn, Spring Township's supervisor who approved the development plans for the Wagner Farms/Stonegate subdivision, testified to his recollection that no sinkholes were

---

[1] Twenty-three customers originally signed on to the Formal Complaint. In the course of the proceeding, however, the OCA experts determined that only the properties of those customers that reside on South Wagner Circle, Nash Road and Shelley Drive were in the path of the water that spilled from the fractured main, a total of 19 improved lots, and open areas. (The residences located on North Wagner Circle were not above the underground path of the water from the fractured main.) OCA St. 2 at 10.

[2] The 23 PAWC customers that signed on to the Formal Complaint are as follows:
PAWC customers and address numbers on North Wagner Circle: 3110- Rodney Schock, 3113-Charles D. Baltz, 3116-Roxanne Miller.
PAWC customers and address numbers on South Wagner Circle: 3115-Steve Dougherty & Anna Farina, 3117-Jean Paul Valeus, 3119-Neil Rahn & Rose Ann Ruggiero, 3121-Michael Maher, 3122 Thomas Schmitz, 3123-Robert Creveling, 3124 Vincent Kopriva, 3126-Cheryl & Jase Mellinger, 3128-David Singerling, 3130-Roberto Soto & Anna K. Stubenrauch-Soto, 3132-Robert Yeager.
PAWC customer and addresses on Shelley Drive: 301-Kenneth Gabel, 302-Tara Cesca, 303- Alan King, 304-Sean Warrington, 305-Gopalan Sridhar, 309-Paul McCracker.
PAWC customers and addresses at Nash Road: 3201-Antonio Guatieri, 3203-David H. Lewis III, 3210-William Zapata.

found by the developer at that time. Tr. 184. The developer did acknowledge that if found, any sinkholes would be remediated with professional guidance. Tr. 183. Ms. Jeri Diesinger, geologist for Spring Township, testified that in her review of many records including Wagner Farms files, she found no indication of preexisting sinkhole activity. Tr. 258-59, 273. Beginning in 2003, Ms. Diesinger, began maintaining a township database of reported sinkholes. Tr. 249-50. In September 2004, five months before the Iroquois Avenue main break in question, a sinkhole was reported at the fence line between the Baltz property at 3113 North Wagner Circle and the Farina property at 3115 South Wagner Circle. Tr. 251; Amended Formal Complaint (addendum of addresses). The sinkhole was located four to five houses away from the Creveling home at 3123 North Wagner Circle that sits at the intersection of that street and Iroquois Avenue. Tr. 36, 96-97. Three weeks prior to the main break, Ms. Julia Baltz complained several times to PAWC of low water pressure. Tr. 87, 96-97.

On February 5, 2005 at 10:30 p.m., the Creveling household experienced low water pressure along with popping and cracking noises in the home. Tr. 15. Others in and nearby the Stonegate community similarly experienced low water pressure or no water. Tr. 47, 105, 154-44, 629. At 10:45 p.m., Mr. Rothwell, PAWC's network supervisor for the Penn Water District, was awakened by a computerized SCADA alarm to his cell phone, indicating low water levels at the Blanton tanks that supply water to the Stonegate community via the Iroquois Avenue main adjacent to the Creveling property. Tr. 628-29, 711. Mr. Rothwell discovered soon after that call that the two Blanton tanks, 500,000 gallons each, had emptied by around 11:00 p.m., or in about 20 minutes. Tr. 549.

About 500 PAWC customers, including the Stonegate community, awakened to find that they had no water. Tr. 16, 69-71, 135-36. It was Superbowl Sunday, February 6, 2005. Many

people went to the grocery store to buy bottled water. Tr. 48. The Crevelings returned from a breakfast in Lancaster and were immediately approached by a PAWC employee who pointed to water coming out of their sump pump into the street. The PAWC employee told them that they had water in the basement. Mr. Creveling and two PAWC employees, including Mr. Rothwell, checked the Creveling's basement. The sump pump was running and there was a muddy puddle and evidence of water that had receded. Tr. 17-19. Mr. Rothwell pointed out cracks in the house structure to Mr. Creveling. Tr. 19-20. The Crevelings noticed that additional cracks had appeared in the house, in the arch next to the stairs, along the staircase. Tr. 18.

A PAWC employee, likely Mr. Rothwell, then pointed out a hole in the Creveling's backyard where two or three trees had sunk into the ground adjacent to, and within 10 feet of, the road where the main break was eventually found. Tr. 18-19, 24, 31-32. Ms. Ruggiero and Mr Rahn, at 3119 South Wagner Circle, received a call from Kristen Creveling asking Ms. Ruggiero and Mr. Rahn to help watch the children and move boxes away from the water in their basement Tr. 82. While in the Crevelings' home, Ms. Ruggiero noticed water squirting up from a crack in the middle of the Crevelings' basement floor. Tr. 83. Mr. Rahn also noticed this and water seeping in other areas of the Crevelings' basement. Tr. 107. The gas company shut off service to the Crevelings' house at PAWC's request and the Crevelings left their home after Mr. Rothwell told them that they should vacate. He also told them that PAWC would pay for them to stay at the Homewood Suites. Tr. 20-21, 42, 83.

Mr. Alan King, at 303 Shelly Drive in the Stonegate community, also had several inches of water in his basement. Mr. King lives 300 yards northwest of PAWC's main break at Iroquois Avenue. Tr. 366-67. His 25 gallon-per-minute sump pump, which had never activated before or since the main break, was running non-stop. Tr. 353-61; OCA St. 2 at 9. The sump pump ran

continuously for at least 30 hours, and then continued to cycle after that. Tr. 353-61. Mr. King's neighbor at 305 Shelly Drive also had a sump pump that was continuously cycling water into the street. Tr. 360, OCA St. 2 at 9. A PAWC employee tested the muddy water in Mr. King's basement and found that it was water that had been treated with chlorine Tr. 356.

In the meantime, PAWC had been attempting to pinpoint the location of the broken main that caused the Blanton tanks to empty. Approximately 15 hours after the tanks had emptied, PAWC located the break on Iroquois Avenue, adjacent to the Crevelings' home and Stonegate community. Around 3 p.m. on Superbowl Sunday, Mr. Vaughn, Spring Township's Roadmaster, was notified by Mr. Rothwell that the broken main was being excavated. Tr. 159. It was not until 4:30 p.m. to 5:00 pm that PAWC began to excavate the main. Tr. 690. PAWC issued a boil water advisory the following morning that lasted at least 24 hours. Tr. 675.[3]

On Monday, February 7, 2006, Mr. Creveling left the hotel where he was staying to visit his home and noted that the hole into which the trees sank next to the main break had expanded. Tr. 22. He testified that either the foundation of his house had risen, or the ground next to the house's foundation had sunk. Tr. 22. The deck of the house had bowed and since the time of the main break, the condition of the deck had worsened. Tr. 22-23. A small hole had appeared to the right of the deck. Tr. 22.

PAWC commissioned American Geotech to conduct a geophysical survey of the area. OCA St. 1 at 2. During February 13-16, 2006, American Geotech conducted a ground-penetrating radar survey in the Crevelings' basement and told Mr. Creveling that it had found voids and advised him to do additional tests before determining whether it would be safe to live in the house. Tr. 43; Diesinger Exh. 1 at 18-19. American Geotech drafted a report dated

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[3] Mr. Rothwell testified that the boil advisory was issued "the next morning" (after the excavation on Sunday February 6, 2005) and mistakenly testified that the date was February 6th, rather than Monday, February 7th. Tr. 675.

February 22, 2006. OCA St. 1 at 2; Diesinger Exh. 1 at 17. PAWC later provided a revised copy of this study, dated March 8, 2006, to Mr. Creveling's neighbor, Mr. Rahn, in response to Mr. Rahn's request that PAWC conduct a geophysical survey of the other areas adjacent to the main break to assess whether other damage, not visible from the surface, may have resulted from the flow of water escaping from the main break. Tr. 108; OCA St. 1 at 2.

In the days, weeks, and few months following the main break, new sinkholes appeared where there had been none previously. Several weeks after the main break, a hole appeared along the entire length of the Crevelings' back deck and the home's foundation appeared different. Tr. 89. Six holes opened on the Creveling property after February 5, 2005. Tr. 23, 32. On April 6, 2005, Ms. Ruggiero and Neil Rahn noticed a sinkhole in the street near their property. Tr. 97. They called Spring Township, whose employees made repairs to the street after PAWC checked its connections. Tr. 98, 177. On April 8, 2005, Mr. Singerling noticed a void under the curb of his property in the grassy area between the sidewalk and street. Tr. 50-51; Rahn Exh. 1, Photo 4A. On September 4, 2005, A sinkhole appeared near a fire hydrant between the property of Jean Paul Valeus at 3117 South Wagner Circle and the property of Mr. Rahn and Ms. Ruggiero at 3119 South Wagner Circle. Tr. 113, 123, 179; Rahn Exh. 1, Photo 5; Amended Complaint (addendum of addresses).

C. Summary of Relevant OCA and Township Expert Testimony

OCA witness Terry L. Fought, the OCA's consulting engineer, conducted an extensive investigation into the February 5, 2005 main break on Iroquois Avenue, Sinking Springs, PA. OCA St. 1 at 1-2. Mr. Fought inspected the 48 feet of the 125 feet of cast iron main that was removed and retained; met with the Complainants; reviewed the AGI and Enviroscan reports performed within a month after the event; viewed the videotape taken of the excavation taken by

John Rothwell; conversed with the OCA's witness Don Hoskins, Ph.D., consulting geologist; reviewed all discovery responses and the May 9, 2006 deposition transcript of John Rothwell. Id. Mr. Fought testified that the main was installed in the year 1970, based on the PAWC response to OCA discovery. Id., at 7. The main was not exposed to precipitation, as it was under a roadway that directed precipitation away from the main. Id. at 8. Also, no storm sewers were located near the main such that leakage from them could have affected the main bed. Id. At 8.

Mr. Fought concluded that the only source of water that could have eroded the main bed, causing the loss of support and the fracture of the main, was leakage over a period of time from the PAWC main itself. Id. at 9, 12; Tr. 299. In Mr. Fought's opinion, "the waterline leaking at a joint undermined the water pipe." The leaking water that would have been under pressure at 95 to 100 pounds per square inch, washed away the bedding of the pipe to the point that a joint of the pipe exceeded its design deflection of five degrees and started leaking greater and greater...until the break occurred." Tr. 299-300. Any water that would permeate into the area from the side of the road "would not have had sufficient pressure to wash that much dirt away." Tr. 300. Felicia Bechtel, M.Sc., P.G., who appeared as an expert geologist for the Township of Spring concurred in this opinion, stating: "Outside of a water main ..., Enviroscan is unable to find another source of water capable of initiating soil transport and subsequent sinkhole development." Bechtel Exh. 1 at 43.

Mr. Fought testified that PAWC had performed some leak detection shortly before the main break in the Penn Water District, but not in the immediate area of the main break, soon after the main break, Permalog units were installed to detect leaks near the intersection of Iroquois Avenue and South Wagner Circle. OCA St. 1 at 12. Routine leak detection is desirable

in all areas, but especially in karst areas, to detect leaks early in order to prevent the type of damage that occurred in this case. OCA 1S at 4. Mr. Fought's analysis of the tank levels in the period prior to and after the main break indicated that there was continuous leaking in the system that was substantially reduced after the Iroquois main break was repaired. OCA 1S at 11-12.

Mr. Fought also noted that most normal pipeline settling occurs within the first couple of years after construction into the main bed. Id. at 17. Since the water released from the broken main did not surface at the site of the break, Mr. Fought concluded that the water was forced into solution channels in the limestone formations and traveled for a distance along the main in South Wagner Circle. The subsequent collapsed sinkholes at 3128 South Wagner, in the roadway at 3117 South Wagner, and the sunken fire hydrant at 3119 South Wagner indicated that some of the water released from the broken main followed the path of the main bed. Id. Based upon his investigation, Mr. Fought concluded that additional geophysical studies should be done by PAWC to determine the locations and extent of other uncollapsed. Id.

Ms. Bechtel's investigation led to the same conclusion, *i.e.*, that further geophysical studies should be done. In addition, Ms. Bechtel echoed Mr. Fought's statements that this main break could have been prevented had PAWC engaged in systematic acoustic leak detection. Bechtel Exh. 1 at 3-4.

OCA expert witness Dr. Hoskins began his career as professional geologist in 1956 and attained positions of increasing responsibility with the Pennsylvania Bureau of Topographic and Geologic Survey until becoming its Director in 1986. He retired from this position in January 2001. OCA St. 2, App. A. Dr. Hoskins also performed an extensive review of all relevant documents, all available topographic and aerial maps and made three site visits to the Penn Water District. During these visits, he visually examined aspects of properties along South

Wagner Circle, Nash Road and Shelly Drive, and rock outcroppings near to the affected area. OCA St. 2 at 3-4. Dr. Hoskins noted that PAWC had available to it ample information, including publicly available geological maps (DMH Exh. 1) and records of ground surface failure (Exh. 4), to make it aware that ground failure above sinkhole formations repeatedly occurs in this area of its service territory and especially along public transportation routes. OCA St. 2 at 7. Dr. Hoskins also expressed the importance of installing and maintaining special leak detection to prevent damage associated with pipeline failure. Id. Dr. Hoskins echoed Mr. Fought's conclusion that the material supporting the pipeline was likely removed by water leakage from the pipeline itself, since it was located beneath impervious pavement and there are no other known sources of water that could have eroded the supporting material. OCA St. 2 at 7-8.

Dr Hoskins also expressed his agreement with the AGI report's conclusion that because of the main break the chance of future sinkhole activity has greatly increased in the area. Id. at 9. He further agreed that additional investigation by an experienced geotechnical engineer using additional geophysical techniques should be performed. Id. at 9. Dr. Hoskins concluded with this recommendation:

> Based on the reports of ground disruption or failure and sump pumping along South Wagner Circle, Nash Road and Shelly Drive, the entire area should be geophysically surveyed using techniques that will discover and delineate potential areas where surface collapse may occur.
>
> The geophysical techniques used should be designed to discover all potential collapse areas beneath constructed buildings as well as to discover potential collapse areas of the non-constructed ground surface, especially along the routes of main and distribution water pipelines. Effective surveying requires selecting differing techniques that produce the most reliable information for each classification of constructed and non-constructed surface. For example, due to the clay content of most Pennsylvania soils the use of Ground Penetrating Radar to ascertain karst features in unconstructed areas is not recommended.

Additionally, the entire PAWC main pipeline distribution system that lies above the limestones of Spring Township should be surveyed to determine potential failure areas so that effective preventative measures can be designed, installed and maintained to prevent recurrences of the February 5, 2005 event.

OCA St. 2 at 10. On surrebuttal, Dr. Hoskins refuted PAWC witness Kanaskie's testimony that it would not be reasonable to require further geophysical study of the area coinciding with the underground path of the water released from the Iroquois Avenue main. He testified as follows:

> The presently visible damage on property adjacent to the site of the water main break plus the visible evidence of water flow from the water main break site to additional property within the Development are all geological and hydrogeological evidence that water flow was initially directed west south westerly along geologically controlled subsurface channels, eroding the stabilized infilling material. The surface evidence is that this water flow was of such high intensity to undermine vegetation, land surface and building structure through creating of voids above the bedrock into which the surface soil and vegetation collapsed.
> Similar voids were likely developed following the geologically controlled channels elsewhere beneath paving and structures of the Development. These voids are discoverable using geophysical testing procedures that are specifically designed to identify voids. Once identified by the appropriate geophysical testing procedures, the voids can be confirmed with drill or probe testing similar to that performed by PAWC in the parking lot of the nearby school on Iroquois Avenue. Once direct drilling or probing confirms voids, remediation can then be performed.
> No visible evidence of karst related surface features (such as closed depressions) existed prior to the construction of the Wagner Farms Development. This is borne out by examination of aerial photography of the area. From this data a reasonable geological conclusion can be drawn that such sinkholes that likely exist in the bedrock had become stabilized. They were filled with the normal materials resulting from the dissolution of the underlying bedrock. Voids into which the surface soil could collapse, such as adjacent to the water main break, were absent in the Development.
> Thus voids discovered during the recommended geophysical testing and probing, if any, would be the direct result of the water main break and the resulting high intensity water flow. These voids should be identified and remediated in order to protect the welfare of the community.

OCA St. 2S at 3-4.

The American Geotech study was described by expert witnesses for the OCA and Spring Township as follows[4]: American Geotech found that water from PAWC's broken main traveled underground west to residential areas and northeast to the school area. OCA St. 2 at 9. The study found that because of PAWC's Iroquois main break, the chance of future sinkhole activity in the area had greatly increased and the large quantity of water from PAWC's main break would worsen existing sinkhole conditions underneath homes. Diesinger Exh. 1 at 19. American Geotech concluded that recent sinkholes that had opened up since the main break were caused by excessive water injected by the broken water main through existing solution channels and existing (closed) sinkholes. OCA St. 2 at 9. It recommended additional geophysical investigation for several residential homes immediately to the west of the broken main and that that the investigation further include consideration of the nearby school. Diesinger Exh. 1 at 19-20.

Mr. Creveling's insurance company commissioned a similar type of study. During the week of March 4, 2005, Enviroscan completed its geophysical survey. Exh. TLF-8 at 3. Enviroscan issued its final report on March 22, 2006 that included a ground penetrating radar survey of just the Creveling property. Exh. TLF-8. Enviroscan found that the location of the largest sinkhole, on the Creveling property and near the site of the water main break was "controlled by the location of concentrated infiltration from the water main break, and that the sinkhole activity was triggered by the water main breakage, and consequent loss of 1.5 million gallons of water into the subsurface." Exh. TLF-8 at 10.

Since as early as 1993, PAWC has reported to the Commission that it has engaged in regular leak detection procedures in all distribution systems throughout its service territories and

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[4] Upon motion by PAWC counsel, the American Geotech study itself was not admitted into the record. Tr. 246. Judge Weismandel, however, ruled that the expert witnesses were entitled to rely upon, refer to, and quote relevant portions of the American Geotech report in their testimonies. Tr. 246-47.

that it employs state-of-the-art leak detection methods. OCA Exhibit A, Tabs 1-8. Well-established Company policy requires 100% of hydrants, 33% of system valves and 20% of service line valves to be sounded annually. Id. This was also established policy prior to PAWC's acquisition of Citizens. OCA Exh. A, Tab 9. In response to discovery for any and all records of leak detection procedures, PAWC provided only a record dated January 24, 2005 of sounding for leaks in hydrants on a few streets in the Penn Water District; this practice apparently began only a few days prior to the main break. Tr. 646-8. Had PAWC maintained a systematic practice of sounding hydrants and valves for leaks throughout the Penn Water District for ten years prior to this catastrophic main break, as represented to the Public Utility Commission, the Iroquois main fracture would have been discovered far earlier than February 6, 2006 and the catastrophic events would have been avoided. OCA St. 2S at 10-15; Bechtol Exh. 2 at 3-4. In an area that both Mr. Hassinger and Mr. Rothwell were well aware was sinkhole-prone (Tr. 695-696, Tr. 567-8), PAWC failed to exercise an appropriate degree of vigilance over the integrity of the distribution system, thus putting the safety of its customers, its employees and the public in jeopardy.

IV. BURDEN OF PROOF

Section 332(a) of the Public Utility Code provides that the party seeking affirmative relief from the Commission has the burden of proof. 66 Pa.C.S. §332(a). In this proceeding, the Complainants have requested that the Commission direct PAWC to repair any damage caused by the Iroquois Avenue main break on February 5, 2005, and to conduct a ground-penetrating radar study to determine whether other subsurface damage was caused. The Complainants and

Intervenor OCA are the parties seeking affirmative relief from the Commission and, thus, are the parties with the burden of proof.

In Se-Ling Hosiery, Inc. v. Margulies, 364 Pa. 45, 70 A.2d 854 (1950), the Pennsylvania Supreme Court held that the term "burden of proof" means a duty to establish a fact by a preponderance of the evidence. The term "preponderance of the evidence" means that one party has presented evidence which is more convincing, by even the smallest degree, than the evidence presented by the other party. The Commission has held that a complainant, to establish a sufficient case against a utility and satisfy the burden of proof, must show that the utility should be held responsible or accountable for the problem described in the complaint. Feinstein v. Philadelphia Suburban Water Co., 50 PaPUC 300 (1976).

In addition to determining whether the complainants have satisfied the burden of proof, care must be exercised to ensure that the decision of the Commission is supported by substantial evidence in the record. 2 Pa.C.S. §704. The term "substantial evidence" has been defined by the Pennsylvania Supreme Court, Superior Court and Commonwealth Court as such relevant evidence that a reasonable mind might accept as adequate to support a conclusion. More is required than a mere trace of evidence or a suspicion of the existence of a fact sought to be established. Norfolk & Western Ry. Co. v. Pa. P.U.C., 489 Pa. 109, 413 A.2d 1037 (1980); Erie Resistor Corp. v. Unemployment Comp. Bd. of Review, 194 Pa Super. Ct. 278, 166 A.2d 96 (1961); and Murphy v. Comm. Dept. of Public Welfare, White Haven Center, 85 Pa. Commw. 23, 480 A.2d 382 (1984).

It is the OCA's position, as detailed further below, that the Formal Complainants and Intervenor OCA have met their burden of proving that PAWC has provided and continues to provide unsafe, inadequate, unreasonable and inefficient service. As such, the Formal

Complaints should be sustained and that PAWC should be required, among other things, to repair the known damage to an adjacent property caused by the February 5, 2005 main break and to conduct a ground penetrating radar study in specific areas that lay in the path of the 1.5 million gallons of water that were released from the main, as set forth in the Proposed Ordering Paragraphs, attached as Appendix C.

V. SUMMARY OF THE ARGUMENT

The three Formal Complainants and Intervenor OCA have met the burden of proving that, in multiple ways, PAWC has violated Section 1501 of the Public Utility Code, 66 Pa.C.S. §1501 and pertinent regulations, including those requiring the utility to report "events of unusual nature" to the Commission, 52 Pa. Code §65.2. PAWC also failed to report the event and the related outages to DEP pursuant to its regulations, yet another facet of the inadequate service in the instant case. PAWC's actions in failing to engage in systematic leak detection in the Penn Water District, as it repeatedly stated to the Commission was done in all areas of its service territory since as early as 1993, its failure to report the incident, its failure to promptly investigate, its failure to create, maintain and preserve records associated with this catastrophic main break are all aspects of the inadequate, unreasonable, unsafe and inefficient service supported by the evidence of record in this matter. PAWC's actions placed and continue to place the safety and well-being of its customers, its employees and the general public traveling the streets above the infrastructure that lay in the path of the 1.5 million gallons of water, at risk.

Under various provisions of the Public Utility Code, the Commission has broad powers to frame remedies for unsafe, unreasonable and inefficient service. "Service" and "facilities" are broadly defined. 66 Pa.C.S. §102. The fundamental power to regulate is also broadly described.

66 Pa.C.S. §501. Section 1501 imposes an obligation on PAWC to construct, maintain and repair its systems in all respects "as shall be necessary or proper for the accommodation, convenience and safety of its patrons, employees and the public." 66 Pa.C.S. §1501. Indeed, Section 1505 repeats this language in authorizing the Commission to "determine and prescribe, by regulation or order" the actions to be taken after determining that service was or is unsafe. 66 Pa.C.S. §1505. The geophysical study proposed by Formal Complainants and the OCA is a reasonable request to remedy the inadequate service and an order requiring it, as well as any indicated repairs, is well within the power and authority of the Commission.

Finally, it must be noted that PAWC was under an obligation to create, maintain and preserve records concerning this event. This Commission has stated that a party is obligated to preserve records, even despite the existence of a regular program that would purge them on a regular bases; periodic "purging" of electronic records is the functional equivalent of destroying data. Phone Talk, Inc., 126 PUR4th 179, 189-190 (1991), *citing* In re Agent Orange Product Liability Litigation, 506 F. Supp. 750, 751 (E.D.N.Y. 1980); *see also* Vertis Group, Inc. v. Duquesne Light Co., Docket No. C-00003643 (Order February 24, 2003)(ALJ and Commission recognize the "spoliation of evidence" doctrine that enables the factfinder to draw negative inferences where relevant documents are not produced, but concluded that Complainants had not raised the issue timely.)[5] The Commission noted that, at the very least, a party responsible for destroying or failing to produce data or information which is or was in its hands, will be subject to any adverse inference which can be drawn from the failure to produce. Id., 190. Complainants were entitled to access to the portions of the pipe that were scrapped and the

[5] The Initial Decision and the Final Order are lengthy and only a short portion of each deals with "spoliation of evidence," so copies have not been attached to this Main Brief. Print copies will be provided upon specific request and the OCA would also note that the documents are available on the PUC website at www.puc.state.pa.us/PcDocs/379069.doc and www.puc.state.pa.us/PcDocs/342073.doc.

purged SCADA data, among other records, and PAWC had an obligation to retain them, but did not. The OCA submits that the Commission should draw any and all adverse inferences that can be drawn from PAWC's failure to produce these highly material physical and documentary items of evidence. [6]

VI. ARGUMENT

A. The Commission Has The Authority To Order The Geophysical Study and Repairs to the Damage Caused By the Main Break

It is a well-established principle that the primary object of the Public Utility Code and regulations is "not to establish a monopoly or guarantee the security of investment" in public utilities "but first and at all times to serve the interests of the public." Ridley Township v. Pa P.U.C., 172 Pa. Super. 472, 94 A.2d 168 (1952); Sayre v. Pa. P.U.C., 161 Pa. Super. 182, 184, 54 A.2d 95, 96 (1947); Hoffman v. Public Service Commission, 99 Pa. Super. 417, 429 (1930). The Public Utility Commission has a duty, above all others, to enforce the Public Utility Code in order to ensure the safety and protection of Pennsylvania consumers and the public. Reid v. GTE North, Inc. & Bell Tel. Co., No. C-00934777, 1993 Pa. PUC LEXIS 31, *12 (May 25, 1993)(Reid); Re Consolidated Rail Corp., No. A-00104132, 1982 Pa. PUC LEXIS 61 (Oct. 1, 1982). Indeed, the courts have rejected the argument that public utilities have duties only to existing patrons or employees, because to do so renders the word "public" in various sections of the Code "meaningless surplusage." Reid; Postal Telegraph-Cable Co. v. Pa. P.U.C., 154 Pa. Super. 340, 35 A.2d 535 (1944); West Penn Rys. Co. v. Pa. P.U.C., 142 Pa. Super. 140, 15 A.2d 539 (1940).

[6] The final section of the OCA's proposed findings of fact relate to the missing physical evidence and documents.

Moreover, pursuant to its inherent police powers,[7] the legislature created the PUC to regulate public utilities in accordance with the public interest. Reid, 1993 Pa. PUC LEXIS 31, *12-*13. This dictate is embodied in several provisions of the Public Utility Code, including Section 501 and 501. Section 1501 mandates:

> "Every public utility shall furnish and maintain adequate, efficient, safe and reasonable service and facilities, and shall make all such repairs, changes, alterations, substitutions, extensions, and improvements in or to such service and facilities as shall be necessary and proper for the accommodation convenience, and safety of its patrons, employees, *and the public*."

66 Pa.C.S. §1501 (emphasis added). "Service" is defined by Section 102 of the Code in its broadest and most inclusive sense, as follows:

> "...any and all acts done, rendered, or performed, and any and all things furnished or supplied, and any and all facilities used, furnished, or supplied by public utilities, or contract carriers by motor vehicle, in the performance of their duties under this part to their patrons, employees, other public utilities, and the public, ..."

66 Pa.C.S. §102. This section is to be broadly construed by the PUC. AT&T Comm. of Pa. v. Pa. P.U.C., 130 Pa. Commw. 595, 599; 568 A.2d 1362, 1364 (1990). The word "facilities" is similarly broadly defined. 66 Pa. C.S. §102, Cohen v. West Penn Power, 56 PaPUC 528 (1982)(Cohen). That the fractured main and the water that flowed from it into the subterranean areas of the Stonegate community fall within the definition of "service" and "facilities" in the Code cannot reasonably be questioned.

Furthermore, it is the duty of the Commission to enforce the provisions of Section 1501. Section 501 of the Public Utility Code expressly states. "...the commission shall have full power and authority, and it shall be its duty to enforce, execute and carry out, by its

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[7] The "police power" is the inherent power of a body politic to enact and enforce laws for the promotion of the general welfare. Commonwealth v. Barnes & Tucker Co., 472 Pa. 115, 123, 371 A.2d 461, 465 (1977). In the exercise of the police power, a state may both suppress corporate activity which is "offensive, disorderly or unsanitary" and enact regulations to promote the public health, morals or safety and the general well-being of the public. Commonwealth v. Harmar Coal Co., 452 Pa. 77, 92, 306 A.2d 308, 316 (1973); Bacon v. Walker, 204 U.S. 311 (1907)

regulations, orders, or otherwise, all and singular, the provisions of this part, and the full intent thereof..." 52 Pa.C.S. §501 (a). It is the duty of all public utilities regulated by the Commission to obey all Commission orders and regulations in regards to the enforcement of the provisions of the public utility code. "Every public utility, its officers, agents and employees, and every other person or corporation subject to the provisions of this part...shall observe, obey, and comply with such regulations or orders, and the terms and conditions thereof." 52 Pa.C.S. §501(b).

The Commission has broad discretion in its ability to interpret and enforce all provisions of the Public Utility Code. *See* Popowsky v. Pa. P.U.C., 683 A 2d 958, 961 (1996)(PUC has broad discretion in setting just and reasonable rates); *see also* Application of Pa. Power & Light Co. for Restructuring Plan under Section 2806, 1998 Pa. PUC LEXIS 131, *152 (June 15, 1998); Dominion Retail, Inc. v. Pa.P.U.C., 831 A.2d 810, 814 (2003) (PUC has broad discretion in interpreting what costs are natural gas costs for the purpose of recovery under 66 Pa. C.S. § 1307(f)). In addition, the Commission has broad discretion in shaping appropriate remedies under the Code when code violations occur. *See* County of Erie v. Verizon North, Inc., 879 A.2d 357, 365 (Pa. Commw. 2005) where the Commonwealth Court held that PUC possesses the authority to order appropriate remedies and can direct Verizon to make refunds or terminate any illegal practices pursuant to 66 Pa.C.S. §501.

In addition, Section 1505 of the Code describes the Commission's power to shape adequate remedies broadly where it has determined that utility service is or has been unreasonable, unsafe or inefficient as follows:

> Whenever the commission, after reasonable notice and hearing, upon its own motion or upon complaint, finds that the service or facilities of any public utility are unreasonable, unsafe, inadequate, insufficient, or unreasonably discriminatory, or otherwise in violation of this part, , the commission shall determine and prescribe, by regulation or order, the

> reasonable, safe, adequate, sufficient, service to be observed, furnished, enforced, or employed, including all such repairs, changes, alterations, extensions, substitutions, or improvements in facilities *as shall be reasonably necessary and proper for the safety, accommodation and convenience of the public.*

66 Pa.C.S. §1505 (emphasis added). Again, as noted earlier, the Commission in shaping remedies must do so not just to protect a utility's customers and employees, but also to promote the safety of the public.

Indeed, if issues of the safety of a community arise during the course of a utility company's operation, the power of the Commission to act is irrefutable. *See* Re Consolidated Rail Corp., *supra.* The Commission exercised its discretion to issue a restraining order against further aerial spraying by West Penn Power where it was clear that adjacent landowners and the general public may be subjected to a health or safety risk due to the spraying. In Cohen, *supra*, the PUC determined that it had the authority to put a temporary ban on aerial spraying of chemical herbicides in a utility's right of way, even though right of way maintenance was generally a matter for utility management. Part of the rationale for this was that the Public Utility Code requirement that service be safe extends to those members of the public that may come in contact with the utilities' facilities, in that case, a product used for right-of-way maintenance. Id. As in Cohen, in the instant case it is not just the customers who own property adjacent to the main break area who are at risk, it is any PAWC employee or member of the public as well who drives the affected streets or parks in the school parking lot adjacent to Iroquois Avenue.

