

**IN THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

In re: Petition of Atmos Energy Corporation	)	
for Approval of Tariff Establishing Environ-	)	Docket No. 07-00081
mental Cost Recovery Rider	)	

**CONSUMER ADVOCATE AND PROTECTION DIVISION’S RESPONSE TO FIRST
DISCOVERY REQUEST OF ATMOS ENERGY CORPORATION**

Robert E. Cooper, Jr., Attorney General and Reporter, through the Consumer Advocate and Protection Division of the Office of the Attorney General {”Consumer Advocate”), pursuant to the procedural schedule entered by the Hearing Officer, respectfully submits its responses to the first discovery requests of Atmos Energy Corporation (“Atmos”).

REQUEST NO. 1:

1. Please identify each person whom you expect to call as an expert witness at the hearing on the merits in this docket, and for each such expert witness:

RESPONSE NO. 1:

The Consumer Advocate is still continuing its investigation in this matter. In particular the Consumer Advocate is awaiting responses to its discovery requests. The requested material has not yet been received, reviewed, or analyzed; accordingly, the Consumer Advocate has not yet determined the particular subject matter or issues on which potential witnesses may testify, nor has it determined the expert witnesses whom it may call at the hearing in this matter. The Consumer Advocate does not waive any privileges and procedural protections to which it is entitled, but it will furnish information in good faith as to who may offer testimony on behalf of the Consumer Advocate in this docket so as not to cause an unnecessary delay in this proceeding. Any testimony prepared

on behalf of the Consumer Advocate in this case will be provided to Atmos when the pre-filed testimony is submitted, along with a copy of or reference to the documents and exhibits relied upon by each witness submitting testimony. At the present time, the Consumer Advocate believes that Terry Buckner, a Regulatory Analyst employed by the Office of the Attorney General, may offer testimony in this matter.

REQUEST NO. 1(a):

- (a) State the field in which the witness is to be offered as an expert.

RESPONSE NO. 1(a):

See Response No. 1, above. Material that is responsive to this request will be provided by the Consumer Advocate when it submits its pre-filed testimony in this case.

REQUEST NO. 1(b):

- (b) State the subject matter on which the witness is expected to testify.

RESPONSE NO. 1(b):

See Response No. 1, above. Material that is responsive to this request will be provided by the Consumer Advocate when it submits its pre-filed testimony in this case.

REQUEST NO. 1(c):

- (c) State the substance of the facts and opinions to which the witness is expected to testify and a summary of the grounds for each opinion.

RESPONSE NO 1(c):

See Response No. 1, above. Material that is responsive to this request will be provided by the Consumer Advocate when it submits its pre-filed testimony in this case.

REQUEST NO. 1(d):

- (d) Provide complete background information, including the witness's current employer, as well as his or her educational, professional and employment history, and qualifications within the field in which the witness is expected to testify.

RESPONSE NO. 1(d):

See Response No. 1, above. To the extent available, the requested material is provided in Attachment A.

REQUEST NO. 1(e):

- (e) Identify all publications written or presentations presented in whole or in part by the witness, including either a copy of all such publications and presentations or a reference to where such publications and presentations may be publicly obtained.

RESPONSE NO. 1(e):

See Response No. 1, above. To the extent available, the requested material is provided in Attachment A.

REQUEST NO. 1(f):

- (f) Identify any matter in which the expert has testified (through deposition or otherwise) by specifying the name, docket number and forum of each case, the dates of the prior testimony and the subject of the prior testimony, and identify the transcripts of any such testimony.

RESPONSE NO. 1(f):

See Response No. 1, above. To the extent available, the requested material is provided in Attachment A.

REQUEST NO. 1(g):

- (g) Provide the terms of the retention or engagement of each expert including but not limited to the terms of any retention or engagement letters or agreements relating to his/her engagement, testimony, and opinions as well as the compensation to be paid for the testimony and opinions.

RESPONSE NO. 1(g):

See Response No. 1, above. Terry Buckner is a full-time employee of the Office of the Attorney General.

REQUEST NO. 1(h):

- (h) Identify and produce any exhibits to be used as a summary of or support for the testimony or opinions provided by the expert.

RESPONSE NO. 1(h):

See Response No. 1, above. Material that is responsive to this request will be provided by the Consumer Advocate when it submits its pre-filed testimony in this case to the extent that such material is available. If demonstrative exhibits are prepared for the hearing in this matter, the Consumer Advocate will provide them to Atmos in a timely manner after their preparation. The Consumer Advocate reserves the right to introduce as hearing exhibits any documents in the administrative record of this case and any documents in the administrative record of any other TRA docket, including but not limited to, previous rate cases of this company.

REQUEST NO. 1(i):

- (i) Produce copies of all documents provided to, reviewed by, utilized by, relied upon, created by, or produced by any proposed expert witness in evaluating, reaching conclusions or formulating an opinion in this matter.

OBJECTION AND RESPONSE NO. 1(i):

The Consumer Advocate objects to this request on the grounds that it is overly broad, unduly burdensome, and unlikely to lead to the discovery of admissible evidence. Furthermore, this request may seek the production of documents that are protected by the Work Product Doctrine.

The overall breadth of the request constitutes an undue burden upon the Consumer Advocate. The Consumer Advocate does not track or maintain copies of all documents that its witnesses create or review in connection with this matter. Additionally, this request may encompass documents created or assembled by or on behalf of the Consumer Advocate's attorneys in anticipation of litigation, which are protected from disclosure under the Work Product Doctrine. Generally, such documents consist of pre-filing investigative material created or developed under the direction of one or more attorneys, and include such things as notes, mental impressions, summaries, memoranda, research and other information typically considered as attorney work product. Tenn. R. Civ. P. 26.02(3).

Consistent with these objections, and without waiving them, the Consumer Advocate responds as follows:

See Response No. 1, above. Copies of or references to the material relied upon by the Consumer Advocate's witnesses will be produced when the Consumer Advocate submits its pre-filed testimony in this case. In addition, materials reviewed and retained by the Consumer Advocate are provided in Attachment B.

REQUEST NO. 2:

2. If you contest any of the assertions contained in the Petition in this matter, or any of the relief requested therein, explain your contentions and the factual and legal bases for them.

OBJECTION AND RESPONSE NO. 2:

The Consumer Advocate objects to this request to the extent it requests the production of documents that are protected by the Work Product Doctrine. This request may encompass documents created or assembled by or on behalf of the Consumer Advocate's attorneys in

anticipation of litigation, which are protected from disclosure under the Work Product Doctrine. Generally, such documents consist of pre-filing investigative material created or developed under the direction of one or more attorneys, and include such things as notes, mental impressions, summaries, memoranda, research and other information typically considered as attorney work product. Additionally, the Consumer Advocate reserves the right to use any case, statute, or other source of law in support of its position in this matter. Tenn. R. Civ. P. 26.02(3).

Consistent with this objection, and without waiving it, the Consumer Advocate responds as follows:

As noted in Response No. 1, above, the Consumer Advocate's investigation of this case is ongoing. Because the Consumer Advocate has not completed its review and analysis of this matter, it has not yet formed any conclusions on the merits of Atmos's Petition, or any of the relief requested therein. The Consumer Advocate's positions and contentions regarding the merits of Atmos's Petition, as well as the relief requested therein, will be provided to Atmos when the Consumer Advocate completes its investigation of this matter and draws its conclusions and opinions on the merits of the Petition and the relief requested. The Consumer Advocate's positions and contentions regarding the merits of Atmos's Petition, as well as the relief requested therein, will be provided to Atmos in a timely manner after such positions and contentions are known by the Consumer Advocate either through the submission of pre-filed testimony and exhibits or through supplemental discovery responses.

Although the Consumer Advocate has not completed its investigation of this matter, its cursory investigation and preliminary review of Atmos's case-in-chief (the Petition and pre-filed testimony and exhibits of Atmos), as well as the documents provided in Attachment B, raise serious

questions regarding whether Atmos has met its burden of proving that the environmental costs that are the subject of this proceeding should be recovered from regulated ratepayers through the proposed environmental cost recovery rider. In particular:

- Atmos failed to demonstrate that the environmental costs that are the subject of this proceeding were incurred for the provisioning of regulated natural gas utilities services;

- Atmos failed to demonstrate that the environmental hazards that are the subject of this proceeding resulted from the provisioning of regulated natural gas utilities services;

- Atmos failed to demonstrate that the properties or locations containing the environmental hazards that are the subject of this proceeding are used and useful for the provisioning of regulated natural gas utilities services;

- Atmos failed to demonstrate that the manufactured gas plants and the underground storage tanks that are the subject of this proceeding were used and useful for providing regulated natural gas utilities services;

- Atmos failed to demonstrate that regulated ratepayers derived a public utility benefit from the costs incurred to remediate the environmental hazards associated with the manufactured gas plants and underground storage tanks that are the subject of this proceeding;

- Atmos failed to demonstrate that the environmental costs that are the subject of this proceeding were accounted for in accordance with the accounting and procedural requirements established in TPSC Docket No. 94-02529;

- Atmos failed to demonstrate that the environmental costs that are the subject of this proceeding have been audited and verified to be exclusively for the remediation of the environmental hazards that are the subject of this proceeding;

-- Atmos failed to demonstrate that the total of the environmental costs that are the subject of this proceeding agree with the aggregate deferred expense balance recorded in the relevant general ledger account;

-- Atmos failed to demonstrate that the environmental costs that are the subject of this proceeding have not already been expensed in prior accounting periods;

-- Atmos failed to disclose whether its purchase price of United Cities Gas Company included any adjustment for the environmental liabilities of United Cities Gas Company;

-- Atmos failed to demonstrate that it has exhausted any claims against prior landowners, insurance companies, government funds, or other third parties for compensation or reimbursement of the environmental costs that are the subject of this proceeding;

-- Atmos failed to demonstrate that the environmental costs that are the subject of this proceeding are just and reasonable and were prudently incurred to serve the public utility needs of regulated ratepayers;

-- Atmos failed to demonstrate that public policy interests are served by allowing it to recover from ratepayers costs associated with the remediation of environmental hazards created by Atmos or its predecessors;

-- Atmos failed to demonstrate that its proposal to recover the environmental costs that are the subject of this proceeding over a three-year period is just, reasonable, and in the public interest;

-- Atmos failed to demonstrate that its proposal to exclude regulated ratepayers served from rate schedules 260, 280, 291, and 294 from assessment of any environmental cost recovery is just, reasonable, and in the public interest; and

-- Atmos failed to demonstrate why at least a portion of the costs incurred to remediate the environmental hazards associated with the manufactured gas plant site in Bristol and underground storage tanks in Bristol, Kingsport, and Johnson City should not be recovered from Atmos's Virginia ratepayers.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 3:

3. Provide the name, last known address, phone number, and employer for each person with knowledge of discoverable matters in this case. Separately for each, provide a reasonable summary of the discoverable facts the witness is thought to have knowledge of.

RESPONSE NO. 3:

The Consumer Advocate believes that the following persons may have knowledge of discoverable matters in this case:

Donna Washburn
Deputy Director
Division of Underground Storage Tanks
Tennessee Department of Environment and Conservation
4th Floor, L & C Tower
401 Church Street
Nashville, TN 37243
615-532-0987

Ms. Washburn's office may have information on the extent of the work performed at each underground storage tank site that is the subject of this proceeding, including the history of such sites, nature of the work, and cost of the work performed at such sites.

Andy Shivas
Division of Superfund
Tennessee Department of Environment and Conservation
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243
615-532-0912

Mr. Shivas's office may have information on the extent of the work performed at each manufactured gas plant site that is the subject of this proceeding, including the history of such sites, nature of the work, and cost of the work performed at such sites.

Terry Buckner
Regulatory Analyst
Office of the Attorney General
Consumer Advocate and Protection Division
P.O. Box 20207
Nashville, TN 37202-0207
615-741-8727

Mr. Buckner may have information on the extent of the work performed at each underground storage tank and manufactured gas plant site that is the subject of this proceeding, including the history of such sites, nature of the work, and cost of the work performed at such sites.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 4:

4. Produce copies of all hearing exhibits that you plan to introduce, use, or reference at the hearing on the merits in this docket.

RESPONSE NO. 4:

See Response No. 1, above. Material that is responsive to this request will be provided by the Consumer Advocate when it submits its pre-filed testimony in this case to the extent that such material is available. If demonstrative exhibits are prepared for the hearing in this matter, the Consumer Advocate will provide them to Atmos in a timely manner after their preparation. The Consumer Advocate reserves the right to introduce as hearing exhibits any documents in the administrative record of this case and any documents in the administrative record of any other TRA docket, including but not limited to, previous rate cases of this company.

REQUEST NO. 5:

5. Where available, provide Excel (or other data files) containing the information provided in response to these request items.

RESPONSE NO. 5:

No Excel or other data files have been produced in response to these request items at this time. Any Excel or other data files relied upon by the Consumer Advocate's witnesses will be produced when the Consumer Advocate submits its pre-filed testimony in this case.

REQUEST NO. 6:

6. Do you dispute that Petitioner was legally obligated to remediate the underground storage tanks (USTs) and manufactured gas plant (MGP) sites described in the Petition? If so, please explain your contentions.

OBJECTION AND RESPONSE NO. 6:

The Consumer Advocate objects to this request to the extent it requests the production of documents that are protected by the Work Product Doctrine. This request may encompass

documents created or assembled by or on behalf of the Consumer Advocate's attorneys in anticipation of litigation, which are protected from disclosure under the Work Product Doctrine. Generally, such documents consist of pre-filing investigative material created or developed under the direction of one or more attorneys, and include such things as notes, mental impressions, summaries, memoranda, research and other information typically considered as attorney work product. Tenn. R. Civ. P. 26.02(3).

Consistent with this objection, and without waiving it, the Consumer Advocate responds as follows:

At this time, the Consumer Advocate is without sufficient information to form an opinion as to whether Atmos was legally obligated to remediate the underground storage tanks and manufactured gas plant sites described in the Petition. The Consumer Advocate would note, however, that for the reasons stated in Response No. 2, above, it may not be just and reasonable or in the public interest for Atmos to recover the environmental costs that are the subject of this proceeding from ratepayers even if Atmos was legally obligated to remediate the underground storage tanks and manufactured gas plant sites described in the Petition. In any event, Atmos has the burden of proof to establish the legal obligation of Atmos to remediate the underground storage tanks and manufactured gas plant sites described in the Petition.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 7:

7. Do you contend that the environmental costs incurred by Petitioner were either unreasonable or unnecessary? If so, please explain your contentions.

RESPONSE NO. 7:

At this time, the Consumer Advocate is without sufficient information to form a position on whether the environmental costs incurred by Atmos were either unreasonable or unnecessary. The Consumer Advocate would note, however, that for the reasons stated in Response No. 2, above, it may not be just and reasonable or in the public interest for Atmos to recover the environmental costs that are the subject of this proceeding from ratepayers even if the environmental costs incurred by Atmos were reasonable and necessary. In any event, Atmos has the burden of proof to establish that the environmental costs incurred by Atmos were reasonable and necessary.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 8:

8. Please identify any person on the staff of the Consumer Advocate Division who has any prior environmental experience including, but not limited to, auditing environmental costs incurred by a regulated utility, evaluating either the reasonableness or necessity of such costs, or testifying before any regulatory authority regarding a utility's deferred environmental costs.

RESPONSE NO. 8:

Terry Buckner.

REQUEST NO. 9:

9. Do you contend that all or any portion of the deferred environmental costs described in the Petition should not be recovered from ratepayers? If so, please state the amount you contend should not be recovered and explain the basis for your contentions.

RESPONSE NO. 9:

See Response No. 2, above. The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 10:

10. If the Authority permits Petitioner to recover all or a portion of the deferred environmental costs, do you object to the use of a rider as a means to recover such costs? If so, please explain why you object to the use of a rider and describe any alternative recovery method you would propose.

RESPONSE NO. 10:

See Response No. 2, above. At this time, the Consumer Advocate is without sufficient information to form a position on the appropriate recovery mechanism, assuming that the Authority permits Atmos to recover all or a portion of the deferred environmental costs. The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 11:

11. If the Authority permits Petitioner to recover all or a portion of the deferred environmental costs, do you object to the use of a three-year recovery period as proposed by Petitioner? If so, please explain why you object to such a recovery period and describe any alternative recovery period you would propose:

RESPONSE NO. 11:

See Response No. 2, above. At this time, the Consumer Advocate is without sufficient information to form a position on the appropriate recovery period, assuming that the Authority permits Atmos to recover all or a portion of the deferred environmental costs. The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 12:

12. Do you agree that Petitioner is seeking only a dollar-for-dollar recovery of the deferred environmental costs and that no other recovery is requested in the Petition? If not, please explain your contentions and identify and describe what other costs or recovery you contend that the Petitioner is seeking.

RESPONSE NO. 12:

At this time, the Consumer Advocate is without sufficient information to either agree or disagree that Atmos is seeking only a dollar-for-dollar recover of the deferred environmental costs and that no other recover is requested in the Petition. The Consumer Advocate would note, however, that for the reasons stated in Response No. 2, above, it may not be just and reasonable or in the public interest for Atmos to recover the environmental costs that are the subject of this proceeding from ratepayers even if Atmos is seeking only a dollar-for-dollar recovery of the deferred environmental costs and that no other recovery is requested in the Petition. In any event, Atmos has the burden of proof to establish that Atmos is seeking only a dollar-for-dollar recovery of the deferred environmental costs and that no other recovery is requested in the Petition.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 13:

13. Do you object to the rider's formula, as described in the Petition? If so, please explain the basis for your objections, and identify and describe the problems that you have identified with the formula.

RESPONSE NO. 13:

See Response No. 2, above. At this time, the Consumer Advocate is without sufficient information to form a position on the rider's formula, as described in the Petition. The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

REQUEST NO. 14:

14. Are you aware of any other jurisdictions that have permitted a regulated utility to recover deferred environmental costs through a rider mechanism? If so, please identify those jurisdictions and explain why you contend that the Authority should not follow the same approach in this case, if you so contend.

OBJECTION AND RESPONSE NO. 14:

The Consumer Advocate objects to this request to the extent it requests the production of documents that are protected by the Work Product Doctrine. This request may encompass documents created or assembled by or on behalf of the Consumer Advocate's attorneys in anticipation of litigation, which are protected from disclosure under the Work Product Doctrine.

Generally, such documents consist of pre-filing investigative material created or developed under the direction of one or more attorneys, and include such things as notes, mental impressions, summaries, memoranda, research and other information typically considered as attorney work product. Tenn. R. Civ. P. 26.02(3).

Consistent with this objection, and without waiving it, the Consumer Advocate responds as follows:

At this time, the Consumer Advocate is not aware of any other jurisdictions that have permitted a regulated utility to recover deferred environmental costs through a rider mechanism. The Consumer Advocate would note, however, that decisions of other jurisdictions are not binding on the Authority; and for the reasons stated in Response No. 2, above, it may not be appropriate for the Authority to follow the decision of any other jurisdictions that have permitted a regulated utility to recover deferred environmental costs through a rider mechanism, if any such decisions exist.

The Consumer Advocate's investigation of this case is ongoing. Information that is responsive to this request may be provided in the pre-filed testimony of the Consumer Advocate's witnesses or in supplemental discovery responses.

Respectfully submitted,

Robert E. Cooper, Jr.
Attorney General and Reporter
State of Tennessee



Joe Shirley, B.P.R. No. 022287
Office of the Attorney General
Consumer Advocate and Protection Division
P.O. Box 20207
Nashville, TN 37202
(615) 741-8733

July 10, 2007

CERTIFICATE OF SERVICE

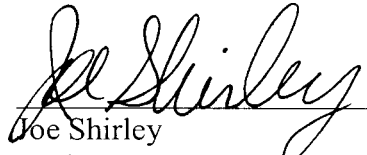
I hereby certify that a true and exact copy of the foregoing was served via U.S. Mail or electronic mail upon:

Patricia Childers
Vice President, Rates & Regulatory Affairs
Mid-States Division
Atmos Energy Corporation
810 Crescent Centre Drive, Suite 600
Franklin, Tennessee 37067-6226
Telephone: (615) 771-78332
Facsimile: (615) 771-8301

William T. Ramsey
A. Scott Ross
Neal & Harwell, PLC
One Nashville Place, Suite 2000
150 Fourth Avenue North
Nashville, Tennessee 37219
Telephone: (615) 244-1713
Facsimile: (615) 726-0573

Henry Walker
Boult Cummings Conners & Berry, PLC
1600 Division Street, Suite 700
P.O. Box 340025
Nashville, Tennessee 37203

this the 10th day of July, 2007.



Joe Shirley
Assistant Attorney General

#108908

Robert “Terry” Buckner, Regulatory Analyst

B.S. in Business Administration, University of Tennessee, Knoxville

CPA, Member of the AICPA and the Tennessee Society of CPAs

Twenty-nine years of experience with the public utility industry:

1975 - 1978 First Utility District of Knox County

1980 - 1988 TDS Telecom

1989 - 1994 Tennessee Public Service Commission (“TPSC”)

1995 - 2001 Office of the Attorney General for the State of Tennessee - Consumer Advocate
And Protection Division

2001 - 2004 Comptroller’s Office for the State of Tennessee - Public Utility Audit

2004 - 2007 Office of the Attorney General for the State of Tennessee - Consumer Advocate
And Protection Division

Oral and written testimonies were performed in numerous rate proceedings before the TPSC and the Tennessee Regulatory Authority (“TRA”). Including the following dockets and companies:

Dockets

TRA Docket #06-00290 Tennessee American Water Company
<http://www2.state.tn.us/tra/dockets/0600290.htm>

TRA Docket #06-00175 Chattanooga Gas Company
<http://www2.state.tn.us/tra/dockets/0600175.htm>

TRA Docket #05-00258 Atmos Energy Corporation
<http://www2.state.tn.us/tra/dockets/0500258.htm>

TRA Docket #04-00288 Tennessee American Water Company
<http://www2.state.tn.us/tra/dockets/0400288.htm>

TRA Docket #03-00391 BellSouth Telecommunications, Inc.
<http://www2.state.tn.us/tra/dockets/0300391.htm>

TRA Docket #02-00383 Chattanooga Gas Company
<http://www2.state.tn.us/tra/dockets/0200383.htm>

TRA Docket #01-00451 United Telephone Company
<http://www2.state.tn.us/tra/dockets/0100451.htm>

TRA Docket #00-00523 Rural Universal Service
<http://www2.state.tn.us/tra/dockets/0000523.htm>

TRA Docket #99-00210 BellSouth Telecommunications, Inc.
TRA Docket #99-00244 BellSouth Telecommunications, Inc.
TRA Docket #98-00559 BellSouth Telecommunications, Inc.
(Attached)

TRA Docket #99-00995 Telephone Electronics Corporation
<http://www2.state.tn.us/tra/dockets/9900995.htm>

TRA Docket #98-00626 United Telephone - Southeast
(Attached)

TRA Docket #97-00982 Chattanooga Gas Company
(Attached)

TRA Docket #96-00977 Nashville Gas Company
(Attached)

TPSC Docket #95-02258 United Cities Gas Company
(Attached)

TPSC Docket #95-02116 Chattanooga Gas Company
(Attached)

TPSC Docket #94-02876 BellSouth Telecommunications
(Attached)

TPSC Docket #92-13527 South Central Bell
(Testimony N/A)

IN THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE

RECEIVED

2004 SEP 29 PM 4:23

T.R.A. DOCKET ROOM

IN RE:

PETITION FOR EXEMPTION OF
CERTAIN SERVICES

DOCKET NO. 03-00391

CONSUMER ADVOCATE AND PROTECTION DIVISION'S
SUPPLEMENTAL RESPONSES TO BELL SOUTH
TELECOMMUNICATIONS, INC.'S DISCOVERY REQUESTS

Comes now Paul G. Summers, Attorney General and Reporter for the State of Tennessee, through the Consumer Advocate and Protection Division of the Office of the Attorney General ("Consumer Advocate"), pursuant to Rule 26.05 of the Tennessee Rules of Civil Procedure, and hereby submits the following supplemental responses to the discovery requests propounded by BellSouth Telecommunications, Inc. ("BellSouth"):

SUPPLEMENTAL RESPONSES

BellSouth's First Discovery Request, Interrogatory No. 2: Please identify each expert witness you intend to present in this docket and, for each, please state:

- a) the subject or subjects upon which the expert will testify;
- b) the basis for your assertion that the witness is qualified as an expert including, but not limited to, a current curriculum vitae;
- c) all tests, studies, measurements, experiments, or other analysis or actions performed or observed by the expert relating to the expert's testimony;
- d) all opinions that the expert will present in this docket and the basis for each

opinion; and

e) all facts of which you or the expert are aware that support those opinions.

Supplemental Response: The Consumer Advocate intends to present the expert testimony of Dr. Steve Brown and Mr. Terry Buckner in this docket.

Dr. Brown will testify on the PRI service market as well as economic factors that should be addressed in this docket to determine whether existing or potential competition is an effective regulator of the price of PRI services and whether the public interest and competitive policies are served by exempting PRI services from regulatory requirements, including factors such as relative market position of competitors in the retail market and wholesale or input market, dominance in the retail market and wholesale or input market, and competitive pricing policies and strategies. Dr. Brown's curriculum vitae is attached. It is likely that Dr. Brown will testify that the PRI market conditions do not support the conclusion that existing and potential competition is an effective regulator of the price of those services, and that the public interest and competitive policies are served by current regulatory requirements. Dr. Brown's investigation and analysis are ongoing and his testimony is not complete. The Consumer Advocate will provide or reference all information and documents that support Dr. Brown's testimony at the time that it submits his pre-filed direct testimony on October 4, 2004.

Mr. Buckner will testify on the PRI service market as well as PRI tariffing, pricing, costs, quantities, and service offerings among incumbent and competing carriers. Mr. Buckner's curriculum vitae is attached. It is likely that Mr. Buckner will testify that the pricing, costs, and/or quantities of PRI services among incumbents and competitors do not support the conclusion that existing and potential competition is an effective regulator of the price of those services, and that the

opinion; and

- e) all facts of which you or the expert are aware that support those opinions.**

Supplemental Response: The Consumer Advocate intends to present the expert testimony of Dr. Steve Brown and Mr. Terry Buckner in this docket.

Dr. Brown will testify on the PRI service market as well as economic factors that should be addressed in this docket to determine whether existing or potential competition is an effective regulator of the price of PRI services and whether the public interest and competitive policies are served by exempting PRI services from regulatory requirements, including factors such as relative market position of competitors in the retail market and wholesale or input market, dominance in the retail market and wholesale or input market, and competitive pricing policies and strategies. Dr. Brown's curriculum vitae is attached. It is likely that Dr. Brown will testify that the PRI market conditions do not support the conclusion that existing and potential competition is an effective regulator of the price of those services, and that the public interest and competitive policies are served by current regulatory requirements. Dr. Brown's investigation and analysis are ongoing and his testimony is not complete. The Consumer Advocate will provide or reference all information and documents that support Dr. Brown's testimony at the time that it submits his pre-filed direct testimony on October 4, 2004.

Mr. Buckner will testify on the PRI service market as well as PRI tariffing, pricing, costs, quantities, and service offerings among incumbent and competing carriers. Mr. Buckner's curriculum vitae is attached. It is likely that Mr. Buckner will testify that the pricing, costs, and/or quantities of PRI services among incumbents and competitors do not support the conclusion that existing and potential competition is an effective regulator of the price of those services, and that the

public interest and competitive policies are served by current tariffing, pricing, costing, and service requirements. Mr. Buckner's investigation and analysis are ongoing and his testimony is not complete. The Consumer Advocate will provide or reference all information and documents that support Mr. Buckner's testimony at the time that it submits his pre-filed direct testimony on October 4, 2004.

BellSouth's First Discovery Request, Interrogatory No. 3: Please state whether you will contend in this docket that PRI service is not sufficiently competitive in Tennessee to qualify for exemption under T.C.A. § 65-5-208(b), and if you will contend such, state all bases upon which you will make such contention, and all facts which you believe support such contention.

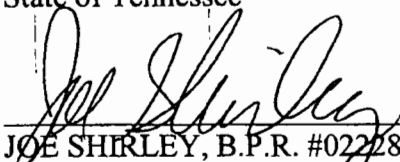
Supplemental Response: See Consumer Advocate's supplemental response to BellSouth's First Discovery Request, Interrogatory No. 2, above.

BellSouth's First Discovery Request, Interrogatory No. 4: Please state whether you agree that competition for PRI services in Tennessee is an effective regulator of price for PRI service, and if you do not agree, please state why you do not agree and all facts that you believe support your position.

Supplemental Response: See Consumer Advocate's supplemental response to BellSouth's First Discovery Request, Interrogatory No. 2, above.

RESPECTFULLY SUBMITTED,

PAUL G. SUMMERS, B.P.R. #6285
Attorney General
State of Tennessee



JOE SHIRLEY, B.P.R. #022287
Assistant Attorney General
Office of the Attorney General
Consumer Advocate and Protection Division
P.O. Box 20207
Nashville, Tennessee 37202
(615) 532-2590

Dated: September 29, 2004

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served via first-class U.S. Mail, postage prepaid, on September 29, 2004, upon:

Joelle Phillips, Esq.
BellSouth Telecommunications, Inc.
333 Commerce Street, Suite 2101
Nashville, Tennessee 37201-3300

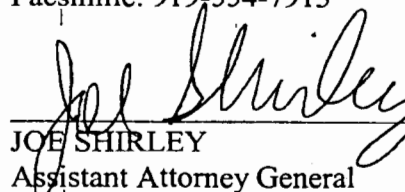
Henry Walker, Esq.
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14111 Capital Boulevard
Wake Forest, North Carolina 27587-5900
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JOE SHIRLEY
Assistant Attorney General

78984

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NOV 18 1994

EXEC. DIR. OFF.

Before the

TENNESSEE PUBLIC SERVICE COMMISSION

Nashville, Tennessee

In Re:

South Central Bell Telephone Company

Docket 94-02876

Direct Testimony

of

Terry Buckner

November 18, 1994

1 Q. Please state your name for the record.

2 A. My name is R. Terry Buckner.

3 Q. By whom are you employed and what is your position?

4 A. I am employed by the Consumer Advocate Division (CA) in the State
5 of Tennessee Attorney General's Office as a Senior Regulatory
6 Analyst.

7 Q. How long have you been employed in the utility industry?

8 A. Approximately seventeen years. Before my employment with the
9 Attorney General, I was employed with the Tennessee Public Service
10 Commission (Commission) as a financial analyst for approximately
11 six years. Prior to my employment with the Commission, I was
12 employed by Telephone and Data Systems (TDS) for eight years and
13 the First Utility District of Knox County for three years.

14 Q. What is your educational background and what degrees do you
15 hold?

16 A. I have a Bachelors degree in Business Administration from the
17 University of Tennessee, Knoxville with a major in Accounting. I am
18 also a Tennessee Certified Public Accountant and a member of the
19 American Institute of Certified Public Accountants.

20 Q. Would you briefly describe your responsibilities as a Senior
21 Regulatory Analyst since your employment with the CA?

22 A. My responsibilities include evaluating financial data, submitting data

1 requests to Companies, making recommendations to the Director of
2 the CA Division and the Consumer Advocate, and preparing
3 testimony and exhibits.

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to present information to the
6 Commission as to the reasonableness of the proposed tariff filing
7 #94-223 by South Central Bell (SCB) in Docket #94-02876 regarding
8 the establishment of regulations, rates, and charges for the provision
9 of Directory Assistance (DA) services in Tennessee.

10 **Q. Would you please identify the general issues regarding Docket**
11 **#94-02876?**

12 A. The Consumer Advocate has filed a motion with the Commission to
13 dismiss SCB's request to impose a charge for DA in Tennessee. In
14 the filed motion, it is the Consumer Advocate's contention that SCB's
15 filing was in fact improperly filed according to Commission rules and
16 that the filing is inappropriate and untimely.

17 Additionally, the CA received responses from SCB to our data
18 request dated November 1, 1994 on November 14, 1994. The CA
19 staff is presently reviewing SCB's responses many of which were
20 inadequate or were not responded to due to SCB's objections. On
21 November 17, 1994, the CA spoke with counsel for SCB and SCB
22 agreed to provide additional information which may offset other

1 issues.

2 Q. Would you please identify the specific issues regarding Docket
3 #94-02876?

4 The specific issues within the filing are as follows:

5 (1) Whether the filing is valid and appropriate under rule 1220-4-2-
6 .55. In exchange for the opportunity to make excessive profits by
7 cutting costs and inefficiencies, SCB agreed that it would not initiate
8 any requests to adjust its earnings except in accordance with rule
9 1220-4-2-.55. SCB is not to initiate any requests and the
10 Commission is not to entertain any unless and until the situation
11 comes within the provision of the rule.

12 The rule requires that SCB not initiate any adjustment unless its
13 earnings are 60 basis points below its prescribed rate of return. The
14 60 basis points translates into 6/10 of 1% or .60%. SCB's prescribed
15 rate of return is 11.25%. Using simple math to subtract .60% from
16 11.25%, one arrives at 10.65% as the point at which SCB can
17 legitimately request an adjustment to its earnings. The Commission
18 Staff knows SCB's most recent report of its earnings in relationship
19 to its prescribed rate of return through the submission of the
20 Commission monthly report 3.01. The Commission 3.01 report for
21 August 1994 shows that SCB is earning 10.79% for the last twelve
22 months to date. Therefore it is clear on its face to SCB and the

1 Commission Staff that there are no grounds to consider this earnings
2 adjustment. The CA believes that this proceeding is illegal,
3 illegitimate and very irregular. It is contrary to both the spirit and the
4 letter of rule 1220-4-2-.55. In addition, it is contrary to what
5 prompted that rule which was to encourage SCB to reduce its
6 expenses and to improve its efficiency. SCB does neither with this
7 particular earnings increase, so therefore it goes even against the
8 policy behind the rule. Certainly, SCB is not offering to reduce any
9 costs or improve its efficiencies by this particular rate increase or rate
10 proposal. SCB has not shown that it is threatened or that the
11 consumer's interests are jeopardized by denying this earnings
12 adjustment. Simply put, SCB is proposing to reduce service that it is
13 presently providing to its customers.