Although West Penn challenged the Commission's authority to impose the PUC's ban on aerial spraying, the ALJ found and the Commission agreed that that transmission line right-of-way maintenance practices of West Penn "clearly fall within the definition of service and facilities which the Company is required to render and perform, under Section 1501 of the Code,

in a safe, efficient and reasonable manner." Id. at *1, 6-7. The ALJ specifically noted: "The requirement that the provision of service be safe extends also to those members of the public who may come into contact with the utilities' facilities." Id. at *7 (quoting Lower Chichester Twp. v Pa. Pub. Util. Comm'n., 180 Pa.Super. 503, 119 A2d 674, 12 PUR3d 477 (1956)); *see also* Postal Telegraph-Cable Co. v. Pa. P.U.C., *supra*, and West Pa. Rys. Co. v. Pa.P.U.C., *supra*.

Inherent in the Commission's power to shape remedies to render service safe, reasonable and efficient is the power to order studies to determine how best to accomplish that objective. For example, in 1996, the Commission approved a settlement that called for a corrosion study of water system infrastructure to be in the public interest. In Schuylkill Township v. Borough of Phoenixville, the Borough was required to have a qualified engineer conduct a corrosion study of its water system. Schuylkill Township v. Borough of Phoenixville 1996 Pa. PUC LEXIS 125, * 5-6. Schuylkill Township had filed a complaint with the Commission alleging inadequate water quality. ALJ Smolen found Phoenixville in violation of Section 1501 because the water in the system was substantially corroded as a result of inadequate water mains. Id. at *5-6. The ALJ then ordered Phoenixville to reline the pipes, alter chemical treatment, and study the corrosion problem to make substantial corrections. While the proceedings were underway, Phoenixville filed for a rate increase. The end result was a Settlement between the parties which stipulated that Phoenixville would conduct a corrosion study within six months of the Commission order. The Commission adopted the ALJ's Recommended Decision concluding that the settlement requiring the corrosion study was in the public interest. Id. at *32-33.

The Commission has ordered other types of studies as a prerequisite to remedying inadequate service. In Balla v. Redstone Water Co., Docket No. C-992270, Order of June 28,

2005, for example, the PUC directed that an engineering feasibility study be performed in order to determine the least-cost method of remedying the Company's several persistent secondary Safe Drinking Water violations and to propose an implementation plan. Several other PUC orders have required the utility to conduct a study tailored to determine how the exact violations that had been determined could be eliminated. *See, e.g.*, Kessler v. Schickshinny Water Co., 64 PaPUC 290 (1987)(Company ordered to provide report of a licensed engineer with recommendations to render distribution system and water quality adequate); Ashbaugh v. Fitz Henry Water Co., 51 PaPUC 287 (1977)(Company ordered, *inter alia*, to engage the services of a waterworks engineer and submit a report with recommendations); Bell v. Cowanshannock Water Co., 49 Pa PUC 238 (1975) (Company ordered to submit engineer's report with recommendations and cost estimates to upgrade unsatisfactory water quality); Investigation Upon Commission Motion For the Purpose of Ascertaining Whether There Is An Inadequacy of Service of Nokomis Water Co., 43 PaPUC 276 (1967)(Company ordered to provide a report with recommendations and cost estimates prepared by a competent engineer supporting improvements necessary to furnishing satisfactory quality of water at adequate pressure).

The PUC has also ordered that a utility conduct a study to determine the least-cost method for rendering the pressure in the system adequate after the Commonwealth Court reversed and remanded a matter involving inadequate water pressure. Barone v. Pa. P.U.C., 86 Pa. Commw. 393, 485 A.2d 519 (1984), *petition for rehearing of order on remand denied sub. nom.*, 61 PaPUC 385 (1986).

Section 1501 and prior Commission decisions show that the Commission has wide latitude in determining how quality of service violations are to be remedied. Inherent in this authority is the power to require that a competent study be performed to determine the nature and

extent of the harm or conditions that may need to be remedied or repaired. The fact that the PUC has not ordered a Ground Penetrating Radar study before does *not* mean that it cannot do so in the instant case. The Commission has stated that the task of regulating public utilities "requires flexibility, since the public interest is a dynamic concept, which will not be adequately protected unless the Commission has the authority to meet changing needs." Reid, *supra*, at *12-*13. The Ground Penetrating Radar study being requested by the OCA and the nineteen customers who reside on the three affected streets within the Stonegate Community is reasonable and well within the Commission's power to grant, as a remedy for PAWC's violations of the Public Utility Code and pertinent regulations.

B. The Law Governing Accountability for Property Damage Due to Water Main Breaks

To date, OCA has discovered no reported PUC Orders deciding Complaints that seek repair of damage due to a main break causing sinkhole collapses. Several Pennsylvania civil cases involving damage to property resulting from main breaks, however, have been decided by the civil courts and some have been considered by the appellate courts as well. While it is clear that this Commission is not to assess monetary damages, it is equally clear, as discussed above, that the PUC has full and broad equitable powers to order restitution, repair and other "make-whole" equitable remedies. Moreover, just as the Commission's decisions on evidentiary and procedural issues may be informed by decisions of civil courts on comparable issues, Warthman v. GTE North, Inc., Docket No. C-00924416, (June 4, 1993), the Commission may also look to civil courts for decisions on substantive issues of accountability. In other words, if a civil court were to find a water purveyor negligent and liable for monetary damages caused by a main break in circumstances similar to those presented in the instant case, *a fortiorari*, the PUC should find the main break unreasonable and unsafe service and order any equitable remedies within its

power, such as repair of damage and study of the extent of the damage caused by the main break For this reason, the OCA presents this brief discussion of civil cases within our jurisdiction that involved damages caused by water main breaks.[8]

The most recent appellate case involving damage associated with a main break is Pennsylvania Liquor Control Board v. City of Philadelphia, 17 Pa. Commw. 627. 333 A.2d 497 (1975)(PLCB). In that case, the PLCB filed a complaint with the Commonwealth Court in original jurisdiction against the City for monetary damages that resulted from the basement of one of its stores being flooded, alleging that the City had been negligent. The City filed a motion for summary judgment and a stipulation of facts, including one which stated that "[t]he City had no notice, express or implied, of the condition which cased the break in the water main." PLCB at 629, 333 A.2d 498. The City argued that in light of the stipulation, it could not be held liable without actual or implied notice, as a matter of law. The Commonwealth Court denied the motion for reasons highly relevant in the instant case.

The Court explained that "implied notice" is not a term customarily used by the courts of Pennsylvania in this context, but they have used a similar term "constructive notice," meaning "that which is apparent upon reasonable inspection"(*sic*). PLCB, 630, 333 A.2d 499, *citing* Good v. Philadelphia, 333 Pa. 13, 6 A.2d 101 (1939). The Court determined that summary judgment was not warranted because the factual stipulation could not be read to preclude the City's liability for negligent failure to inspect its lines or for negligent construction of the lines. Id. In other words, in a situation where a water supplier has negligently failed to inspect its system, as in the instant case, constructive notice of leakage can be found.

[8] For a lengthy discussion of cases in all jurisdictions involving damage due to main breaks, see the ALJ Annotation entitled "Liability of Water Distributor for Damage Caused by Water Escaping from Main," 20 A.L.R. 3rd 2194 (2005).

The Court continued to address the City's argument that the doctrine of exclusive jurisdiction was not available to the PLCB, and agreed that the Supreme Court had abrogated that doctrine in favor of the doctrine of *res ipsa loquitur*, as articulated in the Restatement (Second) of Torts §328D (1965), which reads as follows:

> (1) It may be inferred that harm suffered by the plaintiff is caused by negligence of the defendant when
>
> > (a) the event is of a kind which ordinarily does not occur in the absence of negligence;
> > (b) other responsible causes, including the conduct of the plaintiff and third persons, are sufficiently eliminated by the evidence; and
> > (c) the indicated negligence is within the scope of the defendant's duty to the plaintiff.
>
> (2) It is the function of the court to determine whether the inference may be reasonably be drawn by the jury, or whether it must necessarily be drawn.
>
> (3) It is the function of the jury to determine whether the inference is to be drawn in any case where different conclusions may reasonably be reached.

PLCB at 631, 333 A.2d 499, *citing* Gilbert v. Korvette, Inc., 457 Pa.602, 327 A.2d 94 (1974). Just as significant, the Court notes that Comment (c) to the Restatement (Second) §328D states that "it is permissible to conclude that the escape of water from a main does not usually happen unless someone has been negligent." Id., at 632, 333 A.2d 500. The Court notes as well, however, that both sides should have an opportunity at trial to present evidence on the question whether the event would ordinarily occur in the absence of negligence. Id.

To be clear, the OCA fully believes that the Complainants and the OCA have submitted ample *direct* evidence of PAWC's failure to meet its own internal service standards and its failure to be sufficiently vigilant of its distribution system to act timely to prevent the type of catastrophic damage that occurred here. If the ALJ does not agree, however, as the "judge and jury" deciding the case, the ALJ may also consider that the elements of *res ipsa loquitur* have

also been met. That is, the evidence supports the following conclusions matching the elements necessary to invoke the *res ipsa* doctrine:

(1) A water main does not ordinarily fracture in the absence of negligence;

(2) (a) The Complainants played no part in causing the catastrophic events of February 5 and 6, 2006;

(b) All other sources of water other than PAWC's have been ruled out as a cause of the main's supporting material being washed away to the point that the main deflected, bent and burst;

(c) the testimony and exhibits have conclusively disproved PAWC's claim that a sinkhole spontaneously opened up beneath the main, causing the break;

(3) PAWC has a duty to the Complainants under the Public Utility Code to provide safe, adequate, reasonable and efficient service and all of the acts and omissions that led to the main break and the resulting damage were done within the scope of that duty.

In light of the above, the Commission may consider the circumstantial evidence, in addition to the direct evidence offered that creates a permissible inference of fault on the part of PAWC in the instant case

A case decided just prior to PLCB by the Superior Court is also instructive on the subject of accountability for main breaks. Banet v. City of Philadelphia, 226 Pa. Super. 452, 313 A.2d 253 (1973), Hoffman, J., dissenting (Banet).[9] In Banet, the plaintiffs had offered proof that during the 60 years since the pipe that failed had been installed, the City had conducted no inspections. Id., 453, 313 A.2d 254. The City had discarded the pipe and had run no tests to determine the cause of the break. The Opinion noted that the doctrine of *res ipsa loquitur* had been applied in limited circumstances, primarily involving common carriers or utility companies. Id., 454, 313 A.2d 255. While, as noted earlier, the doctrine of exclusive control was later abrogated by the Supreme Court in Korvette in favor of the *res ipsa* doctrine, the Superior Court

[9] The six judges of the Superior Court who heard the appeal were equally divided in favor of affirmance and reversal, therefore the judgment below was affirmed. The Dissenting Opinion by Judge Hoffman was joined by Judges Cercone and Spaeth.

finds the two doctrines closely related. In applying the two doctrines, the Opinion gave weight to the fact that the appellants had been precluded from determining the cause of the break due to the destruction and unavailability of the main. Id., 458, 313 A.2d 256. The Opinion stated, in applying *res ipsa*, that the Comments to the Restatement focused on the activities of public utilities, noting that "... the escape of gas or water from mains or of electricity from wires or appliances..." do not usually occur unless someone has been negligent. Id. 459, 313 A.2d 257.

Some older main break cases, while focusing on the issue of actual or constructive notice to defendants, contain notable similarities to the instant case. *See. e.g.* Schwindt v. Lehigh Water Co., 33 Pa. Super 23 (1907) (Water not as dangerous as natural gas, but may become dangerous when pressure is doubled in pipes that have been in use for 50 years); Rumsel v. City of Philadelphia, 171 Pa. 63, 32 A. 1133 (1895)(Court noted that the jury was instructed to decide whether an element of the City's negligence was not to have records at their waterworks to enable them to locate a leak); Baker v. North East Borough, 151 Pa. 234, 24 A. 1079 (1982)(Larger amount of travel on highway along which water pipe was installed required greater vigilance in watching and keeping the pipe in such a condition as not to interfere with or endanger public travel).

In a case of a city water main break damaging plaintiff's property when the water flooded the plaintiffs' store and damaged merchandise, the Supreme Court of Iowa noted that liability could be imposed upon the city without a showing of negligent conduct. Lubin v. City of Iowa City, 257 Iowa 383, 131 N.W. 2d 765 (1964).

> It is neither just nor reasonable that the city engaged in a proprietary activity can deliberately and intentionally plan to leave a water main underground beyond inspection and maintenance until a break occurs and escape liability. A city or corporation so operating knows that eventually a break will occur, water will escape and in all probability flow onto the premises of another with resulting damage. We do not ordinarily think of water mains as being extra-hazardous but when such a practice is

followed they become "inherently dangerous and likely to damage his neighbor's property" within the meaning of Pumphrey v. J. A. Jones Construction Co., supra. The risks from such a method of operation should be borne by the water supplier who is in a position to spread the cost among the consumers who are in fact the true beneficiaries of this practice and of the resulting savings in inspection and maintenance costs. When the expected and inevitable occurs, they should bear the loss and not the unfortunate individual whose property is damaged without fault of his own.

Id., 257 Iowa at 391, 131 N.W.2d at 770.

In short, damage due to main breakage is not uncommon in Pennsylvania or other states. The above cases support the Commission holding PAWC accountable for the results of its break to the extent possible within its equitable powers to regulate utility service.

C. PAWC Violated Section 1501 When it Failed to Report, as Required by Regulations, the Main Break, the Outages and Associated Damages to the PUC and DEP.

PAWC failed to adhere to Commission regulations that require the reporting of accidents, as follows:

§65.2 Accidents

(a) *General.* A public utility shall submit a report of each reportable accident involving the facilities or operations for the public utility in this Commonwealth. The reports shall be addressed to the Secretary of the Commission.

(b) *Reportable accidents.* Reportable accidents are those involving utility facilities or operations which result in one of the following circumstances:

(1) The death or injury of a person

(2) An occurrence of an unusual nature, whether or not death or injury of a person result, which apparently will result in a prolonged and serious interruption of normal service of more that 3 days.

(c) *Telegraphic reports.* A report by telephone or telegraph shall be made within 24 hours in the event of an occurrence of an unusual nature.

(d) *Written reports.* A written report shall be made on Form UCTA-8 within 5 days of a reportable accident. Accidents which are also reportable to the Bureau of

Workmen's Compensation, Department of Labor and Industry, may be reported to the Commission by filing a copy of the report submitted to that Bureau in place of Form UCTA-8.19.]

52 Pa. Code §65.2 (emphasis added).

The main break and release of 1.5 million gallons of water from the Blanton Tanks constitutes a reportable accident under Section 65.2(b)(2) which required PAWC to report to the Commission. Subsection (b)(2), quoted above, defines a reportable accident in part as an "event of an unusual nature." The draining of the 500,000 gallon tanks in 20 minutes is an unusual event, beyond doubt. Mr. Hassinger also agreed that a water main break rendering a house uninhabitable would be an unusual event. Tr. 510. In this case, PAWC acknowledged the causation between the main break, high pressure water flow, and damage to the Creveling home, as evidenced by Mr. Rothwell authorizing reimbursement to the Crevelings to stay in a hotel at PAWC's expense. Tr. 20-21. A water company paying for the lodging of a residential customer is uncommon and underscores the unusual nature of this series of events.

A reportable accident under Section 65.2(b)(2) further requires that the unusual occurrence "will apparently result" in a prolonged and serious interruption of normal service of more than 3 days." 52 Pa. Code § 65.2(b)(2). Normal water service ceased late on February 5, 2005, when customers reported low water pressure. Water service was unavailable for a reported 500 customers, and the water outage lasted all day on February 6, 2005 for some. Tr. 135-36. Even when water service resumed on February 7, 2006, a boil water advisory was in effect beginning on that day and would have remained in effect for at least the 24 hours required for testing to take place. Tr. 675. Customers who were informed of boil water advisories through the media, if they were informed at all, were cautioned not to use the water as they normally would. Tr. 135, 224.

Mr. Bortz of the Wilson School District testified that on February 7, 2005, the school was closed due to the events. When the school reopened on February 8, 2005, PAWC provided bottled to the school because PAWC water was not yet known to be potable. Tr. 216-219. The testimony of PAWC's affected customers and Mr. Rothwell, PAWC's network operator have established a timeline of facts that show normal water service did not resume for at least 3-4 days from February 5, 2005 to February 8, 2005.

Because both the unusual nature and duration of the main break require the application of Section 65.2, PAWC had an obligation to report the incident to the PUC both by telephone and in writing. However, PAWC made no such report to the knowledge of Mr. Hassinger, who is the director of network for American Water Service Company and head of the chain of command for PAWC in an event such as the main break. Tr. 585 86. Mr. Rothwell, PAWC's first responder to the main break admitted that he did not report the main break and the outage to the PUC. Tr. 713. The record indicates that the Commission has only become aware of the events through the persistence of the Complainants -- Spring Township, Wilson School District, and 23 PAWC residential customers.

This is not the first time that PAWC has failed to give notice to regulatory agencies in accord with regulations. In investigating a December 10, 2005 incident in which PAWC operator error at the Yellow Breeches Water Treatment Plant "resulted in a chemical spill of approximately 372 gallons of hydrofluorosilic acid" affecting approximately 34,000 PAWC customers, the Commission found:

> Perhaps the most troubling aspects of this incident, however, were PAWC's failures to notify the Commission in a timely fashion of the spill and to provide its consumers with timely and adequate notice after the Pennsylvania Department of Environmental Protection (DEP) concluded that a "Do Not Consume" advisory was to be put into effect early in the afternoon of December 10th when high levels of fluoride were found in PAWC's potable water supply. In our March 10, 2006 Order, we specifically found that

> while PAWC may have been in technical compliance with DEP's applicable public notice regulations, PAWC did not provide actual, timely notice to many of the affected customers. We also found that the contents of PAWC's public notice were inadequate under DEP's public notice regulations, as PAWC failed: (i) to identify when the fluoride spill entered the potable water distribution system, 25 Pa. Code § 109.411(a)(2); (ii) to include any of the required adverse health effects language, 25 Pa. Code 109.411(a)(3) & (d)(1) or (d)(2); and (iii) to identify the population at risk, including any subpopulations of customers that are particularly vulnerable to the contaminant in their water supply, 25 Pa. Code § 109.411(a)(4). In addition, we found that PAWC failed to use its Internet website to notify the public about the incident and water advisory.

Proposed Policy Statement Relating to Unscheduled Water Service Interruptions and Associated Actions, 36 Pa.B. 4013 (July 29, 2006) (footnotes deleted).

The PUC may, in enforcing Section 1501 of the Public Utility Code, reference violations of regulations promulgated by the DEP. *See* Motion of Chairman Wendell F. Holland, Policy Statement Re Public Notice Standards Relating to Unscheduled Water Service Interruptions; Proposed Policy Statement, Docket No. M-00061956. "At all times, utilities are required to follow the regulations relating to public notification as promulgated by the DEP at 25 Pa. Code §109.407." Id. In the instant case, the PUC should find that PAWC's decision to ignore both PUC and DEP regulations, as discussed below, designed to ensure that customers and the environment are protected from hazardous conditions, is a violation of the safe and adequate service requirement of Section 1501.

In the case of PAWC's recent fluoride spill, the PUC consulted DEP regulations in coming to its determination, noting, for instance, that "the detailed public notice requirements already contained in DEP's regulations made it unnecessary for the Commission to impose an additional layer of public notice regulations on water utilities." Proposed Policy Statement Relating to Unscheduled Water Service Interruptions and Associated Actions, Doc. No. M-00061956, (order adopted June 1, 2006). *See also* Final Investigation Order and Release of Staff Report, Docket No. I-00050109 (Mar. 2, 2006) (referencing DEP regulation at 25 Pa.Code §

109.707, and directing PAWC to review and update all of its Emergency Response Plans for PA plants within the next several months).

In the instant case, PAWC should have notified the PUC pursuant to Section 67.2 and the DEP of the interruption in service, under DEP's regulation for planned service interruptions *See* 25 Pa. Code § 109.708. DEP's regulations provide that, "[t]he public water supplier shall give reasonable notice to the affected customers prior to a planned service interruption affecting quantity or quality of the water delivered to the customers. If the interruption is scheduled to exceed 8 hours and affect 15 or more service connections the water supplier shall also notify the Department." 25 Pa. Code § 109.708.[10]

First, although the main break itself was obviously unplanned, the decision to shut off water feeding the Blanton tanks and those customers served by the Blanton tanks was a deliberate decision and therefore a planned interruption. At hearings, Mr. Rothwell described PAWC's methodical shutting off of valves in the Stonegate community in order to determine which shut-off would cause the level of the Blanton tanks to refill as indicated by SCADA, thus indicating the isolation of the leak. Tr. 687. PAWC was required to have notified DEP of this planned interruption of service to its customers, as it planned to isolate the leak. 25 Pa. Code § 109.708. Second, PAWC should have also notified DEP of the service interruption because locating it, excavating the broken main, and replacing the broken main should have been a repair that PAWC could foresee would "exceed 8 hours and affect 15 or more service connections." 25 Pa. Code § 109.708.

Mr. Rothwell estimated that it took 12 to 13 hours to find and isolate the leak. Tr. 689. Once the leak was isolated on Iroquois Avenue around 3.00 p.m. on February 6, 2006, Tr. 154,

[10] The threshold of 15 or more service connections related to DEP's definition of a "public water system" as a system having "at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year." 25 Pa. Code § 109.1.

the supply to the Iroquois main which serves the Stonegate community had to remain shut off for many hours while the pipe was excavated, clamped, and replaced with a new section of pipe. Water was unavailable to some affected PAWC customers all day on February 6, 2005. Tr. 135-36. In this case, not only should PAWC have notified the PUC directly, but PAWC should also have notified DEP. Although questioned extensively about recordkeeping and obligations to provide notice to agencies, neither PAWC witnesses Hassinger or Rothwell ever noted any report made to either agency nor did either witness produce a document demonstrating that such requirements had been met.

When an emergency occurs, a prudently operated water utility should have on hand a contact list of state agencies, such as the DEP and PUC, so that the incident may be reported and the utility may receive assistance and guidance from the agencies. Drinking Water Handbook For Public Officials, American Water Works Association Edition, at 59 (re: emergency planning). *See also* 52 Pa. Code § 101.1 *et seq.* The Commission's regulations require utilities to maintain emergency response plans that include "[n]otification of the appropriate emergency services and emergency preparedness support agencies and organizations" in order to protect infrastructure and "ensure safe, continuous and reliable service." 52 Pa Code §§101.1, 101.3(4)(iii). In the present case, the appropriate agencies for PAWC to contacted under Section 101.3(4)(iii) were both the Commission and DEP, both of which could have offered support and guidance in PAWC's main break emergency.

PAWC, chose to act alone, however. In so doing, the Company also failed to (1) notify customers of the water outage, Tr. 216; (2) notify all affected customers of the boil water

advisory[11], Tr. 224, 228, 135; (3) notify PAWC customers, other than the Crevelings, that a safety hazard might exist due to the main break, Tr. 354-55, 363-64, and (4) failed to create, maintain and preserve important evidence. Tr. 741-42 (Mr. Rothwell scrapped 77 feet of the broken cast iron main without allowing it to be tested for leaks and cracks to help determine the cause of the main break).

By failing to notify the PUC of the catastrophe at all, PAWC deprived the Commission the opportunity to timely order or undertake an investigation, should it have chosen to do so, as in the case of PAWC's fluoride spill. *See* Final Investigation Order and Release of Staff Report, Docket No. I-00050109 (Mar. 2, 2006).

D. PAWC Violated Section 1501 Regarding a Utility's Obligation to Provide Safe and Reasonable Service by Failing to Engage in Systematic Leak Detection and by Failed to Respond to Low-Level Tank Alarms in a Timely Manner.

With every base rate filing PAWC submits pursuant to Section 1308(b) of the Public Utility Code, 66 Pa C S. §1308(d), the Company includes a set of documents in order to comply with the PUC's Water Conservation Measures – Statement of Policy, codified at 52 Pa. Code §65 20. That Statement of Policy reads, in pertinent part as follows:

> In rate proceedings of water utilities, the Commission intends to examine specific factors regarding the action or failure to act to encourage cost-effective conservation by their customers. Specifically, the Commission will review utilities' efforts to meet the criteria in this section when determining just and reasonable rates and may consider those efforts in other proceedings instituted by the Commission.
>
> ...
>
> (4) *Unaccounted-for water.* Levels of unaccounted-for water should be kept within reasonable amounts. Levels above 20% have been considered by the Commission to be excessive.
>
> (5) *Leak detection.* A system of leak detection should be utilized on a regular basis, with leaks being repaired as expeditiously and economically as possible.

[11] Mr. Vaughn, a supervisor of Spring Township in contact with PAWC network supervisor Rothwell during the emergency was not notified of the boil water advisory. Tr. 224. Mr. Rahn, PAWC customer and Stonegate resident, only learned of a boil advisory in effect through the media. Tr. 135.

52 Pa. Code § 65.20(4)-(5). The Public Utility Code specifically mentions "efficiency, effectiveness and adequacy of service of each utility when determining just and reasonable rates under this title." 66 Pa.C.S. §523(a). For fixed utilities, the commission considers specifically "management effectiveness and operating efficiency as measured by an audit," "action or failure to act to encourage cost-effective conservation by consumers of water utilities" and "any other relevant and material evidence of efficiency, effectiveness and adequacy of service." 66 Pa.C.S. §523(b). Section 1501 requires not merely "safe and reasonable" service, but also *efficient* service. 66 Pa.C.S. §1501.

For many years, PAWC has offered up direct testimony by a company management employee in support of the Company's efforts in this regard. In the 1993 rate case, Mr. Nick Rowe testified solely on the subject of cost-effective conservation. OCA Exh. A, Tab 1. In brief, Mr Rowe testified, in pertinent part, that PAWC:

- Sounds for leaks on all customer control valves once every five years.
- Sounds all hydrants for leaks each year
- Employs seven state-of-the-art electronic leak detection vans to detect and repair fractured transmission and distribution mains throughout the state.
- Has conducted a comprehensive water audit in each of its operations to identify ways to increase water available for customers use other than capacity additions.
- Purchased and utilized state-of-the-art water use monitoring equipment which allows the proper sizing of large meters to accurately measure water use.

Id. at 3-4. Mr. Rowe sponsored PAWC Exh. 2-A, the Company's entire Water Resource Management Program (WRMP), a document that details the types of programs PAWC has "to promote the wise and efficient use of water." Id., 5. The entire document contained nearly 90 pages of detailed conservation policies on virtually every aspect of a water utility operation. OCA Exh. A, Tab 2. The Water Audit Handbook included in Exhibit 2-A was the product of a

regional effort to assist PAWC personnel by setting forth procedures for conducting a comprehensive system-wide water audit to assess the delivery efficiency of the water distribution system. In the 1994 rate case, Mr. David Modeer testified to the Company's water conservation planning pursuant to the PUC's Conservation Policy Statement. OCA Exh. A., Tab 3. As did Mr. Rowe, Mr. Modeer touted the WRMP (Exhibit 1-C in that case) as "clear evidence of the Company's commitment to this important environmental issue." Id. at 7. Mr. Modeer also sponsored a document marked Exhibit 1-H, PAWC's "Action Plans" to reduce unaccounted-for water. OCA Exh. A, Tab 4. PAWC submitted similar testimony and exhibits with its 1999 and 2001 base rate filings Tabs 5-8, as did Citizens Utilities Water Company of Pennsylvania in its 1995 filing (Tab 9), the last filing prior to its acquisition by American Water Works in 2001.

Thus, PAWC and Citizens repeatedly offered testimony and exhibits demonstrating that systematic leak detection procedures were in place throughout their systems. Citizens stated in its 1995 case: "Penn Water believes that lost and unaccounted for water is minimal within each of its service districts because each district has an on-going leak detection program. Leaks that are detected immediately to minimize lost water." OCA Exh. A, Tab 9 at 1.[12]

All of this information was presented by witnesses, under oath and subject to cross-examination, for the PUC's consideration in setting just and reasonable rates in a Section 1308(b) proceeding, 66 Pa.C.S. §1308(b).

PAWC standards were apparently ignored in the Penn Water District for years prior to the main break. The OCA served several discovery requests on PAWC seeking the type of documents that would have been generated had the conservation policies and practices summarized above been carried out. No documents were forthcoming. The OCA also asked for

[12] Citizens referred to itself in its base rate cases as "Penn Water." In the instant case, reference is made to the "Penn Water District" which is a subpart of the former Citizens Utilities service territory.

all "manuals, standard operating procedures, best practices guides and any such materials used by PAWC regarding leak detection practices and procedures." The response to that request referred the OCA back to documents provided in response to an earlier request (documents included as an Exhibit TCF-4 to OCA witness Fought's Direct Testimony) and no additional documents were provided.

On the issue of the operating procedure manual, the OCA would first point out that in the June 1994 Management Audit of Citizens, one of the findings was that "Operations and Maintenance (O&M) manuals have not been developed for the local properties." The Audit states as follows:

> Currently, operating and/or maintenance schedules are conducted at the discretion of the respective local property Superintendents with some variations based on the unique characteristics of the respective properties rather than propagated from a detailed operations and maintenance manual.
> At a minimum, the O&M manual should include the following
> - standardized operating practices
> - prescribed maintenance tasks
> - respective schedules to accomplish the designated tasks
>
> The Manager Operations (*sic*) has acknowledged the need to develop O&M manuals for each of the local properties...

OCA Exh. A, Tab 10 at 31. In the Bureau of Audit's 1997 Management Efficient Investigation, the Bureau reported as Follow-up Finding and Conclusion No. 7: "O&M manuals have been developed for all company facilities." OCA Exh. A, Tab 11, at 17. This Finding and Conclusion *should* have been true for all facilities, including the Penn Water District. Such a manual presumably would have set forth schedules for important conservation efforts on a regular ongoing timeline, such as sounding all hydrants, 20% of all system valves and 33% of all service line control valves annually. No manual was provided.

Mr. Brian Hassinger, currently a Manager and Regional Network Director, served as a manager of engineering construction for Citizens from 1991 to 1998; as a Vice-President and

General Manager of Citizens from 1998 to 2002, and as a Manager for PAWC from 2002 to 2004. Hassinger Exh. 1; Tr. 498-500. His experience in the region encompassing Sinking Springs and the Penn Water District spans 15 years. Tr. 500. Mr. Hassinger did not recall any involvement with developing a water conservation policy for Citizens at any point in his tenure there, but he was aware of the PUC Statement of Policy on Water Conservation. Tr. 505-506.

Mr. Hassinger testified that he did not recall whether a system-wide leak detection survey was performed in the late '90s. Tr. 513-514. Nor did he recall whether such a survey was done after 2000. After the change in control in early 2001, Mr. Hassinger became aware that the American system adhered to AWWA standards on water conservation. Tr. 515-16. He was not sure, however, whether the leak detection specialist teams survey three distribution miles each day, or more, or less. Tr. 516-517. He believed the standard of sounding 100% of all hydrants each year in each district may have changed, but he could not say whether it has become stricter or looser and "did not know whether it was 100% in every district across Pennsylvania." Tr. 517. With the policy of sounding 20% or more of all system valves, again, he could not say what the "target" was for Penn Water district. Tr. 518. He also could not say for the Penn Water District what the "actual target" for a percentage of all system valves and service line valves. Tr. 518-519.

Mr. Hassinger had never personally witnessed the team of leak detection specialists in the Sinking Springs area, but he made an "assumption that [Mr. Randolph] has been there to assist." Tr. 520. Mr. Hassinger was unaware that no leak detection records had been provided in response to discovery by the OCA. Tr. 520-21. Mr. Hassinger had never seen the Water Loss Audit Handbook used in PAWC's system. Tr. 523; OCA Exh. A, Tab 6 at 14. Mr. Rothwell did not know what a water loss audit was. Tr. 674.