14 The CA would first say that this matter should be dismissed outright
15 and that there was no need for this hearing in the first place if SCB
16 complied with the rule. The Commission should dismiss this
17 proceeding in its entirety and deny SCB any adjustment to its
18 earnings;

19 (2) The determination of the 50% destimulation factor used by SCB
20 to calculate revenue is not factually supported in their filing and calls
21 into question the projected earnings increase identified by SCB. In
22 addition, the imposition of the directory assistance charge will likely

1 increase revenues in the future from the Company's electronic white
2 page offering. The Company has not included the additional revenue
3 from this service in its projection;

4 (3) A local call allowance of 5 residential and 3 business per month
5 for DA calls but no long distance DA allowance. This is backwards,
6 logically there should be a greater DA allowance for long distance
7 calls since a directory for the distant calling area is not normally
8 available to the caller;

9 (4) While SCB has not provided the average monthly amount of new
10 number listings by month, it only provided the activity for October
11 1994 during which 67,889 in new number listings were issued. If this
12 is representative of a normal month, an average of approximately
13 600,000 numbers are not available during the directory publishing
14 cycle. This recognizes that there is a sixty to ninety day lag in the
15 time a number list is compiled and the date when a directory is
16 issued for a particular year. The directory does not include the new
17 number listings during the lag time or for future new number listings
18 until a new directory is published the following year. As a result,
19 there is a significant number of listings which are not available in the
20 directories and the ratepayer has no option but to use DA;

21 (5) SCB is attempting to take advantage of or circumventing the
22 proposed local competition rule currently pending. Under the

1 proposed rule, SCB would be required to reduce access charges half
2 way to the interstate level without offsetting rate increases. By using
3 the DA charge to more than offset the access reductions, SCB avoids
4 the earnings reductions required in the proposed local competition
5 rule. This filing is also an attempt by SCB to stifle potential
6 competition at the expense of the captive monopoly ratepayers by
7 increasing the charges for monopoly directory assistance charges and
8 reducing rates for the potentially competitive access charges;

9 (6) There is a general vagueness in the determination of who the
10 "handicapped or disabled" are and who makes that determination to
11 qualify for an exemption from this tariff filing;

12 (7) Additionally, SCB's recent tariff filing revision filed
13 November 14, 1994, includes a fifty call allowance for "qualified
14 handicapped or disabled" employees of businesses. The Company
15 has provided nothing to show an allowance is adequate. Obviously,
16 the imposition of such a charge on business will impact a business'
17 decision when considering the employment of a disabled person who
18 must obtain telephone numbers in the performance of their jobs. The
19 allowance of approximately 2 calls per work day may not be
20 sufficient especially when the position calls for extensive use of the
21 telephone;

22 (8) There are illiteracy concerns for those citizens who cannot read

1 and would be disadvantaged by this tariff filing. While we recognize
2 that it is not the duty of the telephone company to teach reading, it
3 must be recognized that a large number of Tennesseans are
4 functionally illiterate. Based on data obtained from the Tennessee
5 Department of Education, approximately 1 in 6 Tennesseans is
6 functionally illiterate. This indicates that approximately 816,000 are
7 functionally illiterate based upon the U.S. Census Bureau estimate of
8 the population of Tennessee;

9 (9) SCB's rationale for determining the proposed reductions in access
10 and toll rates, and the amounts per service to be reduced by SCB is
11 questionable as to its propriety. It may be more appropriate to reduce
12 Caller ID or reduce touch-tone calling rates. SCB has not shown any
13 linkage between its revenues for long distance and directory
14 assistance rates;

15 (10) There is no assurance that 100% of the proposed access
16 reductions by SCB will be flowed through by the Inter-exchange
17 Carriers (IXCs) to the ratepayer. There are no new reductions in tariff
18 filings pending for any long distance carrier. In other words, the
19 earnings of the IXCs would increase if the access reductions are not
20 flowed through dollar for dollar by reduced interlata long distance
21 rates;

22 (11) Uncertainty exists as to whether the filing would jeopardize the

1 accuracy of the annual access reduction ordered by the Commission
2 (Megacom Order U-87-7492). The filing made by the Company to
3 reduce access rates in accordance with order U-87-7492 is under the
4 assumption that the proposed tariff is already in effect. This
5 assumption impacts the magnitude of the access reductions;

6 (12) Privacy concerns also exist in that SCB will release name and
7 address to a DA caller seeking identification for a phone number.
8 Presently, SCB's DA will not provide the name and address when the
9 caller has only the telephone number. Under the proposed tariff a
10 caller will be able to obtain such information. In addition, this
11 proposal raises safety issues as well as privacy concerns;

12 (13) SCB should realize a dramatic increase in revenues from
13 unpublished number listings if the tariff is approved. This increase is
14 not recognized anywhere in the filing. Additionally, the tariff filing
15 is a disincentive to timely updates of directories. Also, SCB has not
16 quantified the expected revenue increase and earnings from this new
17 service;

18 (14) SCB has failed to provide evidence to demonstrate the
19 reasonableness and fairness of this tariff filing when it is presently
20 recovering the cost of DA through other revenue streams. This
21 Commission has historically denied SCB's filings for a per call charge
22 for DA, as recent as September 1993 in tariff filing 92-190. SCB has

1 provided NO evidence since September 1993 to change the
2 Commission's current policy DA service in Tennessee.

3 **Q. Are there other concerns with SCB's tariff filing?**

4 A. Yes, the CA requests that public hearings be held across SCB's
5 Tennessee service area to allow SCB customers the opportunity to
6 express an opinion as to whether customers should be charged on a
7 per DA call basis or that DA be recovered on a business as usual
8 basis. The hearings should be scheduled to allow a representative
9 number of customers of all types, areas and means to express their
10 views on the proposed DA filing. Additionally, the public should be
11 adequately notified of their opportunity and the potential change in
12 the ratepayers bill. After public opinion is expressed, the
13 Commission can more adequately determine the reasonableness of
14 the current DA tariff filing.

15 SCB has not stated how the safety, efficiency, or adequacy of DA
16 relates to those rates. Moreover, the CA is concerned that the DA
17 rate request is priced to operate contrary to a free market system by
18 discouraging calls rather than establishing a low rate and encouraging
19 calls.

20 It must also be recognized that while this tariff was made by SCB, it
21 will impact all Tennessee ratepayers. If approved, it will be a
22 precedent for filings by other carriers such as AT&T.

1 Q. Does this conclude your testimony?

2 A. Not necessarily. As I indicated earlier SCB was not fully responsive
3 to our data request. We may have additional concerns upon receipt of
4 that information.

CERTIFICATE OF SERVICE

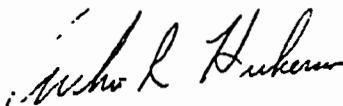
I, L. Vincent Williams, hereby certify that a true and correct copy of the foregoing Testimony of Terry Buckner has been served on the following parties of record by depositing a copy of the same in the United States mail, postage pre-paid, addressed to them, in accordance with the following list, this 18th day of November, 1994:

Charles Howorth, Esq.
South Central Bell Telephone Company
333 Commerce St.
Suite 2101
Nashville, TN 37201-3300

John M. Farris, Esq.
50 North Front St.
Suite 1400
Memphis, TN 38103

Roger Briney, Esq.
AT&T
1200 Peachtree St., NE
Room 4068
Atlanta, GA 30309

Val Sanford, Esq.
230 4th Ave., North
3rd FL P.O. Box 198888
Nashville, TN 37219-8888

for 

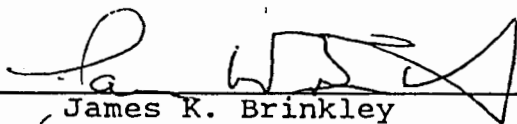
L. Vincent Williams

STATE OF GEORGIA

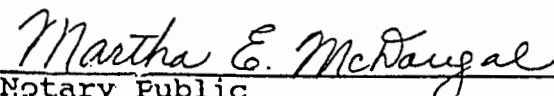
COUNTY OF FULTON

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared James K. Brinkley who, being by me first duly sworn deposed and said that:

He is appearing as a witness on behalf of BellSouth Telecommunications, Inc., d/b/a South Central Bell Telephone Company, before the Tennessee Public Service Commission in Docket No. 94-02876, Application of South Central Bell to Establish Regulation, Rates and Charges for the Provision of Directory Assistance Service in Tennessee, and if present before the Commission and duly sworn, his testimony would be set forth in the annexed Testimony consisting of 8 pages and 0 exhibits.


James K. Brinkley

SWORN TO AND SUBSCRIBED BEFORE ME
THIS 11th DAY OF NOVEMBER, 1994.


Notary Public

Notary Public, Gwinnett County, Georgia
My Commission Expires March 8, 1997

DIRECT TESTIMONY OF
JAMES K. BRINKLEY
ON BEHALF OF BELL SOUTH TELECOMMUNICATIONS, INC.,
D/B/A
SOUTH CENTRAL BELL TELEPHONE COMPANY

NOVEMBER 18, 1994

Q. PLEASE STATE YOUR NAME, EMPLOYER, POSITION AND BUSINESS ADDRESS.

A. My name is James K. Brinkley. I am employed by BellSouth Telecommunications, Inc., d/b/a South Central Bell Telephone Company in Tennessee (hereinafter referred to as "South Central Bell" or "the Company"). My present position is Director - Pricing & Economics in the Regulatory and External Affairs department. My business address is 675 West Peachtree Street NE, Atlanta, Georgia 30375.

Q. PLEASE GIVE A BRIEF DESCRIPTION OF YOUR BACKGROUND AND EXPERIENCE.

A. I received a Bachelor of Science degree from Clemson University in 1969 and a Master of Engineering degree from the University of South Carolina in 1973. After graduating from Clemson University, I served approximately two years active duty in the U.S. Army and am presently a Battalion Commander in the U.S. Army Reserves. I began my telephone

career with Southern Bell in 1973 in Columbia, South Carolina as an Outside Plant Engineer. Since then, I have served in various positions in the Engineering, Support Services, Marketing, and Pricing organizations in both South Carolina and Georgia. Currently, I have responsibilities for tariff and rate development for switched access, operator services, and billing and collections services for the nine states in the BellSouth region.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. On October 6, 1994, South Central Bell filed a revenue neutral tariff package to implement a charge for Directory Assistance (hereinafter referred to as "DA"). My testimony will describe the elements of the Company's filing package, why it is appropriate to charge for DA, and the benefits to consumers that will occur with approval of this package by the Tennessee Public Service Commission.

Q. DESCRIBE THE TARIFF PACKAGE FILED BY SOUTH CENTRAL BELL.

A. There are three parts to this tariff filing:

1. The implementation of a charge for DA service,
2. A reduction of Message Telecommunications Service ("MTS") charges, and
3. A reduction of intrastate Switched Access charges.

The revenue generated by a DA charge will be passed on to customers through lower long distance rates and access charges. Specifically, the DA charge proposal will generate approximately ^{22.9}~~\$19.9~~ million in revenue and cost savings annually. The MTS charge proposal will reduce revenues by approximately ^{7.7}~~\$6.6~~ million annually. The Switched Access charge proposal will reduce revenues by approximately ~~\$13.3~~ ^{15.2} million annually.

It should be noted that the impact of the Switched Access charge reduction on Tennessee consumers will depend on the pricing actions of the interexchange carriers ("IXCs").

Q. DID SOUTH CENTRAL BELL INITIATE THIS PROCEEDING TO ADJUST ITS EARNINGS?

A. No. As I have explained above, if this filing is approved, it will be revenue neutral and thus will have no effect on the company's earnings.

Q. WHAT WILL SOUTH CENTRAL BELL CHARGE FOR DIRECTORY ASSISTANCE?

A. The proposed tariff provides that all residence customers will have an allowance of five free DA calls per line per month and business customers will receive a three call

allowance per line or equivalent per month. A charge of \$.25 per call will be applied on DA calls exceeding the allowance. There will be no charge for DA calls made from hospitals, nursing homes, public and semi-public telephone service locations and customer-provided public telephones. Customers with disabilities that prevent their use of the printed directory will be exempt from the charges on their residential line and will receive a fifty call allowance on their business line.

South Central Bell's proposal protects those customers who use DA service only when necessary by moving some of the responsibility for paying for the service to those who use the service frequently. While the frequent DA user will begin paying for this service, all customers will have access to lower toll rates.

Q. WHY IS IT APPROPRIATE TO CHARGE FOR DIRECTORY ASSISTANCE?

A. In an increasingly competitive telecommunications environment, prices for individual services should reflect their underlying cost. Currently, competitive applications of Time Warner AxS of Tennessee, L.P., AVR, L.P., d/b/a Hyperion of Tennessee; Access Transmission Service, Inc. ("ATS"), Teleport Denver Inc., and Metropolitan Fiber Systems of Tennessee, Inc. ("MFS") are pending before the Commission,

and a rulemaking is underway to open the local exchange to competition. Tariffs such as this one which move rates toward reflecting their underlying cost must be implemented in order to transition customers in Tennessee to a rate structure which will be sustainable in this increasingly competitive environment.

Today, because there is no charge for DA service in Tennessee, over \$27 million of this service cost is recovered each year through prices customers pay for other services. Almost every customer, therefore, pays for DA service whether they use the service or not. Tennessee is the only state in the nation where there is no charge for customers to use intrastate DA service. Present usage studies show that eighty percent of residential customers make five or fewer DA calls, and ninety-five percent of business customers make three or fewer DA calls. From our studies, the majority of Tennessee's customers will not even be affected by the DA charge proposed in the tariff.

Q. IF THIS TARIFF IS APPROVED, WILL SOUTH CENTRAL BELL LAY OFF OPERATORS WHEN THERE IS LESS DEMAND FOR THE SERVICE?

A. The Company does not expect any layoffs as a result of implementing a directory assistance charge and has made this commitment to the Communications Workers of America. Any

necessary reduction in force will be handled by attrition and reassignment.

Q. DESCRIBE THE TOLL CHARGE REDUCTION PROPOSED IN THE TARIFF.

A. There are two parts to the toll reduction proposed in the tariff. First, the tariff proposes to lower the rate on all mileage bands 31 miles and over. This reduction equates to \$2,770,292 annually. The second part of this tariff filing is a volume discount which equates to a ^{4,724,000}~~\$3,803,000~~ revenue reduction.

The volume discount will apply to both residential and business customers. For each billing period, customers billed up to \$10 in intraLATA toll will receive a one percent discount, for ^{5 1/2}~~\$10.01~~ to \$25 - a ~~five~~ percent discount, and for more than \$25 - an ^{11%}~~eight~~ percent discount. The discounts will be applied on an account basis for calls carried by South Central Bell and are in addition to rate period discounts. The discounts will not apply to Optional Calling Plan calls, local exchange service charges, DA charges, operator-handled surcharges, or RegionServ calls. This volume discount will provide a benefit to those customers who rely on long distance service.

Q. DESCRIBE THE SWITCHED ACCESS CHARGE REDUCTION PROPOSED IN THE

TARIFF.

- A. The annual projected gross revenue impact for Switched Access services is a reduction of ^{17,895,470} \$15,738,867 to South Central Bell. The projected net revenue impact, assuming flow through of the access rate decreases by the IXC's, is a reduction of ^{15,223,776} \$13,300,000. This reduction equals ^{more than} approximately half of the amount necessary to attain parity with current interstate Switched Access rates in Tennessee. Additionally, this reduction equates to approximately a twenty ^{five} ~~two~~ percent change in the composite Switched Access rate.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

- A. South Central Bell's tariff filing will result in a much greater benefit to customers than does free DA. Present usage studies show that eighty percent of residential customers make five or fewer DA calls, and ninety-five percent of business customers make three or fewer DA calls. From our studies, the majority of Tennessee's customers will not even be affected by the DA charge proposed in the tariff.

There are many customer benefits to be gained from implementation of South Central Bell's proposed tariff:

* responsibility for paying for DA service shifted to the

individuals and businesses who use it frequently (i.e., move prices toward reflecting their underlying cost);

- * lower MTS rates for the longer mileage bands;
- * a volume discount for customers who use South Central Bell's intralata long distance service and, by choice or necessity, use long distance services frequently; and
- * a reduction in the difference between intrastate and interstate access rates in Tennessee by approximately half.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

STATE OF TENNESSEE

Office of the Attorney General



PAUL G. SUMMERS
ATTORNEY GENERAL AND REPORTER

ANDY D. BENNETT
CHIEF DEPUTY ATTORNEY GENERAL

LUCY HONEY HAYNES
ASSOCIATE CHIEF DEPUTY
ATTORNEY GENERAL

REC'D TH
REGULATORY AUTH.
'99 APR 30 PM 11 50

EXECUTIVE SECRETARY
MICHAEL E. MOORE
SOLICITOR GENERAL

CORDELL HULL BUILDING
NASHVILLE, TN 37243-0486

TELEPHONE (615) 741-3481
FACSIMILE (615) 741-2009

April 30, 1999

Mr David Waddell
Executive Secretary
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

Re: United Telephone-Southeast, Inc. Tariff to Reflect Proposed Changes Under Price
Regulation Plan
Docket No. 98-00626

Dear Mr. Waddell:

I have enclosed an original and thirteen copies of Direct Testimony of Consumer Advocate Division witness Robert T. Buckner, Senior Regulatory Analyst in the above referenced matter. Copies are being furnished to counsel of record for interested parties.

Sincerely,

A handwritten signature in cursive script, appearing to read "L. Vincent Williams".

L. Vincent Williams
Consumer Advocate

c: Counsel of record

Before the

TENNESSEE REGULATORY AUTHORITY

IN RE: UNITED TELEPHONE-SOUTHEAST, INC. TARIFF TO REFLECT
PROPOSED CHANGES UNDER PRICE REGULATION PLAN
DOCKET NO. 98-00626

DIRECT TESTIMONY
of
ROBERT T. BUCKNER

April 30, 1999

1 **Q. Please state your name for the record.**

2 A. My name is Robert T. Buckner ("Terry").

3

4 **Q. By whom are you employed and what is your position?**

5 A. I am employed by the Consumer Advocate Division ("CA") in
6 the State of Tennessee Attorney General's Office as a Senior Regula-
7 tory Analyst.

8

9 **Q. How long have you been employed in the utility industry?**

10 A. Approximately twenty years. Before my employment with the
11 Attorney General, I was employed with the Tennessee Public Service
12 Commission ("Commission") as a financial analyst for approximately
13 six years. Prior to my employment with the Commission, I was
14 employed by Telephone and Data Systems ("TDS") for eight years and
15 the First Utility District of Knox County for three years.

16

17 **Q. What is your educational background and what degrees do you**
18 **hold?**

19 A. I have a Bachelors degree in Business Administration from the
20 University of Tennessee, Knoxville with a major in Accounting. I am
21 also a Tennessee Certified Public Accountant and a member of the
22 American Institute of Certified Public Accountants. Additional

1 education background with respect to my qualifications is provided in
2 Exhibit No. 1 (Attachment A).
3

4 **Q. Would you briefly describe your responsibilities as a Regulatory**
5 **Analyst since your employment with the CA?**

6 A. I prepared testimony and exhibits as an employee with the
7 Commission before becoming a member of the CA. My
8 responsibilities have not changed significantly since becoming
9 employed with the CA.
10

11 **Q. What is the purpose of your testimony before the Tennessee**
12 **Regulatory Authority ("TRA")?**

13 A. The purpose of my testimony is to present the CA's
14 recommendations on the calculated amount to be used in changing
15 United Telephone-Southeast ("UTSE") Tariff under their Price
16 Regulation Plan in Tennessee Regulatory Authority ("TRA") Docket
17 #98-00626. Also, my testimony will address the methodology set
18 forth in the stipulation in TRA Docket #96-01423 and its concurrence
19 with Tenn. Code Ann. § 65-5-209.
20
21
22

1 **Q. By what amount should UTSE be allowed to change their Tariff**
2 **under the Price Regulation Plan?**

3 A. It is the CA's position that UTSE should reduce their Non-Basic
4 Rates by an annual amount of \$351,935 in contrast to UTSE's
5 proposal to increase rates \$2,072,472 for a total difference of
6 \$2,457,406. See Attachment B, Line 10 of Exhibit No. 1. This
7 amount is consistent with the CA's Statement of Issues filed with the
8 TRA on December 1, 1998.

9
10 **Q. Does this reduction include the imputation of Yellow Page**
11 **revenues?**

12 A. No. UTSE has refused to identify the Yellow Page revenue that
13 would have been imputed had the procedures that were in place in
14 1995 were being followed today. Consequently, the impact of this
15 alleged deficiency cannot be determined at this time.

16
17 **Q. Does the methodology as set forth in the stipulation in TRA**
18 **Docket #96-01423 conflict with the requirements of Tenn. Code**
19 **Ann. § 65-5-209?**

20 A. No. The methodology does not conflict. Tenn. Code Ann. §
21 65-5-209 establishes the limit in the amount of rates increases that may
22 occur in any one year:

1 § 65-5-209(e) A price regulation plan shall
2 maintain affordable basic and non-basic rates by
3 **permitting a maximum annual adjustment that**
4 **is capped at the lesser of one half (1/2) the**
5 **percentage change in inflation for the United**
6 **States using the gross domestic product-price**
7 **index ("GDP-PI") from the preceding year as**
8 **the measure of inflation, or the GDP-PI from**
9 **the preceding year minus two (2) percentage**
10 **points.** An incumbent local exchange telephone
11 company may adjust its rates for basic local
12 exchange telephone services or non-basic services
13 only so long as its aggregate revenues for basic
14 local exchange telephone services or non-basic
15 services generated by such changes do not exceed
16 the aggregate revenues generated by the maximum
17 rates permitted by the price regulation plan.
18 (Emphasis added.)
19

20 The stipulation establishes the method of determining the
21 cumulative percentage increases and the maximum cumulative
22 increase allowed over a period of years assuming that rates are
23 increased the maximum allowed each year in accordance with Tenn.
24 Code Ann. § 65-5-209. The stipulation does not modify the provisions
25 of the statute and does not allow UTSE to increase rates in any one
26 year more than the amount otherwise allowed under the statute. The
27 maximum increase in any one year continues to be limited by the
28 statute.

29 Additionally, the stipulation as interpreted by UTSE does
30 conflict with the Telecommunications Act of 1996 and the FCC order

1 in Docket #96-128. Section 276(b)(1)(B) of the Telecommunications
2 Act (See Attachment E) directs the FCC to “discontinue the intrastate
3 and interstate carrier access charge payphone service elements and
4 payments.... and all intrastate and interstate payphone subsidies from
5 basic exchange and exchange access revenue....” In its Docket #96-
6 128, the FCC ordered such subsidies to be removed. UTSE has
7 notified the TRA that its intrastate rates included an estimated subsidy
8 for payphone operations of \$143,500. (See Attachment D.) UTSE
9 reduced its access charges to remove the subsidy in April 1997. If the
10 base rates in effect on June 6, 1995 are used in the computation of the
11 SPI as proposed by UTSE, this subsidy is restored. Clearly, this is
12 contrary to the FCC’s Orders.

13
14 **Q. Does the methodology as adopted in the stipulation create an**
15 **additional limit that was not specifically identified in Tenn. Code**
16 **Ann. § 65-5-209?**

17 **A.** Yes, it could. If the mix in the type of services being provided
18 were to change materially, the formula for establishing the maximum
19 cumulative increase could prohibit a company from increasing rates in
20 any one year to the full amount otherwise allowable under Tenn. Code
21 Ann. § 65-5-209.

22 Attachment C to my testimony is an example of how the

1 stipulation could result in rates that are less than the maximum allowed
2 under Tenn. Code Ann. § 65-5-209.

3 As shown on page 3 of the example, the adjustment allowed
4 under Tenn. Code Ann. § 65-5-209 is a .8% reduction. The
5 cumulative PRI as computed in accordance with the stipulation is
6 100.29%. However, when calculated using the rates that produce the
7 .8% reduction the SPI is 101.23%. Since under the stipulation the SPI
8 cannot exceed the PRI, the proposed rates that produce a .8% reduction
9 would exceed those allowed under the stipulation. In this example, the
10 rates allowed under the stipulation would be lower than those allowed
11 by Tenn. Code Ann. § 65-5-209.

12 This does not indicate that the stipulated methodology is faulty.
13 The parties simply agreed to a methodology that may result in some
14 instances where rates are lower than the maximum allowed otherwise
15 under the statute. As a result, the stipulation serves as the limiting
16 factor. This does not indicate that there is a conflict between the
17 statute and the stipulation since the resulting rates are lower than the
18 maximum allowed by the statute. I have been advised by counsel that
19 while the parties may agree on a procedure that imposes an additional
20 limit on the level of rates, the parties cannot implement a procedure
21 that results in rates greater than those allowed by statute.
22

1 Q. What caused the stipulation methodology to result in a lower rate
2 level in the example?

3 A. The change in the mix of services. I point out that this is a
4 hypothetical example that is being used for illustrative purposes and
5 does not reflect an actual change in mix that has occurred.
6

7 Q. Does this conclude your testimony?

8 A. Yes, it does.
9
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Before the

TENNESSEE REGULATORY AUTHORITY

IN RE: UNITED TELEPHONE-SOUTHEAST, INC. TARIFF TO REFLECT
PROPOSED CHANGES UNDER PRICE REGULATION PLAN

DOCKET NO. 98-00626

EXHIBITS

April 30, 1999

Attachment A

Robert T. Buckner (Terry)

Senior Regulatory Analyst

Office of the Attorney General for the State of Tennessee

Consumer Advocate Division

Additional Education Background:

Micro-Computer Training, **University of Wisconsin, Madison**

Cost Separations School, **United States Telephone Association, San Diego**

Rate Case School, **Arthur Andersen LLP, Chicago**

Telecommunications Conference, **University of Georgia, Athens**

NARUC Conference, **Michigan State University, Lansing**

Management Training Seminar, **Vanderbilt University**

Interstate Access Settlements, **National Exchange Carrier Association**

SEARUC Conferences, **Birmingham, AL. and Charleston, S.C.**

Telephone Plant Accounting Program, **Ernst and Young LLP, Atlanta**

ATTACHMENT B

Sprint United Telephone-Southeast, Inc
1998 Annual Price Adjustment Filing

<u>Aggregate Non-Basic Revenues at Current Rates</u>		Aggregate Non-Basic Revenues @ 6/98 Rates
Line		
1	General Subscriber Service Tariff	\$30,697,976 40 a/
2	Access	9,103,137 60 b/
3	Directory Revenue	58,353 60 c/
4	Miscellaneous Revenues	4,132,349 88 d/
5	Total Non-Basic per Company [L1+L2+L3+L4]	\$43,991,817 48
 <u>Computation of the Maximum Adjustment Factor</u>		
6	Inflation First QTR 1997 vs First Qtr 1998	1 20% e/
Maximum Annual Adjustment Factor is the lesser of		
7	1/2 Inflation Rate [L6 X 5]	0 60%
	or	
8	Inflation less 2% [L6-2%]	-0 80%
9	Maximum Adjustment Factor [L8]	-0 80% f/
Maximum Allowed Annual Adjustment to Aggregate		
10	Non-Basic Revenue [L5 X L9]	(\$351,934 54)
 <u>Aggregate Non-Basic Revenues Proposed Rates</u>		Aggregate Non-Basic Revenues @ UTSE Proposed Rates
11	General Subscriber Service Tariff	\$32,755,722 24 a/
12	Access	9,120,864 00 b/
13	Directory Revenue	58,353 60 c/
14	Miscellaneous Revenues	4,132,349 88 d/
15	Total Company Proposed Non-Basic Revenue [L11+L12+L13+L14]	\$46,067,289 72
UTSE Proposed Increase in Aggregate Non-Basic Revenues [L15-L5]		<u>\$2,075,472 24</u>
Proposed Increase in Aggregate Non-Basic Revenues Exceeds Allowed Adjustment [L16-L10]		\$2,427,406 78
UTSE Proposed % Increase in 1998 Non-Basic Aggregate Revenues		<u>4 72%</u>

a/ Sprint UTSE Filing as revised 10/16/98 Non-Basic Service Price out page 12

b/ Sprint UTSE Filing as revised 10/16/98 Non-Basic Service (Access) Price out page 2

c/ Sprint UTSE Filing as revised 10/16/98 Non-Basic Service General Ledger [Directory compensation] page 1

d/ Sprint UTSE Filing as revised 10/16/98 Non-Basic Service General Ledger [Miscellaneous] page 1

e/ ATTACHMENT B of Sprint UTSE's Filing as revised 10/16/98

f/ Tenn Code Ann 65-5-209

Hypothetical Example

Proposed changes for each of the three years fall under the maximum annual increase allowed under Tenn. Code Ann. 65-5-209. However in the third year the proposed rates exceed the maximum level established by the Stipulation accepted in 1996.

Assumptions:

	Year 1	Year 2	Year 3
Inflation (GDP-PI)	2.40%	2.70%	1.20%
Maximum Factor [Lesser of (1/2)X(GPI-PI) or (GDP-2%)]	0.40%	0.70%	-0.80%
Year 1 - rate reduction			
Year 2 - No rate change			
Year 3- Rate reduced in accordance with Tenn. Code Ann 65-5-209			

Computed Results

Computed Annual Increase	-1.00%	0.00%	-0.80%
Computed PRI per Stipulation	100.40%	101.10%	100.29%
Computed SPI per Stipulation	99.00%	99.00%	101.23%
SPI Exceeds the Cumulative PRI by			0.93%

Year 1

Comparison of SPI, PRI, and Annual Increase

Base/Current Rates				Proposed Rate			
Service	Volume	Initial	Revenue	Volume	Proposed	Revenue	
		Rates			Rates		
Service 1	1,000	\$1.000	\$1,000.00	1,000	\$0.9900	\$990.00	
Service 2	4,000	2.0000	8,000.00	4,000	\$1.9800	7,920.00	
Service 3	200	5.0000	1,000.00	200	\$4.9500	990.00	
Service 4	600	7.0000	4,200.00	600	\$6.9300	4,158.00	
Service 5	800	3.0000	2,400.00	800	\$2.9700	2,376.00	
Service 6	900	4.0000	3,600.00	900	\$3.9600	3,564.00	
			\$20,200.00				
				Aggregate Revenue		\$19,998.00	99.00% SPI
				PRI			100.40% PRI
				Annual % Change			-1.00%
				Cumulative Change			-1.00%

Year 1 proposed rate changes comply with both Tenn. Code Ann. 65-5-209 and the Stipulation

Hypothetical Example
Year 2

Comparison of proposed increase with annual limit per statute.

Service	Current Rates			Proposed Rate			
	Current Volumes	Current Rates	Current Revenue	Proposed Volume	Proposed Rates	Proposed Revenue	
Service 1	1,100	\$0.9900	\$1,089.00	1,100	\$1.2500	\$1,375.00	
Service 2	4,500	1.9800	8,910.00	4,500	2.2500	10,125.00	
Service 3	300	4.9500	1,485.00	300	4.9500	1,485.00	
Service 4	650	6.9300	4,504.50	650	6.9300	4,504.50	
Service 5	850	2.9700	2,524.50	850	2.9700	2,524.50	
Service 6	1,000	3.9600	3,960.00	1,000	2.4590	2,459.00	
Aggregate Revenues			\$22,473.00	Aggregate Revenues		\$22,473.00	100.00%
				Allowed annual Increase			0.70%
				Annual % Change			0.00%

Comparison of PRI with SPI.

Service	Base Rates			Proposed Rate			
	Current Volumes	Initial Rates	Initial Revenue	Proposed Volume	Proposed Rates	Proposed Revenue	
Service 1	1,100	\$1.0000	\$1,100.00	1,100	\$1.2500	\$1,375.00	
Service 2	4,500	2.0000	9,000.00	4,500	2.2500	10,125.00	
Service 3	300	5.0000	1,500.00	300	4.9500	1,485.00	
Service 4	650	7.0000	4,550.00	650	6.9300	4,504.50	
Service 5	850	3.0000	2,550.00	850	2.9700	2,524.50	
Service 6	1,000	4.0000	4,000.00	1,000	2.4590	2,459.00	
Aggregate Revenues			\$22,700.00	Aggregate Revenues		\$22,473.00	99.0000% =SPI
				Cumulative % Change			-1.00%
							101.10% =PRI
				Allowed Cumulative % Change			1.10%

Year 2 proposed rate changes comply with both Tenn. Code Ann. 65-5-209 and the 1996 Stipulation

Hypothetical Example
Year 3

Comparison of proposed increase with annual limit per statute.

Service	Current Rates			Volume	Proposed Rate		Revenue	
	Current Volumes	Current Rates	Revenue		Proposed Rates	Revenue		
Service 1	3,100	\$1.2500	\$3,875.00	3,100	\$1.5000	\$4,650.00		
Service 2	5,000	\$2.2500	11,250.00	5,000	\$2.3000	11,500.00		
Service 3	450	\$4.9500	2,227.50	450	\$4.9000	2,205.00		
Service 4	700	\$6.9300	4,851.00	700	\$6.9300	4,851.00		
Service 5	860	\$2.9700	2,554.20	860	\$2.9000	2,494.00		
Service 6	900	\$2.4590	2,213.10	900	\$1.1720	1,054.80		
Aggregate Revenues			\$26,970.80	Aggregate Revenues		\$26,754.80		99.20%
				Allowed annual Increase				-0.80%
				Annual % Change				-0.80%

Comparison of PRI with SPI.

Service	Base Rates			Volume	Proposed Rate		Revenue	
	Current Volumes	Initial Rates	Revenue		Proposed Rates	Revenue		
Service 1	3,100	\$1.0000	\$3,100.00	3,100	\$1.5000	\$4,650.00		
Service 2	5,000	\$2.0000	10,000.00	5,000	\$2.3000	11,500.00		
Service 3	450	\$5.0000	2,250.00	450	\$4.9000	2,205.00		
Service 4	700	\$7.0000	4,900.00	700	\$6.9300	4,851.00		
Service 5	860	\$3.0000	2,580.00	860	\$2.9000	2,494.00		
Service 6	900	\$4.0000	3,600.00	900	\$1.1720	1,054.80		
Aggregate Revenues			\$26,430.00	Aggregate Revenues		\$26,754.80		101.23% =SPI
				Cumulative % Change				1.23%
				PRI				100.29% PRI
				Allowed Cumulative % Change				0.29%

Year 3 rate changes comply with the limit in Tenn. Code Ann. 65-5-209 but exceed the limit established by the 1996 Stipulation.

Computation of Cumulative Adjustment Limit

	First Qtr. 1995 vs First Qtr 1996	First Qtr. 1996 vs First Qtr 1997	First Qtr. 1997 vs First Qtr 1998
Inflation (GPI-PI)	2.40%	2.70%	1.20%
Calculation			
Step 1			
Base Rate of 100	100.00%	100.00%	100.00%
Step 2			
Plus: The lesser of			
1/2 Inflation Rate	1.20%	1.35%	0.60%
or			
Inflation Rate - 2%	0.40%	0.70%	-0.80%
Annual Adjustment Factor Tenn Code Ann. 65-5-209	0.40%	0.70%	-0.80%
	100.40%	100.70%	99.20%
Step 3			
Divided by 100%	1.004	1.007	0.992
Step 4			
Current PRI	100.00%	100.40%	101.10%
New PRI=Current PRI X Annual Adjustment Factor	100.4000%	101.1028%	100.2940%

Attachment D

May 27, 1997

MEMORANDUM

TO: Lynn Greer, Chairman
Sara Kyle, Director
Melvin Malone, Director

FROM: Chris Klein, Chief Utility Rate Division
Mike Gaines, Telecommunications Manager

SUBJECT: Tariff filing by United Telephone Southeast (UTSE) to reduce the intrastate CCLC access rate to remove the subsidy to pay telephones. Tariff 97-206, Docket 97-00409

UTSE filed tariffs effective April 1, 1997, to remove payphone operations from its tariffs. At that time, UTSE estimated the subsidy to payphone operations to be immaterial and did not reduce rates. However, on May 19, 1997, UTSE submitted a revised subsidy estimate and filed this tariff to reduce access rates \$143,500, effective the same day.

The Staff reviewed this estimated amount, but has not audited the number because this matter will be addressed in the pending Payphone Docket 97-00409. Unless otherwise notified, this tariff will go into effect pending the outcome of Docket 97-00409.

cc: Docket File 97-00409

Telecommunications Act of 1996 Section 276

"SEC. 276. PROVISION OF PAYPHONE SERVICE.

"(a) NONDISCRIMINATION SAFEGUARDS.--After the effective date of the rules prescribed pursuant to subsection (b), any Bell operating company that provides payphone service--

"(1) shall not subsidize its payphone service directly or indirectly from its telephone exchange service operations or its exchange access operations; and

"(2) shall not prefer or discriminate in favor of its payphone service.

"(b) REGULATIONS.--

"(1) CONTENTS OF REGULATIONS.--In order to promote competition among payphone service providers and promote the widespread deployment of payphone services to the benefit of the general public, within 9 months after the date of enactment of the Telecommunications Act of 1996, the Commission shall take all actions necessary (including any reconsideration) to prescribe regulations that--

"(A) establish a per call compensation plan to ensure that all payphone service providers are fairly compensated for each and every completed intrastate and interstate call using their payphone, except that emergency calls and telecommunications relay service calls for hearing disabled individuals shall not be subject to such compensation;

"(B) **discontinue the intrastate and interstate carrier access charge payphone service elements and payments in effect on such date of enactment, and all intrastate and interstate payphone subsidies from basic exchange and exchange access revenues, in favor of a compensation plan as specified in subparagraph (A);** (Emphasis Added)

"(C) prescribe a set of nonstructural safeguards for Bell operating company payphone service to implement the provisions of paragraphs (1) and (2) of subsection (a), which safeguards shall, at a minimum, include the nonstructural safeguards equal to those adopted in the Computer Inquiry-III (CC Docket No. 90-623) proceeding;

"(D) provide for Bell operating company payphone service providers to have the same right that independent payphone providers have to negotiate with the location provider on the location provider's selecting and contracting with, and, subject to the terms of any agreement with the location provider, to select and contract with, the carriers that carry interLATA calls from their payphones, unless the Commission determines in the rulemaking pursuant to this section that it is not in the public interest; and

"(E) provide for all payphone service providers to have the right to negotiate with the location provider on the location provider's selecting and contracting with, and, subject to the terms of any agreement with the location provider, to select and contract with, the carriers that carry intraLATA calls from their payphones.