Mr. Hassinger could not recall whether he had a role in developing the O&M manuals that the Bureau of Audits had reported were completed for all of Citizens districts. Tr. 525. His resume, however, included information that he had "work[ed] with the operations staff to develop O&M manuals and prepare DEP and PUC reports. Tr. 526. He was not sure why no documents were provided in response to the OCA's discovery request for O&M manuals. Tr. 526.

One of Mr. Hassinger's responsibilities is to direct the implementation of standards, targets, policies and plans to ensure continuing and increasing operational efficiency of the PAWC system. Tr. 528. One aspect of that responsibility is to reduce risks associated with operating a water system and an aspect of increasing operational efficiency is to ensure that leak detection is performed on a regular basis. Tr. 528 Mr. Hassinger conceded that the commencement of hydrant sounding and records associated with that action in January 2005 may have been prompted by the implementation plan to start a system-wide database of leaks and main breaks, as represented to the PUC's Bureau of Audits in December 2004. OCA Exh. A, Tab 14; Tr. 547-548. Mr. Rothwell concurred that the leak detection reports of hydrant sounding began on January 24, 2006 and that no records existed for any leak detection procedures prior to that time Tr. 646, 647-648

According to the Second Prehearing Conference Memo submitted by counsel for PAWC, Both Mr. Rothwell and Mr. Hassinger were to be called by the Company to testify in the following areas:

- Involvement and response to the subject water main break;
- Work and maintenance on the entire water distribution system;
- Safety and reliability of the water system;
- Causation of the water main break;
- Appropriateness of all PAWC systems and processes regarding leak detection;
- Appropriateness of all PAWC processes for shut-down in the event of a leak;

- PAWC reasonable procedure with equipment and maintenance of lines;
- PAWC practices and procedures in maintaining a safe and reliable system.

PAWC Second Prehearing Memorandum at 2.[13] Yet, Mr. Hassinger had not reviewed even the PAWC-commissioned geophysical study by Dr. Chung of American Geotech that recommended ground-penetrating radar and further analysis of the area, since the main break had rendered it more sinkhole-prone. Tr. 558-559.

In short, PAWC was and continues to provide unsafe and inefficient service because its water resource management policies and standards are not adhered to in the Penn Water District.

E. PAWC Failure to Monitor and Respond to Low Tank Levels in a Sinkhole Prone Area Amounts to Inadequate Service Under Section 1501

PAWC's Blanton water tanks, that supply water to the Iroquois Avenue main and the Stonegate community, have a 40-feet depth capacity. Tr. 621, 623. The tanks are equipped with low water level alarms which activate when the tank levels are around 28-30 feet. Tr. 643. The alarm is generated by a computerized program called, System Control and Data Acquisition ("SCADA") that generates updated readings every 15 minutes. Tr. 624. When SCADA detects low water levels in the Blanton tanks, as determined by Mr. Rothwell's setting, Tr. 611, it sends an alarm by way of an automatic telephone call to PAWC's local Mountain Home office, to dispatch, and to Mr. Rothwell's cellphone. Tr. 625. SCADA also visually appears as a flashing warning on the computer screens that monitor SCADA data. Tr. 626.

In addition to monitoring tank levels through SCADA, PAWC personnel manually write down high and low tank levels, each once a day, in the Penn Water District Logs as demonstrated in Rothwell Exhibit 2. Tr. 624, 656; Rothwell Exh. 2.

[13] Counsel for PAWC did not announce the decision not to call Mr. Hassinger until the end of the day's hearing on June 28, 2006. Tr. 401. Consequently, ALJ Weismandel granted OCA's request for Subpeonae of Mr. Hassinger and Mr. Rothwell, who were required to appear for direct testimony as-of-cross on June 30, 2006.

Mr. Rothwell is responsible for setting the tank alarms at the Blanton tanks. Tr. 627, 643. Although Mr. Rothwell testified that the alarm is never turned off manually[14], Tr. 629, his responsibility as network operator for the Penn Water District includes the ability to change the alarm setting, Tr. 643 or turn the alarms off, should he choose to do so. Tr. 611. Mr. Rothwell does not typically call other service people or directors or managers when a low level tank alarm sounds. Tr. 627. He testified that although he will send a service person out to check on the tanks each time a low tank alarm sounds, he will check on the levels himself first but would not call a director or a manager right away

Mr. Rothwell was asked in cross-examination upon what occasions, other than the memorable date of February 5, 2005, did Mr. Rothwell hear the low level tank alarms sound for the Blanton tanks. Mr. Rothwell's answer was vague, stating, "Summertime it would go off. There's been a couple of other times we had well failures." Tr. 630. However, high and low tank levels in the range of 16.9 to 22.5 feet were manually recorded in the week and a half preceding the Iroquois Main break on January 26, January 27, January 28, January 29, January 30, January 31, 2005. The "high" tank level for each of these days preceding the main break never exceeded 22.5 feet. Tr. 645-46.

When confronted with the manual recordings of low tank levels in the Penn Water District Operator Logs just a few minutes after his initial vague answer, Mr. Rothwell had to admit that if the tank alarms were set at 28 to 30 feet, the low tank alarms sounded for many days surrounding the catastrophic main break of February 5, 2005. In fact, if the tank alarm was activated on January 26-31, 2006, Mr. Rothwell's phone should have been ringing as constantly during that period as it did the night of February 5, 2005. Tr. 720. On both February 5 and 7,

[14] In conflicting testimony, Mr. Rothwell later acknowledged that he has, in fact, disarmed the tank alarm on at least one occasion. Tr. 724

2005, Mr. Rothwell testified that he stopped acknowledging the alarms, and probably disarmed them. Tr. 720, 724. A strong inference can be drawn from the testimony that Mr. Rothwell either disabled or changed the tank alarm settings that otherwise would have been constantly going off during January 26 to January 31, 2005 with tank levels never clearing the 28 feet required to silence the alarms, or else Mr. Rothwell simply ignored those early, and multiple SCADA warnings in January 2005 of a main leak.[15]

F. More Voids Than Are Visible on the Surface May Have Been Created by the Main Break and the Resulting Rush of Water at High Pressure

When the testimony of expert witnesses in a case conflicts, it is incumbent upon the Commission to determine the relative credibility of the witnesses and to decide which should be accepted or given predominant weight. *See* Pittsburgh Railway Company v. Pa. P.U.C., 198 Pa. Super. 415, 428, 182 A.2d 80, 86-87 (1962) (Pittsburgh Railway). In so doing, the Commission may consider the length and variety of the witness's relevant experience, the amount of detail offered and the degree of the testimony's probative force. Id. The PUC may also consider the degree of care taken in the expert's observations of the area in question, including the length of time taken to make inspections and study the issues involved in his or her conclusions. *See* Moscow Borough Council v. City of Scranton, 1987 Pa. PUC LEXIS 89 (1987). In PUC proceedings, an expert's conclusions may be considered more competent, relevant and probative if reached with regard for the need to prevent accidents and promote the safety of the public. Pittsburgh Railway, *supra*.

[15] Mr. Rothwell testified that he did not remember if he received a tank alarm to his cell phone on February 4, 2005, the day before the main break, tr. 721, when the Blanton tanks registered a low water level of 26 feet, a full 2-4 feet below the 28-30 feet alarm setting. *See* Rothwell Exh. 1 (see log sheet dated "5-Feb-0"5; entry of 26 feet from 11:00 p.m. the previous night); Tr. 718 (interpreting the log sheet dated, "5-Feb-05."). Mr. Rothwell reasoned that he may not have received the alarm to his cell phone because he "probably" left the house to go grocery shopping with his daughter. Tr. 721.

Without doubt, the Complainants' and Intervenors' expert witnesses should be given predominant weight. Only the Township witnesses' Ms. Diesinger and Ms. Bechtol were able to observe the excavation in the area of the main break within a day after the break occurred. Ms. Bechtol was called by the Creveling's insurer to examine, using Ground Penetrating Radar (GPR), the areas beneath the foundation of the Creveling home within days after the break occurred.

To be more specific, experts called by the Township and the OCA were in agreement that the damage caused by the main break and the flow of high-pressure water in all probability caused more damage than has become visible on the ground surface. To ensure the safety of the public and the residents, the only method to discern whether in fact such subterranean damage has occurred presenting the risk of collapse under the streets, the homes, or PAWC's distribution system, is a GPR study. In fact, PAWC's own geophysical expert, Dr. Chung, was the first to draw this conclusion.[16]

OCA witness Hoskins testified that the February 2005 and subsequent sinkholes resulted from the excess water escaping from broken 8-inch main, then draining through existing solution channels from the broken main water location toward the west to the residential areas and to the northeast to the School area. OCA St. 2 at 9. He also concurred with Dr. Chung's conclusion that because of the main break and flow of high-pressure water, the chance of future sinkhole activity has greatly increased in the area. Id at 9.

[16] PAWC named Dr. Chung as its witness in its February 2006 Prehearing Memorandum, however, ultimately failed to call Dr. Chung. His testimony, if consistent with his report, would have been favorable to the Complainants and the OCA. Dr. Chung's Report was provided in response to discovery requests and each of the expert witnesses appeared had reviewed the Report and had an opportunity to comment on it. While the report in its entirety was not admitted into evidence, testimony of the witnesses who appeared at the hearing who reviewed it and agreed with the most relevant of its recommendations was admitted. Tr. 241-248.

These opinions are borne out by the facts. Several sinkholes have appeared in the street and adjacent grassy areas since the February 4, 2005 main break

OCA witness Fought testified that leakage from the mains eroded the supporting material away from the main bed, causing deflection and ultimately failure of the main, allowing the two 750,000-gallon tanks to empty. OCA St. 1 at 11-12. The water from the main, usually at a pressure of 95 to 105 pounds per square inch (p.s.i.) was forced laterally through solution channels toward the Wilson School and into the Wagner Farms development. Id. at 12-13. None of the water surfaced, except when forced to the surface by sump pumps in residences 350 to 400 feet from the site of the break at 303 and 305 Shelley Drive. Id. On South Wagner Circle, a fire hydrant had sunk into the ground a few inches, indicating that water had flowed along the main to the hydrant, causing the hydrant and part of the connecting pipeline to sink. Id. As the main break occurred under a paved roadway and, the only source of water that could have led to the break was water from the main itself. Id. at 16. Mr. Fought recommended that PAWC be required to do additional geophysical studies to determine the locations and extent of other uncollapsed sinkholes in the area. Id. at 18.

Township witnesses Diesinger and Bechtol also concurred in the conclusions of OCA witnesses Hoskins and Fought. Notably, Ms. Diesinger, the Township's Director of Engineering Services, had been able to observe, first-hand, the excavation of the main break area as well as the video that was taken by Mr. Rothwell. Ms. Diesinger testified that she had observed no "throats" in the area below the main break and that there was no soil disturbance under the pipe except that which was apparently caused by the backhoe. Twp. St. 1 at 14. Ms. Diesinger testified both as an expert geologist and as a Township employee with extensive experience with street and road issues in Spring Township. Id. at 16. Often, main breaks produce water that

appears on the street; however, in the instant case, Ms. Diesinger perceived from the photographs and videotapes that the water was forced out of the main in a lateral direction. Id. Jay Vaughan, the Township's Roadmaster and Jeri Diesinger, the Township Geologist also testified that they were present during the excavation of the main and that there was no evidence of a sinkhole either at street level or below the main. Twp St. 1 at 20.

The Enviroscan report, initially procured by the Creveling's insurer and sponsored in this proceeding by Ms. Felicia Bechtol, M.Sc., P.G., President of Enviroscan, was also emphatic in its conclusion that the sinkhole activity was triggered by the water main breakage and the consequent loss of 1.5 million gallons of water into the subsurface. Bechtol Exhibit 1 at 40-43; Twp Exh. 7, Diesinger Exhibit 1 at 22-23. Ms. Bechtol, as well, was able to view the excavation on the morning of February 7, 2005 and Enviroscan performed the GPR study within two weeks following the main break. Bechtol Exh. 1 at 33.

Certainly, greater weight should be given to the expert and lay witnesses' testimony who had an opportunity to observe the excavation nearer to the time that the event occurred, on the issue of whether a sinkhole collapse had occurred beneath the main bed.

G. PAWC's Expert Witnesses' Testimony Should be Given Little or No Weight

PAWC first called Craig Clauser, P.E., a metallurgical engineer. Mr. Clauser had been asked to perform a metallurgical engineering evaluation of the piping involved with the main break. PAWC Exhibit 1 at 3. To do so, Mr. Clauser examined the three lengths of pipe that had been retained by PAWC, which he examined using a stereomicroscope three months after the break in a Sinking Spring PA facility. Id. at 3-4. Mr. Clauser concluded that the breaks that he observed occurred as a result of a single, catastrophic event. Id. at 5. Moreover, he attempted to rebut OCA witness Fought's testimony with his conclusion that "[e]xamination of the pipe

revealed no evidence of pipe joints which had been leaking prior to the time of this incident." Id. at 5.

On cross-examination by Complainants' counsel and the OCA, Mr. Clauser stated that he had not personally viewed the excavation of the main break site and had viewed only photographs. Tr. 420. Mr. Clauser had not had any discussions with PAWC personnel about the incident, except those who were working at the facility where the pipe was stored. Tr. 422. Those employees did not know which of the three retained pipe segments was the first to break. one. Tr. 422. He stated that he had read Mr. Rothwell's deposition transcript six months before appearing, but could not recall Mr. Rothwell's position with PAWC Tr 421. In fact, Mr. Rothwell's deposition had been taken on May 4, 2006, just eight weeks prior to the hearing at which Mr. Clauser appeared. Tr. 424.

On cross-examination by the OCA, Mr. Clauser admitted that he had been able to inspect only 48 feet of the 125 feet of pipe that had been removed from the ground. Tr. 433. He conceded that he could not rule out leakage in the 77 feet of pipe that he had not been able to inspect because PAWC had not retained it. Tr. 434. For the first time during cross-examination, he testified that he believed that two of the breaks occurred during the excavation when the pipe segments were lifted out of the trench. Tr. 435. This contradicted his written testimony that "[t]hese failures occurred as a single, catastrophic event." PAWC Exh. 1 at 5. Both of those statements cannot be true: either the breaks happened simultaneously underground or a break happened underground, then two others after the excavation. Mr. Clauser did not explain how he could discern the difference between the break that occurred underground and those that he later

stated that he believed occurred during excavation.[17] He also admitted that he did not know how the pipe segments were positioned in the trench. Tr. 444. Therefore, he could not know in which direction the wedge break occurred or whether it lost support laterally.

PAWC then called Richard L. Kanaskie, P.G., C.S.E.O., as its expert geologist, to express his expert opinion that "a sinkhole caused the water main break." PAWC Exh. 2 at 7. Mr. Kanaskie surmised that water from sources other than the main itself led to the collapse that caused the main break. The first source that he describes is rain water that "infiltrate[s] through the road surface." Id. at 8. Second, he mentions naturally occurring water such as "springs or seeps"; third, water entering the ground in grass areas adjacent to the roadway; fourth high seasonal water tables; fifth, the Wagner Farm detention pond. Id. at 9-10. Finally, he concluded that to do a study in the Wagner Farms development would not be reasonable, because the area is riddled with karst features and the study would "not distinguish recent manmade activity from historic features." Id. at 13.

On cross-examination by counsel for the Township, Mr. Kanaskie conceded that he did not know the location of the water that escaped through the main, nor whether it was under Wagner Circle or someone's house. Tr. 453. He had concluded that the detention pond was higher in elevation than the main break "by standing and looking." Tr. 456-457. However, he then agreed that the bottom of the detention pond was at an elevation of 407 feet and the main break area was at an elevation of 412-413 feet. Id.

On cross-examination by the OCA, Mr. Kanaskie conceded that, as he had not personally observed the excavation site, he could not have observed a sinkhole, if indeed one existed. Tr. 462. While his written testimony mentioned "springs" as a possible source of water other than

[17] Indeed, as no chain of custody records or any other record were produced for the pipe, query how any of the experts could have known to a certainty that they were inspecting the segments of the pipe that had actually broken while still underground

from the main, he had not observed any on the site nor on any of the maps that he had looked at. He had not reviewed any governmental publications that showed where the water table was at the time of the break. Tr. 464. The lack of logic in his reasoning as to the Wagner Ponds detention pond was quite clear: if there were sinkholes in the bottom of the detention pond, any water flowing into it would be directed downward, not laterally to an area of higher elevation.

After cross-examination of the two PAWC witnesses and surrebuttal by the OCA and the Township expert witnesses, no question remained as to whose testimony should be given greater weight on the issue of causation. OCA witness Hoskins pointed out that while Mr. Kanaskie had pointed out other sources of water that could have contributed to the erosion of the main's supporting material, he offered no data to support his speculative comments. OCA St. 2S. Also, had a high water table affected the main's supporting material, it would have been apparent on the video of the excavation. The soil beneath the repaired pipe appeared packed and firm and the only visible voids were to the side of the excavation trench. The Commission should also consider that the Company's theory that the sinkhole collapsed first, under the main causing the fracture, does not jibe with the other facts of the record. Had the sinkhole opened beneath the main the water would have been directed downward through the "path of least resistance" by the force of gravity. Instead it was forced laterally to the west beneath the Creveling property and beyond to the King property.

Both OCA witness Hoskins and Ms. Bechtel, on behalf of the Township, responded to Mr. Kanaskie's assertion that it would not be reasonable to require additional study. OCA witness Hoskins testified as follows:

> The presently visible damage on property adjacent to the site of the water main break plus the visible evidence of water flow from the water main break site to additional property within the Development are all geological and hydrogeological evidence that water flow was initially

directed west south westerly along geologically controlled subsurface channels, eroding the stabilized infilling material. The surface evidence is that this water flow was of such high intensity to undermine vegetation, land surface and building structure through creating of voids above the bedrock into which the surface soil and vegetation collapsed.

Similar voids were likely developed following the geologically controlled channels elsewhere beneath paving and structures of the Development. These voids are discoverable using geophysical testing procedures that are specifically designed to identify voids. Once identified by the appropriate geophysical testing procedures, the voids can be confirmed with drill or probe testing similar to that performed by PAWC in the parking lot of the nearby school on Iroquois Avenue. Once direct drilling or probing confirms voids, remediation can then be performed.

No visible evidence of karst related surface features (such as closed depressions) existed prior to the construction of the Wagner Farms Development. This is borne out by examination of aerial photography of the area. From this data a reasonable geological conclusion can be drawn that such sinkholes that likely exist in the bedrock had become stabilized. They were filled with the normal materials resulting from the dissolution of the underlying bedrock. Voids into which the surface soil could collapse, such as adjacent to the water main break, were absent in the Development.

Thus voids discovered during the recommended geophysical testing and probing, if any, would be the direct result of the water main break and the resulting high intensity water flow. These voids should be identified and remediated in order to protect the welfare of the community.

OCA St. 2S at 3-4. Ms. Bechtol also testified that, in her expert opinion

> . .[S]inkholes are inherently driven by the movement of water. Where there is a leak or loss of water to occur, with sinkholes appearing at the same location or in the approximate path of the water (which we know to be toward the farthest point down-gradient at which the water table intersects with the ground surface), it is highly unlikely that sinkholes in this circumstance would be a pre-existing condition.

Bechtol Exh. 1 at 5-6. Moreover, Township witness Mr. Vaughan testified that the Township would not issue a "Use and Occupancy Permit" for a property which had an unremediated sinkhole. Tr. 183. Notes on the plan for the Wagner Farm subdivision indicated that any sinkholes located within the subdivision would be remediated as guided by a professional. Tr.

183. Mr. Vaughan testified that he did not recall any sinkhole conditions being noted on the final plan submitted to the Township for the Wagner Farms development. Tr. 184. It stands to reason that townships generally would not issue permits allowing their residents to move into homes built on voids that were at risk of collapse and that builders would not intentionally construct a dwelling on a site that is at risk of collapse. Moreover, as Mr. Fought testified, the other sources of water that Mr. Kanaskie testified about would not be permeating the soil at sufficiently high pressures to substantially erode the supporting materials within the karst structures.

The PUC should not permit PAWC to turn its back on this group of customers, as it has. Mr. Rahn testified that Mr. Rothwell had reassured Mr. Rahn that the Company "would take care of everything" including testing the properties for newly created voids. Tr. 103. Initially, PAWC paid the hotel bills for the Crevelings who were forced to vacate their home. Tr. 20-21. At a meeting with Company representatives, including Mr. Seth Mendelsohn, the concerned customers were told that the Company was unwilling to do anything more concerning the consequences of the main break however. Tr. 104.

Only one remedy is available to this customer group that would allow them to know whether their homes are at risk in any way as a consequence of PAWC water washing away material supporting karst areas beneath their homes. That remedy is a ground penetrating radar (GPR) study on only three of the streets in the Wagner Farm Development. Dr. Hoskins felt certain that, considering the directional flow of the water, the homes on North Wagner Circle would not have been affected by the main break. Dr. Hoskins believed that the homes in which the sump pumps were activated on the night of the main break were indicative of the areas most

affected and they were located on South Wagner Circle, Nash Road and Shelly Drive.[18] OCA St. 2S at 10. Dr. Hoskins estimated the cost of surveying the area beneath a house at approximately $1000 each. OCA St. 2 at 11. He estimated the cost of surveying all ground surface areas external to buildings at $10,000. Id. Thus, the study that the customer Formal Complainants seek would cost a total of about $29,000, because there are nineteen houses on South Wagner Circle, Nash Road and Shelly Drive above the areas into which the PAWC water flowed.[19]

H Conclusion

The purpose of Section 1501 of the Public Utility Code is to codify the obligation of Pennsylvania's regulated utilities to their customers to provide safe, adequate and efficient reliable service. Under Section 1501, PAWC is required to provide adequate water service, in that the water provided is potable, sufficient in supply, and service is reliable and continuous. PAWC is also required to "make all such repairs, changes, alterations, substitutions, extensions, and improvements in or to such service and facilities as shall be necessary or proper for the accommodation, convenience and safety of its patrons, employees, and the public. Such service also shall be reasonably continuous and without unreasonable interruptions or delay." 66 Pa. C.S. § 1501 (emphasis added).

[18] The OCA would note that Mr. King's sump pump was activated from sometime between midnight and 3:00 am on February 6, 2005 and continued to cycle for at least 30 hours. Tr. 354-355. He also testified, however, that after five days of heavy rain, the sump pump had not turned on and he had confirmed that the pump was still operable. Tr. 356-357. One can infer from these facts that the flow from the main break may have caused a void beneath his home into which the rainwater drains away rather than pooling such that the sump pump is activated.

[19] The flow of PAWC water caused sump pumps to activate at the homes of Mr. Creveling at 1323 South Wagner Circle, Mr. King at 303 Shelley Drive, and at two homes on Nash Road. OCA St. 1 at 3. PAWC personnel tested the water flowing in Mr. King's basement and confirmed that it was chlorinated and, thus, had come from the broken main. Tr. 356-357.

Under Section 1501, PAWC has a responsibility to operate its system in such a way as to minimize the risk of main breaks that could result in service disruptions or jeopardy to the safety of PAWC customers, its employees and the public. Adequate maintenance and prudent operation of a water system are required under Section 1501, because they are essential to avoid costly and inconvenient repairs to ratepayers that result from a system that suffers from inadequate maintenance and imprudent operation. The Commission should conclude that PAWC has violated the Public Utility Code and various relevant regulations, for all of the reasons discussed above, and order the relief sought by the formal complainants

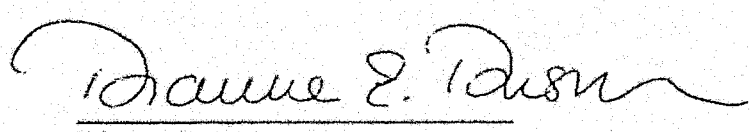
VII. CONCLUSION

For all of the above reasons, this Commission should adopt the proposed findings of fact and conclusions of law set forth in the attached appendices.

The Commission should conclude that PAWC has violated Section 1501 of the Public Utility Code, 66 Pa.C.S. §1501, because it has been providing and continues to provide unsafe, unreasonable and inefficient service. The Commission should require PAWC to repair the known damage that resulted to the Creveling property as a result of the February 5, 2005 main break and should further order that a ground penetrating radar study be performed in the subsurface areas. These areas should include the streets, PAWC's infrastructure and the residences on South Wagner Circle, Shelley Drive and Nash Road, that lay in the path of the water that escaped the main. Such a study is the only method by which the health and safety of PAWC customers, employees and the general public can be ensured.

As a remedy for the continuing inefficient service, the Commission should require reports showing compliance with PAWC Water Resource Management Standards, as shown in the attached Proposed Ordering Paragraphs.

Respectfully Submitted,



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APPENDIX A

PROPOSED FINDINGS OF FACT

Proposed Findings of Material Fact

BACKGROUND

1. Pennsylvania-American Water Company (PAWC) is a certified public utility serving, among other areas, Sinking Springs, Spring Township, Berks County, Pennsylvania, and the service area in question in the present case is the Stonegate Neighborhood Development known as Wagner Farms and the Wilson Southern Junior High School/Cornwall Terrace Elementary Complex (School). Tr. at 14, 46, 214.

2. PAWC began servicing the Sinking Springs area in 2001 upon the acquisition of Citizens Water Company, who formerly provided water service to the area. Tr. at 5,12.

3. Spring Township, Berks County is known as a sinkhole prone area. OCA St. 1 at 5; Tr. at 538.

4. The PAWC system includes an 8-inch cast iron water main located beneath Iroquois Avenue in Spring Township. This main serves Wagner Farms and the School. The 8-inch main connects to a 10-inch ductile iron pipe on Iroquois Avenue, which connects to a 12-inch ductile iron pipe on Martins Road. OCA St. 1 at 7.

5. On February 5, 2005 the 8-inch water main in Iroquois Avenue broke releasing 1.5 million gallons of water into the earth. OCA St. 1 at 12.

6. The release of the large amount of pressurized water caused sinkholes to form in the area surrounding the water main break, resulting in severe damage to homes and property in the vicinity. The main break also led to the activation of sump pumps as far away as two blocks from the main break. OCA St. 1.

7. The failure of PAWC to incorporate company-wide leak detection policies in the Spring Township area and the failure to respond to the SCADA warning devices, intended to alert the company to large amount of water drainage, resulted in the massive amount of water being released into a known sinkhole prone area. Tr. at 301, 516-20, 720.

8. The Formal Complainants who began this case are current customers of PAWC who reside in the Sinking Springs area of the system. Tr. at 14, 46.

PROPOSED FINDINGS BASED UPON CUSTOMERS' TESTIMONY.

9. On February 5, 2005 between 10:00 p.m. and midnight, the residents of Wagner Farms began experiencing low water pressure. Tr. at 15, 47, 81, 105, 354.

10. At approximately 10:00 p.m. on February 5, 2005 the Crevelings, who reside in Wagner Farms at 3123 Wagner Circle, began hearing creaks and popping noises in the walls. Tr. at 15.

11. The following morning February 6, 2005 before 7:00 a.m. the residents of Wagner Farms found that there was no running water in their homes. Tr. at 16, 69-70, 47-8, 81, 106, 149, 354.

12. On the morning of February 6, 2005, the Crevelings found that a crack had formed above the basement door. Tr. at 17.

13. The morning of February 6, 2005 many residents of Wagner Farms went to stores to buy water and noticed others doing the same. Tr. at 48, 356.

14. Residents' sump pumps activated the morning of February 6, 2005 and continued to run until the following morning. Tr. at 18, 70, 106, 353, 355, 360, 578.

15. At 12:30 p.m. on February 6, 2005 the Crevelings were approached by representatives from PAWC at their home. The PAWC representative accompanied Creveling through his home where water was found in the basement, cracks were found in the stairway and doorway, and trees on the property had sunken into the ground. Tr. at 18-9.

16. Ms. Rose Ann Ruggiero and Mr. Neil Rahn received a phone call from the Crevelings on February 6, 2005 around 1:00 p.m. explaining that there was water in the basement of the Creveling home and asking if Ms. Ruggiero and Mr. Rahn would come to the Creveling home and help to watch the children. Tr. at 82, 106-7.

17. Ms. Ruggiero went to the Crevelings home the afternoon of February 6, 2005 where she entered the basement and saw cracks in the basement floor and water squirting and seeping through the cracks. Tr. at 83, 106-7

18. From 12.30 p.m. until 4:00 p.m., water continued to enter the basement and cracks continued to form throughout the Crevelings house. The fence and trees in the Crevelings' yard had sunken into the ground and there was a hole forming in the yard. Tr. at 20, 83, 86, 107.

19. At 5:00 p.m. or February 6, 2005 the Crevelings were told by PAWC to vacate their house. PAWC paid for the Creveling family to stay in a hotel. Tr. at 20, 83, 530.

20. By 2:00 p.m. February 6, 2005 the water pressure had returned to the residents' homes. Tr. at 74, 86.

21. PAWC was unable to locate the break for at least twelve hours from the evening of February 5, 2005 when they began searching until the afternoon of February 6, 2005 when the break was discovered. Tr. at 81, 154-5, 576, 689.

22. Approximately 2:45 p.m. on February 6, 2005, Wagner Farms residents went to the site of the excavation of the pipe on Iroquois Avenue where they were told by John Rockwell, a PAWC employee, that main breaks were common at this time of the year and that PAWC had already repaired twelve breaks. Tr. at 85.

23. Township employees also went to the excavation site. It appeared that there was no depth below the pipe and that the ground underneath was solid. Tr. at 198-9, 164-5, 279, 285.

24. After the February 6, 2005 incident PAWC made test holes on the school parking lot. Tr. at 219-20, 227, 561-2.

25. The Creveling property suffered a total of six sinkholes on the property that engulfed trees and a fence. Additionally, it appeared that the foundation of the house had risen or the ground had depressed. Tr. at 22-3, 89-90, 157, 162.

26. On April 6, 2005 a sinkhole appeared on the property of Ms. Ruggiero and Mr. Neil Rahn located at 3119 South Wagner Circle. The sinkhole was repaired by the township. Tr. at 97, 112, 175.

27. On April 8, 2005 a sinkhole formed under the sidewalk and curb of Mr. Singerling's property located at 3128 South Wagner Circle. Mr. Singerling paid for the reparations of the sinkhole. Tr. at 50-1, 113, 175.

28. On September 4, 2005 a sinkhole formed under a fire hydrant in Wagner Farms. Tr. at 113, 115, 175.

29. There are three sinkholes located behind the Cornwall Terrace Southern Junior High School that formed within fourteen months of a leaking storm sewer that was installed by the school. Tr. at 235-6.

30. The residents of Wagner Farms received no information from PAWC concerning this event. When they called the company, customers received a prerecorded message explaining that the company was aware of the problem and was in the process of fixing it. There was no opportunity to leave a message with PAWC. Tr. at 29, 48, 70-1, 105.

31. At a meeting on April 20, 2005 representatives from PAWC informed residents of Wagner Farms, including Mr. Singerling, that the company would do nothing further for any of residents of Wagner Farms affected by the main break except for the Crevelings. Tr. at 54, 57-8.

32. For the most part, residents of Wagner Farms were unaware of sinkhole activity in Berks County prior to the February 6, 2005 incident. Only after the incident did they become aware of a sinkhole on a neighbor, Anne Farina's, property. Tr. at 34, 63-4, 76, 173-5.

33. Township records for Wagner Farms for the last ten years revealed no records of repaired sinkholes. Tr. at 144-5, 186-7, 199.

PROPOSED FINDINGS OF FACT BASED UPON EXPERT TESTIMONY

34. Sinking Spring Borough is an area of carbonate geology and karst topography. Carbonate geology is characterized by soluble carbonate bedrock such as limestone. Karst topography is the result of erosion in the carbonate bedrock occurring over time. OCA St. 2 at 6; Diesinger St. 1 at 9; Twp. St. 2 at 34.