"(2) PUBLIC INTEREST TELEPHONES.--In the rulemaking conducted pursuant to paragraph (1), the Commission shall determine whether public interest payphones, which are provided in the interest of public health, safety, and welfare, in locations where there would otherwise not be a payphone, should be maintained, and if so, ensure that such public interest payphones are supported fairly and equitably

"(3) EXISTING CONTRACTS.--Nothing in this section shall affect any existing contracts

between location providers and payphone service providers or interLATA or intraLATA carriers that are in force and effect as of the date of enactment of the Telecommunications Act of 1996

"(c) STATE PREEMPTION.--To the extent that any State requirements are inconsistent with the Commission's regulations, the Commission's regulations on such matters shall preempt such State requirements.

"(d) DEFINITION --As used in this section, the term 'payphone service' means the provision of public or semi-public pay telephones, the provision of inmate telephone service in correctional institutions, and any ancillary services."

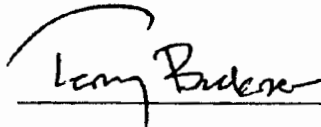
BEFORE THE TENNESSEE REGULATORY AUTHORITY
AT NASHVILLE, TENNESSEE

IN RE: UNITED TELEPHONE-
SOUTHEAST, INC. TARIFF TO
REFLECT PROPOSED CHANGES
UNDER PRICE REGULATION PLAN

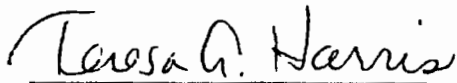
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AFFIDAVIT

I, Robert T. Buckner, Senior Regulatory Analyst for the Consumer Advocate Division of the Attorney General's Office, hereby certify that the attached Direct Testimony represents my opinion in the above referenced case and the opinion of the Consumer Advocate Division



Sworn to and subscribed before me
this 13th day of April, 1999.



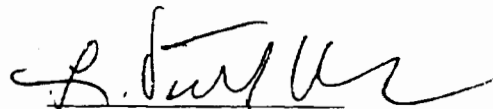
NOTARY PUBLIC

My commission expires on. Jan. 25, 2003

CERTIFICATE OF SERVICE

I hereby certify that this document was served on parties of record by U.S. Mail or by facsimile this 3rd day of April, 1999.

James B. Wright, Esq.
United Telephone-Southeast, Inc
14111 Capital Blvd.
Wake Forest, NC 27587-5900



L. Vincent Williams

STATE OF TENNESSEE

Office of the Attorney General



PAUL G. SUMMERS
ATTORNEY GENERAL AND REPORTER

ANDY D. BENNETT
CHIEF DEPUTY ATTORNEY GENERAL

LUCY HONEY HAYNES
ASSOCIATE CHIEF DEPUTY
ATTORNEY GENERAL

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NASHVILLE, TN 37243-0485

TELEPHONE (615) 741-3491
FACSIMILE (615) 741-2009

July 30, 1999

Mr David Waddell
Executive Secretary
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

Re: Proceeding for the Purpose of Addressing Competitive Effects of Contract Service
Arrangements Filed by BellSouth Telecommunications, Inc. in Tennessee
Docket No. 98-00559

Dear Mr. Waddell:

I have enclosed an original and thirteen copies of Rebuttal Testimony of Consumer Advocate Division witness Robert T. Buckner, Senior Regulatory Analyst, in the above referenced matter. Copies are being furnished to counsel of record for interested parties.

Sincerely,

A handwritten signature in dark ink, appearing to read "L. Vincent Williams".

L. Vincent Williams
Consumer Advocate

c: Counsel of record

Before the

TENNESSEE REGULATORY AUTHORITY

IN RE: PROCEEDING FOR THE PURPOSE OF ADDRESSING COMPETITIVE EFFECTS
OF CONTRACT SERVICE ARRANGEMENTS FILED BY BELL SOUTH
TELECOMMUNICATIONS, INC. IN TENNESSEE
DOCKET NO. 98-00559

REBUTTAL TESTIMONY
of
ROBERT T. BUCKNER

July 30, 1999

1 **Q. Please state your name for the record.**

2 A. My name is Robert T.("Terry") Buckner.

3

4 **Q. By whom are you employed and what is your position?**

5 A. I am employed by the Consumer Advocate Division ("CA") in
6 the State of Tennessee Attorney General's Office as a Senior Regula-
7 tory Analyst.

8

9 **Q. How long have you been employed in the utility industry?**

10 A. Approximately twenty years. Before my employment with the
11 Attorney General, I was employed with the Tennessee Public Service
12 Commission ("Commission") as a financial analyst for approximately
13 six years. Prior to my employment with the Commission, I was
14 employed by Telephone and Data Systems ("TDS Telecom") for eight
15 years and the First Utility District of Knox County for three years.

16

17 **Q. What is your educational background and what degrees do you**
18 **hold?**

19 A. I have a Bachelors degree in Business Administration from the
20 University of Tennessee, Knoxville with a major in Accounting. I am
21 also a Certified Public Accountant, a member of the Tennessee Society
22 of Certified Accountants, and a member of the American Institute of

1 Certified Public Accountants. Additional education background with
2 respect to my qualifications is provided in Exhibit RTB-1.

3

4 **Q. Would you briefly describe your responsibilities as a Senior**
5 **Regulatory Analyst since your employment with the CA?**

6 A. Before becoming a member of the CA, I prepared testimony and
7 financial exhibits as an employee with the Commission. Since
8 becoming employed with the CA, my responsibilities have not
9 changed significantly.

10

11 **Q. What is the purpose of your testimony before the Tennessee**
12 **Regulatory Authority ("TRA")?**

13 A. The purpose of my testimony is to present factual information,
14 which supports the CA's position concerning the two Contract Service
15 Arrangements ("CSAs") initiated by BellSouth ("Bell") in TRA
16 Dockets #99-00210 and #99-00244, CSA's TN98-2766-00 and KY98-
17 4958-00 respectively, and to respond to the positions taken by Bell's
18 witness Frame.

19

20 **Q. Have you done any other analysis of Bell's CSAs than the work**
21 **specifically related to these two CSAs?**

22 A. Yes. In Docket #97-01105, I reviewed many of Bell's CSAs

1 that had been filed for period of time in 1997. I set forth the results of
2 my review in a document filed in that docket entitled, *Consumer*
3 *Advocate Division's Comments on BellSouth's Contract Service*
4 *Arrangements*, July 22, 1998. At this time, I wish to adopt my opinion
5 as set forth in that document as part of my testimony in the present
6 Dockets. A copy of the Comments on BellSouth's Contract Service
7 Arrangements is attached as Exhibit RTB-2.

8
9 **Q. In your investigation of Docket #97-01105, what was Bell's**
10 **apparent motive for CSAs?**

11 A. I met with representatives of Bell on February 18, 1998 to
12 discuss the matter of CSAs. I concluded from our discussions that it
13 was Bell's position that there were three basic reasons for the CSAs:
14 (1) Response to a competitive telecommunications provider; (2) To
15 protect Bell's revenue stream for the long-term; and (3) As an
16 incentive for customers to increase the usage of services.

17
18 **Q. In the meeting of February 18, 1998, what was the basis for**
19 **determining discount levels?**

20 A. The basis for determining the discount levels was the following:
21 (1) Up to the individual marketer; (2) There was no specific Bell
22 policy for determination; and (3) The discount amount was dependent

1 upon the volume of services purchased by the customer.

2

3 **Q. How is the information gained in Docket #97-01105 relevant to**
4 **these Dockets?**

5 A. I believe that the information is relevant in that it is indicative of
6 the fluid and evolving nature of the CSAs in Tennessee. Additionally,
7 there is evidence of anti-competitive behavior and price
8 discrimination.

9

10 **Q. In these Dockets, the Bell witness, Mr. Frame, defends the CSAs**
11 **primarily on the basis of competition. (See Frame Direct**
12 **Testimony, Page 2, Lines 19-21.) Has the TRA, the FCC, or any**
13 **other authority found that Bell has complied with the**
14 **requirements necessary to open its local market in Tennessee to**
15 **competition?**

16 A. No. The Telecommunications Act of 1996 requires incumbents
17 such as Bell to take action to allow competition to develop in the local
18 market. Those requirements are found in Sections 251 and 252 of the
19 Act. In Section 271(B), a checklist is provided for determining if an
20 incumbent Regional Bell Operating Company ("RBOC"), such as Bell,
21 has complied with Sections 251 and 252. Neither the TRA, the FCC,
22 nor any other appropriate authority has found that Bell has yet

1 complied with the requirements of the Act in Tennessee.

2 In May 1998, the TRA conducted an extensive hearing of more
3 than ten days in Docket #97-00309 for the purpose of determining if
4 Bell had opened its local market in Tennessee to competition in
5 accordance with the Act and as required to be eligible to enter the
6 regional interLATA long distance market. On April 8, 1999, Bell filed
7 a Notice of Voluntary Dismissal and Withdrawal in Docket #97-00309
8 volunteering to withdraw its request that the TRA find that it had
9 opened its market to allow competition as required by the
10 Telecommunications Act of 1996. Since April 8, 1999, Bell has not
11 filed or otherwise provided persuasive evidence that it has opened its
12 local Tennessee market to competition..

13

14 **Q. Have you reviewed the "Rate Assurance" provisions included in**
15 **the CSA identified by Bell as CSA TN-98-2766-00?**

16 **A.** Yes, on page 9 of the CSA TN98-2766-00 in Docket #99-
17 00210, the following provision is found:

18 If _____ is offered a service proposal
19 from an unauthorized carrier that is
20 comparable both in rate and in level of
21 support provided by BellSouth for any V&T
22 Eligible Service which priced at least 15%
23 less than those provided to _____ by
24 BellSouth which priced at least 15% less
25 than those provided to _____ by BellSouth
26 then these services may be considered for a
27 price reduction. _____ shall provide

1 BellSouth written notice of the service
2 proposal, and sufficient information to
3 validate the terms and rates of the offer and
4 the option to respond to the alternative
5 proposal.

6 BellSouth shall respond in writing
7 within seven (7) calendar days as to whether
8 or not BellSouth will pursue a new rate for
9 _____. In the event BellSouth elects to
10 respond to the offering from the alternative
11 carrier and offers _____ a service proposal
12 with rates that are within ten percent (10%)
13 of the alternative carrier's competitive
14 offering, this agreement shall continue in
15 effect at the new customized rate and
16 charges until the expiration of the V&T
17 Agreement. The parties shall amend the
18 Minimum Annual Revenue Base and the
19 corresponding Discount Levels listed in
20 Appendix II to reflect the rate reduction and
21 any other portions of the Agreement
22 necessary to effect this Rate Assurance
23 Adjustment

24 If BellSouth elects not to respond to
25 the offer from the alternative carrier or does
26 not offer _____ a service proposal with rates
27 that are within ten percent (10%) of the
28 alternative carrier's offering, the parties shall
29 amend Appendix IA, Appendix IB and
30 Appendix II and any other pertinent
31 provisions of this Agreement as necessary to
32 reduce _____'s Minimum Annual Revenue
33 Base, the Annual Revenue Base and the
34 corresponding Discount Levels listed in
35 Appendix II, if necessary, to permit _____ to
36 purchase the services in question from the
37 alternative carrier.

38
39 While this provision is labeled "Rate Assurance," the assurance
40 provided is that Bell will be able to stop a customer from moving to a
41 competitor of Bell. This provision does not assure the customer that

1 Bell will match a competitor's offer. Instead, it tends to guarantee that
2 Bell can retain the customer by offering to provide the service at rates
3 that are 10% higher than the rates offered by the competitor. While
4 the customer could theoretically reject the higher Bell rates, the
5 punitive effect of the termination penalty included in the CSA would
6 likely result in any potential saving being captured by Bell and not by
7 the customer.

8
9 **Q. What amount of a discount would a competitor have to offer the**
10 **customer under this CSA before Bell would need to respond?**

11 A. Under this provision, a competitor would have to offer the
12 customer a rate that is 23.5% below Bell's Tariffed rate before Bell
13 would even have to consider responding.

14 As stated, the prices offered by the competitor must be priced at
15 least 15% less than those provided by Bell under the contract. Since
16 the CSA provides a discount of 10%, the prices under the CSA are at
17 90% of the tariffed rates for the services provided. A 15% reduction
18 in these rates would require the offered rates to be equal to 76.5% of
19 the tariffed rates. (90% X 85% = 76.5%) This, of course, reflects a
20 23.5% discount.

Bell CSA provided Discount off Tariffed Rates	10%
Bells' Rates as % of Tariffed	90%
The required competitive offer must be 15% below Bell	$90\% \times 85\% = 76.5\%$ of Tariffed Rates
Total minimum discounts offered by the Competitor	$100\% - 76.5\% = 23.5\%$

Q. What level of a discount would Bell have to include in its counter offer in order to invoke the termination penalty if the customer elects to purchase service from the competitor?

A. Since Bell needs only to come within 10% of the competitor in order to bind the customer, Bell is only required to increase its contract discount from 10% to 15.85%.

A competitor offers a 23.5% discount off Bell Tariffed Rates Competitors' rates as a percent of Tariffed	76.5%
Bells' response must be within 10% of Competitive offer	$76.5\% \times 110\% = 84.15\%$
Discount Required by Bell to retain the customer	$100\% - 84.15\% = 15.85\%$

As a result, the customer would not be able to take advantage of what might otherwise be deemed a more economic and competitive offer, but instead will be bound to Bell.

While the customer could theoretically reject the Bell counter offer of the 15.85% discount, the punitive termination provision would

1 likely eliminate any savings.

2 How the termination provision would penalize the customer
3 depends on when the contract terminates. As Mr. Frame stated in his
4 pre-filed testimony, termination of the contract at the end of a contract
5 year results in a flat charge. (See Frame Direct Testimony, Page 18,
6 Lines 6-8.) However, if the contract is terminated during a contract
7 year, the charge is likely to be much greater.

8 IX Termination Liability

9 B If written notice of termination is delivered
10 to BellSouth to be effective prior to the end
11 of the current V&T Contract Year,
12 BellSouth will bill ____ the appropriate
13 termination charges calculated in A. above,
14 in addition to an amount equal to the
15 difference between the current Contract
16 Year to date billing for V&T Eligible
17 billings and the current year Minimum
18 Annual Revenue Base.

19
20 The Minimum Annual Revenue Base for CSA TN98-2766-00 is
21 \$5,750,000. Therefore, if the contract is to terminate in the middle of
22 the year and the customer has been billed only \$2,850,000, the
23 termination penalty will be \$2,850,000 in addition to the flat rate
24 charge as stated by Mr. Frame.

25

26

27

1 Q. Would the customer be subject to any additional termination
2 charges?

3 A. Yes. Paragraph C of Section IX of CSA TN98-2766-00
4 provides:

5 C. The application of termination charges
6 pursuant to this Section shall not affect the
7 application of termination charges pursuant
8 to the tariff or any other agreement.
9

10 In accordance with BellSouth's tariffs, the customer would be
11 liable for termination charges for some of the services listed on Mr.
12 Frame's Exhibit RLF-1. For example, from the discounted rate for
13 MegaLink® ISDN identified on the exhibit, it appears that the customer
14 has entered into a 49-72 month agreement¹ to purchase this service.
15 Therefore, the provision of BellSouth's Tariff Section B7.5.4 E would
16 apply.

17 Tariff Section B7.5.4

18
19 E. A Termination Liability Charge is applicable
20 at the date of termination. The applicable
21 charge is dependent on the contract period
22 subscribed to and will be equal to the
23 number of months remaining in the contract
24 times the monthly rate provided under the
25 contract.
26

27 Therefore, not only would the customer be liable for the

¹ The rate for MegaLink® ISDN on Exhibit RLF-1 is \$217.50 with a 13% discount
Therefore the pre-discounted rate would be \$250 (\$217.50 / 87% = \$250.00) BellSouth Tariff
Section 7 5 6 D (1) Primary Rate Interface for a 49-72 month commitment is \$250.00 / month
USOC PRFS1

1 termination penalty in Section IX of the CSA, but the customer would
2 also be required to pay \$250 for each MegaLink ®ISDN Primary Rate
3 Interface for each of the remaining months on its contract to purchase
4 MegaLink ®ISDN service.

5
6 **Q. Are the termination provisions in this CSA consistent with those**
7 **included in other Bell CSAs?**

8 **A.** No. The termination provisions in this CSA and CSA KY 98-
9 4598-00 are different from some other CSA's filed by Bell. For
10 example, in some CSAs the cancellation language is patterned as
11 follows:

12 If Subscriber cancels this Agreement
13 at any time prior to the expiration of
14 the service period set forth in this
15 agreement, Subscriber shall be
16 responsible for all termination
17 charges. Unless otherwise specified
18 by tariff, termination charges are
19 defined as **reasonable** charges due or
20 remaining as a result of the minimum
21 service period agreed to by Company
22 and Subscriber and set forth in the
23 Attachments. (Emphasis added.)
24

25 While the provision calls for the termination charge to be
26 reasonable, as evident from information obtained during our review of
27 the CSA process, the actual charges set forth in the CSA Attachments
28 are arbitrary and dependent upon the ability of the customer to

1 negotiate. For example, Bell provided copies of correspondence
2 between certain of its employees that included the following
3 discussions:

4 wants the first year termination
5 liability to be reduced \$75K (\$325,000 to
6 \$250,000). This shouldn't be an issue since
7 I added an additional \$100K(sic) as a
8 termination liability in the first year of the
9 Supplemental agreement.

10
11 I have done some calculations on
12 the services that we have under contract at
13 _____. Based on the termination penalties
14 on these contracts I share _____ concern that
15 they would be "double gigged" in the highly
16 unlikely event of an early termination on an
17 MSA. For example, if _____ enters into a 36
18 month MSA agreement with an effective
19 date of 2/01/97, but they cancel ALL
20 services through BellSouth at the conclusion
21 of year 1 on 2/01/98, their termination
22 penalties would be as follows

23
24 \$938,000 Contract termination penalties (ESSX,
25 SMARTPath, PRI ISDN, Synchronet)
26 \$775,000 MSA cancellation penalty at end of Year 1

27
28 \$1,713,000 TOTAL TERMINATION PENALTY

29
30 _____ understands that the individual
31 contracts and the MSA agreement are two
32 different issues, but they do not feel that we
33 should have such hefty penalties. My
34 contact tells me that if we can get the MSA
35 penalties more like the following, we can
36 continue with negotiations:

37
38 \$266,000 Year 1
39 \$134,000 Year 2

40
41 (See Exhibit RTB-3.)

1 From these statements, I infer that the termination liabilities
2 included in these contracts are not based on Bell's unrecovered costs
3 or damages that might be incurred by Bell if the contract is breached
4 by the customer. Instead, termination liabilities are largely arbitrary
5 and subject to the ability of the customer's and of Bell's negotiators.

6 Further, these exorbitant Termination Liability amounts are not
7 a financial incentive to the customer as Bell contends, but a penalty
8 imposed on customers. Otherwise, the customer might select services
9 from a competing telecommunications service provider that offers
10 more economical rates. A true financial incentive for the customer
11 would be additional discounts at greater service volumes, not the
12 penalty of paying for services the customer no longer wishes to
13 receive.

14 The revised termination provisions in CSA KY98-4598-00,
15 however, tie the penalties to the discounts received, and do not reflect
16 incurred costs or damages to Bell, which might result from the
17 termination of the contract.

18

19 **Q. Does CSA KY98-4958-00 include the same "Rate Assurance"**
20 **provisions as CSA TN98-2766-00?**

21 **A.** No. The Rate Assurance provision is not included in KY98-
22 4958-00.

1 **Q. Is the computation of the termination penalty under CSA KY98-**
2 **4958-00 consistent with computation under CSA TN98-2766-00?**

3 A. No. Although when Bell filed the CSA, a page identified as
4 "Additional Terms and Conditions" included replacement language for
5 the computation of the termination liability that would have been
6 similar, Mr. Frame testified that the substitute language was not
7 accepted for CSA TN98-2766-00. (See Frame Direct Testimony,
8 Page 17, Line 16.)
9

10 **Q. Does the Consumer Advocate Division have a concern with the**
11 **termination provisions in CSA KY98-4958-00?**

12 A. Yes. While the procedure for determining the termination
13 penalty is different in CSA KY98-4958-00 than in CSA TN98-2766-
14 00, it also results in an amount that is not related to any cost or
15 damages that Bell would incur as the result of the contract being
16 prematurely terminated.

17 In fact, the procedure works somewhat in reverse of what one
18 might expect. It would normally be expected, that the longer the
19 contract has been in effect and the less time remaining on the contract
20 when terminated, the smaller the termination liability. This is not the
21 case as stated in the revised language of CSA KY98-4958-00. The
22 termination penalty actually increases each month for the first year and

1 then remains constant. Therefore, if the customer terminates the
2 contact at the end of the first year or even at the end of the 35th month,
3 when there is only one month remaining on the contract, the
4 termination penalty will be the same. Obviously, any damages, that
5 Bell incurs as the result of the early termination, would not be the same
6 if the contract is terminated after one year when compared to
7 termination with only a month remaining. This termination penalty is
8 unjust and unreasonable.

9
10 **Q. You state that the termination penalty is not related to costs**
11 **incurred by Bell. Doesn't the revised language in KY98-4958-00**
12 **specifically address costs incurred by Bell?**

13 **A.** Yes, it does. The recovery of the costs, however, is in addition
14 to the penalty computed based on the length of time that the CSA has
15 been in place.

16
17 **Q. Are there other provisions in these CSAs that cause you concern?**

18 **A.** In addition to the anti-competitive "Rate Assurance" provision
19 in CSA TN98-2766-00 (TRA Docket #99-00210) and the punitive
20 termination provision as previously discussed, these and other CSAs
21 filed by Bell are discriminatory.

22

1 **Q. Does Tennessee law prohibit discrimination?**

2 A. Yes. Discrimination is addressed in several statutes. For
3 example, Tenn. Code Ann. §65-4-122. Discriminatory charges -
4 Reasonableness of rates - Unreasonable preferences - Penalties
5 provides the following:

6 (a) If **any common carrier** or public
7 service company, directly or indirectly, **by**
8 **any special rate, rebate, drawback,** or
9 **other device, charges, demands, collects,**
10 or **receives from any person a greater or**
11 **less compensation for any service within**
12 **this state than it charges, demands,**
13 **collects, or receives from any other person**
14 **for service of a like kind under**
15 **substantially like circumstances and**
16 **conditions,** and if such common carrier or
17 such other public service company **makes**
18 **any preference between the parties**
19 **aforementioned** such common carrier or
20 other public service company commits
21 **unjust discrimination, which is prohibited**
22 **and declared unlawful.** (Emphasis Added.)

23

24 **Q. Is Bell a common carrier?**

25 A. Yes.

26

27 **Q. Does Bell directly or indirectly, by any special rate, rebate,**
28 **drawback, or other device, charges, demands, collects, or receives**
29 **from any person a greater or less compensation for any service**
30 **within this state than it charges, demands, collects, or receives**

1 from any other person for service of a like kind under
2 substantially like circumstances and conditions?

3 A. Yes. Paragraphs II A, B, C, D, & E, III A of CSA KY98-4958-
4 00 (TRA Docket #99-00244) and paragraphs II A & B of CSA TN 98-
5 2766-00 (TRA Docket #99-00210) provide that service will be
6 furnished to these two customers at a discounted rate, with the amount
7 of the discount being dependent upon the amount of service to which
8 the customer commits to purchase. The level of the service
9 commitment is measured by total revenue collected from the
10 customers. If the actual volume (revenue) during the contract year
11 exceeds the projected volume, the customer is to receive a rebate.

12 As provided in paragraph III A, the customer served under CSA
13 TN98-2766-00 will be billed for services at rates 10% less than the
14 tariffed rates if the customer purchases the contracted level of service.
15 If, however, in accordance with paragraph XIV B, the customer's
16 annual billing equals or exceeds \$6,250,000, the customer will receive
17 a rebate equal to an additional 1%. If the customer's actual purchase
18 equals or exceeds \$6,750,000, the rebate is increased to an additional
19 2% and to an additional 3%, if the actual purchase equals or exceeds
20 \$7,250,000. Bell is providing these customers both a discount and a
21 rebate.
22

1 **Q. Are the same discounts and rebates provided to these two**
2 **customers of the CSAs in this case?**

3 A. No. When the discount and rebate provisions of the two
4 contracts in this proceeding are compared, it is obvious that the
5 amounts being charged, demanded, billed, and collected are lesser for
6 one than the other. For example, the customer served in CSA TN98-
7 2766-00 is required to purchase \$4,750,000 in order to obtain an 8%
8 discount, while the customer served under CSA KY98-4598-00 is
9 required to purchase half the service of \$2,375,000 to obtain the same
10 8% discount. In order to obtain an 11% discount, the customer served
11 under CSA TN98-2766-00 must purchase \$6,250,000 of service, while
12 the customer served under CSA KY98-4598-00 must purchase only
13 \$3,000,000.

14
15 **Q. Is the difference in the amount of the discounts based on a**
16 **difference in the cost?**

17 A. No. The CA previously requested Bell to admit that the
18 difference in the rates charged customers under the approved tariffs
19 and the CSAs was no greater than the difference in the cost of
20 providing the service to the customers served under the CSAs. Bell
21 responded that it could neither admit nor deny because it had not
22 performed the analysis required. Consistent with its response to our

1 discovery request, the cost studies filed by Bell in support of the CSAs
2 in this docket do not reflect customers specific cost, but are the same
3 cost supports that Bell filed in support of its tariffed rates for the
4 services provided under the CSA. When this data is reviewed, it found
5 that many of the services are common to both CSAs, and that the same
6 costs are identified. This again supports the position that the
7 difference in the rates charged under CSA KY98-4958-00 (TRA
8 Docket #99-00244) and CSA TN98-2766-00 (TRA Docket #99-
9 00210) is not based on the costs of providing the services.

10

11 **Q. Are the same discounts and rebates provided to these customers as**
12 **the discounts and rebates provided to other customers, who**
13 **purchase service under CSAs?**

14 A. No. To illustrate that different discounts and rebates are being
15 offered. The following table is provided, which identifies the percent
16 discount provided under the two CSAs that are the specific subject of
17 these dockets as well as discounts provided to customers that are
18 parties to four other CSAs filed by Bell. While each of the CSAs
19 requires the customer to commit to purchase service for a three year
20 period, the amount of service that the customers must agree to
21 purchase in order to qualify for the discounts varies greatly. As I
22 previously explained, the customer served in CSA TN98-2766-00 is

1 required to purchase \$4,750,000 in order to obtain an 8% discount,
2 while the customer served under CSA KY98-4598-00 is required to
3 purchase half the service, \$2,375,000 to obtain the same 8% discount.

4 In order to obtain an 11% discount, the customer served under
5 CSA TN98-2766-00 must purchase \$6,250,000 of service, while the
6 customer served under CSA KY98-4598-00 must purchase only
7 \$3,000,000.

8 This disparity in the amount of revenue required to obtain the
9 discount is also present with CSA TN97-1641-00, which requires the
10 customer to purchase \$5,000,000 of service to obtain a 12% discount,
11 while the customer served under CSA TN98-2766-00 must purchase
12 \$6,500,000.

13 Similarly, the customer that is a party to CSA TN97-5138-00
14 receives a 10.5% discount by committing to purchase only \$1,360,000
15 of service, while the customers under CSAs TN98-2766-00 and
16 KY98-4598-00 must purchase \$5,750,000 and \$2,750,000
17 respectively, in order to obtain 10% discounts.

Other Example CSAs

Discount Provided by CSA	Required Volume under CSA TN98-2766- 00	Required Volume under CSA KY98-4598- 00	Required Volume under CSA TN96-7973- 01	Required Volume under CSA TN96-7961- 02	Required Volume under CSA TN97-1641- 00	Required Volume under CSA TN97-5138- 00	Required Volume under CSA TN96- 7967-03
2.0%							
3.0%							
4.0%			\$104,236				
5.0%				\$284,648			\$63,516
6.0%		\$2,000,000					
7.0%		\$2,250,000					
8.0%	\$4,750,000	\$2,375,000					
9.0%	\$5,250,000	\$2,500,000					
10.0%	\$5,750,000	\$2,750,000					
10.5%						\$1,360,000	
11.0%	\$6,250,000	\$3,000,000					
11.5%						\$1,632,000	
12.0%	\$6,750,000				\$5,000,000		
12.5%						\$1,904,000	
13.0%	\$7,250,000						

Q. Why is it appropriate to compare the discount in these CSAs that are subject to this proceeding with the discounts offered in other CSAs?

A. To determine if CSAs, CSA TN98-2766-00, and CSA KY98-4598-00 are discriminatory, it is not appropriate to simply compare the

1 rates charged the two customers served under these two CSAs. The
2 rates charged in these dockets must be compared to those charged
3 other customers, who are provided service under tariffed rates or under
4 other CSAs. The table, which is provided here, is not an attempt to
5 identify all of the CSAs that provide for discriminatory rates. The
6 comparisons' presented in the table, however, accurately represent the
7 unjust disparities in the rates that exist among the CSAs filed by Bell.

8
9 **Q. Have you made any comparison of the rates charged for specific**
10 **services billed under the CSAs and those for customers billed**
11 **under Bell's General Subscriber Service Tariff rates?**

12 A. Yes. The following table compares the rates charged for some
13 of the services under the provision of the CSAs with the rates for the
14 same service billed at the General Subscriber Service Tariff rates.
15 Again, these are only examples of the disparity and are not intended to
16 be all inclusive. Attachment III,² which was filed with the TRA in
17 support of CSA TN98-2766-00 and identifies the services provided in
18 accordance with that CSA, consists of 17 pages. I have not prepared a
19 schedule that compares the discounted rates charged with the tariffed
20 rates for each service on that listing or for all of the services listed on

² Exhibit RLF-1 filed by BellSouth as an exhibit to Mr. Frame's testimony is a duplicate of Attachment III.

1 similar supporting schedules filed in support of the other CSAs.
2 Instead, I have compared the rates for some of the more familiar
3 services.

4 As shown in this table, the price demanded, charged, and
5 collected from a customer, who purchases one party business line
6 (USOC³ 1FB) service at the tariffed rate in a Group 5 exchange is
7 \$39.70 per month. (Group 5 Exchanges are those exchanges, which
8 have 300,001 -500,000 lines, see BST TN Tariff Section A 3.2.1
9 Eighth Revised Page 1.1) Bell collects \$34.54⁴ per month for this
10 service from the customer billed in accordance with CSA TN98-2766-
11 00. This is a \$5.16 difference. The customer served under KY98-
12 4598-00 is charged \$35.53¹ and the customers served under CSAs
13 TN96-7961-02, TN97-1641-00, and TN97-5138-00 are charged
14 \$37.72, \$34.94, and \$31.87 respectively, for this same one party
15 business line service. This evidence shows an unjust difference in
16 rates for exactly the same service.

³ USOC (Universal Service Ordering Code)

⁴ This is the rate at the maximum discount level provided under the contract.

1 **Q. Are their similar disparities between the rates charged customers**
2 **served under Bell's General Subscriber Service Tariff and those**
3 **served under these CSAs for other services?**

4 **A. Yes. The charges for single business lines in rate group 3 & 4**
5 **exchanges are compared as are the charges for MegaLink ® ISDN,**
6 **MegaLink ®Channel Service, and DID service. In each instance, the**
7 **customers, who are billed the General Subscriber Service Tariff Rates**
8 **pay more than those billed under the CSAs.**

9

10 **Q. Are the same amounts billed for these services under the various**
11 **CSAs?**

12 **A. No The discounts provided under the CSAs vary. Therefore,**
13 **the amount charged for the same services are different under the**
14 **various CSAs.**

15

16

17

18

19

1	Service	USOC	Tariff Rate	Rate CSA TN98-2766-00 ⁵	Rate CSA KY98-4958-00 ¹	Rate CSA TN96-7961-02	Rate CSA TN96-7973-01	Rate CSA TN97-1641-00	Rate CSA TN97-5138-00 ¹
2	Flat Rate Business Line	1 FB Group 5	\$39 70	\$34 54	\$35 33	\$37 72		\$34 94 ⁶	\$31.87 ⁷
3									
4	Flat Rate Business Line	1 FB Group 4	\$39 05	\$33 97	\$34 75				
5									
6	Flat Rate Business Line	1 FB Group 3	\$32 75	\$28 49	\$29 15		\$31 44 ⁸		
7									
8	MegaLink ISDN	PRFS1 (3yr commit)	\$260 00	\$217 50 ⁹		\$247 00	\$240 00		
9									
10	MegaLink Channel Service	VUM 24 (3 yr commit)	\$189 00	\$182 70 ¹⁰	\$168 21				\$165 38
11									
12	DID/AIOD	NDT	\$20 00 ¹¹	\$17 40	\$17 80	\$19 00	\$19 20	\$17 60	\$17 56

⁵ Prices based on the maximum discount provided under the CSA

⁶ Tariff Rate Group 1 \$39 70 X 88%=\$34.94 (100%-12%=88%)

⁷ Discounted rate per workpapers filed with the TRA Staff in support of CSA

⁸ Clarksville is a Class 3 rate schedule wire center. The business rate for a class 3 wire center is \$32.75 (BellSouth Tariff Eighth revised page 1.1 Tariff Section A3 2 1, and Fifteenth revised page 20, Tariff Section A3 7 1) Discount is 4% \$32 75 X 96%=\$31 44.

⁹ The Tariff rates for MegaLink®ISDN service are \$360/ month, Month to Month, \$260/ month with a contract commitment 24 - 48 months, \$250/ month with a contract commitment 49-72 months, \$240 / month with a contract commitment 73 - 96 months (BellSouth Tariff Section B7 5.6 First Revised Page 37 4)While each of these contracts are for 3 years the discount for MegaLink ®ISDN service under CSA TN98-2766-00 appears to have been computed on Attachment III assuming a \$250 / month rate indicating a commitment of at least 49 months. It appears that the discounted rate for TN96-7961-02 was computed based on the \$260/month for a 3 yr commitment The discounted rate for TN96-7973-01 again appears to have been computed assuming that the \$250/month rate for a 49 to 72 month commitment was used \$250 discounted 4% is \$240.

¹⁰ The Tariff rates for MegaLink® Channel Service are \$210/month, Month to Month, \$189/ month with a contract commitment 24 - 48 months, \$171/ month with a contract commitment 49-72 months, \$154/ month with a contract commitment 73 - 96 months (BellSouth Tariff Section B7 3 4 First Revised Page 19)Each of these contracts are for 3 years. Therefore it would appear that the discounts would have been computed based on the \$189 tariffed rates The discounted rate for CSA TN98-2766-00 would be \$164 43 (13% discount) instead of the discounted rate of \$182 70 based on the Month to Month rate of \$210 The result is an actual discount is only 3 4%. (182 70/189=96 6%) [Four MegaLink® Channel were discounted to \$164 43, apparently based on a 3 yr contract commitment.]