35. Sinkholes are depressions in a karst area, or a hole in the underlying bedrock that is not visible at the land surface. Closed depressions are indicators of sinkholes below the land surface. A sinkhole becomes visible when the land surface above it has collapsed. OCA St. 1 at 5-6.

36. There were no closed depressions on the 1975 and 1988 maps of the area affected by the main break: South Wagner Circle, Nash Road, and Shelley Drive. OCA St. 2 at 2, 6.

37. Based on aerial photography, there were no closed depressions, or other karst related surface features, at the time that Wagner Farms was developed. There were no voids or uncollapsed sinkholes. If sinkholes existed in the development at this time, they were stabilized. OCA St 1S at 4.

38. Sinkholes occur when water dissolves the carbonate bedrock causing cavities and channels to open up underground. A collapsed sinkhole or soil piping occurs

when water washes the soil covering the bedrock down into the cavity of the sinkhole. A solution channel is an opening in the bedrock that can transfer water from one location to another. OCA St. 1 at 8; OCA St. 2 at 5; Bechtel Exh. 1 at 34.

39. Sinkholes are formed in karst areas by the force of fluid flow and dissolution of limestone over time, characterized by the localized, gradual, or rapid sinking of the land surface. OCA St. 1 at 5, 8; OCA St 2 at 6-7; Diesinger Exh. 1 at 9.

40. Sinkholes are common along public transportation routes because water mains and other service piping generally run along the same route. OCA St 2 at 6-7.

41. The PAWC Iroquois Avenue water main broke as a result of gradual incremental removal of supporting material by a water source. OCA St. 2 at 8; OCA St. 1 16-17; Tr. at 299, 313-4.

42. An estimated 1.5 million gallons of water was released by PAWC's broken main. OCA St. 1 at 12.

43. Because the water released by the Iroquois Avenue main break never surfaced at the site of the break, it must have entered an existing solution channel and was able to travel for some distance along the Wagner Circle water main. OCA St. 1 at 13, 17.

44. Water from the main break surfaced approximately 300 to 400 feet away from the site of the break. OCA St. 1 at 13.

45. Water from the Iroquois Avenue main flowed into the Wagner Farms subdivision. Some water followed a portion of the water main installed in South Wagner Circle and caused a fire hydrant and the connecting pipeline the hydrant to sink. Pipeline settling under an impervious paved road must have been caused by leakage from the water main. OCA St. 1 at 13, 17.

46. The direction of the water flow from the main break was initially west south westerly along controlled subsurface channels and flowed toward Wagner Farms development. The water eroded the stabilized infilling material. OCA St. 2S at 3.

47. Free/thaw cycles would not cause the pipe to move, lose support, and break, because the Iroquois Avenue main is buried 5 feet deep, below the area's extreme depth of frost penetration level of 1 foot. OCA St. 1S at 2-3 and Exh. TLF-9.

48. The 1.5 million gallons of water from the main break was released at high pressure, causing nearby uncollapsed sinkholes to collapse. The water from the

main break enhances the occurrence of additional sinkholes to collapse throughout the area of Wagner Farms. OCA St. 1 at 17; OCA St 2S at 3.

49. The water main break caused the damage to the Creveling home and property at 3123 South Wagner Circle. OCA St. 1 at Exh. TLF-8; Tr. 467.

50. The sinkhole activity in the Wagner Farms subdivision is attributable to the main break because 1.5 million gallons of pressurized water were released into the area, resulting in the scouring of bedrock and an overburdened substructure, which activated the subsequent sinkhole development. Additionally, it was only after the main break that there was an increase in the level of sinkhole activity. OCA St. 1 at 17; OCA St. 2 at 9; Diesinger Exh. 1 at 23; Bechtel Exh. 1 at 43; Tr. at 458-9, 469.

51. A geophysical survey by a geotechnical investigation firm with experience in identifying and mapping karst topography and identifying open cavities is necessary to determine the if the land structures has been compromised by the main break and resulting release of high pressure water and the location and extent of other sinkholes in the area. It should delineate potential areas where surface collapse may occur. OCA St. 1 at 17 and Exh. TLF-8, OCA St. 2 at 8-0; OCA St. 2S at 3; Twp. St. 1 at 23-24.

52. The geophysical survey should encompass the area along South Wagner Circle, Nash Road, and Shelly Drive. OCA St. 2 at 10.

53. The Sinking Springs area contains limestone solution features that have little inherent strength and is easily eroded by water flow. OCA St. 2 at 8.

54. Water mains are not 100% tight, even at the time of initial installation. OCA ST. 2 at 3

55. PAWC did not perform any leak detection tests in the vicinity of the Iroquois Avenue main break until few weeks before the main break. OCA St. 1S at 3-4 and Exh. TLF-4.

56. PAWC experienced at least seven different main breaks within a three and a half week period OCA St. 1S at 14.

57. Routine leak detection would have allowed for early detection of leaks before they caused greater problems such as the main break OCA St. 1S at 3-4 and Exh. TLF-4.

58. Since the main was located beneath an impervious paved road, the only source of water which could have eroded the supporting material was water leaking from the main itself. OCA St. 1 at 16-17; OCA St. 1S at 4-7; OCA St. 2 at 8; OCA St. 2S at 2-3; Tr. at 308-309.

59. The lack of supporting material caused bending stresses on the main, which in turn caused the main to break as a result of wedge splitting. Wedge splitting occurs when a wedge of the pipe at the bell is split off to relieve bending stresses. OCA St. 1 at 14-15; Tr. at 299-300.

60. Cast iron pipe is more prone to wedge splitting than ductile iron. Ductile iron is approximately twice the strength as cast iron pipe in tensile, beam, and ring bending tests and many times the strength of cast iron pipe in elongation. Cast iron has not been manufactured for use as water mains since the mid 19070's. The PAWC main which broke was made of cast iron. After the break, PAWC used ductile iron pipe to replace the cast iron pipe in the broken main. Ductile iron pipe was available when the Iroquois Avenue main was laid in the 1970s, and has been available and accepted in Pennsylvania since 1965. OCA St. 1 at 13-15 and Exhs.TLF-5, TLF-6, TLF-7; Tr. at 522-3, 595-96, 692.

61. PAWC's Iroquois Avenue cast iron main broke due to "wedge splitting" where a wedge of the pipe at the bell is split off to relieve bending stresses. The wedge splitting occurred when the deflection of the pipe exceeded the allowable bending stress of the cast iron material OCA St. 1 at 14-15 and Exh. TLF-6

62. Supporting material was removed from beneath the Iroquois Avenue main due to a leak in the main that washed supporting material away. OCA St. 1 at 16.

63. A portion of PAWC's broken water main that PAWC removed and replaced was never inspected by Mr. Clauser, the Company's metallurgist. Mr. Clauser only inspected 54 feet of pipe while 125 feet of pipe was removed and replaced. OCA St. 1S at 10.

64. Water could leak from improper joint formation or from a deflected joint when the pipe is not laid in a straight line. Leaking water could have been detected by PAWC if proper leak detection procedures were performed and records retained. OCA St. 1 at 9-11 and Exh. TLF-4;OCA St. 1S at 11-14; OCA St. 2 at 7.

65. Because the surface beneath the pipe, when excavated, was solid, the water from the leaking pipe must have run into the throat of a nearby sinkhole or laterally along a solution channel. Water washed away the material supporting the pipe into an existing but uncollapsed sinkhole OCA St. 1 16-17; OCA St. 2 at 8; Twp. St. 1 at 14; Tr. at 294-95.

66. Failure of the water main had to have been associated with water leaking from the main because there are no other water sources that reasonably could have caused the break. OCA St. 1 at 16-17; OCA St. 1S at 4-9; OCA St. 1S at 3.

67. The bottom of the detention pond that abuts the Wagner Farms development is on ground that is lower in elevation than the Iroquois water main break location. OCA St. 1S at 7.

68. There was no evidence of a sinkhole forming beneath the pipeline to cause the main to break. Rather, the surface beneath the pipe appeared to be solid and intact. The only visible voids were along the side walls of the excavation site. OCA St. 1 16-17; OCA St. 2 at 8; Twp. St. 1 at 14-15; Tr. at 279, 285, 300.

69 PAWC's main pipeline distribution system that lies above limestone of Spring Township should be surveyed for leaks to determine potential areas of failure so that preventative measures can be designed, installed and maintained. The recurrence of the February 5, 2005 PAWC Iroquois main break should be prevented. OCA St. 2 at 10.

PROPOSED FINDINGS OF FACT BASED UPON PENNSYLVANIA-AMERICAN WATER RESOURCE MANAGEMENT POLICIES

70. At least since 1993 PAWC has had a team of Leak Detection Specialists who survey three or more miles of distribution main per day. OCA Exh. A Tab 2 pg. 7; OCA Exh. A Tab 6 pg. 5; OCA Exh. A Tab 8 pg. 5.

71. Witness Hassinger of PAWC was unable to confirm or deny whether three or more miles of distribution main are surveyed per day for leaks in the Penn District. Tr. at 516-7.

72. At least since 1993 PAWC has had a policy requiring that 100% of fire hydrants be sounded each year. OCA Exh. A Tab 1 pg. 4; OCA Exh. A Tab 2 pg. 7; OCA Exh. A Tab 6 pg. 5; OCA Exh. A Tab 7 pg.4; OCA Exh. A Tab 8 pg. 5.

73. Witness Hassinger of PAWC was unable to confirm or deny whether 100% of hydrants were sounded per year in the Penn District. Tr. at 517, 587.

74. At least since 1993 PAWC employs a Water Loss Audit Handbook within each of its operations to analyze all potential sources of water loss. OCA Exh. A Tab 1 pg. 4; OCA Exh. A Tab 8 pg. 63; OCA Exh. A Tab 6 pg.; 63.

75. Witness Hassinger of PAWC explained that though water loss audits are carried out, the Water Loss Handbook is not utilized in the Penn Water District. Tr. at 523.

76. Witness Rothwell of PAWC was unsure of what a water loss audit is. Tr. at 674.

77. At least since 1993 PAWC has had a policy requiring sounding for leaks on 20% of all system valves each year. OCA Exh. A Tab 2 pg. 7; OCA Exh. A Tab 6 pg. 5; OCA Exh. A Tab 8 pg. 5.

78. Witness Hassinger of PAWC was unable to confirm or deny whether 20% of system valves are sounded for leaks each year in the Penn Water District. Tr. at 518, 587.

79. At least since 1993 PAWC has had a policy requiring the sounding of 33% of all service line control valves annually. OCA Exh. A Tab 2 pg. 7; OCA Exh. A Tab 6 pg. 5; OCA Exh. A Tab 8 pg. 5.

80. Witness Hassinger of PAWC was unable to confirm or deny whether 33% of all service line control valves are sounded annually in the Penn District. Tr. at 518, 588.

81. At least since 1993 PAWC has represented that it was using high quality materials in its distribution system to minimize leakage potential. OCA Exh. A Tab 2 pg. 13, OCA Exh. A Tab 6 pg. 9, OCA Exh. A Tab 8 pg. 9.

82. Since 1993 PAWC has employed seven or more maintenance service employees who travel the state in state-of-the-art electronic leak detection vans to detect and locate problem transmission and distribution mains. OCA Exh. A Tab 6 pg. 4; OCA Exh. A Tab 5 pg. 5; OCA Exh. A Tab 7 pg.4.

83. Witness Hassinger of PAWC was unable to confirm or deny whether the PAWC leak detection team ever visited the Penn Water District. Tr. at 519-20.

84. At least since 1999, Citizens Utility Water Company of Pennsylvania, the predecessor to PAWC, employed a comparable leak detection and repair program comprised of sounding fire hydrants, valves, and curb stops. OCA Exh. A Tab 9 at. 4.

PROPOSED ADVERSE FINDINGS BASED ON PHYSICAL EVIDENCE AND DOCUMENTS PAWC FAILED TO PRODUCE

86. The portions of pipe that were scrapped showed evidence of leakage at the joints which caused or contributed to the erosion of the pipe bed and the fracture.

87. The SCADA data for the months requested, January to March 2005, showed that tank alarms occurred repeatedly, which would have put PAWC on notice of a substantial leak in the distribution system

88. The records from the gauges from which the tank level data were manually recorded in the Penn District Operator Log (Rothwell Exhibit 2) would have shown that PAWC was on notice that there were substantial leaks in the distribution system.

89. Witness statements of those present at the time of the excavation, when the fractured main was first visible, would confirm that no sinkhole appeared beneath the Iroquois Avenue main and that leakage from the main eroded the pipe bed, causing the main to break.

90. A video recording that included continuous footage of the excavation when the fractured main was first visible would show that no sinkhole appeared beneath the Iroquois Avenue main and that leakage from the main eroded the pipe bed, causing the main to break.

APPENDIX B

PROPOSED CONCLUSIONS OF LAW

PROPOSED CONCLUSIONS OF LAW

1 The Commission has jurisdiction over the parties and the subject-matter of this proceeding.

2. Pursuant to 66 Pa.C.S. §332(a), the Formal Complainants and Intervenor OCA, as the proponents of a rule or order, have the burden of proof. 66 Pa.C.S. §332(a)

3. Formal Complainants and Intervenor OCA have borne their burden of proving that PAWC has failed to furnish and maintain adequate, efficient, safe and reasonable service and facilities to the customers of Sinking Springs, PA in contravention of Section 1501 of the Public Utility Code, 66 Pa.C.S. §1501. More specifically, Complainants and Intervenor have proved that PAWC was and is in violation of Section 1501 because of the following actions or inactions on the part of Company personnel:

a. PAWC failed to perform a prompt and thorough investigation of the events surrounding the main break. No statements were taken from those who were present when the area of the broken main was unearthed. No photos or videos were taken of the broken main at the time that it was excavated.

b. PAWC failed to retain records associated with the events surrounding the main break. Parts of the pipe that were removed in the area of the break were discarded. No chain of custody records associated with the part of the pipe that was removed were produced. The electronic SCADA records that would have shown the tank levels at 15 minute intervals and the issuance of tank alarm calls were allowed to be purged.

c.. PAWC failed to report the main break and destruction of the residential structure adjacent to the main, an occurrence of an unusual nature, pursuant to 52 Pa. Code. §65.2.

4 Formal Complainants and Intervenor OCA have borne their burden of proving that PAWC made or granted an unreasonable preference or advantage to its customers and provided unreasonably different service to customers as between localities, in violation of Section 1502 of the Public Utility Code, 66 Pa.C.S. §1502. More specifically, Complainants and Intervenor have proved that PAWC was and is in violation of Section 1502 because of the following actions or inactions on the part of Company personnel.

a PAWC tested the subsurface areas of the parking lot of its customer, the Wilson School District, adjacent to the main break PAWC persistently refused, however, to test the subsurface areas of properties of its residential customers in the Stonegate development adjacent to the main break, specifically South Wagner Circle, Shelley Drive and Nash Road, after repeated requests by the customers who reside there and who are reasonably concerned over an increased potential for further sinkhole collapse as a result of the main break.

b. PAWC failed to adhere to its own company-wide policies concerning water resource management and leak detection and repair in the Penn Water District, thus subjecting its

Penn Water customers to an unreasonable disadvantage, in that their quality of service was unreasonable, unsafe and less efficient, as compared to other localities.

5. It would be unjust and inequitable to allow PAWC to permit Respondent PAWC to reap any benefit from its failure to comply with pertinent provisions of the Public Utility Code and relevant regulations.

6. Pursuant to Section 1504, 66 Pa.C.S. §§1504, the Commission has authority, after notice and hearing upon complaints, to prescribe as to service and facilities, just and reasonable standards and practices to be imposed, observed and followed by a public utility.

PROPOSED ORDERING PARAGRAPHS

WHEREFORE, Pennsylvania-American Water Company is HEREBY ORDERED to take the following actions consistent with Sections 1504 and 1505 of the Public Utility Code, 66 Pa.C.S. §1504-1505:

a. Within thirty (30) days of this Order, begin the process of remediating the subsurface damage and the damage to the former Creveling residence, located at 1323 South Wagner Circle, Sinking Springs, PA;

b. PAWC shall provide monthly status reports to the parties, the PUC's Bureau of Fixed Utility Services[1] and the Bureau of Safety and Compliance;

c. Within one year, PAWC shall have completed the remediation of the damage done to the residence at 1323 Wagner Circle, Sinking Springs, PA and shall provide a full report to the parties and to the Commission;

d. Within thirty (30) days of this Order, PAWC shall cause a Ground Penetrating Radar (GPR) test to be performed in the areas of South Wagner Circle, Shelly Drive and Nash Road [specify] to determine the existence of any voids that may put the residents, their homes, the streets and PAWC's infrastructure in jeopardy of damage or collapse;

b. Upon completion of the GPR test by a competent geophysical engineering firm, PAWC shall provide the documentary results of the test to the parties, the parties' consultants, the PUC's Bureau of Fixed Utility Services and the Bureau of Safety and Compliance;

c. For a period of two years, ten days following the end of each quarter, PAWC shall provide to the OCA, its engineering experts and to the Commission's BFUS. leak detection reports and records to demonstrate that all areas of its service territory are maintained consistent with PAWC's longstanding leak detection and repair policy as set forth in OCA Exhibit A and with the PUC's Water Conservation Policy Statement, codified in 52 Pa. Code §53.20. These records will consist of the following:

---

[1] The OCA has been requested by a representative of the BFUS to include the Commission's BFUS as an entity to be served with any documentation of compliance with a Commission Order.

1. PAWC's Water Audit Master Plan;

2. Records of water audits and annual updates to the audits,

3. Records of compliance with Chapter 65 of the Pennsylvania Code and the American Water Works Service Operations Manual;

4. An Action Plan, consistent with PAWC's Water Resource Management Program, to detect leaks and control non-revenue water specifically in the Penn Water District that encompasses Sinking Springs, PA.

5. Monthly records that demonstrate that the Action Plan is being carried out.

CERTIFICATE OF SERVICE

Re: Spring Township	:	
v.	:	Docket No. C-20054746
Pennsylvania American Water Company	:	
Neil R Rahn and David Singerling, et al.	:	
v.	:	Docket No. C-20054919
Pennsylvania-American Water Company	:	
Wilson School District	:	
v.	:	Docket No. C-20055371
Pennsylvania American Water Company	:	

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Main Brief upon parties of record in this proceeding in accordance with the requirements of 52 Pa Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 18th day of August, 2006.

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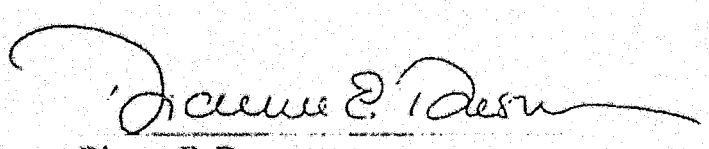

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant, v. PENNSYLVANIA AMERICAN WATER COMPANY, Respondent;	:	Docket No. C-20054746
NEIL R. RAHN and DAVID SINGERLING, ET AL., Complainants,	:	
OFFICE OF CONSUMER ADVOCATE, Intervenor, v PENNSYLVANIA AMERICAN WATER COMPANY, Respondent;	:	Docket No. C-20054919
WILSON SCHOOL DISTRICT, Complainant, v. PENNSYLVANIA AMERICAN WATER COMPANY (PAWC), Respondent.	:	Docket No. C-20055371

DOCUMENT FOLDER

AFFIDAVIT OF DONALD HOSKINS, Ph. D., P.G.

---

1. My name is Donald Hoskins and I am a consulting geologist for the Office of Consumer Advocate in the above-captioned matter. My Direct and Surrebuttal Testimonies, OCA Statements 2 and 2S, have already been admitted into the evidentiary record. I have been asked

by the OCA to provide, by way of an exhibit, a more specific illustration of the area that I recommend for the scope of the geophysical study on South Wagner Circle, Nash Road and Shelley Drive.

2. I obtained the attached digital aerial photograph from the records of the Pennsylvania Bureau of Topographic and Geologic Survey. The photo was taken by the United States Geological Survey in 2004 under a contract between the Commonwealth and USGS.

3. On the photograph, I have marked the boundaries of the area within the Wagner Farms development that, in my expert opinion, coincide with the underground flow paths of the water from the PAWC main break on February 5 and 6, 2005. My opinion is based upon both my personal observations and review of the Sinking Springs, PA topographic quadrangle map. (Hoskins Exhibit 1). The specific streets and houses, by number, are also shown on this exhibit. (The photograph shows a vacant lot at 300 Shelley Drive on which a house has since been constructed.)

4. The attached photograph is intended to replace the photograph previously submitted under cover of letter dated August 25, 2006, which inadvertently omitted two residential properties from the recommended study area.

I, Donald Hoskins, Ph.D., P.G., being duly sworn according to law, depose and say that the foregoing facts are true and correct to the best of my knowledge, information and belief.

Donald Hoskins

Donald Hoskins

Sworn and subscribed before
me this 29th day of August 2006.

Susan J. Henry

My Commission expires:

NOTARIAL SEAL
SUSAN J. HENRY, Notary Public
Harrisburg, Dauphin County
My Commission Expires Oct. 8, 2006

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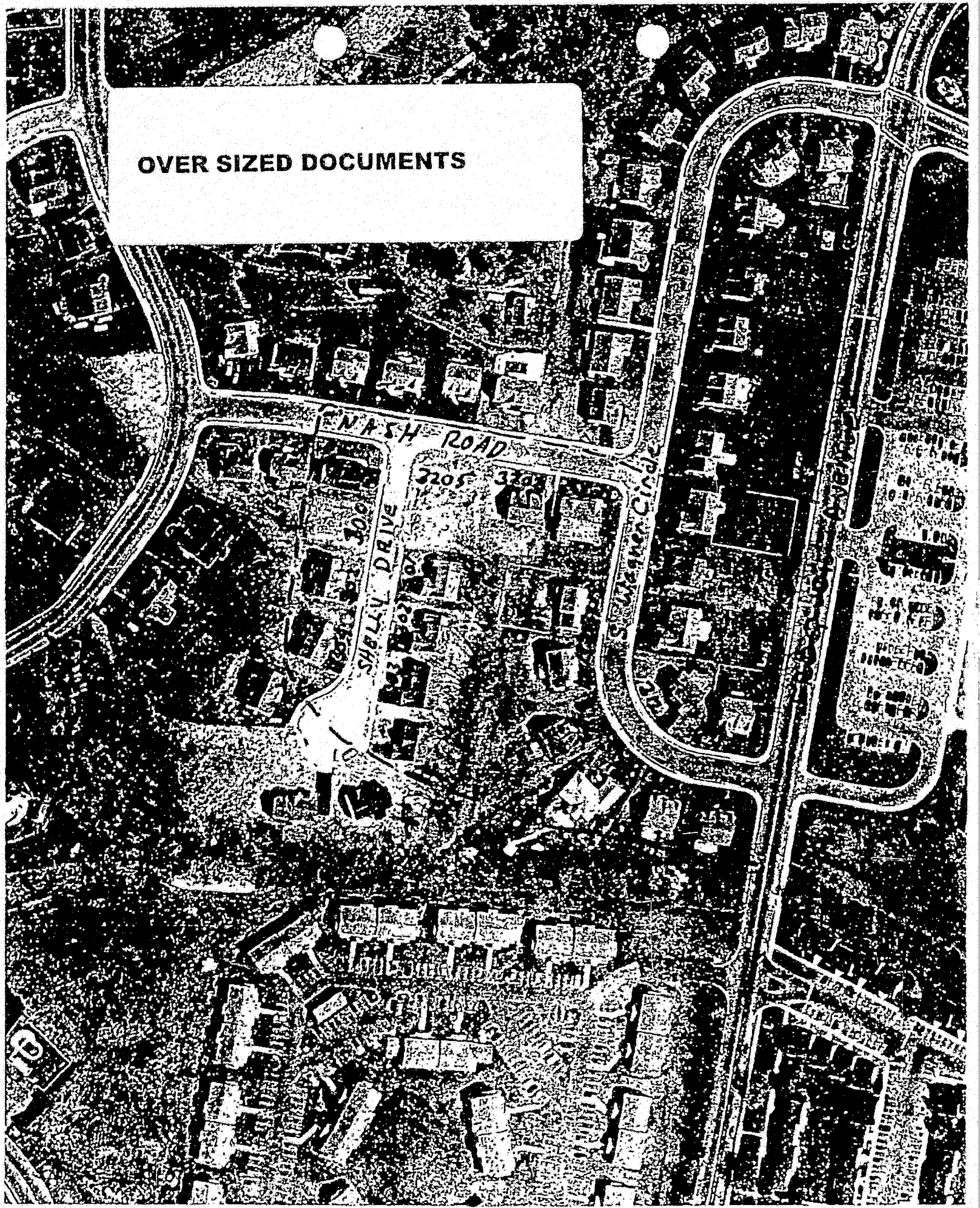

HOSKINS Exhibit 2

Kozloff Stoudt
ATTORNEYS AT LAW — PROFESSIONAL CORPORATION

ORIGINAL

August 18, 2006

Email Address:
jlondon@kozloffstoudt.com

Prothonotary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
P.O. Box 3265
400 North Street
Harrisburg, PA 17120

Re: Township of Spring vs. Pennsylvania-American Water Company
Docket No: C-20054746

Dear Sir/Madam:

Enclosed please find an original and ten (10) copies of the Main Brief of Complainant, Township of Spring for filing. Kindly time stamp and return one copy to me in the enclosed, self-addressed stamped envelope.

Thank you for your assistance in this matter.

Very truly yours,

KOZLOFF STOUDT
Professional Corporation

Joan E. London

DOCUMENT FOLDER

RECEIVED
AUG 18 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

JEL:clt
Enclosures
cc: The Honorable Wayne L. Weismandel
Diane E. Dusman, Senior Assistant Consumer Advocate
Kenneth Zielonis, Esquire
Harry D. McMunigal, Esquire
Mark M. Bridge, Esquire
Seth A. Mendelsohn, Esquire

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8/21/06
19

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 ORIGINAL : Assigned to: Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No C-20054919 DOCUMENT FOLDER : Assigned to: Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No C-20055371 : Assigned to: Wayne L. Weismandel, A.L.J.

MAIN BRIEF OF COMPLAINANT, TOWNSHIP OF SPRING

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SECRETARY'S BUREAU

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BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

ORDER

AND NOW, this _____ day of _____, 2006, it is hereby ORDERED AS FOLLOWS:

1. That Respondent, Pennsylvania-American Water Company, is currently, and was on and before February 5, 2005, in violation of the Pennsylvania Public Utility Code, in its maintenance of the Penn District Water Mains.

2. Respondent, Pennsylvania-American Water Company, shall conduct subsurface testing, including but not limited to testing by Ground Penetrating Radar

(GPR) and other similar testing recommended by a geologist and/or geotechnical engineer, to determine the extent of damage from the water main break of February 5-6, 2005, of the streets, sidewalks, and rights of way in Wagner Farms, and along Iroquois Avenue in the vicinity of the water main break.

3. Respondent, Pennsylvania-American Water Company shall utilize leak detection protocols, including acoustic leak detection and Permalogs, on all facilities in the Township.

PENNSYLVANIA PUBLIC UTILITY COMMISSION

_____

WAYNE L. WEISMANDEL,
ADMINISTRATIVE LAW JUDGE

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TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING,	: Docket No C-20054746
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID	: Docket No. C-20054919
SINGERLING, *et al.*,	:
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT,	: Docket No. C-20055371
Complainant	:
vs.	:
	:
PENNSYLVANIA-AMERICAN	:
WATER COMPANY,	: Assigned to:
Respondent	: Wayne L. Weismandel, A.L.J.

BRIEF OF COMPLAINANT, TOWNSHIP OF SPRING

I. STATEMENT OF QUESTIONS INVOLVED

A. DID RESPONDENT, PENNSYLVANIA-AMERICAN WATER COMPANY, FAIL TO PROVIDE SAFE, REASONABLE, AND ADEQUATE SERVICE AS REQUIRED BY 66 Pa.C.S.A. SECTION 1501?

Suggested Answer: In the affirmative.

B. DOES THE COMMISSION HAVE THE AUTHORITY TO ORDER RESPONDENT, PENNSYLVANIA-AMERICAN WATER COMPANY, TO CONDUCT SUBSURFACE TESTING OF STREETS AND AREAS OF THE WATER MAINS TO DETERMINE THE EXISTENCE OF DAMAGE FROM THE WATER MAIN BREAK?

Suggested Answer: In the affirmative.

II. STATEMENT OF THE CASE

This Brief is submitted in support of the position of the Township of Spring, Berks County, Pennsylvania ("Township"), Complainant in Docket No. C-20054746. It is the position of the Township that Respondent, Pennsylvania-American Water Company ("PAWC") has acted in violation of the Public Utility Code, 66 Pa.C.S.A. Section 101, *et seq.*, causing conditions contrary to the health, safety, and welfare of the Township and its residents. The facts and circumstances relevant to the disposition of the instant actions are as follows:

PAWC is a public utility holding a Certificate of Public Convenience, rendering water service in the Commonwealth of Pennsylvania, including the Township. PAWC renders water service pursuant to its Tariff-Water-Pa.P.U.C. No.4. (Formal Complaint of Wilson School District, Paragraph 4). The Township is located at 2800 Shillington Road, Cornwall Terrace, Reading, Berks County, Pennsylvania, and is a commercial customer

of PAWC. The Township is the custodian of streets, sidewalks, and other public facilities on behalf of its residents.

PAWC operates numerous facilities for the purposes of rendering water service in the Commonwealth of Pennsylvania, including facilities in the Township. These facilities included, during time periods relevant to this action, an eight inch (8") cast iron water main located in the center of Iroquois Avenue, which connected to a twelve inch (12") cast iron main, also located in Iroquois Avenue, which, in turn, connects to two 500,000 gallon storage tanks, located at Old Fritztown and Gring's Hill Roads in the Township, known as the "Blanton Tanks." The Blanton Tanks are in the mouth of the pressure zone, known as the "Mountain Pressure Zone" supplying Iroquois Avenue. (N.T., Page 621, Lines 22-25; Page 678, Lines 13-16). The water runs through the Iroquois Avenue Lines at a pressure approximately ninety five (95) psi. (N.T., Page 661, Lines 17-20). These facilities serve, *inter alia*, the residential development known as Wagner Farms (a/k/a Stonegate Neighborhood Development) ("Wagner Farms") and an education complex of the Wilson School District known as the Wilson Southern Junior High School/Cornwall Terrace Elementary School Complex. The schools are located across Iroquois Avenue from the Wagner Farms development.

The water main at issue, according to John Rothwell ("Rothwell"), Network Supervisor for PAWC, was a cast iron pipe installed by a predecessor corporation of PAWC in approximately 1970. (N.T., Page 693, Lines 9-14). PAWC purchased the area which includes Iroquois Avenue, known as the "Penn District" from Citizens Water Company in approximately 2002. (N.T., Page 669, Lines 19-20; Page 693, Lines 13-14).

Rothwell knew that some of the pipe in the Penn District was cast iron, as opposed to stronger, heavier-walled ductile iron pipe. (N.T., Page 692, Line 22 to Page 693, Line 8). Rothwell, furthermore, knew that the Penn District area was sinkhole-prone. (N.T., Page 693, Lines 23-24). Brian J. Hassinger ("Hassinger"), Network Director for American Water Company, as well as Rothwell, admit that ductile iron piping is an industry standard, and has been industry standard since the mid-to-late 1970s. (N.T., Page 568, Line 23 to Page 569, Line 5; Page 697, Lines 5-11). However, even though it was known, including by Rothwell, that the area in question was sinkhole-prone and riddled with limestone geology, the mains were not replaced with ductile iron until they broke, and other available measures were not taken to support lines. (N.T., Page 697, Lines 1-19; Page 698, Lines 8-12).

Although the bulk of the incident in question occurred late in the evening of February 5, 2005 (Saturday night) and February 6, 2005, there were first inklings of trouble noted by Rothwell as early as February 4, 2005, when Rothwell received at least one alarm showing a low water level in the Blanton tanks. (N.T., Page 708, Lines 8-16; Page 718, Lines 10-24; Rothwell Exhibit 2, Penn Water District Operator's Log).[1] Rothwell, furthermore, testified that he "probably" received low tank alarms on Saturday morning (February 5) as well, and believes that he "might have" received tank alarms from Blanton during the evening of February 5, between 5:00 p.m and 8:00 p.m. (N.T., Page 720, Lines 18-20; Page 721, Lines 15-19). Subsequently, on February 5, at

[1] The tank levels are monitored by a Supervisory Control And Data Acquisition (SCADA) system, which records tank levels every fifteen minutes. (N.T., Page 611, Lines 16-17). According to Hassinger, Rothwell has the ability to set tank alarm levels, and to turn off tank alarms. (N.T., Page 611, Lines 2-5).

approximately 10:45 p.m., Rothwell received a tank alarm through his cell phone. Rothwell, who was at home at the time, drove to the Sinking Spring office of PAWC, and discovered that the two 500,000 gallon tanks had emptied nearly instantaneously. (N.T., Page 731, Line 4 to Page 732, Line 7). Rothwell admitted that water kept pumping into the tanks, even though the tanks were empty. (N.T., Page 686, Lines 8-11). It was admitted by PAWC that approximately 1.5 million gallons of water were lost as a result of this incident, and it is unknown what was the ultimate destination of this water. (N.T., Page 549, Lines 9-23 (Hassinger); Page 700, Lines 9-14 (Rothwell)). There was no monitoring of mains in February of 2005 for leak detection, and no monitoring of mains to date, according to Rothwell. (N.T., Page 686, Lines 12-19). It was not until after this incident that Permalogs, which "listen" for leaks once daily between 2:00 and 2:15 in the morning, were placed in the water distribution system. (N.T., Page 681, Line 11 to Page 682, Line 7). Permalogs were technology which was readily available to PAWC in February of 2005. (N.T., Page 684, Lines 8-11).

Efforts were made by PAWC to locate the source of the loss of water by closing valves, and monitoring the SCADA system. PAWC crews first went to Spohn Road, to Bradley Avenue, to Shakespeare Avenue, and to a variety of remote rights-of-way to attempt to find the location of the problem. (N.T., Page 687, Line 22 to Page 689, Line 10). They were unsuccessful in their efforts. On Sunday morning, PAWC investigated a complaint of sump pump activation, and water running down the street, on Shelley Drive in Wagner Farms. (N.T., Page 689, Lines 9-17). The break, however, was not at that location. Although PAWC has "leak detection teams," no such teams were called

or otherwise deployed to the area, a fact which Hassinger describes as "not remarkable." (N.T., Page 573, Line 20 to Page 576, Line 19; Page 591, Line 11).

Township Supervisor and Roadmaster Jay W. Vaughan ("Vaughan") testified that late in the evening on February 5, 2005, he received a call from his daughter, who lived four or five blocks from the location at which the water main break was ultimately found, that she had low water pressure. (N.T., Page 147, Line 8 to Page 148, Line 1). On Sunday morning, February 6, 2005, Vaughan received calls from other residents, complaining of no water. (N.T., Page 149, Lines 1-11) Vaughan contacted Rothwell on Sunday morning, and told him of the complaints that he had received. Rothwell responded that PAWC was still looking for the location of the break. (N.T., Page 150, Lines 15-17). Vaughan's testimony is consistent with that of Complainants, Robert Creveling, David Singerling, Anna Studenrauch-Soto, Rose Ruggiero, and Neil Rahn, all of whom are residents of Wagner Farms, and who reported low water pressure late in the evening of February 5, and waking up to no water on the morning of February 6. (N.T., Pages 14-16 (Creveling); Pages 47-49 (Singerling); Pages 69-70 (Studenrauch-Soto); Page 81 (Ruggiero); Pages 104-105 (Rahn)). When residents called the water company, they received a pre-recorded message to Spring Township residents to the effect that there was "trouble at the Blanton pumping station." There was no opportunity provided to leave a message or speak with a person. (N.T., Page 70, Line 18 to Page 71, Line 10; Page 105, Lines 9-15). There was no water service for approximately 15-16 hours, and although there was a "boil water" advisory in effect,

this was disseminated only in the newspaper, and many residents, including Alan King and Neil Rahn, did not immediately find out about the advisory.

The break was discovered on Sunday afternoon, February 6, when a PAWC employee driving along Iroquois Avenue observed that several evergreen trees at the property of Robert and Kristen Creveling, located at 1323 South Wagner Circle (at the corner of Iroquois Avenue and Wagner Circle), had significantly sank into the ground. Rothwell admits that PAWC did not find the leak at Iroquois Avenue and South Wagner Circle until between noon and one o'clock in the afternoon on February 6, and, thus, it took PAWC approximately twelve (12) to thirteen (13) hours to find the leak after the initial reports the evening before. (N.T., Page 689, Lines 18-24). The broken main, furthermore, was not excavated for another three (3) to four (4) hours afterward. (N.T., Page 690, Lines 16-18).

Jeri L Diesinger, P.G. ("Diesinger"), the Director of Engineering Services for the Township, in her testimony, reviewed a videotape, produced by PAWC in discovery and marked as Diesinger Exhibit 5. The videotape contained footage of the actual street opening and exposure of the broken main. Noteworthy, according to Diesinger, was that the "sloped surface at the base of where the water line is laying looks to be intact." (N.T., Page 282, Line 25 to Page 283, Line 120). Diesinger saw no hole or depression underneath the pipe. (N.T., Page 285, Lines 5-8). Vaughan observed the broken line the following morning. Vaughan noted that the pipe had been clamped, and that the sides of the trench were wet, with far less water than expected on the street, or in the bottom of the trench. (N.T., Page 163, Lines 15-17; Page 165, Lines 1-8). It is the position of the

Township that the water loss caused the acceleration of sinkhole activity in the immediate area, including the damage to the Creveling property.

During the process of excavating the broken main, PAWC found a large area of concrete, which it claims to be evidence of a pre-existing, previously repaired sinkhole in the bed of Iroquois Avenue. (See, e.g., Diesinger Exhibit 5, Vaughan Exhibit 1). Iroquois Avenue is a Township street. Vaughan, in his capacity as Roadmaster for the past twelve years, and elected official, examined road repair records for the past ten years, including daily logs, and found no evidence of any Township employee having repaired a sinkhole in Iroquois Avenue. (N.T., Pages 142-146). Within the next several weeks, PAWC replaced approximately one hundred twenty five feet (125') of water line, and closed the excavation.

The Crevelings suffered severe damage to their house and yard as a result of the water main break and flow of water underneath their house and yard, and the property has been rendered uninhabitable. (See, Rahn Exhibit 1A, which is a photograph showing some of the damage to the Creveling's yard). Prior to February 5, 2005, there had been no problems with sinkholes or subsidence on the Creveling property. (N.T., Page 32, Lines 11-16). Likewise, other than one isolated subsidence event in 2004 at the fence line of 3113-3115 South Wagner Circle (see, N.T., Page 251, Lines 2-8), Wagner Farms residents testified that prior to the above-described events of February 5-6, 2005, they had not had noted sinkhole activity on their properties or in the Wagner Farms Subdivision. (N.T., Page 62, Line 25 to Page 63, Line 2 (Singerling); Page 73, Lines 5-7 (Soto-Studenrauch); Page 91, Lines 11-24 (Ruggiero). Since the events in question,

however, there have been numerous episodes of sinkhole activity in and near Wagner Farms. (N.T., Page 115, Line 9 to Page 116, Line 5). On April 3, 2005, a sinkhole opened in the parking lot of the school complex, immediately across Iroquois Avenue from the area of the water main break. (N.T., Page 111, Line 23 to Page 112, Line 13; Rahn Exhibit 1D; Rahn Exhibit 2). On April 6, 2005, a sinkhole opened on street (Wagner Circle) in front of the Ruggiero-Rahn property. (N.T., Page 97; Rahn Exhibits 3A and 3B). On April 8, 2005, a sinkhole opened in front of Singerling's property, at the curb line. (N.T., Page 62, Lines 23-24; Page 63, Lines 11-13; Rahn Exhibit 4A). Then, on September 4, 2005, the fire hydrant between 3117 and 3119 South Wagner Circle inexplicably sank five (5) to six (6) feet into the ground. (N.T., Page 113, Lines 5-22; Page 122, Lines 3-12; Rahn Exhibit 5). All of the residents testifying expressed extreme concern for their safety, that of children in the neighborhood, and for their property. Indeed, even Hassinger testified that he does not know if there are voids now beneath the roadway in Wagner Circle or Iroquois Avenue; does not know if anyone at PAWC knows if there are such voids; and is not aware of any study having been conducted to determine the existence of such voids. (N.T., Page 549, Line 24 to Page 550, Line 7). PAWC, according to Rahn, was initially receptive to subsurface testing (such as with ground penetrating radar) to determine whether there was additional damage. However, by April 20, 2005, when PAWC representatives met with Township officials and homeowners in Wagner Farms, PAWC representatives reneged and refused to cooperate in such testing. (N.T., Page 103, Line 11 to Page 104, Line 8).

On June 17, 2005, the Township filed a Formal Complaint with the PUC, alleging that PAWC had failed to provide reliable, safe service, and was failing to take proper steps to remediate the damage caused by the water main break. Subsequently, the homeowners in Wagner Farms, the Wilson School District, and the Crevelings filed Formal Complaints. After the completion of discovery, a Formal Hearing was held before the Administrative Law Judge on the above-captioned cases from June 26-30, 2006. This Brief is submitted in accordance with the Revised Scheduling and Briefing Order entered in the above-referenced matter on March 9, 2006.

III. SUMMARY OF ARGUMENT

PAWC has failed to provide safe, reasonable, and adequate water service to its customers, including the Township, and has failed to take the steps required to provide such service in the future, including making upgrades, improvements, and repairs to its water system, especially in the vicinity of the water main break. PAWC acquired the water distribution system from Citizens' Utilities in 2002. Its officials knew that portions of the Penn Water District, including the area of the water main break at issue in this case, were replete with carbonate geology and prone to sinkhole activity. PAWC officials also knew that some of the water mains, including the main on Iroquois Avenue that ultimately broke and caused the loss of 1.5 million gallons of water, were older and made from cast iron, which is not (and has not been since the 1970s) industry standard. The current industry standard is for ductile iron, which is far stronger and more resilient than cast iron. It is well known that unsecured and leaking water mains can cause sinkholes in areas of limestone rock, such as the area in question.

Furthermore, PAWC failed to take feasible reasonable precautions in this sinkhole prone area, including support of lines, which it had taken in other areas of the Penn District. Finally, there was no program, as part of water conservation or loss prevention, of replacement of older lines until such lines broke.

Since the main break in question, PAWC's response has been inadequate. Although PAWC replaced the broken main with stronger, ductile iron pipe, it has failed to take steps to ascertain all of the damage done. Both of the PAWC officials who testified (Rothwell and Hassinger) admitted that they did not know the ultimate destination of the escaped 1.5 million gallons of water from the Blanton tanks. The event resulted in the total loss of the home of Robert and Kristen Creveling, along with the development of voids and sinkholes under the residence. Residents have testified to accelerated formation of sinkholes in their yards and in the streets in front of their homes, which activity had not been occurring, with one exception, prior to the events of February 5 and 6, 2005. The residents, the School District, and the Township, have requested the use of testing by means such as ground penetrating radar (GPR) to determine the destination of the water, and to determine the existence of damage, so that it can be remediated. The Township, as the guardian of its streets and sidewalks, has requested such testing in order to see to the repair of potentially hazardous conditions to residents and the traveling public, such as development of sinkholes and subsidence of public ways. PAWC, however, has refused to take this step. The Township asks that the Commission order such testing, which testing is a "measurement" which it is within its jurisdiction to order, as well as any further

remediation, by PAWC, as part of its duty under the Public Utility Code to provide safe and adequate service, and to make necessary repairs and improvements to the system for the safety of the public.

IV. ARGUMENT

A. RESPONDENT, PENNSYLVANIA-AMERICAN WATER COMPANY, FAILED TO PROVIDE SAFE, REASONABLE, AND ADEQUATE SERVICE AS REQUIRED BY 66 Pa.C.S.A. SECTION 1501

Section 1501 of the Public Utility Code, sets forth mandatory requirements for the character of public utility service and facilities. This section provides, in relevant part:

> Every public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities, and shall make all such repairs, changes, alterations, substitutions, extensions, and improvements in or to such service and facilities as shall be necessary or proper for the accommodation, convenience, and safety of its patrons, employees, and the public. Such service shall be reasonably continuous and without unreasonable interruptions or delay. Such service and facilities shall be in accordance with the regulations of the commission. ...

66 Pa.C.S.A. Section 1501. The failure of a public utility to provide reasonably safe and continuous water service to its customers "poses a clear and present danger to the health, safety, and welfare of those customers denied water service and experiencing interruptions in their service; [such a] failure also constitutes a violation by [the water utility] of Section 1501 of the Pennsylvania Public Utility Code, 66 Pa.C.S.A. Section 1501." *Pennsylvania Public Utility Commission v. Beaver Brook Water Company*, 66 PUC 411 (1988). In the instant case, it is respectfully submitted that PAWC has not comported with the above-cited duties, by allowing conditions to continue which led to the break;

by failing to respond adequately, and by failing to take the steps needed to determine the extent of the damage and prevent future harm.

Officials of PAWC, including Rothwell, were well aware of the fact that the area of the Township of Spring in question was prone to sinkholes. (N.T., Page 693, Lines 23-24; 697-698, generally). Both Rothwell and Hassinger, however, admitted that while ductile iron piping is an industry standard, and has been industry standard since the mid-to-late 1970s, the mains in question were not replaced with available stronger ductile iron. (N.T., Page 568, Line 23 to Page 569, Line 5; Page 697, Lines 5-11). However, even though it was known, including by Rothwell, that the area in question was an area of limestone geology prone to sinkholes, the mains were not replaced with ductile iron until they broke, and other available measures were not taken to support lines. (N.T., Page 697, Lines 1-19; Page 698, Lines 8-12). Ductile iron, according to Terry L. Fought, P.E. ("Fought"), has approximately twice the strength as cast iron pipe in tensile, beam, and ring bending tests, and many times the strength of cast iron pipe in elongation, all of which could be applicable to the type of failure (known as a "wedge splitting failure"). Ductile iron pipe, according to Fought, would have been less susceptible to the type of failure experienced in this case. (Direct testimony of Terry L. Fought, Page 15, Lines 8-14; N.T., 6/27/06, Page 287).

Donald Hoskins, P.G. ("Hoskins"), in his direct testimony, testified to the publicly available information on the likelihood of sinkholes in the area, of which PAWC had to have been aware, and the measures which need to be taken:

In addition to the publicly available geological map described above [the map produced by William E. Kochanov] (DMH Exhibit 1), the records of ground surface failure maintained by Spring Township (Township Exhibit 4) are ample information that ground failure above sinkholes repeatedly occurs in this area of PAWC territory and especially along public transportation routes. Since these public transportation routes are also the routes for water mains and other service piping, and since ground failure is an annually repeated occurrence special leak detection and shutoff equipment should be installed and maintained to prevent damage associated with pipeline failure.

(Hoskins Direct Testimony, Page 7, Lines 136-148).[2]

Readily available measures could have prevented the water main break, and concomitant damage and service interruptions in question. Felicia Bechtel, P.G. ("Bechtel"), in her expert sur-rebuttal testimony for the Township at the hearing, stated as follows:

My opinion is that prevention of leakage into the ground, in an area of known limestone rock and known sinkhole activity, should have been a priority. This can be accomplished by either double piping lines and mains in areas known for sinkhole formation, or by, at very least, monitoring the system through methods such as acoustic leak detection, and tightening the system were necessary to prevent leaks causing this type of event. The methods that Pennsylvania-American was using at the time, such as monitoring tank levels and sounding of lines, were not sufficient.

(N.T., 6/28/06, Bechtel Sur-Rebuttal, Page 4, Lines 1-7). Bechtel analogizes sinkhole formation to forest fires and other preventable catastrophic events, in disagreement with the testimony offered by Richard Kanaskie to the effect that sinkhole activity is a natural and inevitable consequence of land development activity, and offers the opinion that the sinkhole activity described by Township witnesses and Wagner Farms

[2] The Township does not seek shutoffs, on advice of its Fire Marshal. Interestingly, the Kochanov Map to which Hoskins refers does not show a pre-existing sinkhole at the location attributed by PAWC to causing this event. Hoskins, like Fought, Bechtel, and Diesinger, attributes the water main break to gradual incremental removal of supporting material from water leakage from the pipeline. (Hoskins Direct Testimony, Page 7, Line 156 to Page 8, Line 169).

residents is attributable to the water main break, but did not have to have occurred, and does not occur absent human carelessness, such as failing to properly secure and support the water main in question:

> To explain further, sinkholes are inherently driven by the movement of water. Where there is a leak or loss of water to occur, with sinkholes appearing at the same location or in the approximate path of the water (which we know to be toward the farthest point down-gradient at which the water table intersects with the ground surface), it is highly unlikely that sinkholes in this circumstance would be a pre-existing condition.
>
> I further disagree with Mr. Kanaskie's point that the occurrence of sinkholes is an inherent risk of building in areas prone to geologic hazards, with the implication that this should be accepted as a risk and really no one's fault, like a tsunami or a hurricane if you live on the coast. This is actually more akin to forest fires in his analogy. Just like sinkholes, yes, there are naturally occurring forest fires caused by lightening strikes. Most, however, are caused by human carelessness, such as by not putting out campfires, or improper disposal of cigarettes. No one says, though, that forest fires have to be a natural consequence of human enjoyment of nature. People can camp and hike in the woods, but they just have to do so carefully, and with respect for the surrounding environment, topography, and naturally occurring conditions (including drought and conditions ripe for forest fires). It is the same with development, with its concomitant need for utilities, in areas where there are conditions ripe for sinkhole development. When installing utilities that can leak water, this requires care, such as support of lines, prevention of water leakage, and monitoring and remediation where there is leakage. Sinkholes caused by man's activity do not have to occur.

Additionally, Fought, testifying on behalf of the Office of Consumer Advocate, stated in his Sur-Rebuttal testimony that his review of testimony and evidence of record indicated that PAWC had failed to engage in leak detection activity until approximately a month before the incident in question. (N.T., 6/30/06). According to both Kanaskie and Fought, water mains are not water tight. Thus, it is critically important that in areas of carbonate geology, that precautionary measures, which are feasible, be taken.

PAWC, however, by its own admission, failed to do so, including failure to perform consistent leak detection, and failure to install such monitoring devices as Permalogs. This neglect, causing the damage in question, constitutes a failure to provide safe and reasonable service, in violation of Section 1501 of the Code, *supra*.

PAWC further failed to make reasonable efforts to detect the water main break so as to be able to begin remediation, and prevent water from being pumped back into the tanks and re-emptying into the area of the broken main. Although Rothwell testified to working throughout the night to find the source of the loss of water, there were readily available measures which could have been taken. First, there were signs of impending trouble which Rothwell apparently minimized or ignored, including several "low tank alarms" as early as February 4 from the Blanton tanks. Then, once it was clear that there had been a catastrophic loss of water, even though PAWC has "leak detection teams," no such teams were called or deployed. (N.T., Page 573, Line 20 to Page 576, Line 19; Page 591, Line 11). It was not until approximately thirteen (13) hours after the loss that the break was discovered, and this was only because a PAWC employee, responding to the wrong location, saw the sunken trees on the Creveling property. This absolute ineptitude on the part of PAWC allowed the worsening of the situation, and is a violation of PAWC's duty to provide safe service.

B. THE COMMISSION HAS THE AUTHORITY TO ORDER RESPONDENT, PENNSYLVANIA-AMERICAN WATER COMPANY, TO CONDUCT SUBSURFACE TESTING OF STREETS AND AREAS OF THE WATER MAINS TO DETERMINE THE EXISTENCE OF DAMAGE FROM THE WATER MAIN BREAK

Testing of the type requested by the Township, the School District, and the residents will, contrary to the position of PAWC, allow for a determination of whether there has been (and is) latent and dangerous damage resulting from the water main break. Although PAWC has taken the position that this testing will not be helpful, the Township disagrees, especially with respect to its request for subsurface testing of its streets. Bechtel, in her sur-rebuttal testimony to Kanaskie's testimony, stated:

> Q. I would like to call your attention to the portion of Mr. Kanaskie's testimony on Pages 12 and 13, where Mr. Kanaskie offers the opinion that there is no geological basis for Pennsylvania American Water Company to perform testing and identify subsurface features throughout the Wagner Farms development as a response to the subject water main break. Have you reviewed this portion of Mr. Kanaskie's testimony?
>
> A. Yes, I have.
>
> Q. Do you have an opinion as to whether this is correct?
>
> A. Yes, I do. I do not agree with his conclusion.
>
> Q. What is the basis for your disagreement?
>
> A. To give an example, Enviroscan performed sub-surface testing in Millersville, Pennsylvania in a case where a sinkhole opened after a water main break. The borough repaired the sinkhole, and then hired Enviroscan to perform non-invasive subsurface testing using Ground Penetrating Radar (GPR) over the water lines, to show where there were potential sinkholes forming, but not yet opened. This survey was able to show where there was incipient activity.
>
> To explain further, sinkholes are inherently driven by the movement of water. Where there is a leak or loss of water to occur, with sinkholes appearing at the same location or in the approximate path of the water (which we know to be

toward the farthest point down-gradient at which the water table intersects with the ground surface), it is highly unlikely that sinkholes in this circumstance would be a pre-existing condition.

(N.T., 6/28/06, Bechtel Sur-Rebuttal Testimony, Page 5, Line 4 to Page 6, Line 2).

The Commission, under Section 1504, may, "after reasonable notice and hearing, upon its own motion or upon complaint...

(2) Prescribe adequate and reasonable standards for the measurement of quantity, quality, pressure, initial voltage, *or other condition pertaining to the supply of service of any and all public utilities.*

(3) Prescribe reasonable regulations for the examination and testing of such service, and for the measurement thereof.

66 Pa.C.S.A. Section 1504 (2) and (3) (emphasis added). See also, *The Vertis Group, Inc., et al. v. Pennsylvania Public Utility Commission,* 840 A.2d 390 (Pa.Commw. 2003). This section of the Public Utility Code affords the Commission broad powers to order quantitative, objective measurement and testing relating to services rendered by public utilities such as PAWC. Here, the subsurface condition since the water main break of February 5-6, 2005 is a "condition pertaining to" the supply of water service by PAWC. Sinkhole activity and void development, in addition to the extreme hazard to safety of neighborhood residents of Wagner Farms, school children and employees in the Wilson School District, and the traveling public, will also create service interruptions and water quality problems (as evidenced by the "boil water" order in the hours and days after the water main break).

In the instant case, the requested relief is part and parcel to the duty of a public utility to repair and make improvements to provide safe and adequate service under

Section 1501 of the Code, *supra*, and under Section 1505 of the Code, 66 Pa.C.S.A. Section 1505, which requires that a public utility make all repairs, changes, alterations, extensions, and improvements to its facilities as necessary and proper for the accommodation, convenience, and safety of its patrons, employees, and the public. *Id.*

It is axiomatic that a utility cannot make needed repairs and improvements unless and until it knows that they are needed. PAWC is, based upon the testimony and evidence adduced, familiar with methods of strengthening and supporting lines in areas containing and prone to voids (as it has done so at Franklin Place and in Wyomissing Hills, both of which are in the Penn Water District). Such sub-surface testing is necessary to determine if any voids have developed in an area in which there has been a below ground loss of 1.5 million gallons of water, which is and was sinkhole prone. Accordingly, under Sections 1501, 1504, and 1505 of the Public Utility Code, *supra*, the Public Utility Commission has the power to order the testing requested by the Township, its residents, and the Wilson School District.

V. PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

A. Proposed Findings of Fact

1. Pennsylvania-American Water Company ("PAWC") is a public utility holding a Certificate of Public Convenience, rendering water service in the Commonwealth of Pennsylvania, including in Spring Township, Berks County ("Township").

2. The Township is a municipal corporation, and is located at 2800 Shillington Road, Cornwall Terrace, Reading, Berks County, Pennsylvania

3. The Township is a customer of PAWC.

4. PAWC renders water service pursuant to its Tariff-Water-Pa.P.U.C. No.4.

5. PAWC operates numerous facilities for the rendering of water service in the Commonwealth of Pennsylvania, including facilities in the Township.

6. PAWC's facilities included, as of February 5, 2005, an eight inch (8") cast iron water main located in the center of Iroquois Avenue. This main connected to a twelve inch (12") cast iron main, also located in Iroquois Avenue, which, in turn, connects to two 500,000 gallon storage tanks, located at Old Fritztown and Gring's Hill Roads in the Township, known as the "Blanton Tanks." The Blanton Tanks are in the mouth of the pressure zone, known as the "Mountain Pressure Zone" supplying Iroquois Avenue. (N.T., Page 621, Lines 22-25; Page 678, Lines 13-16).

7. The water, during the time period relevant to this action, ran through the Iroquois Avenue lines at a pressure approximately ninety five (95) psi. (N.T., Page 661, Lines 17-20).

8. PAWC's above-described facilities serve, *inter alia*, the residential development known as Wagner Farms (a/k/a Stonegate Neighborhood Development) ("Wagner Farms") and an education complex of the Wilson School District known as the Wilson Southern Junior High School/Cornwall Terrace Elementary School Complex. The schools are located across Iroquois Avenue from the Wagner Farms development.

9. The above-described Iroquois Avenue water main was a cast iron pipe installed by a predecessor corporation of PAWC, known as "Citizen's Utilities" in approximately 1970. (N.T., Page 693, Lines 9-14).

10. PAWC purchased the area which includes Iroquois Avenue, known as the "Penn District" from Citizens Water Company in approximately 2002. (N.T., Page 669, Lines 19-20; Page 693, Lines 13-14).

11. Some of the pipe, including the main at issue in the Penn District was cast iron, as opposed to stronger, heavier-walled ductile iron pipe. This was known to one or more officials of PAWC. (N.T., Page 692, Line 22 to Page 693, Line 8).

12. One or more officials of PAWC knew that the Penn District area was underlain with limestone rock and carbonate geology, and was sinkhole-prone. (N.T., Page 693, Lines 23-24).

13. One or more officials of PAWC knew that ductile iron piping is an industry standard, and has been industry standard since the mid-to-late 1970s. (N.T., Page 568, Line 23 to Page 569, Line 5; Page 697, Lines 5-11).

14. The cast iron mains were not replaced with ductile iron until they broke, and other available measures were not taken to support lines on Iroquois Avenue. (N.T., Page 697, Lines 1-19; Page 698, Lines 8-12).

15 On February 4, 2005, John Rothwell, Network Supervisor, received at least one alarm, which consisted of an automatically dialed call to his cell phone, showing a low water level in the Blanton tanks. (N.T., Page 708, Lines 8-16; Page 718, Lines 10-24; Rothwell Exhibit 2, Penn Water District Operator's Log).

16. Rothwell has the ability to set tank alarm levels, and to turn off tank alarms. (N.T., Page 611, Lines 2-5).

17. Rothwell also received low tank alarms on Saturday morning (February 5) as well, and received tank alarms from Blanton during the evening of February 5, between 5:00 p.m. and 8:00 p.m. (N.T., Page 720, Lines 18-20; Page 721, Lines 15-19).

18. On February 5, 2005, at approximately 10:45 p.m., Rothwell, who was at home, received a tank alarm through his cell phone. Upon arrival at the Sinking Spring office of PAWC, he discovered that the two 500,000 gallon tanks had emptied nearly instantaneously. (N.T., Page 731, Line 4 to Page 732, Line 7).

19. Water kept pumping into the tanks, even though the tanks were empty, and the water ran through the lines. (N.T., Page 686, Lines 8-11).

16. Approximately 1.5 million gallons of water were lost as a result of this incident, and it is unknown to PAWC officials what was the ultimate destination of this water. (N.T., Page 549, Lines 9-23; Page 700, Lines 9-14).

17. There was no monitoring of mains in February of 2005 for leak detection, and no monitoring of mains to date. (N.T., Page 686, Lines 12-19)

18. It was not until after this incident that Permalogs, which "listen" for leaks once daily between 2:00 and 2:15 in the morning, were placed in the water distribution system. (N.T., Page 681, Line 11 to Page 682, Line 7).

19. Permalogs were technology which was readily available to PAWC in February of 2005. (N.T., Page 684, Lines 8-11).

20. Efforts were made by PAWC to locate the source of the loss of water by closing valves, and monitoring the SCADA system. However, it took nearly thirteen (13) hours to locate the source of the water.

21. Although PAWC has "leak detection teams," no such teams were called or otherwise deployed to the area. (N.T., Page 573, Line 20 to Page 576, Line 19; Page 591, Line 11).

22. The initial reports of problems were complaint calls to PAWC and Township Supervisors Jay W. Vaughan late Saturday night of low water pressure. (N.T., Pages 147-150).

23. When residents called the water company, they received a pre-recorded message to Spring Township residents to the effect that there was "trouble at the Blanton pumping station." There was no opportunity provided to leave a message or speak with a person. (N.T., Page 70, Line 18 to Page 71, Line 10; Page 105, Lines 9-15).

24. There was no water service for approximately 15-16 hours, and although there was a "boil water" advisory in effect, this was disseminated only in the newspaper, and many residents, including Alan King and Neil Rahn, did not immediately find out about the advisory.

25. The break was discovered on Sunday afternoon, February 6, when a PAWC employee driving along Iroquois Avenue observed that several evergreen trees at the property of Robert and Kristen Creveling, located at 1323 South Wagner Circle (at the corner of Iroquois Avenue and Wagner Circle), had significantly sank into the ground. (N.T., Page 689, Lines 18-24).

26. The broken main was not excavated for another three (3) to four (4) hours afterward. (N.T., Page 690, Lines 16-18).

27. There no evidence of any Township employee having repaired a sinkhole in Iroquois Avenue. (N.T., Pages 142-146).

28. According to Jeri L. Diesinger, P.G., and Jay W. Vaughan, it did not appear that there was significant disruption of soils underneath the broken main. This is corroborated by the videotape (Exhibit 5 to Diesinger's direct testimony) of the excavation. The Administrative Law Judge accepts as credible testimony that the water main break was not caused by a pre-existing sinkhole that opened under the main, but rather, that the water main was outdated, leaked, causing acceleration of loss of support, and ultimately broke, causing the damage in question.

29. Robert and Kristin Creveling, residents of 3123 South Wagner Circle, suffered severe damage to their house and yard as a result of the water main break and flow of water underneath their house and yard, and the property has been rendered uninhabitable. (See, Rahn Exhibit 1A).

30. Prior to February 5, 2005, there had been no problems with sinkholes or subsidence on the Creveling property. (N.T., Page 32, Lines 11-16).

31. Other than one isolated subsidence event in 2004 at the fence line of 3113-3115 South Wagner Circle (see, N.T., Page 251, Lines 2-8).

32. Prior to the above-described events of February 5-6, 2005, they had not had noted sinkhole activity on their properties or in the Wagner Farms Subdivision.

(N.T., Page 62, Line 25 to Page 63, Line 2 (Singerling); Page 73, Lines 5-7 (Soto-Studenrauch); Page 91, Lines 11-24 (Ruggiero)).

33. Since the events in question, however, there have been numerous episodes of sinkhole activity in and near Wagner Farms. (N.T., Page 115, Line 9 to Page 116, Line 5).

34. On April 3, 2005, a sinkhole opened in the parking lot of the school complex, immediately across Iroquois Avenue from the area of the water main break. (N.T., Page 111, Line 23 to Page 112, Line 13; Rahn Exhibit 1D; Rahn Exhibit 2).

35 On April 6, 2005, a sinkhole opened on street (Wagner Circle) in front of the Ruggiero-Rahn property. (N.T., Page 97; Rahn Exhibits 3A and 3B).