The discounted rate for KY98-4958-00 was computed correctly using the \$189 rate for a 24-48 month contract \$189 discounted at 11% is \$168 21

¹¹ BellSouth Tariff Section A12.7 2 Eighth Revised Page 2

1 Q. Is the customer billed under CSA TN98-2766-00 provided any
2 additional discounts from that specified in the CSA?

3 A. Yes. For example, Bell's Tariff Section B7.5.6 First Revised
4 Page 37.4 provides that the monthly rate for MegaLink® ISDN service
5 is \$360. If the subscriber commits to take the service for a period of
6 24 to 48 months, the rate is discounted to \$260. (A 27.7% discount.)
7 If the customer commits to take the service for a period of 49 to 72
8 months, the rate is reduced to \$250 and to \$240 with a commitment of
9 from 73 to 96 months. From the price-out filed by Bell with the
10 Authority in support of this CSA, it is apparent that the customer is
11 being given a discount for committing to purchase MegaLink®ISDN
12 for at least four years. The discounted rate shown on Attachment III
13 filed in support of the CSA is \$217.50 per month, which is a 13%
14 discount off of the \$250 tariffed rate charged to a customer that signed
15 a 49 to 72 month commitment. It appears that the service billed in
16 accordance with CSA TN98-2766-00 is receiving a 30.55% discount
17 for committing to continue to purchase the service as provided in the
18 tariff and an additional 10%-13% discount¹² under the CSA for a total
19 discount of 37.5% to 39.6%¹³.

¹² The 13% discount assumes the customer billing reaches the maximum discount level provided under the CSA. The discount at the contract level is 10%.

¹³ At 10% discount level under the CSA the rates would be \$225. ($\$250 \times 90\% = \$225$) [$\$225/\$360 = 62.5\%$, $1 - 62.5\% = 37.5\%$] At 13% discount level under the CSA the rate would be

1 The customers billed under the provisions of CSAs KY98-4958-
2 00, CSA TN96-7961-02, CSA TN97-5138-00, and CSA TN96-7973-
3 01 appear to have also received discounts in accordance with the
4 provision of the Tariffs in addition to the discounts provided in the
5 CSA.

6
7 **Q. Do the tariffs also provide for termination penalties?**

8 A. Yes. The tariffs do have termination provisions. In some
9 instances, when the customer is provided a discount for committing to
10 purchase service over an extended period of time. For example, Bell's
11 Tariff Section B7.5.4 E provides that:

12 A Termination Liability Charge is
13 applicable at the date of termination. The
14 applicable charge is dependent on the
15 contract period subscribed to and will be
16 equal to the number of months remaining in
17 the contract times the monthly rate
18 provided under the contract.

19
20 Similar provisions are included in other tariff sections, where a
21 discounted rate is provided in exchange for customer's commitment to
22 purchase service over an extended period of time.

23
24 **Q. In the event that the customer being billed under the CSA**

\$217.50 (\$250 X 87%=\$217.50) [\$217.50/\$360=60.4%, 1-60.4%=39.6%]

1 transfers the service to a competitor of Bell, which termination
2 penalty would apply?

3 A. Both penalties would apply. Section IX paragraph C of CSA
4 TN98-2766-00 and the first sentence of Section IX paragraph B of
5 CSA KY98-4958-00 provides the following:

6 The application of termination
7 charges pursuant to this Section shall
8 not affect the application of the
9 termination charges pursuant to the
10 tariff or any other agreement
11

12 Q. Mr. Frame, testifying on behalf of Bell, contends that the CSA
13 does not modify the tariffed rates:

14 Q. WHAT RATE OR PRICE DOES
15 BELL SOUTH CHARGE THIS
16 C U S T O M E R F O R
17 T E L E C O M M U N I C A T I O N S
18 S E R V I C E S ?
19

20 A. The rates charged to the customer
21 are those specified in the
22 appropriate tariffs and available
23 to any customer ordering the same
24 services. This CSA does not
25 modify those tariffed rates in any
26 way, but rather provides discounts
27 based on billed revenue from the
28 eligible services identified in the
29 contract. (See Frame Direct
30 Testimony, Page 7, Lines 12-17.)
31

32 Is this statement consistent with the documents that BellSouth has
33 filed in support of its CSAs?

1 A. No. In support of its CSAs, Bell had filed documents that
2 provide the same information as Frame Exhibit RLF-1, which
3 identifies each service subject to the CSA and for **each** such service
4 identifies the following:

- 5 1. The USOC
- 6 2. Service Description
- 7 3. Quantity
- 8 4. **Discounted Rate**
- 9 5. Annual Revenue
- 10 6. Unit Cost
- 11 7. Annual Cost
- 12 8. Annual Contribution
- 13 9. Percent Contribution
- 14 (Emphasis Added.)
- 15

16 **Q. You state that this document identifies the discounted rates for the**
17 **individual service provided under the CSA. Are the tariffed rates**
18 **for the individual service stated on the document?**

19 A. No. The tariffed rates for the services are not identified. The
20 only rates are the individual discounted rates. This document
21 identifies each individual service being discounted, and the discounted
22 rate to be billed under the CSA for each specific service.

23

24 **Q. Does the Frame Exhibit RLF-1 identify CSA rates for one party**
25 **business service in a Group 5 exchange than that charged for a**
26 **Group 4 exchange?**

1 A. Yes. On page 3 of Exhibit RLF-1 four rates are identified for
2 Flat Rate Business line: \$34.54, \$33.97, \$28.49, \$26.80 and \$23.93.

3
4 Q. Are these the tariffed rates for a Flat Rate Business line in the
5 various exchange groups?

6 A. No. These are the discounted rates. The tariffed rates for a 1
7 party business lines for group 5, group 4, group 3, group 2, and group
8 1 exchanges, are \$39.70, \$39.05, \$32.75, \$30.80, and \$27.05,
9 respectively. The tariff rates and the rates discounted at 13% as shown
10 on Mr. Frame's Exhibit RLF-1 are presented in comparative format in
11 the following table.

Service	Tariffed Rate ¹⁴	Tariffed Rate Discounted 13%
1 FB Group5 exchange	\$39 70	\$34 54
1 FB Group4 exchange	\$39.05	\$33.97
1 FB Group3 exchange	\$32.75	\$28.49
1 FB Group2 exchange	\$30.80	\$26.80
1 FB Group1 exchange	\$27.05	\$23.53

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19 The filing of the exhibit that compares the revenue from the individual
20 services after a discount with the cost of providing the individual services is

¹⁴ BellSouth Tariff Section A3.2.1, Eighth Revised Page 1 1.

1 not consistent with Mr. Frames position that the individual service rates are
2 not discounted.

3

4 **Q. Are Bell's CSAs evidence of anti-competitive behavior?**

5 A. Yes. Bell's CSAs are evidence of anti-competitive behavior.

6 Tenn. Code Ann §65-5-208. Classification of services - Exempt
7 services - Price floor - Maximum rates for non-basic services states the
8 following:

9 (c) Effective January 1, 1996, an
10 incumbent local exchange telephone
11 company shall adhere to a price floor
12 for its competitive services subject to
13 such determination as the authority
14 shall make pursuant to § 65-5-207.
15 The price floor shall equal the
16 incumbent local exchange telephone
17 company's tariffed rates for essential
18 elements utilized by competing
19 telecommunications service
20 providers plus the total long-run
21 incremental cost of the competitive
22 elements of the service. When shown
23 to be in the public interest, the
24 authority shall exempt a service or
25 group of services provided by an
26 incumbent local exchange telephone
27 company from the requirement of the
28 price floor. **The authority shall, as
29 appropriate, also adopt other rules
30 or issue orders to prohibit
31 cross-subsidization, preferences to
32 competitive services or affiliated
33 entities, predatory pricing, price
34 squeezing, price discrimination,
35 tying arrangements or other
36 anti-competitive practices.**

(Emphasis added.)

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Q. Do the prices for services provided under the CSAs reflect price discrimination?

A. The economic definition of price discrimination is defined as, "the practice of selling the same product at two or more prices where the price differences do not reflect cost differences."¹⁵ The price of service provided to the customers subject to the CSAs is different from the price of the service when provided under tariff rates. In addition, the same services provided under different CSAs are at different prices.

Bell does not contend that the cost of providing the service differs. In fact, the documents that Bell has filed in support of the CSAs, which identifies the cost of the various services, is the same as the cost used to support the tariffed rates. (See Attachment III to the various CSAs and Bell's Exhibit RLF-1 filed with Mr. Frame's testimony.) While the rates are different, the costs of providing the service are the same. Bell is selling the same product at two or more prices, where the price differences do not reflect cost differences. By definition, the rates are discriminatory.

¹⁵ Kaserman, David L. and Mayo, John W., *The Economics of Antitrust and Regulation*, Orlando. The Dryden Press, 1995

1 **Q. Are there tying arrangements included within the CSAs?**

2 A. While there is no specific wording in the CSA state there are
3 tying arrangements, Mr. Frame has entered testimony that; "...the
4 discount on billed revenue is determined by the specific mix for each
5 customer . . . " (Frame Direct Testimony, Page 14, Lines 13-14.) The
6 discounts are therefore apparently specifically tied to the combination
7 of services purchased by the customer. This would indicate, that in
8 order to obtain a discount on one service, a customer may have to
9 purchase another specific service or a specific group of other services.

10

11 **Q. Do the CSA's include other anti-competitive practices?**

12 A. Yes. As Dr. Brown will provide in more detail, the CSAs
13 provide that Bell will react to the same economic event differently
14 based on the underlying cause of the event. If the event is caused by a
15 competitor, Bell's actions will be different from its actions if the event
16 has other causes. For example, in Paragraph X of CSA TN98-2766-
17 00, the following language is found:

18 In the event of a Business Change as
19 defined herein which significantly
20 reduces the volume of network
21 services required by____, and those
22 subsidiaries listed in Appendix III,
23 with the result that _____ is unable
24 to meet its Minimum Annual
25 Revenue Base under this Agreement
26 (notwithstanding _____ best efforts
27 to avoid such a shortfall), BellSouth

1 and _____ shall cooperate in efforts
2 to develop a mutually agreeable
3 alternative that will **reduce** _____
4 **liability** under the Minimum Annual
5 Revenue Base, the Annual Revenue
6 Base and the Discount levels which
7 satisfies the concerns of both parties
8 and complies with all applicable
9 legal and regulatory requirements.
10 Such alternative will reduce the
11 Customer's Annual Revenue Base,
12 Minimum Annual Revenue Base and
13 the corresponding Discount levels to
14 the extent of any shortfall resulting
15 from a Business Change as defined
16 herein. **This provision shall not**
17 **apply to a change resulting from a**
18 **decision by _____ to transfer**
19 **portions of its traffic or projected**
20 **growth to providers other than**
21 **BellSouth.** (Emphasis added.)
22

23 Similar language is found in CSA KY98-4958-00.

24

25 **Q. How does this language indicate that Bell will react differently to**
26 **the same economic event dependent on the underlying cause?**

27 A. As stated in the previously quoted paragraph, Bell will work
28 with the customer and will reduce or adjust the minimum annual
29 revenue base and the related discount level if the decline is the result
30 of a business change. However, if the decline in demand is caused by
31 the customer electing to transfer part of its telecommunications
32 operations to a competitor of Bell, no such reduction will be made.
33 From Bell's perspective the end result of a decline in the level of

1 service purchased by the customer is the same. Bell will receive less
2 revenue. In accordance with the provision in the CSAs, Bell's actions
3 in response to such a decline will be different depending upon the
4 cause in the revenue decline and will be punitive toward the customer
5 if the decline is caused by a competitor. Dr. Brown will provide a
6 more thorough discussion on this matter.

7
8 **Q. In his testimony Mr. Frame states:**

9
10 Although I am not a lawyer, the
11 discount on billed revenue is
12 determined by specific service mix
13 for each customer as described
14 above. Because these customers
15 have a different product mix, they
16 are not similarly situated such that
17 BellSouth can lawfully offer the
18 customer different discounts and
19 revenue commitments. (See Frame
20 Direct Testimony, Page 14, Lines
21 13-16.)
22

23 **Do you agree with his conclusion that because two customers**
24 **subscribe to different groups of services they are not similarly**
25 **situated?**

26 **A.** No. If you accept his definition of similarly situated, the idea of
27 uniform tariffed rates for business services is useless. Using his
28 argument as justification, Bell could charge a business customer, who
29 subscribes to only a single business line, more for that line than it
30 would charge the customer's business neighbor for a single business

1 line, who also purchases a call forwarding. Since the customers would
2 have a different product mix, Mr. Frame's definition would allow Bell
3 to find that the two business customers would not be similarly situated.

4 Additionally, if a business customer had an office with three
5 business lines with caller ID on each line and another customer
6 occupying an adjacent office in the same building has four business
7 lines and call waiting on each line, Mr. Frame's definition would find
8 these customers are not similarly situated.

9 If adopted, Mr. Frame's definition of similarly situated could
10 virtually result in each customer being placed in a separate one
11 customer class.

12

13 **Q. Is there some relationship between the mix of services being**
14 **provided and the amount of discounts provided under the**
15 **individual CSAs?**

16 **A.** The revenue contribution is largely a matter of the mix of
17 services being provided. Using the revenue and cost data filed as
18 Bell's Exhibit RLF-1 and the corresponding schedules filed with other
19 CSAs, I have compared the discounts awarded with the weighted per
20 cent contribution before and after the discount for various CSAs. The
21 results as shown on Exhibit RTB-4 do not reflect a consistent pattern.
22 It does appear that the customers, whose mix of services produces the

1 lesser contributions before discounts, are the customers who are also
2 receiving the larger discounts. For example, the services discounted
3 under TN98-2766-00 produce a contribution of 127% before the rates
4 were discounted by 13%. Similarly, the services for CSA KY98-4958-
5 00 resulted in a contribution of 137% before the discounts of 11%-
6 13%. In contrast, the contributions from the services being
7 discounted under CSA TN97-7973-01 produce a contribution of 999%
8 before the 4% discount, while the services under CSA TN97-7961-01
9 produce a contribution of 540% before the 5% discount.

10

11 **Q. Did you compute the "contribution" consistent with the**
12 **computation on Bell's Exhibit RLF-1?**

13 **A. Yes.**

14

15 **Q. Are any of the services discounted under the CSA TN98-2766-00**
16 **and CSA KY98-4958-00 being discounted below the cost of**
17 **providing the service as identified by Bell?**

18 **A. Yes.** On Bell Exhibit RLF-1, there are 80 instances of service
19 being discounted below the cost as identified by Bell for CSA TN98-
20 2766-00 and 15 instances of service being discounted below cost under
21 CSA KY98-4958-00. The USOCs and the resulting negative
22 contributions are presented on Exhibit RTB-5. The service

1 descriptions, quantities, and cost of these are presented on Bell Exhibit

2 RLF-1.

3

4 **Q. Does this conclude your testimony?**

5 **A.** Yes, it does.

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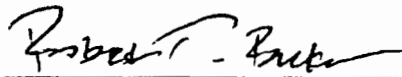
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BEFORE THE TENNESSEE REGULATORY AUTHORITY
AT NASHVILLE, TENNESSEE

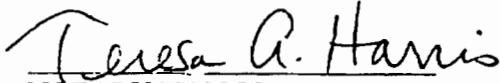
IN RE: PROCEEDING FOR THE)
PURPOSE OF ADDRESSING)
COMPETITIVE EFFECTS OF CONTRACT) DOCKET NO. 98-00559
SERVICE ARRANGEMENTS FILED BY)
BELLSOUTH TELECOMMUNICATIONS,)
INC IN TENNESSEE.)
)

AFFIDAVIT

I, Robert T. Buckner, Senior Regulatory Analyst, for the Consumer Advocate Division of the Attorney General's Office, hereby certify that the attached Rebuttal Testimony represents my opinion in the above referenced case and the opinion of the Consumer Advocate Division



Sworn to and subscribed before me
this 30th day of July, 1999.


NOTARY PUBLIC

My commission expires on: Jan. 25, 2003

Before the

TENNESSEE REGULATORY AUTHORITY

IN RE: PROCEEDING FOR THE PURPOSE OF ADDRESSING COMPETITIVE EFFECTS
OF CONTRACT SERVICE ARRANGEMENTS FILED BY BELL SOUTH
TELECOMMUNICATIONS, INC. IN TENNESSEE.
DOCKET NO. 98-00559

EXHIBITS
of
ROBERT T. BUCKNER

July 30, 1999

Robert T. Buckner (Terry)

Senior Regulatory Analyst

Office of the Attorney General for the State of Tennessee

Consumer Advocate Division

Additional Education Background:

Micro-Computer Training, University of Wisconsin, Madison

Cost Separations School, United States Telephone Association, San Diego

Rate Case School, Arthur Andersen LLP, Chicago

Telecommunications Conference, University of Georgia, Athens

NARUC Conference, Michigan State University, Lansing

Management Training Seminar, Vanderbilt University

Interstate Access Settlements, National Exchange Carrier Association

SEARUC Conferences, Birmingham, AL. and Charleston, S.C.

Telephone Plant Accounting Program, Ernst and Young LLP, Atlanta

Before the

TENNESSEE REGULATORY AUTHORITY

In Re: Nashville Gas Company

Docket No. 96-00977

DIRECT TESTIMONY

of

R. Terry Buckner

October 28, 1996

1 Q. Please state your name for the record.

2 A. My name is R. Terry Buckner.

3

4 Q. By whom are you employed and what is your position?

5 A. I am employed by the Consumer Advocate Division ("CA") in the
6 State of Tennessee Attorney General's Office as a Senior Regulatory
7 Analyst.

8

9 Q. How long have you been in the utility industry related
10 employment?

11 A. Approximately nineteen years. Before my employment with the
12 Attorney General, I was employed with the Tennessee Public Service
13 Commission ("Commission") as a financial analyst for approximately
14 six years. My responsibilities included testifying before the
15 Commission as to the appropriate cost of service for public utilities
16 operating in Tennessee. Prior to my employment with the
17 Commission, I was employed by Telephone and Data Systems
18 ("TDS") for eight years and the First Utility District of Knox County
19 for three years.

20

21

22

1 Q. What is your educational background and what degrees do you
2 hold?

3 A. I have a Bachelors degree in Business Administration from the
4 University of Tennessee, Knoxville with a major in Accounting. I am
5 also a Tennessee Certified Public Accountant and a member of the
6 American Institute of Certified Public Accountants.