36. On April 8, 2005, a sinkhole opened in front of Singerling's property, at the curb line. (N.T., Page 62, Lines 23-24; Page 63, Lines 11-13; Rahn Exhibit 4A).

37. On September 4, 2005, the fire hydrant between 3117 and 3119 South Wagner Circle inexplicably sank five (5) to six (6) feet into the ground. (N.T., Page 113, Lines 5-22; Page 122, Lines 3-12; Rahn Exhibit 5).

38. PAWC officials do not know, and have taken no steps to ascertain whether there are voids now beneath the roadway in Wagner Circle or Iroquois Avenue; (N.T., Page 549, Line 24 to Page 550, Line 7).

39. The Administrative Law Judge accepts as credible the testimony of Felicia Bechtel, P G., and Terry Fought, P.E., that PAWC did not take sufficient steps to prevent the incident in question, such as use of ductile iron piping, acoustic leak detection, and proper support for lines in a known area of carbonate geology.

40. The Administrative Law Judge accepts as credible the testimony of Felicia Bechtel, P.G., that the testing of the streets in the area of the lines with ground penetrating radar and similar tests will detect voids and damage caused by the main breaks. The Administrative Law Judge rejects the testimony of Richard Kanaskie, P.E., that such testing would not be helpful in determining the scope of damage caused by the water main break.

41. The Township incorporates by reference the Proposed Findings of Fact of the Office of Consumer Advocate, the Crevelings, and Wilson School District as though the same are set forth herein at length.

B. Proposed Conclusions of Law

1. The Commission has jurisdiction over the subject matter of this proceeding and the parties to this proceeding pursuant to 66 Pa.C.S.A. Section 1501, 1504, and 1505.

2. The Commission is entitled to award all requested relief in this matter. 66 Pa.C.S.A. Sections 1501, 1504.

3. Complainant, Township of Spring, has met its burden of proof that it is entitled to the relief requested.

4. Respondent, Pennsylvania-American Water Company, has violated the Pennsylvania Public Utility Code by failing to provide safe and adequate service, and failing to improve or repair its facilities to ensure such service. 66 Pa.C.S.A. Section 1501 and 1505.

5. The requested relief is not cost-prohibitive to Respondent, and is necessary to ensure the safety of Township residents and the public at large.

6. The Township incorporates by reference the Proposed Conclusions of Law of the Office of Consumer Advocate, the Crevelings, and Wilson School District as though the same are set forth herein at length.

VI. CONCLUSION

For the foregoing reasons, it is respectfully requested as follows:

1. That the Administrative Law Judge find Respondent, Pennsylvania-American Water Company, to be in violation of the Pennsylvania Public Utility Code.

2. That the Administrative Law Judge order Respondent, Pennsylvania-American Water Company, to conduct subsurface testing, including but not limited to testing by Ground Penetrating Radar (GPR) and other similar testing recommended by a geologist and/or geotechnical engineer, to determine the extent of damage from the water main break of February 5-6, 2005, of the streets, sidewalks, and rights of way in Wagner Farms, and along Iroquois Avenue in the vicinity of the water main break.

3. That the Administrative Law Judge order Respondent, Pennsylvania-American Water Company to utilize leak detection protocols, including acoustic leak detection and Permalogs, on all facilities in the Township.

4. That the Administrative Law Judge issue any other relief, including civil penalties and awards of costs and fees, as found necessary and appropriate.

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SOLICITORS FOR COMPLAINANT,
TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that this day I served a true copy of the foregoing document, the Main Brief of Complainant, Township of Spring, upon

participants through their counsel of record in accordance with the requirements of 52 Pa. Code Section 1.54 (relating to service by a participant):

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Dated this 18th day of August, 2006.

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August 28, 2006

James J. McNulty, Secretary
PA Public Utility Commission
Commonwealth Keystone Bldg.
400 North Street
Harrisburg, PA 17120

ORIGINAL

RE: Spring Township v.
Pennsylvania American Water Company
Docket No. C-20054746

DOCUMENT FOLDER

Neil R Rahn and David Singerling v.
Pennsylvania-American Water Company
Docket No. C-20054919

Wilson School District v.
Pennsylvania American Water Company
Docket No. C-20055371

BTL

Dear Secretary McNulty:

Enclosed please find for filing an original and nine (9) copies of the Office of Consumer Advocate's Errata to the OCA Main Brief in the above-captioned proceeding.

Copies have been served upon all parties of record as shown on the attached Certificate of Service.

Sincerely,

Dianne E. Dusman

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Senior Assistant Consumer Advocate
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Enclosures
cc: Hon. Wayne L. Weismandel, ALJ
All parties of record
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PA PUC
SECRETARY'S BUREAU

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

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PA PUC
SECRETARY'S BUREAU

SPRING TOWNSHIP, Complainant,	:	
v.	:	Docket No. C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent;	:	
NEIL R. RAHN and DAVID SINGERLING, ET AL., Complainants, and	:	
OFFICE OF CONSUMER ADVOCATE, Intervenor,	:	
v.	:	Docket No. C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent;	:	
WILSON SCHOOL DISTRICT, Complainant,	:	
v.	:	Docket No. C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent.	:	

DOCUMENT FOLDER

DOCKETED
DEC 20 2006

OFFICE OF CONSUMER ADVOCATE'S ERRATA

The Office of Consumer Advocate (OCA) respectfully submits the following errata to the Main Brief and Appendices of August 18, 2006 in the above-captioned proceeding.

Reference	Reads:	Should Read:
P. 6, l. 10	virtually allexpert witnesses	virtually all expert witnesses
P. 21, l. 1-2	The Court continued to address the City's argument that the doctrine of exclusive jurisdiction was not available to the PLCB,	The Court continued to address the City's argument that the doctrine of exclusive control was not available to the PLCB,

REFERENCE	READS:	SHOULD READ:
P. 36, l. 17	the appropriate agencies for PAWC to contacted	the appropriate agencies for PAWC to have contacted
P. 36, l. 20	PAWC, chose to act alone, however	PAWC chose to act alone, however.
P. 37, l.13	Section 1308(b)	Section 1308(d)
P. 40, l.4	included as Exhibit TCF-4	included as Exhibit TLF-4
P. 46, l. 2-4	Only the Township witnesses Ms. Diesinger and Ms. Bechtol were able to observe the excavation.	Only the Township expert witness Ms. Diesinger was able to observe the excavation
P 48, l. 5	Twp. St. at 20.	Diesinger Exh. 1 at 15; tr. 279-280.
P. 48, l. 7-12	Bechtol	Bechtel
P. 53, l. 8	structures.	structures. OCA St. 1-S at 10-15, tr. 300.
Proposed Finding of Fact (PFOF) 47, l. 3	depth of frost penetration level of 1 foot.	depth of frost penetration level of 1 meter, or 3.28 feet.
PFOF 55.	PAWC did not perform any leak detection tests in the vicinity of the Iroquois Avenue main break until a few weeks before the main break. OCA St. 1S at 3-4 and Exh. TLF-4.	PAWC had not performed any leak detection tests in the vicinity of the Iroquois Avenue main break. OCA St. 1S at 3-4 and Exh. TLF-4.
PFOF 63, l.2-3	Mr. Clauser only inspected 54 feet of pipe, while 125 feet of pipe was removed and replaced. OCA St.1S at 10.	Mr. Clauser only inspected 48 feet of pipe, while 125 feet of pipe was removed and replaced. Tr. 433; OCA St.1S at 10.
Prop. Order, ¶d., l. 3	Road [specify] to determine the existence of any voids	Road to determine the existence of any voids
Prop. Order, ¶e., l.1-3	b…PAWC shall provide the documentary results of the test to the parties, the parties' consultants, the PUC's Bureau of Fixed Utility Services and the Bureau of Safety and Compliance;	e…PAWC shall provide the documentary results of the test, together with a proposed timetable and remediation plan to deal with any voids discovered through the GPR testing, to the parties, the parties' consultants, the PUC's Bureau of Fixed Utility Services and the Bureau of Safety and Compliance;

The OCA would also note that Paragraph 4.a.-b in Appendix B, Proposed Conclusions of Law should be deleted. For the convenience of the Commission and the parties to this proceeding, the OCA will serve the corrected versions of the Appendix A, Proposed Findings and Appendix B, Proposed Conclusions and Ordering Paragraphs, with the Reply Brief on September 1, 2006.

WHEREFORE, the Office of Consumer Advocate respectfully requests that the Commission, the Presiding Officer and the parties to this proceeding note the above errata to the Main Brief and Appendices A and B that were filed and served on August 18, 2006.

Respectfully submitted,

/ Dianne E. Dusman

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CERTIFICATE OF SERVICE

Re:	Spring Township	:	
	v.	:	Docket No. C-20054746
	Pennsylvania American Water Company	:	
	Neil R Rahn and David Singerling, et al.	:	
	v.	:	Docket No. C-20054919
	Pennsylvania-American Water Company	:	
	Wilson School District	:	
	v.	:	Docket No. C-20055371
	Pennsylvania American Water Company	:	

I hereby certify that I have this day served a true copy of the foregoing document, Office of Consumer Advocate's Errata to the OCA Main Brief, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below.

Dated this 28th day of August, 2006.

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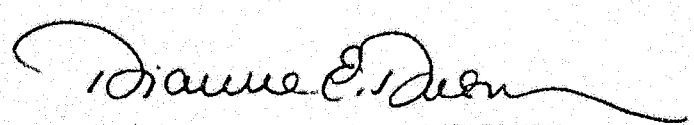

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1921-1988

August 30, 2006

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120

ORIGINAL

RE: Neil R. Rahn, David Singerling, et al v. PA American Water; No.: C-20054919
Township of Spring v. PA American Water; No.: C-20054746
Wilson School District v. PA American Water, No.: C-20055371
Our File No.: 10176-1041

Dear Secretary McNulty:

Enclosed please find for filing three (3) original and three (3) copies of Pennsylvania American Water Company's Response to Office of Consumer Advocate's Motion to Admit Post-Hearing Exhibit into Evidence. Kindly file the originals, time-stamp the extra copies and return one copy to the undersigned.

Should you have any questions or comments, please feel free to contact me.

DOCUMENT FOLDER

Very truly yours,

BINGAMAN HESS

Harry D. McMunigal

BTL

HDM:PLT:mny
Enclosures
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Nancy E. Longo, Esquire(nlongo.bridgelaw@verizon.net)

20

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No. C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No. C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	
v.	:	Docket No. C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

PENNSYLVANIA AMERICAN WATER COMPANY'S RESPONSE TO OFFICE OF CONSUMER ADVOCATE'S MOTION TO IDENTIFY AND ADMIT POST-HEARING EXHIBIT INTO EVIDENCE

1.-7. Denied. The referenced documents speak for themselves. Pennsylvania American Water Company avers that some of the allegations contained herein may be conclusions of law and are therefore denied. Pennsylvania American Water Company objects to the offer of substantive expert testimony of Donald Hoskins. Ph.D., P.G. into the record as expert testimony pursuant to this Court's Revised Scheduling Order of March 9, 2006 set forth the timing for Complainant's expert testimony to be filed on or before May 17, 2006 and rebuttal testimony to be filed on or before June 9, 2006. Furthermore, a four (4) day hearing was

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Kozloff Stoudt
ATTORNEYS AT LAW PROFESSIONAL CORPORATION

ORIGINAL

September 1, 2006

E-mail: jlondon@kozloffstoudt.com

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

RECEIVED
SEP 01 2006
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Re: Township of Spring
v. Pennsylvania-American Water Co.
Docket No. C20054746
Neil R. Rahn and David Singerling, et al.
v. Pennsylvania-American Water Co.
Docket No. C-20054919
Wilson School District
v. Pennsylvania-American Water Co.
Docket No. C-20055371
Our File No. 100744-388

Dear Sir/Madam:

Enclosed please find an original and ten (10) copies of the Reply Brief of Complainant, Township of Spring for filing. Kindly time stamp and return one copy to me in the enclosed, self-addressed stamped envelope.

Thank you for your assistance in this matter.

Very truly yours,

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KOZLOFF STOUDT
Professional Corporation

Joan E London 11CAB1
Joan E. London

JEL/kab
Enclosure
cc The Honorable Wayne L. Weismandel (w/enclosure)
Diane E. Dusman, Senior Assistant Consumer Advocate (w/enclosure)
Kenneth Zielonis, Esquire (w/enclosure)
Harry D. McMunigal, Esquire (w/enclosure)
Mark M. Bridge, Esquire (w/enclosure)
Seth A. Mendelsohn, Esquire (w/enclosure)

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

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PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

REPLY BRIEF OF COMPLAINANT, TOWNSHIP OF SPRING

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KOZLOFF STOUDT
Professional Corporation
By: Joan E. London, Esquire
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P.O. Box 6286
Wyomissing, PA 19610

I. INTRODUCTION

This Reply Brief is submitted in accordance with the Amended Scheduling Order of the Administrative Law Judge, dated March 9, 2006, providing for the filing of Reply Briefs no later than the close of business on September 1, 2006. Complainant, Township of Spring ("Township") files this Brief in response to the Main Brief submitted by Respondent, Pennsylvania-American Water Company ("PAWC"). The Township here incorporates by reference its Statement of Facts and Arguments of Law from its Main Brief as though the same were set forth herein at length. By this Brief, the Township responds to the averments and arguments of PAWC, and seeks the relief requested in its Main Brief.

II. COUNTER-ARGUMENT

A. THE TOWNSHIP MET ITS BURDEN OF PROVING BY A PREPONDERANCE OF THE EVIDENCE THAT PAWC DID NOT PROVIDE AND MAINTAIN ADEQUATE, EFFICIENT, SAFE, AND REASONABLE SERVICE AND FACILITIES

Section 1501 of the Public Utility Code, 66 Pa.C.S.A. Section 1501, requires that a Public Utility, such as PAWC, provide to its customers efficient, safe, and reasonable service and facilities. The Township, and Complainants in the above-captioned consolidated actions, have met their burden of showing by a preponderance of the evidence that PAWC has failed to comport with the standards set forth in the Code.

PAWC has asserted that its response to the initial complaints on February 5, 2005 of low water pressure, and, later, no water service, was adequate. The Township, however, takes issue with this characterization. John Rothwell ("Rothwell"), Network

Supervisor for PAWC, testified that he received the tank alarm at approximately 10:45 p.m. on February 5, 2005, and immediately began investigating the source. However, Rothwell and a PAWC crew worked through the night, but did not discover the source of the loss of water from the 500,000 gallon tanks. Rothwell knew that the tanks had emptied, that water was being pumped into the tanks and emptying into the water distribution system, and that in excess one million gallons of water was gone (and unaccounted for). Clearly, this was a catastrophic loss. Yet, even being aware of this, Rothwell did not alert available PAWC leak detection teams, and continued, for 12-13 hours, to search fruitlessly for the source of the water loss. The loss was only discovered accidentally, by a PAWC employee who happened to be driving by the Creveling residence along Iroquois Avenue, and saw the sunken trees. PAWC had measures other than simply shutting off valves throughout the system in an attempt to isolate the problem at its disposal, but failed to utilize such measures.

Even prior to the event, the evidence shows that PAWC did not comport with its statutory duties. PAWC, for example, did not place Perma-Logs, which are an important troubleshooting tool, on the lines in this area. Indeed, Rothwell admitted that PAWC did not do so until after the water main break This is especially troublesome, in light of the known carbonate geology of the area, which requires that any entity potentially introducing water into the sub-surface utilize special precautions to avoid just this type of event. PAWC attempts to utilize the geology of the area in an attempt to minimize its liability. In fact, just the opposite is true. In expert testimony, Felicia Kegel Bechtel, P.G. ("Bechtel") spoke of a higher duty of care required in

placement of water lines in such areas, including double piping, encasement of lines, and a program of leak detection and remediation. These precautionary measures are available, and were available to PAWC during all times relevant to this action. Yet, PAWC failed to avail itself of these measures.

PAWC cites as evidence of its lack of culpability for the water main break that there had been one (1) sinkhole in the Wagner Farms development prior to the February 5, 2005 event. However, in spite of the geology of the area, Wagner Farms could hardly have been considered to be a hotbed of sinkhole activity prior to this event. A review of the publicly available geologic map, prepared by William Kochanov and utilized during the hearings, shows sinkhole activity in other areas of the Township, but not in the vicinity of Wagner Farms. Likewise, the Sinkhole Database prepared by Jeri L. Diesinger, P.G., Director of Engineering Services shows the one subsidence episode in Wagner Farms prior to February 5, 2005, but does not show further sinkhole activity until after the event in question. Since that date, there have been four (4) significant sinkhole episodes. This presents strong evidence of cause and effect.

PAWC attempts to insulate itself from liability by stating that the main in question was installed by a predecessor corporation, and that it is not subject to "successor liability." It is not the installation of the main which is at issue. Rather, this is a case of improper maintenance, lack of use of readily available leak detection and prevention methods, and failure to timely remediate the break which are the basis of PAWC's alleged liability. Both Rothwell and Brian Hassinger of PAWC, both of whom were in management positions at PAWC with supervisory responsibilities in the Penn

Water District, knew both that the area in question was prone to sinkholes, and that the lines in the area were made of cast iron and were in excess of thirty five years old. Both were also aware that ductile iron is stronger and more resilient than cast iron. In fact, ductile iron has been the industry standard for water mains since the late 1970s. In spite of this knowledge, PAWC has admitted that it was only replacing the older cast iron mains when they broke, did not install Perma-Logs until after the break, and otherwise took no prospective, and available steps to prevent the foreseeable harm which occurred. After the purchase of the systems from Citizens' Utilities in approximately 2001, the lines (including the water main at issue) was within the exclusive control of PAWC, and PAWC held the means to prevent the water main break and ensuing damges, but it did not utilize these means, all in violation of its statutory duty to provide safe, reliable, and efficient service.

PAWC then attempts to absolve itself of liability by pointing to possible alternative sources of water. These alternative sources, however, are speculative. Richard Kanaskie testified that a sinkhole caused the main to rupture. Kanaskie first testified to the presence of concrete in the extended excavated area. It was PAWC's, and Kanaskie's, position that the concrete was definitive proof of a previously filled sinkhole in the area of the break, in the bed of Iroquois Avenue. The repair of Township streets is a Township responsibility. Vaughan, however, testified that in his examination of Township records, and in his personal recall (as an elected Supervisor, appointed Roadmaster, and long-term Township resident), he had no recollection of the Township having repaired a sinkhole at the location in question. Kanaskie then pointed

to infiltration through the road surface, and higher than average precipitation in the eight months prior to the water main break. Bechtel, however, testified that an asphalt road surface is generally impervious, and the subsurface is dry even after wet weather. Kanaskie then pointed to a detention basin, allegedly containing open sinkholes. Although the Township alleges that the detention basin is higher in elevation, it is only the rim of the basin which is slightly higher in elevation than Wagner Farms. The bottom of the basin, where any sinkholes would be located, is lower in elevation than the area of the break, and, by definition, could not have supplied water to the area of the break.

Although the Township acknowledges that this is a case alleging regulatory and statutory violations, and not a negligence case, PAWC has alleged that the Township is analogizing this matter to a tort case in which an instruction on *res ipsa loquitur* has been requested. In the case of *Hollywood Shop, Inc. v. Pennsylvania Gas and Water Company*, 270 Pa.Super. 245, 411 A.2d 509 (1979), the Superior Court found in a case by a store against a utility alleging damages due to a water main break, that the trial court had erred in not giving the jury a requested instruction on *res ipsa loquitur*. The Court found that such an instruction was warranted under facts "which lie somewhere in between the case in which plaintiff brings in no evidence of specific acts of negligence, and therefore must rely on the *res ipsa loquitur* inference alone, and the case in which the defendant's negligence can be clearly and indubitably ascertained from the plaintiff's evidence...." *Id.* at 513. It is the position of the Township that it has shown that PAWC violated its duties under applicable statutes and regulations by failing to utilize readily

available leak detection and pipe encasement/strengthening methods. However, *Hollywood Shop, supra,* and even the cited examples in Section 328D of the *Restatement(Second) of Torts* makes it clear that liability for a water main break can be subject to the doctrine of *res ipsa loquitur.*

The position of the Township that the leakage from the water main in question caused a loss of support is supported by the evidence. The videotape of the excavation, offered into evidence by the Township, shows the excavation of the line, and shows that the soil under the broken main was relatively undisturbed. By contrast, according to Jay W. Vaughan, Township Supervisor and Township Roadmaster, who viewed the trench soon after excavation, the sides of the trench were wet. Although Craig Clauser, testifying for PAWC attempts to refute this position by stating that an examination of the line in question showed no evidence of leakage, this position is called into question by evidence offered by PAWC itself. PAWC offered testimony of an acceptable leakage rate of 0.6 gallons per hour from mains. Any testimony of no leakage whatsoever is severely called into question. It is submitted by the Township that it is the duty of a public utility, when providing water service in a manner which introduces pressurized water through the subsurface, to prevent leakage which can create a dangerous situation such as that which occurred on February 5, 2006

B. PAWC CAN BE REQUIRED TO UNDERTAKE THE REQUESTED GEOLOGICAL TESTING

The Commission, under Section 1504 of the Public Utility Code may, "after reasonable notice and hearing, upon its own motion or upon complaint...

(2) Prescribe adequate and reasonable standards for the measurement of quantity, quality, pressure, initial voltage, *or other condition pertaining to the supply of service of any and all public utilities.*

(3) Prescribe reasonable regulations for the examination and testing of such service, and for the measurement thereof.

66 Pa.C.S.A. Section 1504 (2) and (3) (emphasis added). Here, the requested testing is key to the obligation of a utility to repair and make improvements to its system to provide safe and adequate service as required by the Code, and to make needed improvements. A utility cannot repair and improve its system without knowledge of what is needed. The loss of 1.5 million gallons of water, the ultimate destination of which is unknown, clearly triggers a need for remediation, especially where sinkholes have cropped up where they had not appeared in the past. The testing is readily available, without, according to Bechtel and disproportionate cost to PAWC and/or its ratepayers. The safety of the residents of Wagner Farms, students of the Wilson School District, and the traveling public must, at all times, be of paramount concern to the Commission. If the testing is not required, the local residents, and the Township will be without means to ascertain whether there is sufficient subsurface support, leaving homes, yards, streets, and sidewalks in a potentially dangerous condition.

PAWC has alleged that the testing will not be useful in distinguishing between voids which pre-existed the incident at issue, and sinkhole activity which has subsequently occurred. This assertion was refused in Bechtel's testimony. Bechtel, in testimony cited extensively in the Main Brief of the Township, cited to experience in the Borough of Millersville in which ground penetrating radar testing under asphalt did, in

fact, reliably show the condition of the subsurface in a manner in which damage from a water main break would have been detectable. It is the position of the Township that the testing would be a highly useful device to determine whether the currently unknown final destination of the 1.5 million gallons of water has created a dangerous condition along Iroquois Avenue and in Wagner Farms.

III. CONCLUSION

For the foregoing reasons, it is respectfully requested that the Commission grant to the Township the relief requested in its Main Brief.

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TOWNSHIP OF SPRING

BEFORE THE COMMONWEALTH OF PENNSYLVANIA
PUBLIC UTILITY COMMISSION

TOWNSHIP OF SPRING, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054746 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

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NEIL R. RAHN and DAVID SINGERLING, *et al.*, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20054919 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

WILSON SCHOOL DISTRICT, Complainant vs. PENNSYLVANIA-AMERICAN WATER COMPANY, Respondent	: Docket No. C-20055371 : : : : : Assigned to: : Wayne L. Weismandel, A.L.J.

CERTIFICATE OF SERVICE

I, Joan E. London, Esquire, hereby certify that this day I served a true copy of the foregoing document, the Reply Brief of Complainant, Township of Spring, upon

participants through their counsel of record in accordance with the requirements of 52 Pa. Code Section 1.54 (relating to service by a participant):

(via email: ddusman@paoca.org/dwong@paoca.org and First Class U.S. Mail)

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Dated this 1st day of September, 2006.

KOZLOFF STOUDT
Professional Corporation

Joan E. London, Esquire

Solicitors for Complainant, Township of Spring

ORIGINAL

BINGAMAN HESS

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1907-1996
RAYMOND K. HESS
1919-2005
J. WENDELL COBLENTZ
1911-2003
JAMES F. BELL
1921-1988

September 1, 2006

VIA HAND DELIVERY

James J. McNulty, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building, 2nd Floor
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RE: Neil R. Rahn, David Singerling, et al v. PA American Water; No. C-20054919
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Our File No.: 10176-1041

Dear Secretary McNulty:

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Should you have any questions or comments, please feel free to contact me.

Very truly yours,

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BINGAMAN HESS

Harry D. McMunigal

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Mr. David Singerling
Dianne E. Dusman, Senior Assistant Consumer Advocate
Darlene R. Wong, Esquire
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Kenneth Zielonis, Esquire
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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP, Complainant	:	
v.	:	Docket No. C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
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v.	:	Docket No. C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

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PENNSYLVANIA AMERICAN WATER COMPANY

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Harry D. McMunigal, Esquire
Attorney for Pennsylvania American Water Company

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Rules

§1501 of Chapter 66 of the Administrative Code..... .... 2, 10, 11, 15, 18

66 Pa.C.S. §1504 16

I. INTRODUCTION

Respondent, Pennsylvania American Water Company (hereinafter "PAWC"), files this brief in reply to the Main Briefs of Complainants, Spring Township, Wilson School District and Office of Consumer Advocate, into which brief Complainants Neil R. Rahn and David Singerling, et al, have joined.

In this administrative proceeding, Complainants must prove that PAWC failed to furnish or maintain reasonable and adequate service and facilities, pursuant to 66 Pa.C.S. Section 1501, the controlling statute setting forth the standards by which a utility is to operate. However, none of the evidence produced in this proceeding has established any deficient service on the part of PAWC. On the contrary, the overwhelming evidence presented has gone to establish that a sinkhole led to the rupture of the water main, which developed naturally in that area rife with limestone formations and sinkholes. Nothing that PAWC did or failed to do contributed in any way to this occurrence.

In this Reply Brief, PAWC seeks to emphasize that none of the Complainants have produced sufficient substantial evidence to meet their burden of proving by a preponderance of the evidence that the water main break in question was caused by PAWC's failure to furnish and maintain reasonable and adequate service and facilities. They have not been able to establish any deficiencies in PAWC's reasonable leak detection program, or any shortcomings in its response to the water main break. Furthermore, Complainants have not been able to identify any authority of any sort that could remotely be used to justify its request for geophysical testing and remediation efforts on the private properties of the residents in that area.

II. ARGUMENT

A. Complainants Have Failed To Prove That PAWC's Leak Detection Program Was Inadequate Or Unreasonable Under The Circumstances.

Complainants attempt to establish through piecemeal selections of testimony that PAWC was deficient in its leak detection program prior to February 5, 2005. However, as will be shown herein, PAWC's leak detection program was reasonable and adequate and in full conformity with the obligations imposed by §1501.

First, Complainants emphasize that the water main pipeline underlying Iroquois Avenue, installed in 1970, was made of cast iron, whereas ductile iron piping was the industry standard beginning in the late 1970's. Complainants thereby attempt to argue that PAWC's service and facilities were unreasonable and inadequate almost as a matter of law because it continued to operate that arm of its water service through this cast iron pipeline.

It should be noted, first, that PAWC only acquired responsibility for this pipeline when it took over the operation of the service from Citizen's Water Company in 2002. Moreover, John Rothwell persuasively testified concerning the reasonableness of PAWC's procedures in maintaining the pipelines in that system. PAWC goes through a process of replacing mains. The pipelines are examined based upon the number of breaks, pressure problems, and flow problems, and then are replaced accordingly. (NT 6/30/06 at 698) The age of the mains is also one of the factors used in determining whether to replace a main. (698-99) However, there were no plans to replace the main underneath Iroquois Avenue up to the time of the main break because there had never been a problem with that main prior to that date. (699) In fact, that main, installed in 1970, was not even considered "old" in the context of the life of a water main. (699) In addition,

Rothwell explained that PAWC did have procedures in place to shore up lines in its district, when an event occurs which requires such a procedure (699-70)

Complainants argue from this testimony that PAWC's service was somehow inadequate and unreasonable because it failed to replace this main prior to February 5, 2005, even though PAWC had never previously experienced any problems whatsoever with this main. Such an obligation would constitute an overwhelmingly unreasonable burden on the part of PAWC. One must have to speculate as to how the rate payers would feel about bearing the ultimate cost of replacing all of the mains in the district that happen to be made of cast iron, even though none of those mains had been presenting any problems. In addition to the obligation of providing reasonable and adequate service and facilities, PAWC, as a public utility, also has an obligation to its rate payers to limit the imposition upon them of unreasonable or unnecessary costs.

In addition, the testimony of Craig Clauser also underscores that there was in fact nothing wrong with this main in terms of cracks or leakage or any other problem that would have warranted its replacement prior to February 5, 2005. It is important to keep in mind that he is the only expert to have actually undertaken a failure analysis on the specific pipe in question. The results of this investigation confirm that there was no evidence of any leaking from the pipe joints, no slow cracking and no damage to the gaskets. There was likewise no corrosion or thinning of the walls, and the pipes were in very good shape. (PAWC Exhibit 1 at 5, 6; NT 6/28/06 at 427, 428, 429)[1]

Complainants further argue that PAWC's leak detection program was inadequate. However, the testimony of Brian Hassinger and John Rothwell from PAWC prove the contrary

[1] It is significant to note that none of the Complainants have produced any evidence, substantial or otherwise, that there was in fact actual leakage from the pipe that specifically caused this main break. Instead, their arguments on this issue are all based on theory and speculation.

Hassinger testified about PAWC's "routing practice" to engage in leak detection surveys. (NT 6/30/06 at 514) Certain areas are surveyed at a time, including sounding the entire fire hydrant system and all service line control valves. (516-17, 518, 519) He describes PAWC's leak detection program as "aggressive", with at least eight service employees specializing in leak detection. (519)[2] John Rothwell likewise testified about PAWC's system of monitoring tank levels. First, PAWC performs daily inspections where the high and low levels of the two water storage tanks in that area are recorded manually. On top of that, PAWC employs a computer based SCADA system that monitors tank levels, which updates every 15 minutes. (623, 624) When the water level drops to approximately 29 feet, the tank alarms sound, and he receives an alarm call at his office, on his cell phone and through the dispatch. (624, 625) A visual alarm is also portrayed through the SCADA computer screen. (626) When he receives such an alarm, he sends a service man out, who then reports the tank levels over the phone. (627)

Rothwell also reiterated what Hassinger explained about PAWC's leak detection procedures including checking hydrants and valves with a listening device, and also employing permalogs. (669, 670) Complainants cite a small portion of Rothwell's testimony, that PAWC just recently started, in January, 2005, to keep leak detection records, in support of their argument that PAWC's leak detection program was inadequate. (669) What Rothwell actually stated, however, was that, although PAWC just started to keep leak detection records, they have nevertheless employed leak detection practices all along. (669)[3]

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[2] Several of the Complainants have argued that none of these leak detection specialists were called out to the scene once the problem with the main break was identified, presumably theorizing that this constituted an inadequate response to the event. However, it should be noted that these employees specialize as a "leak detection" team, not a "leak response" team.

[3] It bears repeating that PAWC only acquired the utility from Citizen's Water Company in 2002 and cannot be responsible for what practices Citizen's Water Company may have undertaken or ignored.

A significant flaw in Complainants' theory that PAWC's leak detection program was inadequate comes from Complainants' very own witness, Felicia Kegel-Bechtel, testifying for Spring Township as an expert geologist. In response to questioning by OCA, that even if the pipe had been leaking at the allowable and acceptable limit of 0.6 gallons per hour, a proper leak detection procedure undertaken in 2004, prior to the break, would not even have been able to detect such a leakage: "At .6 gallons per hour, that's going to be pretty hard to detect." (NT 6/28/06 at 379, 380) All of Complainants' arguments about the supposed inadequacies in PAWC's leak detection program are nothing more a red herring, simply because the acceptable, allowable rate of leakage from a pipe, at 0.6 gallons per hour, would not even be detected by an adequate leak detection program anyway. Even assuming this leakage took place, which Complainants still have not proven, a reasonable and adequate leak detection program would not have identified it before this break.

The Main Brief filed by OCA is consumed with extensive discussions about the PUC's statement of policy on water conversation measures, and testimony in rate proceedings on the subject of cost-effective conservation, that have nothing whatsoever to do with the present proceeding surrounding the water main break at issue. OCA then makes the leap to argue that PAWC ignored the required leak detection procedures "for years" prior to the main break. (OCA Main Brief at 39) In support of this specious argument, OCA reasons that it had served several discovery requests on PAWC for documents evidencing compliance with conservation practices and policies and leak detection practices and procedures, but that no such documents were produced (OCA Main Brief at 39, 40) However, as was repeatedly discussed in the course of this four-day proceeding, OCA never filed a Motion to Compel, nor a Motion for Sanctions, to obtain production of those documents. Absent such efforts, it cannot argue to PAWC's detriment

that no such policies or procedures existed simply because it did not make the extra efforts necessary to obtain any such documentary evidence establishing such practices and procedures.

Instead, the testimony of Brian Hassinger and John Rothwell adequately summarize the long-standing, reasonable and adequate leak detection procedures that were in place prior to this main break, and Complainants' own expert witness has conceded that even the best leak detection procedures would not have identified any allowable leak emanating from this pipeline anyway. Complainants cannot prove that PAWC failed to furnish and maintain reasonable and adequate service and facilities in this context, and their Complaint in that regard should be denied and dismissed.

B. Complainants Failed To Prove That Any Leakage From The Pipeline Was The Cause Of The Main Break.

It bears repeating that the only expert witness who actually undertook a failure analysis of the pipe in question was Craig Clauser, PAWC's expert metallurgical engineer. Complainants did not present the testimony of any expert metallurgical engineer, and Complainants likewise did not have the pipe in question put through a failure analysis by any of their experts. The only engineering expert presented by Complainants, Terry L. Fought, acknowledged that he did not do any testing of a metallurgical nature to evaluate why the water main broke. (NT 6/27/06 at 293) By contrast, Craig Clauser, PAWC's expert metallurgical engineer, testified specifically regarding the failure analysis he undertook on the section of pipe that was actually involved in the main break. (PAWC Exhibit 1 at 3, 4) He testified that his testing of the pipe confirmed, not just that he saw no evidence of leakage, but instead that the results of his testing positively confirmed that there was in fact no leakage from the pipeline. (5; NT 6/28/06 at 427, 428, 429) Had there been leakage from the pipe joints, Clauser would have expected to see a distorted or

torn gasket, some evidence that the pipe had not been fully seated in the spigot, but he saw none. (427) He did see positive evidence of rust build-up that shows that the pipe was in fact fully seated within the bell. Likewise, there was no damage to the gaskets either; they were fully placed. (427, 428) Moreover, there was no corrosion or thinning of the walls that could be indicative of leakage along the length of the pipes. On the contrary, the pipes were in very good shape. (429)[4]

This proves not just that there was no evidence of leakage, but more affirmatively, that there was positive evidence of no leakage from the pipes, a different fact entirely. It is important to keep in mind, as well, that none of the Complainants' expert witnesses affirmatively proved the presence of any leakage. Instead, the most they could argue is that there "had to have been" some leakage, or there "must have been" some leakage, or there "likely was" some leakage, or there "probably was" some leakage.

Complainants argue that their witnesses determined that the soil surface underlying the pipeline was intact, with no evidence of a sinkhole being present: "Only the Township's witnesses' [sic] Ms. Deisinger and Ms. Bechtel were able to observe the excavation in the area of the main break within a day after the break occurred." (OCA Main Brief at 46) And again: "Ms. Bechtel, as well was able to view the excavation on the morning of February 7, 2005 ..." (OCA Main Brief at 48) This is an incorrect statement of the facts. Instead, Ms. Bechtel

[4] The OCA accuses PAWC of being guilty of spoliation of evidence, because John Rothwell discarded some portions of the pipe that was removed in the excavation of Iroquois Avenue. Specifically, of the 125 feet of pipe that was removed, 54 feet of that pipe was stored for inspection, and the other 71 feet of pipe was scrapped because there was nothing wrong with it. (NT 6/30/06 at 661) This spoliation argument is without merit of any sort. OCA's own expert engineer, Terry L. Fought, had a full opportunity to inspect the portion of the pipeline that was involved in the break. (OCA Statement No. 1 at 1) Complainants' other expert witnesses had that opportunity as well. That additional 71 foot length of pipeline was scrapped because there was nothing wrong with it. (NT 6/30/06 at 661) The question arises of what complaints would be asserted against PAWC had they chosen to continue to maintain that cast iron pipe underground instead of replacing it.

admitted repeatedly that she never visited the site of the excavation. (NT 6/28/06 at 385) She did not even conduct the investigation; one of Enviroscan's project managers did, who for some reason was not called to testify. This project manager, James Bock, is the individual who went out to the site and completed all of the survey work and performed the site inspection. She merely examined photographs, reviewed the report for technical correction and signed off on the report. The conclusions, opinions and recommendations of the report are those of Bock's. (382, 383, 384, 385)

In any event, the point that Complainants attempt to make is that there could not have been a sinkhole underneath the pipeline, because one was not observed at the site of the excavation. However, even Complainants' own expert engineer, Terry L. Fought, acknowledges that the water main break was caused by a sinkhole that was actually adjacent to the water main pipe, not underneath it. (NT 6/27/06 at 294, 295, 299) Similarly, PAWC's expert metallurgical engineer explained that, to cause the pipe to settle and therefore break, the void would only have to consist of a loss of support of as little as a few inches; a ten foot deep sinkhole is not required. (NT 6/28/06 at 442, 443) The intact condition of the soil underlying the pipeline does not therefore establish that it could not have been a sinkhole that caused the main break, with the uncontradicted expert evidence that the sinkhole was in fact adjacent to the pipeline, and could only have consisted of a shifting of the earth of a matter of a few inches.

Additionally, Complainants further argue that the issue of the presence of a pre-existing, previously repaired sinkhole in the very site of the excavation is merely "a claim" by PAWC. (See Spring Township Main Brief at 10) This condition is not just a "claim" being asserted by PAWC, however, but is in fact admitted to by Complainants' witnesses. Specifically, Spring Township's Road Master, Jay Vaughan, acknowledged that what he personally observed in the

excavation site was a slab of cement that appeared to be used to previously fill a sinkhole. (NT 6/26/06 at 189, 190) Likewise, Spring Township's expert geologist, Jeri Deisinger, relied upon Vaughn's statements, including his observation of what was apparently a previously filled sinkhole, to come to her conclusions. (NT 6/27/06 at 251, 252) She further admits that there is no other explanation for the presence of this cement other than to fill a sinkhole, and she in fact acknowledges that the use of cement for that purpose showed some skill in remediation of sinkholes. (253, 254) Furthermore, OCA's engineering expert Terry L. Fought confirmed that the concrete identified in the excavation comes from a repaired sinkhole. (NT 6/27/06 at 302)

It is further the admission of Jeri Deisinger that another sinkhole had developed, less than five months prior to February 5, 2005, a few doors down from the site of the main break, at 3113 and 3115 South Wagner Circle. (Deisinger Exhibit 1 at 13; NT 6/27/06 at 251) Additionally, Larry Bortz, Director of plant management for Wilson School District, acknowledged that the school district has other properties in Spring Township that have experienced previous sinkholes, including three sinkholes within the last 14 months at Southern Junior High School. (NT 6/27/06 at 234, 235)

What has been consistently demonstrated by all of the witnesses who testified in these proceedings is the existence of sinkholes in the area of Iroquois Avenue and South Wagner Circle prior to the main break of February 5, 2005, a condition that is not unusual in this heavily sinkhole-ridden area. In the presence of this geological environment, without any affirmative proof of leakage from the pipe, it is simply impossible for Complainants to produce any substantial evidence that it was leakage from the water main that was the cause of the sinkhole that caused the pipeline to rupture.[5]

[5] The Main Brief filed by OCA is replete with references to the report prepared by Dr. Chung of American Geotech. (OCA Main Brief at 9, 10, 15, 46) However, after extensive argument on this issue,

In its Brief, OCA discusses at quite some length the applicability of civil action case law in negligence claims, citing it as precedent for its argument to impose liability on PAWC under these circumstances. OCA prefaces this analysis by acknowledging that "this Commission is not to assess monetary damages" (OCA Main Brief at 26), but it nevertheless continues in a detailed recitation of case law on negligence and res ipsa loquitur.

It cannot be emphasized enough that this is a PUC proceeding brought to determine if PAWC furnished and maintained reasonable and adequate service and facilities, under the guidelines of §1501 of Chapter 66 of the Administrative Code. This is not a civil proceeding for monetary damages, it is not a negligence action, and none of the case law or theories cited by OCA or any of the other Complainants along those same lines have any applicability whatsoever to this proceeding. OCA even initiates that section of its Brief with the statement that it has discovered "no reported PUC Orders deciding Complaints that seek repair of damage due to a main break causing sinkhole collapses." (OCA Main Brief at 26) No truer statement could be made, because the PUC is not the appropriate forum for what are in reality negligence allegations and not deficient service allegations.

Likewise, the argument made by OCA that res ipsa loquitur should apply to this proceeding is misplaced. As more fully discussed in PAWC's Main Brief, Complainants cannot even meet the first factor of the theory, namely, that the event is of a kind that does not occur in the absence of negligence. In this case, there is ample substantial evidence that this main break occurred, not because of any negligence, but because of the occurrence of the sinkhole in that limestone-supported area. Similarly, other responsible causes, raised in the second factor of the

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Complainants' attempt to introduce this American Geotech report into evidence was specifically disallowed. (NT 6/27/06 at 246) Therefore, all of those references by OCA to this report or its conclusions are simply an attempt at having that report reviewed as part of the record in this case, which should not be countenanced.

theory, are not sufficiently eliminated by the evidence – it is this other responsible cause, the sinkhole developing in this sinkhole-ridden area, that is in fact the responsible cause for this main break. As such, the theory of res ipsa loquitur is inapplicable to this situation and should be disregarded.

What cannot be forgotten is that Robert Creveling is the only Complainant to have suffered any real estate property damage as a result of this incident, and he and his wife are currently pursuing a civil action in the Court of Common Pleas of Berks County for their property damage and other elements of damage they claim to have suffered arising out of this incident. Significantly, this action was not filed just against PAWC but against the developers of this residential subdivision as well. (NT 6/26/06 at 38, 39) That is the proper forum for this type of proceeding, not the PUC. This is yet another reason why Complainants' claims should be denied and dismissed.

C. Complainants Have Failed To Prove That PAWC's Response To The Water Main Break Was Inadequate Under The Circumstances.

Complainants further seek a finding of a violation of §1501 on the part of PAWC by arguing that its identification of and response to this main break was inadequate and unreasonable. In fact, as the evidence demonstrates, the opposite is true, in light of the specific circumstances surrounding this incident, rendering Complainants' arguments in this regard meritless.

In its Main Brief, OCA sets forth an extended theory that John Rothwell presumably deliberately ignored the significance of low tank alarms he received one or two weeks prior to this main break. OCA tries to paint a picture of low tank alarms sounding "for many days surrounding the catastrophic main break of February 5, 2005." (OCA Main Brief at 44) OCA

then somehow tries to make the leap of connecting these low tank alarms to the main break in question. This simply cannot be done.

The evidence establishes that low tank levels were registered on those dates, and that the tank alarms would have sounded on each one of those dates. (NT 6/30/06 at 645, 646) In fact, a leak survey was initiated on January 24, 2005, and no leaks were found. (646, 647) OCA argues that Rothwell's phone "should have been ringing as constantly during that period as it did the night of February 5, 2005." (OCA Main Brief at 44) In fact, there was no testimony that it wasn't; that question was not asked of Rothwell. He did acknowledge that the tank alarms would have sounded on each of those dates. (646)

However, there is absolutely no connection that can be made between these low level tank alarms beginning ten days prior to this main break, and the occurrence of this main break. In fact, Rothwell testified that once the rupture occurred, the tanks would have drained out almost instantaneously, in twenty minutes. (NT 6/30/06 at 731) Low tank alarms occuring as long as ten days before this main break cannot be related to this main break. OCA's argument in this regard is without a factual foundation and should be disregarded.[6]

Complainants further argue that PAWC's response was inadequate because it failed to deploy its "leak detection teams" once the incident had occurred. This argument is incorrect and misleading. Brian Hassinger, the Director of Network for PAWC, did testify that PAWC does

[6] In addition to trying to make an issue where none exists, OCA also misrepresents Rothwell's testimony concerning an alarm he received on the night of the main break. OCA argues, at page 45 of its Main Brief, in footnote 15, that Rothwell "may not have received the alarm to his cell phone [on the night of the main break] because he 'probably' left the house to go grocery shopping with his daughter." The actual testimony Rothwell gave on that issue was that he might have received low tank alarms on his cell phone in the early evening of Saturday, February 5, but he just does not remember exactly when they came through. (NT 6/30/06 at 721) He states that he was home that entire day except for going out a little bit, because he has a daughter that he "probably left the house with, went grocery shopping or something." To take from that testimony the inference that he did not receive the cell phone alarm because he was out with his daughter is a misinterpretation that should not be recognized.

have on staff approximately eight to ten leak detection specialists, whose job it is to look for leaks. (NT 6/30/06 at 574) Complainant Spring Township argues on page 18 of its Main Brief that no such experts were deployed for this incident, when Hassinger's actual testimony was as follows: "I don't know if [the leak detection specialist in the Penn Water District] responded to that or not. And keep in mind, those leak detection experts are experts that are searching for leaks. We found the leak for the - so there was probably no need to bring Mr. Randolph in in this case." (NT 6/30/06 at 575) He reiterated that he does not know whether Randolph was called in for this case. (575) Hassinger's testimony, first, that he does not know whether the Penn Water District leak detection specialist was called in response to this incident, and second, that, by the time this incident happened there was really no need for a leak detection specialist, is a far cry from saying that no such leak detection teams were called or deployed.

Other mischaracterizations of the evidence occurred with regard to the amount of time it took to identify the leak. It took PAWC twelve to thirteen hours to identify the source of the leak, a time frame that was clearly reasonable under the unusual circumstances of this incident where there were no customers calls of a lack of water and there was no water surfacing on any street. (NT 6/30/06 at 590, 591-593) It did not take the "twelve - fifteen hours to find the main break" that Complainant Wilson School District alleges. (Wilson School District Main Brief at 13)

Similarly, OCA cites the notes of testimony at pages 135 and 136 for the fact that "[w]ater was unavailable to some affected PAWC customers all day on February 6, 2005." (OCA Main Brief at 36) In fact, the closest resemblance that those two pages of testimony have to that statement is that a newspaper article stated that 500 customers had their water supply affected on the date in question. There is no indication that water was unavailable "all day". In

fact, the Complainant residents have all consistently testified that they awoke that Sunday morning with no water, but that their water service was restored between 2:00 and 3:00 Sunday afternoon, six to eight hours later. (NT 6/26/06 at 72, 74, 86, 133)

Similarly, Complainant Wilson School District asserts on pages 4 and 12 of its Main Brief that Complainants suffered "approximately three and one half days of no water service" by virtue of this main break. This is simply not correct. As stated above, the residents consistently testified that their water was restored by the middle of the afternoon on Sunday, February 6. Likewise, Larry Bortz, Director of plant management for Wilson School District, testified that PAWC provided the school district with bottled water. (NT 6/27/06 at 218) Bortz further testified that "[t]he water testing came back Tuesday afternoon. We were back in full operation on Wednesday." (219) This amounts to two days of involvement for the school, Monday when the school was closed, and Tuesday when PAWC provided bottled water to the school district, and six to eight hours of involvement when the residents had a lack of water. To extrapolate from these facts the premise that PAWC's customers had "three and one half days of no water service" is in fact erroneous.

In fact, what all of this evidence demonstrates is that PAWC actually put on a show of force in its response to this water break that not only was not unreasonable or inadequate, but was in fact admirable and commendable in light of the circumstances presented.

OCA also argues that PAWC violated Section 1501 when it failed to adhere to Commission regulations requiring the reporting of accidents. Page 31 of OCA's Main Brief cites the particular regulation in question, §65.2, as requiring a public utility to submit a report to the Commission of each reportable accident. This term is defined for purposes of these proceedings as "[a]n occurrence of an unusual nature, ... which apparently will result in a prolonged and

serious interpretation of normal service of more than three days." OCA fashions the argument that this water main break was such a reportable accident, and that it should have been reported to the Commission, and that the failure of PAWC to so report this incident is a violation of §1501. This argument is flawed for three reasons.

First, what happened in this situation was a water main break. This, in and of itself, is not an unusual occurrence. Water main breaks happen. For a variety of reasons, such an event does from time to time occur, and there is nothing "unusual" about its occurrence to have it constitute an occurrence of an unusual nature.

OCA in its Main Brief argues that the main break which caused the draining of 500,000 gallons of water in twenty minutes, which caused the Crevelings' house to be uninhabitable, and which caused PAWC to pay for the Crevelings' lodging is such an unusual event. (OCA Main Brief at 32) However, it is the event itself that must be unusual, in this case the water main break, not the effect of that occurrence. Again, it is the water main break in this case that is the event that must be of an unusual nature to raise the potential reporting requirement, not any of its immediate or more eventual consequences.

Second, this entire situation does not rise to the level of a reportable accident. As discussed above, this occurrence did not result in an interruption of normal service that was prolonged, or serious, or that lasted more than three days. It bears repeating that the residents all acknowledged that their water service was restored within six to eight hours after awakening on Sunday, February 6. The school district was provided bottled water for Tuesday of that next week, with full service being restored by Wednesday. Again, as stated above, the evidence does not establish a prolonged and serious interruption of service for more than three days, but instead establishes an all-day encompassing and timely response to this situation.

Third, even assuming, for purposes of argument only, that this incident rose to the level of a "reportable accident", whether PAWC failed in its obligation to the Commission to report this incident has nothing whatsoever to do with whether it furnished and maintained reasonable and adequate service and facilities to its customers in connection with this incident. There is no cause and effect between the one and the other – falling short in an administrative requirement of filing a report with the Commission does not impact in any way the service being rendered by PAWC to its customers.

D. Complainants Have Failed To Establish Any Authority For Its Request That PAWC Undertake Geophysical Testing And Remediation Activities.

It cannot be emphasized enough that at no time in these proceedings have Complainants produced any authority whatsoever to support their claim that PAWC should be ordered to undertake testing on the private properties of the residents in the Wagner Farms development, and follow-up with remediation efforts. There is no statute, no regulation, no policy statement, no case law, either from Pennsylvania or from any other jurisdiction, for that matter, that would impose upon PAWC such an overwhelmingly burdensome, costly and fruitless exercise.

It is obvious from a review of Complainants' Main Briefs that they have all been unable to identify any legal authority to support their request that PAWC enter onto private property to undertake geological testing and then to carry out remediation efforts to repair sinkhole conditions that were supposedly caused by the water main break. Their arguments do not in any way support their request for relief in this regard.

For example, Complainant Spring Township's Main Brief cites 66 Pa.C.S. §1504 as its authority for this proposition. Subsection (2) of this statute authorizes the Commission to "prescribe adequate and reasonable standards for the measurement of quantity, quality, pressure,

initial voltage, or other condition pertaining to the supply of service of any and all public utilities." Subsection (3) authorizes the Commission to prescribe reasonable regulations for the examination and testing of such service, and for the measurement thereof. 66 Pa.C.S. §1504. However, Spring Township makes the leap from this statute authorizing the Commission to prescribe standards for the measurement of conditions pertaining to the supply of service, to the theory that the Commission can actually order a utility to enter private property to undertake geophysical testing. What is significant here is that the testing that Complainants seek would not be of Respondent's facilities on private property, such as its lines, mains, valves, etc., but of the underlying geophysical structure of these private properties. Contrary to what the Township argues, the subsurface condition of these properties is certainly not a "condition pertaining to" the supply of water service.

Similarly, the OCA sets forth extensive generalized and boilerplate legal premises for the proposition that the Commission has far-reaching authority to confirm that the service rendered by utilities is safe, reasonable and efficient. To support these conclusory arguments are a number of cases where the Commission supposedly exercised its authority in this regard. What is consistent among all of these cases, however, is that the utilities were all ordered by the PUC to undertake various studies or engage in various remedial measures as they directly pertained to the utilities' facilities in question. For example, the Borough of Phoenixville was required to conduct a corrosion study of its water system, and to reline the pipes, alter chemical treatment and study the corrosion problem. Schuylkill Township v. Borough of Phoenixville, 1996 PA PUC LEXIS 125. These cases cited by the OCA also have required a water company to remedy its drinking water violations, to revise its distribution system and water quality, to render improvements necessary to upgrade the quality of water, and to implement a new system to

render water pressure adequate. All of these cases involve utilities being compelled to undertake studies or engage in remedial efforts to improve the utility's specific system and facilities. None of these cases mandate a utility to go beyond its service or facilities, to enter upon private property, to undertake geophysical testing not specifically pertaining to its own infrastructure, and then to remediate what geophysical hazards have been identified.

Complainant Wilson School District puts forth a similar argument that the Commission has the authority to order a utility to undertake remedial work. The cases cited by Complainants in support of this proposition all involve utilities being compelled to undertake remedial work to their own facilities. Both OCA and Wilson School District cite West Penn Power Company v. PA PUC, 578 A.2d 75 (Pa.Commw. 1990). The Commonwealth Court in West Penn affirmed the PUC's decision that the electric utility violated §1501 by removing trees on one of the Complainants' properties in conjunction with its vegetation maintenance obligations in its right of way. What is significant in this case is that the right of way agreement between West Penn and the Complainants' predecessor in title provided that West Penn was given the right to enter upon the land for the purpose of maintaining the vegetation in its right of way. Id. The Court explained that vegetation maintenance is a "service" under §1501 and that West Penn's clearing of the right of way, including trees beyond the right of way, did not constitute reasonable and adequate service. Id. at 77.

By contrast, there is no part of the geophysical testing or remediation efforts contemplated by the Complainants that is part of the prescribed "service" of PAWC as a water company. The reasoning of West Penn is inapposite to the present circumstances, and does not stand for the proposition that the PAWC can enter upon private property to undertake

geophysical testing that does not at all relate to its obligation to provide reasonable and adequate water service.

Complainant Wilson School District also argues that PAWC has waived its right to challenge Commission authority to order such testing, simply because PAWC had entered the property of the Crevelings, the Singerlings and Wilson Cornwall Terrace School to investigate this incident. This argument has no merit.

The doctrine of waiver is legally defined as "the act of intentionally relinquishing or abandoning some known right, claim or privilege. Keenan v. Scot Township Authority, 151 Pa Commw. 225, 616 A.2d 751 (1992). For a waiver to exist, there must be a clear unequivocal and decisive act of the party who is claimed to have waived its rights, with knowledge of such right and an evident purpose to surrender it. Id.; Appeal of Churchill Area School District, 30 Pa.Commw. 413, 375 A.2d 1000 (1977). There has been no intentional relinquishment or abandonment of a right or a claim under the present circumstances. PAWC has not waived or abandoned its position that the PUC has no authority to compel it to undertake these testing and remedial efforts. On the contrary, this position it takes is just an accurate reflection of the state of the law, that no such obligation exists.

What Wilson School District may be arguing is that PAWC is estopped from asserting that there is no authority to compel it to enter private property to undertake these efforts, because of its entry upon the land of these property owners. However, for a proper estoppel argument to succeed, the party claiming the benefit of the principle must prove that it has been prejudiced as a result of reliance on the conduct of the adverse party. Appeal of Churchill Area School District, supra. There is no such reliance or prejudice that can be demonstrated by Complainants herein. This argument or theory simply just does not apply

None of the novel theories presented by Complainants establish the authority they seek to have the PUC compel PAWC to undertake this geophysical testing on private property. In fact, the ranges of their arguments underscore that such an obligation cannot and should not be imposed. What must still be kept in mind, however, is the picture of just what these subsurface conditions are like. Any such testing would reveal extensive limestone geology formations riddled with sinkholes, some of which have existed for thousands of years, and some of which were caused simply by the nature of urbanization. Simply because of the nature of this geological formation, it would be impossible to identify what, if any, sinkhole conditions are attributable to the water main break and what conditions are simply pre-existing, or what are attributable to other man-made sources. (PAWC Exhibit 2 at 12, 13; NT 6/28/06 at 467) Additionally, the further removed in time and distance any such sinkholes are from the Iroquois Avenue main break, the more difficult it is to identify their causes. (467-68)

Complainants point to the fact that such testing would only cost $1,000 per residential property, or $29,000, which they argue is a nominal cost for such a significant procedure. (OCA Main Brief at 54) However, it is obvious that Complainants seek more than just the intellectual knowledge of what results the testing would yield, that they would further insist that remediation efforts be undertaken to correct any sinkhole conditions identified in the testing. Not only could this cost millions of dollars, but it still could not be proven that the conditions being remediated are attributable in any way to the water main break. It is also important to keep in mind that the ultimate costs of that testing and remedial efforts would be born by the utility users, the rate payers. (NT 6/28/06 at 478)[7]

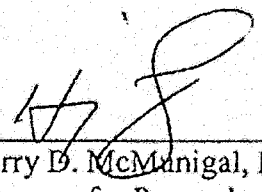
[7] One has to wonder why, if this testing is such a critical necessity and the cost is arguably so nominal, the Complainants did not undertake such testing themselves.

Complainants' request for testing and remediation work is unreasonable, not just because there is no legal authority to support this request, but because it is obvious that the results of such testing would not and could not identify what conditions were caused by the water main break, as distinguished from naturally formed conditions and other manmade causes. When considering the extreme costs and burden associated with this request, it is clear that this claim for relief must be denied and dismissed.

III. CONCLUSION

All parties correctly state the burden or proof applicable in this proceeding, namely, that it is the Complainants that have the burden of proving by a preponderance of the evidence that PAWC has failed in its statutory obligation to "furnish and maintain adequate, efficient, safe, and reasonable service and facilities". As they have failed to meet their burden of proof in this regard, their Complaints must be denied and dismissed in toto.

BINGAMAN, HESS, CORLENTZ & BELL, P.C.



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CERTIFICATE OF SERVICE

I, Harry D. McMunigal, Esquire, hereby certify that three true and correct copies of the foregoing Reply Brief of Respondent Pennsylvania American Water Company were mailed by United States first class mail, postage prepaid and one copy sent via email upon the following party(ies):

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September 1, 2006

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Administrative Law Judge Wayne L. Weismandel
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: Neil R. Rahn, David Singerling, et al v. PA American Water; No.: C-20054919
Township of Spring v. PA American Water, No.: C-20054746
Wilson School District v. PA American Water, No.: C-20055371
Our File No.: 10176-1041

Dear Judge Weismandel:

Pursuant to Your Honor's Revised Scheduling and Briefing Order dated March 9, 2006, enclosed please find a courtesy copy of Reply Brief of Respondent, Pennsylvania American Water Company along with a copy of the Brief on computer disc.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

BINGAMAN HESS

Harry D. McMunigal

DOCUMENT FOLDER

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BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

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v.	:	Docket No. C-20054746
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
NEIL R. RAHN, DAVID SINGERLING, ET AL Complainants	:	
v.	:	Docket No. C-20054919
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	
WILSON SCHOOL DISTRICT, Complainant	:	
v.	:	Docket No. C-20055371
PENNSYLVANIA AMERICAN WATER COMPANY, Respondent	:	

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BINGAMAN, HESS, COBLENTZ & BELL, P.C.

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I. INTRODUCTION

Respondent, Pennsylvania American Water Company (hereinafter "PAWC"), files this brief in reply to the Main Briefs of Complainants, Spring Township, Wilson School District and Office of Consumer Advocate, into which brief Complainants Neil R. Rahn and David Singerling, et al, have joined.

In this administrative proceeding, Complainants must prove that PAWC failed to furnish or maintain reasonable and adequate service and facilities, pursuant to 66 Pa.C.S. Section 1501, the controlling statute setting forth the standards by which a utility is to operate. However, none of the evidence produced in this proceeding has established any deficient service on the part of PAWC. On the contrary, the overwhelming evidence presented has gone to establish that a sinkhole led to the rupture of the water main, which developed naturally in that area rife with limestone formations and sinkholes. Nothing that PAWC did or failed to do contributed in any way to this occurrence.

In this Reply Brief, PAWC seeks to emphasize that none of the Complainants have produced sufficient substantial evidence to meet their burden of proving by a preponderance of the evidence that the water main break in question was caused by PAWC's failure to furnish and maintain reasonable and adequate service and facilities. They have not been able to establish any deficiencies in PAWC's reasonable leak detection program, or any shortcomings in its response to the water main break. Furthermore, Complainants have not been able to identify any authority of any sort that could remotely be used to justify its request for geophysical testing and remediation efforts on the private properties of the residents in that area.

II. ARGUMENT

A. Complainants Have Failed To Prove That PAWC's Leak Detection Program Was Inadequate Or Unreasonable Under The Circumstances.

Complainants attempt to establish through piecemeal selections of testimony that PAWC was deficient in its leak detection program prior to February 5, 2005. However, as will be shown herein, PAWC's leak detection program was reasonable and adequate and in full conformity with the obligations imposed by §1501.

First, Complainants emphasize that the water main pipeline underlying Iroquois Avenue, installed in 1970, was made of cast iron, whereas ductile iron piping was the industry standard beginning in the late 1970's. Complainants thereby attempt to argue that PAWC's service and facilities were unreasonable and inadequate almost as a matter of law because it continued to operate that arm of its water service through this cast iron pipeline.

It should be noted, first, that PAWC only acquired responsibility for this pipeline when it took over the operation of the service from Citizen's Water Company in 2002. Moreover, John Rothwell persuasively testified concerning the reasonableness of PAWC's procedures in maintaining the pipelines in that system. PAWC goes through a process of replacing mains. The pipelines are examined based upon the number of breaks, pressure problems, and flow problems, and then are replaced accordingly. (NT 6/30/06 at 698) The age of the mains is also one of the factors used in determining whether to replace a main. (698-99) However, there were no plans to replace the main underneath Iroquois Avenue up to the time of the main break because there had never been a problem with that main prior to that date. (699) In fact, that main, installed in 1970, was not even considered "old" in the context of the life of a water main. (699) In addition,

Rothwell explained that PAWC did have procedures in place to shore up lines in its district, when an event occurs which requires such a procedure. (699-70)

Complainants argue from this testimony that PAWC's service was somehow inadequate and unreasonable because it failed to replace this main prior to February 5, 2005, even though PAWC had never previously experienced any problems whatsoever with this main. Such an obligation would constitute an overwhelmingly unreasonable burden on the part of PAWC. One must have to speculate as to how the rate payers would feel about bearing the ultimate cost of replacing all of the mains in the district that happen to be made of cast iron, even though none of those mains had been presenting any problems. In addition to the obligation of providing reasonable and adequate service and facilities, PAWC, as a public utility, also has an obligation to its rate payers to limit the imposition upon them of unreasonable or unnecessary costs.

In addition, the testimony of Craig Clauser also underscores that there was in fact nothing wrong with this main in terms of cracks or leakage or any other problem that would have warranted its replacement prior to February 5, 2005. It is important to keep in mind that he is the only expert to have actually undertaken a failure analysis on the specific pipe in question. The results of this investigation confirm that there was no evidence of any leaking from the pipe joints, no slow cracking and no damage to the gaskets. There was likewise no corrosion or thinning of the walls, and the pipes were in very good shape. (PAWC Exhibit 1 at 5, 6; NT 6/28/06 at 427, 428, 429)[1]

Complainants further argue that PAWC's leak detection program was inadequate. However, the testimony of Brian Hassinger and John Rothwell from PAWC prove the contrary.

[1] It is significant to note that none of the Complainants have produced any evidence, substantial or otherwise, that there was in fact actual leakage from the pipe that specifically caused this main break. Instead, their arguments on this issue are all based on theory and speculation.

Hassinger testified about PAWC's "routing practice" to engage in leak detection surveys. (NT 6/30/06 at 514) Certain areas are surveyed at a time, including sounding the entire fire hydrant system and all service line control valves. (516-17, 518, 519) He describes PAWC's leak detection program as "aggressive", with at least eight service employees specializing in leak detection. (519)[2] John Rothwell likewise testified about PAWC's system of monitoring tank levels. First, PAWC performs daily inspections where the high and low levels of the two water storage tanks in that area are recorded manually. On top of that, PAWC employs a computer based SCADA system that monitors tank levels, which updates every 15 minutes. (623, 624) When the water level drops to approximately 29 feet, the tank alarms sound, and he receives an alarm call at his office, on his cell phone and through the dispatch. (624, 625) A visual alarm is also portrayed through the SCADA computer screen. (626) When he receives such an alarm, he sends a service man out, who then reports the tank levels over the phone. (627)

Rothwell also reiterated what Hassinger explained about PAWC's leak detection procedures including checking hydrants and valves with a listening device, and also employing permalogs. (669, 670) Complainants cite a small portion of Rothwell's testimony, that PAWC just recently started, in January, 2005, to keep leak detection records, in support of their argument that PAWC's leak detection program was inadequate. (669) What Rothwell actually stated, however, was that, although PAWC just started to keep leak detection records, they have nevertheless employed leak detection practices all along. (669)[3]

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[2] Several of the Complainants have argued that none of these leak detection specialists were called out to the scene once the problem with the main break was identified, presumably theorizing that this constituted an inadequate response to the event. However, it should be noted that these employees specialize as a "leak detection" team, not a "leak response" team.

[3] It bears repeating that PAWC only acquired the utility from Citizen's Water Company in 2002 and cannot be responsible for what practices Citizen's Water Company may have undertaken or ignored.

A significant flaw in Complainants' theory that PAWC's leak detection program was inadequate comes from Complainants' very own witness, Felicia Kegel-Bechtel, testifying for Spring Township as an expert geologist. In response to questioning by OCA, that even if the pipe had been leaking at the allowable and acceptable limit of 0.6 gallons per hour, a proper leak detection procedure undertaken in 2004, prior to the break, would not even have been able to detect such a leakage: "At .6 gallons per hour, that's going to be pretty hard to detect." (NT 6/28/06 at 379, 380) All of Complainants' arguments about the supposed inadequacies in PAWC's leak detection program are nothing more a red herring, simply because the acceptable, allowable rate of leakage from a pipe, at 0 6 gallons per hour, would not even be detected by an adequate leak detection program anyway. Even assuming this leakage took place, which Complainants still have not proven, a reasonable and adequate leak detection program would not have identified it before this break.

The Main Brief filed by OCA is consumed with extensive discussions about the PUC's statement of policy on water conversation measures, and testimony in rate proceedings on the subject of cost-effective conservation, that have nothing whatsoever to do with the present proceeding surrounding the water main break at issue. OCA then makes the leap to argue that PAWC ignored the required leak detection procedures "for years" prior to the main break. (OCA Main Brief at 39) In support of this specious argument, OCA reasons that it had served several discovery requests on PAWC for documents evidencing compliance with conservation practices and policies and leak detection practices and procedures, but that no such documents were produced. (OCA Main Brief at 39, 40) However, as was repeatedly discussed in the course of this four-day proceeding, OCA never filed a Motion to Compel, nor a Motion for Sanctions, to obtain production of those documents. Absent such efforts, it cannot argue to PAWC's detriment

that no such policies or procedures existed simply because it did not make the extra efforts necessary to obtain any such documentary evidence establishing such practices and procedures.

Instead, the testimony of Brian Hassinger and John Rothwell adequately summarize the long-standing, reasonable and adequate leak detection procedures that were in place prior to this main break, and Complainants' own expert witness has conceded that even the best leak detection procedures would not have identified any allowable leak emanating from this pipeline anyway. Complainants cannot prove that PAWC failed to furnish and maintain reasonable and adequate service and facilities in this context, and their Complaint in that regard should be denied and dismissed.

B. Complainants Failed To Prove That Any Leakage From The Pipeline Was The Cause Of The Main Break.

It bears repeating that the only expert witness who actually undertook a failure analysis of the pipe in question was Craig Clauser, PAWC's expert metallurgical engineer. Complainants did not present the testimony of any expert metallurgical engineer, and Complainants likewise did not have the pipe in question put through a failure analysis by any of their experts. The only engineering expert presented by Complainants, Terry L. Fought, acknowledged that he did not do any testing of a metallurgical nature to evaluate why the water main broke. (NT 6/27/06 at 293) By contrast, Craig Clauser, PAWC's expert metallurgical engineer, testified specifically regarding the failure analysis he undertook on the section of pipe that was actually involved in the main break. (PAWC Exhibit 1 at 3, 4) He testified that his testing of the pipe confirmed, not just that he saw no evidence of leakage, but instead that the results of his testing positively confirmed that there was in fact no leakage from the pipeline. (5; NT 6/28/06 at 427, 428, 429) Had there been leakage from the pipe joints, Clauser would have expected to see a distorted or

torn gasket, some evidence that the pipe had not been fully seated in the spigot, but he saw none. (427) He did see positive evidence of rust build-up that shows that the pipe was in fact fully seated within the bell. Likewise, there was no damage to the gaskets either; they were fully placed (427, 428) Moreover, there was no corrosion or thinning of the walls that could be indicative of leakage along the length of the pipes. On the contrary, the pipes were in very good shape. (429)[4]

This proves not just that there was no evidence of leakage, but more affirmatively, that there was positive evidence of no leakage from the pipes, a different fact entirely It is important to keep in mind, as well, that none of the Complainants' expert witnesses affirmatively proved the presence of any leakage. Instead, the most they could argue is that there "had to have been" some leakage, or there "must have been" some leakage, or there "likely was" some leakage, or there "probably was" some leakage.

Complainants argue that their witnesses determined that the soil surface underlying the pipeline was intact, with no evidence of a sinkhole being present: "Only the Township's witnesses' [sic] Ms. Deisinger and Ms Bechtel were able to observe the excavation in the area of the main break within a day after the break occurred." (OCA Main Brief at 46) And again: "Ms. Bechtel, as well was able to view the excavation on the morning of February 7, 2005 . . ." (OCA Main Brief at 48) This is an incorrect statement of the facts. Instead, Ms. Bechtel

[4] The OCA accuses PAWC of being guilty of spoliation of evidence, because John Rothwell discarded some portions of the pipe that was removed in the excavation of Iroquois Avenue Specifically, of the 125 feet of pipe that was removed, 54 feet of that pipe was stored for inspection, and the other 71 feet of pipe was scrapped because there was nothing wrong with it. (NT 6/30/06 at 661) This spoliation argument is without merit of any sort. OCA's own expert engineer, Terry L. Fought, had a full opportunity to inspect the portion of the pipeline that was involved in the break. (OCA Statement No. 1 at 1) Complainants' other expert witnesses had that opportunity as well. That additional 71 foot length of pipeline was scrapped because there was nothing wrong with it (NT 6/30/06 at 661) The question arises of what complaints would be asserted against PAWC had they chosen to continue to maintain that cast iron pipe underground instead of replacing it.

admitted repeatedly that she never visited the site of the excavation. (NT 6/28/06 at 385) She did not even conduct the investigation, one of Enviroscan's project managers did, who for some reason was not called to testify. This project manager, James Bock, is the individual who went out to the site and completed all of the survey work and performed the site inspection. She merely examined photographs, reviewed the report for technical correction and signed off on the report. The conclusions, opinions and recommendations of the report are those of Bock's. (382, 383, 384, 385)

In any event, the point that Complainants attempt to make is that there could not have been a sinkhole underneath the pipeline, because one was not observed at the site of the excavation. However, even Complainants' own expert engineer, Terry L. Fought, acknowledges that the water main break was caused by a sinkhole that was actually adjacent to the water main pipe, not underneath it. (NT 6/27/06 at 294, 295, 299) Similarly, PAWC's expert metallurgical engineer explained that, to cause the pipe to settle and therefore break, the void would only have to consist of a loss of support of as little as a few inches; a ten foot deep sinkhole is not required. (NT 6/28/06 at 442, 443) The intact condition of the soil underlying the pipeline does not therefore establish that it could not have been a sinkhole that caused the main break, with the uncontradicted expert evidence that the sinkhole was in fact adjacent to the pipeline, and could only have consisted of a shifting of the earth of a matter of a few inches.

Additionally, Complainants further argue that the issue of the presence of a pre-existing, previously repaired sinkhole in the very site of the excavation is merely "a claim" by PAWC. (See Spring Township Main Brief at 10) This condition is not just a "claim" being asserted by PAWC, however, but is in fact admitted to by Complainants' witnesses. Specifically, Spring Township's Road Master, Jay Vaughan, acknowledged that what he personally observed in the

excavation site was a slab of cement that appeared to be used to previously fill a sinkhole (NT 6/26/06 at 189, 190) Likewise, Spring Township's expert geologist, Jeri Deisinger, relied upon Vaughn's statements, including his observation of what was apparently a previously filled sinkhole, to come to her conclusions. (NT 6/27/06 at 251 252) She further admits that there is no other explanation for the presence of this cement other than to fill a sinkhole, and she in fact acknowledges that the use of cement for that purpose showed some skill in remediation of sinkholes. (253, 254) Furthermore, OCA's engineering expert Terry L. Fought confirmed that the concrete identified in the excavation comes from a repaired sinkhole. (NT 6/27/06 at 302)

It is further the admission of Jeri Deisinger that another sinkhole had developed, less than five months prior to February 5, 2005, a few doors down from the site of the main break, at 3113 and 3115 South Wagner Circle. (Deisinger Exhibit 1 at 13; NT 6/27/06 at 251) Additionally, Larry Bortz, Director of plant management for Wilson School District, acknowledged that the school district has other properties in Spring Township that have experienced previous sinkholes, including three sinkholes within the last 14 months at Southern Junior High School. (NT 6/27/06 at 234, 235)

What has been consistently demonstrated by all of the witnesses who testified in these proceedings is the existence of sinkholes in the area of Iroquois Avenue and South Wagner Circle prior to the main break of February 5, 2005, a condition that is not unusual in this heavily sinkhole-ridden area. In the presence of this geological environment, without any affirmative proof of leakage from the pipe, it is simply impossible for Complainants to produce any substantial evidence that it was leakage from the water main that was the cause of the sinkhole that caused the pipeline to rupture.[5]

[5] The Main Brief filed by OCA is replete with references to the report prepared by Dr. Chung of American Geotech. (OCA Main Brief at 9, 10, 15, 46) However, after extensive argument on this issue,

In its Brief, OCA discusses at quite some length the applicability of civil action case law in negligence claims, citing it as precedent for its argument to impose liability on PAWC under these circumstances. OCA prefaces this analysis by acknowledging that "this Commission is not to assess monetary damages" (OCA Main Brief at 26), but it nevertheless continues in a detailed recitation of case law on negligence and res ipsa loquitur.

It cannot be emphasized enough that this is a PUC proceeding brought to determine if PAWC furnished and maintained reasonable and adequate service and facilities, under the guidelines of §1501 of Chapter 66 of the Administrative Code. This is not a civil proceeding for monetary damages, it is not a negligence action, and none of the case law or theories cited by OCA or any of the other Complainants along those same lines have any applicability whatsoever to this proceeding. OCA even initiates that section of its Brief with the statement that it has discovered "no reported PUC Orders deciding Complaints that seek repair of damage due to a main break causing sinkhole collapses." (OCA Main Brief at 26) No truer statement could be made, because the PUC is not the appropriate forum for what are in reality negligence allegations and not deficient service allegations.

Likewise, the argument made by OCA that res ipsa loquitur should apply to this proceeding is misplaced. As more fully discussed in PAWC's Main Brief, Complainants cannot even meet the first factor of the theory, namely, that the event is of a kind that does not occur in the absence of negligence. In this case, there is ample substantial evidence that this main break occurred, not because of any negligence, but because of the occurrence of the sinkhole in that limestone-supported area. Similarly, other responsible causes, raised in the second factor of the

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Complainants' attempt to introduce this American Geotech report into evidence was specifically disallowed. (NT 6/27/06 at 246) Therefore, all of those references by OCA to this report or its conclusions are simply an attempt at having that report reviewed as part of the record in this case, which should not be countenanced.

theory, are not sufficiently eliminated by the evidence – it is this other responsible cause, the sinkhole developing in this sinkhole-ridden area, that is in fact the responsible cause for this main break. As such, the theory of res ipsa loquitur is inapplicable to this situation and should be disregarded.

What cannot be forgotten is that Robert Creveling is the only Complainant to have suffered any real estate property damage as a result of this incident, and he and his wife are currently pursuing a civil action in the Court of Common Pleas of Berks County for their property damage and other elements of damage they claim to have suffered arising out of this incident. Significantly, this action was not filed just against PAWC but against the developers of this residential subdivision as well. (NT 6/26/06 at 38, 39) That is the proper forum for this type of proceeding, not the PUC. This is yet another reason why Complainants' claims should be denied and dismissed.

C. Complainants Have Failed To Prove That PAWC's Response To The Water Main Break Was Inadequate Under The Circumstances.

Complainants further seek a finding of a violation of §1501 on the part of PAWC by arguing that its identification of and response to this main break was inadequate and unreasonable. In fact, as the evidence demonstrates, the opposite is true, in light of the specific circumstances surrounding this incident, rendering Complainants' arguments in this regard meritless.

In its Main Brief, OCA sets forth an extended theory that John Rothwell presumably deliberately ignored the significance of low tank alarms he received one or two weeks prior to this main break. OCA tries to paint a picture of low tank alarms sounding "for many days surrounding the catastrophic main break of February 5, 2005." (OCA Main Brief at 44) OCA

then somehow tries to make the leap of connecting these low tank alarms to the main break in question. This simply cannot be done.

The evidence establishes that low tank levels were registered on those dates, and that the tank alarms would have sounded on each one of those dates. (NT 6/30/06 at 645, 646) In fact, a leak survey was initiated on January 24, 2005, and no leaks were found. (646, 647) OCA argues that Rothwell's phone "should have been ringing as constantly during that period as it did the night of February 5, 2005." (OCA Main Brief at 44) In fact, there was no testimony that it wasn't, that question was not asked of Rothwell. He did acknowledge that the tank alarms would have sounded on each of those dates. (646)

However, there is absolutely no connection that can be made between these low level tank alarms beginning ten days prior to this main break, and the occurrence of this main break. In fact, Rothwell testified that once the rupture occurred, the tanks would have drained out almost instantaneously, in twenty minutes. (NT 6/30/06 at 731) Low tank alarms occuring as long as ten days before this main break cannot be related to this main break. OCA's argument in this regard is without a factual foundation and should be disregarded [6]

Complainants further argue that PAWC's response was inadequate because it failed to deploy its "leak detection teams" once the incident had occurred. This argument is incorrect and misleading. Brian Hassinger, the Director of Network for PAWC, did testify that PAWC does

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[6] In addition to trying to make an issue where none exists, OCA also misrepresents Rothwell's testimony concerning an alarm he received on the night of the main break. OCA argues, at page 45 of its Main Brief, in footnote 15, that Rothwell "may not have received the alarm to his cell phone [on the night of the main break] because he 'probably' left the house to go grocery shopping with his daughter." The actual testimony Rothwell gave on that issue was that he might have received low tank alarms on his cell phone in the early evening of Saturday, February 5, but he just does not remember exactly when they came through. (NT 6/30/06 at 721) He states that he was home that entire day except for going out a little bit, because he has a daughter that he "probably left the house with, went grocery shopping or something." To take from that testimony the inference that he did not receive the cell phone alarm because he was out with his daughter is a misinterpretation that should not be recognized.

have on staff approximately eight to ten leak detection specialists, whose job it is to look for leaks. (NT 6/30/06 at 574) Complainant Spring Township argues on page 18 of its Main Brief that no such experts were deployed for this incident, when Hassinger's actual testimony was as follows: "I don't know if [the leak detection specialist in the Penn Water District] responded to that or not. And keep in mind, those leak detection experts are experts that are searching for leaks. We found the leak for the - so there was probably no need to bring Mr. Randolph in in this case." (NT 6/30/06 at 575) He reiterated that he does not know whether Randolph was called in for this case. (575) Hassinger's testimony, first, that he does not know whether the Penn Water District leak detection specialist was called in response to this incident, and second, that, by the time this incident happened there was really no need for a leak detection specialist, is a far cry from saying that no such leak detection teams were called or deployed

Other mischaracterizations of the evidence occurred with regard to the amount of time it took to identify the leak. It took PAWC twelve to thirteen hours to identify the source of the leak, a time frame that was clearly reasonable under the unusual circumstances of this incident where there were no customers calls of a lack of water and there was no water surfacing on any street. (NT 6/30/06 at 590, 591-593) It did not take the "twelve - fifteen hours to find the main break" that Complainant Wilson School District alleges. (Wilson School District Main Brief at 13)

Similarly, OCA cites the notes of testimony at pages 135 and 136 for the fact that "[w]ater was unavailable to some affected PAWC customers all day on February 6, 2005." (OCA Main Brief at 36) In fact, the closest resemblance that those two pages of testimony have to that statement is that a newspaper article stated that 500 customers had their water supply affected on the date in question. There is no indication that water was unavailable "all day". In

fact, the Complainant residents have all consistently testified that they awoke that Sunday morning with no water, but that their water service was restored between 2:00 and 3:00 Sunday afternoon, six to eight hours later. (NT 6/26/06 at 72, 74, 86, 133)

Similarly, Complainant Wilson School District asserts on pages 4 and 12 of its Main Brief that Complainants suffered "approximately three and one half days of no water service" by virtue of this main break. This is simply not correct. As stated above, the residents consistently testified that their water was restored by the middle of the afternoon on Sunday, February 6. Likewise, Larry Bortz, Director of plant management for Wilson School District, testified that PAWC provided the school district with bottled water. (NT 6/27/06 at 218) Bortz further testified that "[t]he water testing came back Tuesday afternoon. We were back in full operation on Wednesday." (219) This amounts to two days of involvement for the school, Monday when the school was closed, and Tuesday when PAWC provided bottled water to the school district, and six to eight hours of involvement when the residents had a lack of water. To extrapolate from these facts the premise that PAWC's customers had "three and one half days of no water service" is in fact erroneous.

In fact, what all of this evidence demonstrates is that PAWC actually put on a show of force in its response to this water break that not only was not unreasonable or inadequate, but was in fact admirable and commendable in light of the circumstances presented.

OCA also argues that PAWC violated Section 1501 when it failed to adhere to Commission regulations requiring the reporting of accidents. Page 31 of OCA's Main Brief cites the particular regulation in question, §65.2, as requiring a public utility to submit a report to the Commission of each reportable accident. This term is defined for purposes of these proceedings as "[a]n occurrence of an unusual nature, ... which apparently will result in a prolonged and

serious interpretation of normal service of more than three days." OCA fashions the argument that this water main break was such a reportable accident, and that it should have been reported to the Commission, and that the failure of PAWC to so report this incident is a violation of §1501. This argument is flawed for three reasons.

First, what happened in this situation was a water main break. This, in and of itself, is not an unusual occurrence. Water main breaks happen. For a variety of reasons, such an event does from time to time occur, and there is nothing "unusual" about its occurrence to have it constitute an occurrence of an unusual nature.

OCA in its Main Brief argues that the main break which caused the draining of 500,000 gallons of water in twenty minutes, which caused the Crevelings' house to be uninhabitable, and which caused PAWC to pay for the Crevelings' lodging is such an unusual event. (OCA Main Brief at 32) However, it is the event itself that must be unusual, in this case the water main break, not the effect of that occurrence. Again, it is the water main break in this case that is the event that must be of an unusual nature to raise the potential reporting requirement, not any of its immediate or more eventual consequences.

Second, this entire situation does not rise to the level of a reportable accident. As discussed above, this occurrence did not result in an interruption of normal service that was prolonged, or serious, or that lasted more than three days. It bears repeating that the residents all acknowledged that their water service was restored within six to eight hours after awakening on Sunday, February 6. The school district was provided bottled water for Tuesday of that next week, with full service being restored by Wednesday. Again, as stated above, the evidence does not establish a prolonged and serious interruption of service for more than three days, but instead establishes an all-day encompassing and timely response to this situation.

Third, even assuming, for purposes of argument only, that this incident rose to the level of a "reportable accident", whether PAWC failed in its obligation to the Commission to report this incident has nothing whatsoever to do with whether it furnished and maintained reasonable and adequate service and facilities to its customers in connection with this incident. There is no cause and effect between the one and the other – falling short in an administrative requirement of filing a report with the Commission does not impact in any way the service being rendered by PAWC to its customers.

D. Complainants Have Failed To Establish Any Authority For Its Request That PAWC Undertake Geophysical Testing And Remediation Activities.

It cannot be emphasized enough that at no time in these proceedings have Complainants produced any authority whatsoever to support their claim that PAWC should be ordered to undertake testing on the private properties of the residents in the Wagner Farms development, and follow-up with remediation efforts. There is no statute, no regulation, no policy statement, no case law, either from Pennsylvania or from any other jurisdiction, for that matter, that would impose upon PAWC such an overwhelmingly burdensome, costly and fruitless exercise.

It is obvious from a review of Complainants' Main Briefs that they have all been unable to identify any legal authority to support their request that PAWC enter onto private property to undertake geological testing and then to carry out remediation efforts to repair sinkhole conditions that were supposedly caused by the water main break. Their arguments do not in any way support their request for relief in this regard.

For example, Complainant Spring Township's Main Brief cites 66 Pa.C.S. §1504 as its authority for this proposition. Subsection (2) of this statute authorizes the Commission to "prescribe adequate and reasonable standards for the measurement of quantity, quality, pressure,

initial voltage, or other condition pertaining to the supply of service of any and all public utilities." Subsection (3) authorizes the Commission to prescribe reasonable regulations for the examination and testing of such service, and for the measurement thereof 66 Pa.C.S. §1504. However, Spring Township makes the leap from this statute authorizing the Commission to prescribe standards for the measurement of conditions pertaining to the supply of service, to the theory that the Commission can actually order a utility to enter private property to undertake geophysical testing. What is significant here is that the testing that Complainants seek would not be of Respondent's facilities on private property, such as its lines, mains, valves, etc., but of the underlying geophysical structure of these private properties. Contrary to what the Township argues, the subsurface condition of these properties is certainly not a "condition pertaining to" the supply of water service.

Similarly, the OCA sets forth extensive generalized and boilerplate legal premises for the proposition that the Commission has far-reaching authority to confirm that the service rendered by utilities is safe, reasonable and efficient. To support these conclusory arguments are a number of cases where the Commission supposedly exercised its authority in this regard. What is consistent among all of these cases, however, is that the utilities were all ordered by the PUC to undertake various studies or engage in various remedial measures as they directly pertained to the utilities' facilities in question. For example, the Borough of Phoenixville was required to conduct a corrosion study of its water system, and to reline the pipes, alter chemical treatment and study the corrosion problem. Schuylkill Township v. Borough of Phoenixville, 1996 PA PUC LEXIS 125. These cases cited by the OCA also have required a water company to remedy its drinking water violations, to revise its distribution system and water quality, to render improvements necessary to upgrade the quality of water, and to implement a new system to

render water pressure adequate. All of these cases involve utilities being compelled to undertake studies or engage in remedial efforts to improve the utility's specific system and facilities. None of these cases mandate a utility to go beyond its service or facilities, to enter upon private property, to undertake geophysical testing not specifically pertaining to its own infrastructure, and then to remediate what geophysical hazards have been identified.

Complainant Wilson School District puts forth a similar argument that the Commission has the authority to order a utility to undertake remedial work. The cases cited by Complainants in support of this proposition all involve utilities being compelled to undertake remedial work to their own facilities. Both OCA and Wilson School District cite West Penn Power Company v. PA PUC, 578 A.2d 75 (Pa.Commw. 1990). The Commonwealth Court in West Penn affirmed the PUC's decision that the electric utility violated §1501 by removing trees on one of the Complainants' properties in conjunction with its vegetation maintenance obligations in its right of way. What is significant in this case is that the right of way agreement between West Penn and the Complainants' predecessor in title provided that West Penn was given the right to enter upon the land for the purpose of maintaining the vegetation in its right of way. Id. The Court explained that vegetation maintenance is a "service" under §1501 and that West Penn's clearing of the right of way, including trees beyond the right of way, did not constitute reasonable and adequate service. Id. at 77.

By contrast, there is no part of the geophysical testing or remediation efforts contemplated by the Complainants that is part of the prescribed "service" of PAWC as a water company. The reasoning of West Penn is inapposite to the present circumstances, and does not stand for the proposition that the PAWC can enter upon private property to undertake

geophysical testing that does not at all relate to its obligation to provide reasonable and adequate water service.

Complainant Wilson School District also argues that PAWC has waived its right to challenge Commission authority to order such testing, simply because PAWC had entered the property of the Crevelings, the Singerlings and Wilson Cornwall Terrace School to investigate this incident. This argument has no merit.

The doctrine of waiver is legally defined as "the act of intentionally relinquishing or abandoning some known right, claim or privilege. Keenan v. Scot Township Authority, 151 Pa.Commw. 225, 616 A.2d 751 (1992). For a waiver to exist, there must be a clear unequivocal and decisive act of the party who is claimed to have waived its rights, with knowledge of such right and an evident purpose to surrender it. Id.; Appeal of Churchill Area School District, 30 Pa.Commw. 413, 375 A.2d 1000 (1977). There has been no intentional relinquishment or abandonment of a right or a claim under the present circumstances. PAWC has not waived or abandoned its position that the PUC has no authority to compel it to undertake these testing and remedial efforts. On the contrary, this position it takes is just an accurate reflection of the state of the law, that no such obligation exists.

What Wilson School District may be arguing is that PAWC is estopped from asserting that there is no authority to compel it to enter private property to undertake these efforts, because of its entry upon the land of these property owners. However, for a proper estoppel argument to succeed, the party claiming the benefit of the principle must prove that it has been prejudiced as a result of reliance on the conduct of the adverse party. Appeal of Churchill Area School District, supra. There is no such reliance or prejudice that can be demonstrated by Complainants herein. This argument or theory simply just does not apply

None of the novel theories presented by Complainants establish the authority they seek to have the PUC compel PAWC to undertake this geophysical testing on private property. In fact, the ranges of their arguments underscore that such an obligation cannot and should not be imposed. What must still be kept in mind, however, is the picture of just what these subsurface conditions are like. Any such testing would reveal extensive limestone geology formations riddled with sinkholes, some of which have existed for thousands of years, and some of which were caused simply by the nature of urbanization. Simply because of the nature of this geological formation, it would be impossible to identify what, if any, sinkhole conditions are attributable to the water main break and what conditions are simply pre-existing, or what are attributable to other man-made sources. (PAWC Exhibit 2 at 12, 13; NT 6/28/06 at 467) Additionally, the further removed in time and distance any such sinkholes are from the Iroquois Avenue main break, the more difficult it is to identify their causes. (467-68)

Complainants point to the fact that such testing would only cost $1,000 per residential property, or $29,000, which they argue is a nominal cost for such a significant procedure. (OCA Main Brief at 54) However, it is obvious that Complainants seek more than just the intellectual knowledge of what results the testing would yield, that they would further insist that remediation efforts be undertaken to correct any sinkhole conditions identified in the testing. Not only could this cost millions of dollars, but it still could not be proven that the conditions being remediated are attributable in any way to the water main break. It is also important to keep in mind that the ultimate costs of that testing and remedial efforts would be born by the utility users, the rate payers. (NT 6/28/06 at 478)[7]

[7] One has to wonder why, if this testing is such a critical necessity and the cost is arguably so nominal, the Complainants did not undertake such testing themselves.

Complainants' request for testing and remediation work is unreasonable, not just because there is no legal authority to support this request, but because it is obvious that the results of such testing would not and could not identify what conditions were caused by the water main break, as distinguished from naturally formed conditions and other manmade causes. When considering the extreme costs and burden associated with this request, it is clear that this claim for relief must be denied and dismissed.

III. CONCLUSION

All parties correctly state the burden or proof applicable in this proceeding, namely, that it is the Complainants that have the burden of proving by a preponderance of the evidence that PAWC has failed in its statutory obligation to "furnish and maintain adequate, efficient, safe, and reasonable service and facilities". As they have failed to meet their burden of proof in this regard, their Complaints must be denied and dismissed in toto.

BINGAMAN, HESS, COBLENTZ & BELL, P.C

Harry D. McMonigal, Esquire
Attorney for Pennsylvania American Water Company

CERTIFICATE OF SERVICE

I, Harry D. McMunigal, Esquire, hereby certify that three true and correct copies of the foregoing Reply Brief of Respondent Pennsylvania American Water Company were mailed by United States first class mail, postage prepaid and one copy sent via email upon the following party(ies):

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September 8, 2006

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RE: Neil R. Rahn, David Singerling, et al v. PA American Water; No.: C-20054919
Township of Spring v. PA American Water, No.: C-20054746
Wilson School District v. PA American Water, No.: C-20055371
Our File No.: 10176-1041

Dear Secretary McNulty:

Enclosed please find for filing three (3) original and three (3) copies of Pennsylvania American Water Company's Response to Wilson School District's Motion for Admission of Exhibit. Kindly file the originals, time-stamp the extra copies and return one copy to the undersigned.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

BINGAMAN HESS

Harry D. McMunigal

DOCUMENT FOLDER

BTL

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5

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

SPRING TOWNSHIP,
Complainant

v. Docket No. C-20054746

PENNSYLVANIA AMERICAN WATER COMPANY,
Respondent

NEIL R. RAHN, DAVID SINGERLING, ET AL
Complainants

v. Docket No. C-20054919

PENNSYLVANIA AMERICAN WATER COMPANY,
Respondent

WILSON SCHOOL DISTRICT,
Complainant

v. Docket No. C-20055371

PENNSYLVANIA AMERICAN WATER COMPANY,
Respondent

PENNSYLVANIA AMERICAN WATER COMPANY'S RESPONSE TO WILSON SCHOOL DISTRICT'S MOTION FOR ADMISSION OF EXHIBIT

1. Admitted

2 Admitted in part, denied in part. It is admitted only that Wilson School District conducted work on the Cornwall Terrace Wilson Southern Junior High School complex which was the subject of testimony at those hearings by Wilson witness Larry R. Bortz. As to the remaining averments, Pennsylvania American Water Company is without knowledge or information sufficient to allow Respondent to admit or deny when the work was performed, as such, the allegations are denied

DOCUMENT FOLDER

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3 Denied Pennsylvania American Water Company is without knowledge or information sufficient to form the belief as to the truth of the allegations and, as such the allegations are denied

4 -7 Denied. Pennsylvania American Water Company is without knowledge or information sufficient to form the belief as to the truth of the allegations and, as such the allegations are denied By way of further answer, the referenced sinkhole depicted in the photographs appears to be within the fenced Wilson property and does not involve the sidewalk or street known as Iroquois Avenue. It is specifically denied that the photographs are relevant to the issues presented in this case. By way of further answer, it is specifically denied that supplemental briefing or hearing is necessary or appropriate

WHEREFORE, Pennsylvania American Water Company respectfully request that Your Honor deny the Wilson School District Motion for Admission of Exhibit.

Respectfully submitted,

BINGAMAN, HESS, COBLENTZ & BELL, P.C.

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I, Harry D. McMunigal, Esquire, hereby certify that a true and correct copy of the foregoing Response to Wilson School District's Motion for Admission of Exhibit was served on September 9, 2006 via United States first class mail, postage prepaid and a copy via email upon the following party(ies):

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