7

8 Q. Would you briefly describe your responsibilities as a Senior
9 Regulatory Analyst since your employment with the CA?

10 A. I prepared testimony and exhibits as an employee with the
11 Commission before becoming a member of the CA. My
12 responsibilities have not been altered significantly since my
13 employment change.

14

15 Q. What is the purpose of your testimony?

16 A. The purpose of my testimony is to present information to the
17 Tennessee Regulatory Authority ("TRA") on the appropriate
18 operating expenses other than depreciation for the attrition year
19 November 1, 1996 to October 31, 1997 for Nashville Gas Company
20 ("Company"). Additionally, I will present the CA's calculation of
21 other taxes and income taxes for the attrition year.

22

1 **Q. What is an attrition year?**

2 A. An attrition year is a synonym for a forecasted or projected 12 month
3 period.
4

5 **Q. Please identify the issues regarding operation and maintenance**
6 **expenses for Nashville Gas Company in Docket #96-00977?**

7 A. The CA Exhibit, Schedule 8 indicates the differences in the CA and
8 the Company forecasted expenses for the twelve months ended
9 October 31, 1997. The total operation and maintenance expenses
10 projected by the CA are \$7,838,394 lower than the operation and
11 maintenance expenses projected by the Company for the attrition
12 year. The differences that make up this \$7.8 million include the
13 following just and reasonable exclusions, reductions and increases:
14 (1) the CA has excluded approximately \$1.6 million in excessive net
15 expense growth and inappropriate expenses for setting rates for the
16 ratepayer; (2) a \$1.9 million reduction in forecasted expenses
17 associated with sales promotion and advertising; (3) a \$1.3 million
18 reduction in forecasted allocated net pension expense; (4) a \$2
19 million reduction in allocated service company charges; (5) a \$.6
20 million reduction in the Company's Long Term Incentive Pay plan;
21 and (6) a \$.4 million increase in the amount of General and
22 Administrative expenses which are capitalized and charged to non-

1 regulated operations.

2

3 **Q. Please explain the just and reasonable \$1.6 million exclusion due**
4 **to forecasted expense growth differences of the Company and the**
5 **CA for the attrition year.**

6 A. The primary reason for the exclusion is the difference in forecasted
7 expense growth caused by the Company's use of an excessive
8 inflation factor and unsubstantiated growth rates for various
9 expenses. The CA used an annual customer growth of 5.1% and an
10 annual inflation rate of 2.39% which generates a compound growth
11 rate of 12.66% through the attrition year ended October 31, 1997.
12 The information used to determine the CA's forecasted inflation
13 factor was taken from the publication "Blue Chip Indicators."¹ The
14 percentage increase of the attrition year Gross Domestic Product
15 ("GDP") deflator over the test year GDP deflator, equates to an
16 annual inflation rate of 2.39%. The annual inflation rate of 2.39%
17 generates a compounded growth rate of 4.01%. The compound
18 growth rate of 12.66% (customer growth plus inflation growth
19 compounded) was applied to most of the CA's test year ended
20 February 1996 expenses excluding salaries and wages.

¹The Blue Chip Economic Indicators publication is a consensus summary of fifty top economists in the United States.

1 Q. How does the 12.66% growth rate compare with the Company's
2 experience in recent years?

3 The CA's compounded growth rate is somewhat greater than the
4 actual annual expense growth of the Company over the last thirty-
5 three months ended April 1996 of 3.735%, which was a compounded
6 growth rate of 10.61%. In contrast, the Company used an unjust and
7 unreasonable projected 16.10% compounded growth rate for a
8 twenty-two month period ending October 31, 1997 for certain
9 expense items based on an annual inflation rate of 3.2% and an
10 annual customer growth rate of 5.1%. The Company's overall
11 operation and maintenance expenses, however, are projected to grow
12 21.31% for the attrition year over actual 1995.

13 One difference from the CA projection is that, instead of using the
14 GDP deflator, the Company used the CPI inflation indicator from the
15 Economic Forecasting Center of Georgia State University for its
16 speculative annual inflation rate. The GDP deflator, which was used
17 by the CA, has been traditionally used by the Commission and TRA
18 staff, not the CPI inflation factor proposed by the Company. Current
19 evidence supports the CA's projected annual inflation rate of 2.39%.
20 The difference in growth rates results in a lower expense amount of
21 approximately \$1.1 million for expenses excluding salaries and
22 wages.

1 This amount, also, recognizes an error by the Company in their
2 growth of Injuries and Damages of approximately \$.4 million. The
3 Company miscalculated their projected amount of Injuries and
4 Damages for the attrition year. Additionally, the CA has deducted
5 \$145,983 of non-recurring expenses recorded during the test year
6 ended February 28, 1996.

7 Finally, the CA has used actual employees and wage rates as of
8 August 31, 1996 grown during the attrition year. The Company used
9 outdated 1995 actual employee levels. This difference results in
10 \$307,473 in lower salaries and wages than the Company's salary and
11 wage projection for the attrition year.

12
13 **Q. Please explain the forecasted difference in advertising and sales**
14 **promotion expense amounting to \$1.9 million.**

15 A. The CA requested that the Company provide a detailed analysis of the
16 1995 projected advertising and sales promotion expenses in the
17 following categories: Institutional, Conservation, Promotional,
18 Informational and non-regulated Promotional for the sale of
19 appliances. The Company's response was such that amounts
20 projected for each advertising category cannot be determined. Since
21 the Company declined to furnish the breakdown of advertising
22 expenditures, it is not clear if the amount includes advertising that

1 would be included in the rates charged ratepayers. Without such
2 information, there is no possible way to determine if the advertising
3 expense budgeted by the Company is appropriate for setting rates. As
4 with any other expense, the Company is obligated to prove that costs
5 that are recovered in rates are just and reasonable. Since the
6 information is not available, the CA has excluded approximately \$1.9
7 million (\$.8 million in salaries and wages) in advertising and sales
8 promotion expenses. Since the Company failed to support the cost of
9 advertising expense, we have included an amount based on a standard
10 adopted by the Commission. Further, regarding advertising expenses
11 Commission rule 1220-4-5- 45 (Attachment) states, "A utility may
12 not recover from any person other than their shareholders (or other
13 owners) any direct or indirect expenditure for promotional or political
14 advertising. The term 'promotional advertising' means any
15 advertising for the purpose of encouraging any person to select or use
16 gas service or additional gas service or the selection or installation of
17 any appliance or equipment designed to use gas service." We have
18 included an amount equal to .5% of revenues. The CA has applied
19 this threshold to all NARUC Uniform System of Accounts ("USOA")
20 accounts which include advertising and sales promotion expenditures.
21 This standard criteria was set in Commission Docket U-85-7355 for
22 Nashville Gas Company and is consistent with positions taken by the

1 Commission staff in subsequent gas company rate cases, i.e. United
2 Cities Gas Company, Docket #92-02987. Mr. Hal Novak, of the TRA
3 staff and formerly of the Commission staff, recommended in Docket
4 #92-02987, "that the Commission approve its interpretation of the
5 Commission policy by disallowing all advertising and sales
6 promotion expenses that are in excess of .5% of operating revenues."
7 Again, in September 1994, the Commission staff cited the Company
8 in a compliance audit report that "The Company is understating the
9 monthly rate of return that it reports to the Commission" due to
10 excessive advertising expenses which are not in compliance with the
11 Commission Orders. Our case is consistent with the standard as
12 applied in the past.

13
14 **Q. Please explain the forecasted difference in net pension expense of**
15 **\$1.3 million.**

16 A. The Company's pension plan is fully funded and no funding is
17 anticipated during the attrition year based on the Company's 1995
18 annual report to their stockholders. Additionally, Company personnel
19 indicated through CA verbal inquiries that there would be no funding
20 during the attrition year. The CA has not recognized any pension
21 expense for the attrition year which is consistent with Federal Income
22 Tax treatment. The Company, however, has unjustly and

unreasonably included approximately \$1.3 million of net pension expense in its filing. The Company's recognition of a \$1.3 million pension expense in fact causes the ratepayer to pay an expense that has already been paid. Finally, the Commission historically recognized only the actual contributions to the pension plan in the cost of service for setting rates for both telephone and other utilities.

Please note the following examples in cases:

Tennessee-American Water Company	U-87-07534	Mar. 1988
Tennessee-American Water Company	89-15388	May 1990
Tennessee-American Water Company	91-05224	Dec. 1991
Tennessee-American Water Company	96-00959	Oct. 1996
Chattanooga Gas Company	U-87-07531	Apr. 1989
Chattanooga Gas Company	91-03765	Apr. 1991
Nashville Gas Company	U-87-07499	Nov. 1987
Nashville Gas Company	89-10491	Nov. 1989
Nashville Gas Company	91-02636	Nov. 1991
Nashville Gas Company	94-01054	Oct. 1994
United Cities Gas Company	89-10017	Nov. 1989
United Cities Gas Company	92-02987	Sep. 1992
Kingsport Power Company	90-05735	Dec. 1990
Kingsport Power Company	92-04425	Nov. 1992
Tellico Telephone Company	91-09061	Feb. 1992
Tennessee Telephone Company	91-09062	Feb. 1992
Concord Telephone Company	91-09063	Feb. 1992

In summary, the Company should not be allowed to recover the \$1.3 million a second time.

1 Q. Please explain the forecasted difference in allocated service
2 company charges of \$2 million.

3 A. The CA has allocated the general and administrative expenses
4 (service company charges) of Piedmont Natural Gas Company
5 ("PNG") based upon the ratio of the number of Nashville Gas
6 customers at the end of 1995 to the total PNG customers. This results
7 in 22.16% of PNG's customers being in Tennessee, therefore,
8 Nashville Gas is allocated 22.16% of PNG's general and
9 administrative expenses. The Company, however, has allocated these
10 expenses based upon the ratio of net plant in Tennessee to PNG's
11 total net plant in service. This method is inappropriate and
12 inconsistent with allocation methods historically used and further, is
13 unjust and unreasonable. Historically, audit procedures have
14 allocated operating expenses based on the number of customers in
15 Tennessee to the total number of customers in all states in which
16 PNG operates. This method was recommended by the Commission
17 Staff in Docket #92-02987. The Company's method for no real
18 reason ignores the distinctive nature of the plant assets in each state
19 as to age, cost and the rate at which the plant is being depreciated and
20 should be rejected. The CA's method of allocation is approximately
21 \$.6 million lower than the Company's allocation amount.

22 Additionally, the Company has included a projection of \$2.4 million

1 in salaries and wages allocated from PNG to Tennessee customers.
2 This amount is \$1.6 million higher than the 1995 amount and \$1.5
3 million higher than the test year ended February 1996, a 200%
4 increase from the test year. Although we requested all supporting
5 workpapers, the Company provided no support for the reasonableness
6 and accuracy of this 200% increase which is unjust and unreasonable.
7 There is no evidence that any change in the Company's operations
8 warrant a \$1.4 million increase for the attrition year. The Company's
9 projection should be rejected.

10

11 **Q. Please explain the forecasted difference in Long-Term Incentive**
12 **Pay plan of \$.6 million.**

13 A. The Company has included \$.6 million in Long-Term Incentive Pay
14 ("LTIP") during the attrition year. The Company has defined the
15 LTIP as:

16 "a shareholder-approved Executive Long-Term
17 Incentive Plan for the purpose of promoting the
18 interests of the Company by attracting and
19 retaining in its employment persons of outstanding
20 ability....provides executives and other key
21 employees of the Company greater incentive to
22 make material contributions to the success of the
23 Company by granting them incentive
24 compensation conditioned upon the corporate
25 achievement of financial and other performance
26 objectives."
27

1 Thus, the Company rewards employees if the Company
2 overearns. The Company has defined the performance objective "as
3 being a 5% compounded, average, annual increase in net, real
4 (corrected for inflation) after-tax earnings.... Thus, the targets for
5 the periods 1987 through 1991 and 1989 through 1994 were each
6 established as being a 27.6% (5% per year, compounded) increase in
7 net after-tax earnings." After review of the Company's LTIP, the CA
8 recommends exclusion of this expenditure due to the following: (1)
9 The LTIP is based principally on earnings growth. In fact, the plan
10 encourages the executives to seek earnings growth through rate
11 increases such as this one in order to produce growth in earnings
12 instead of performance gains or improved service. In other words
13 increasing rates to the ratepayers for LTIP expenses results in
14 increased earnings, which in turn increases LTIP in the future, and
15 which also increases revenue requirements from the ratepayers in the
16 future. This circular incentive program rewards the Company for
17 increasing rates and **harms** customers; (2) All LTIP employees
18 receive the compensation regardless of the individual employee's
19 performance; and (3) There is no measurable benefit to the
20 ratepayers.

1 Q. Have other regulatory commissions rejected the expense resulting
2 from such incentive plans?

3 Yes, earlier this year the Washington Utilities and Transportation
4 Commission ("WUTC") disallowed incentive pay with the following
5 statement²:

6 "Plans which do not tie payments to goals that
7 clearly and directly benefit ratepayers will face
8 disallowance in future proceedings. (Emphasis
9 added.)

10
11 Additionally, the WUTC commented,

12 "....there is a potential tension between quality and
13 earnings. A firm can concentrate on financial
14 elements so heavily that it can lose sight of the
15 importance of providing customer service. In a
16 public utility service, where many customers have
17 no reasonably substitutable alternatives, the
18 Commission must substitute for the competitive
19 market in assuring that customer service remains a
20 priority to the business. Financial goals are at best
21 a very crude way to measure specific efficiencies
22 that employees can accomplish." (Emphasis
23 added)
24

25 Finally, in 1995 the South Carolina Public Service Commission staff
26 excluded over \$.3 million of Piedmont LTIP³ (Attachment). In fact,
27 in that case both the South Carolina Commission and the Company

²WUTC v. U S WEST Communications, Docket No. UT-950200

³ In RE. Piedmont Natural Gas Company, Inc. Docket No. 95-715-G, Accounting Exhibit A-1, Line No. 13.

1 had excluded LTIP amounts in the projected cost of service
2 schedules.

3
4 **Q. Please explain the forecasted difference of General and**
5 **Administrative expenses transferred for capitalization and to**
6 **non-regulated operations in the amount of \$.4 million.**

7 The Company has made an error in their calculation of General and
8 Administrative expenses to be transferred for capitalization and to
9 non-regulated operations in the amount of \$.4 million for the attrition
10 year. This error was noted in detail on pages 21-22 of the TRA
11 staff's compliance audit of October 14, 1996 (Attachment). Further,
12 the Company was cited by the Commission staff for this same error in
13 a previous compliance audit of September 1994. The Company, as of
14 this date, has failed to correct the error. The Company agreed with
15 the TRA staff finding and has stated that it would implement the
16 change at the beginning of the attrition year, November 1, 1996.

17
18 **Q. Please identify the differences regarding other taxes and income**
19 **taxes for Nashville Gas Company in Docket #96-00977.**

20 A. The CA Exhibit, Schedule 9 indicates the differences in the
21 forecasted amounts between the CA and the Company. The other
22 taxes projected by the CA are \$.2 million lower than the tax amounts

1 projected by the Company for the attrition year. This \$.2 million
2 difference is due to lower payroll taxes.

3
4 **Q. Please explain why the CA forecasted difference of approximately**
5 **\$.2 million in payroll taxes .**

6 A. \$.163 million of the \$.2 million Company overstatement is associated
7 with the unsubstantiated allocation of salaries and wages from PNG
8 (See p.10-11). The residual \$.037 million is half due to the Company
9 including the Company's portion of payroll tax on the personal use of
10 the Company cars. The other half is attributable to an overstated
11 salary and wage calculation by the Company as discussed previously
12 (See p.6).

13
14 **Q. Please explain the forecasted difference in income taxes.**

15 A. The \$1.9 million difference in the CA and Company's income taxes
16 is due to lower operating expenses projected by the CA (discussed on
17 P. 3) and the difference in capital structure, specifically the cost of
18 debt or interest expense (See testimony of Dr. Steve Brown).

19
20 **Q. Does this conclude your testimony?**

21 A. Yes, it does.

22

STATE OF TENNESSEE

Office of the Attorney General



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September 19, 1997

Mr. David Waddell
Executive Secretary
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

Re: Petition of Chattanooga Gas Company to Place into Effect a Revised Natural Gas
Tariff
Docket No. 97-00982

Dear Mr. Waddell:

I have enclosed an original and thirteen copies of Direct Testimony of Consumer Advocate Division witness Robert T. Buckner, Senior Regulatory Analyst in the above referenced matter. Copies are being furnished to counsel of record for interested parties.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Vincent Williams".

L. Vincent Williams
Consumer Advocate

c Counsel of record

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Before the

TENNESSEE REGULATORY AUTHORITY

IN RE: PETITION OF CHATTANOOGA GAS COMPANY TO PLACE INTO
EFFECT A REVISED NATURAL GAS TARIFF
DOCKET NO. 97-00982

DIRECT TESTIMONY
of
ROBERT T. BUCKNER

September 19, 1997

1 Q. Please state your name for the record.

2 A. My name is Robert T Buckner ("Terry").

3

4 Q. By whom are you employed and what is your position?

5 A. I am employed by the Consumer Advocate Division ("CA") in the
6 State of Tennessee Attorney General's Office as a Senior Regulatory
7 Analyst.

8

9 Q. How long have you been employed in the utility industry?

10 A. Approximately twenty years. Before my employment with the
11 Attorney General, I was employed with the Tennessee Public Service
12 Commission ("Commission") as a financial analyst for approximately
13 six years. Prior to my employment with the Commission, I was
14 employed by Telephone and Data Systems ("TDS") for eight years
15 and the First Utility District of Knox County for three years.

16

17 Q. What is your educational background and what degrees do you
18 hold?

19 A. I have a Bachelors degree in Business Administration from the
20 University of Tennessee, Knoxville with a major in Accounting. I am
21 also a Tennessee Certified Public Accountant and a member of the
22 American Institute of Certified Public Accountants.

1 Q. Would you briefly describe your responsibilities as a Regulatory
2 Analyst since your employment with the CA?

3 A. I prepared testimony and exhibits as an employee with the
4 Commission before becoming a member of the CA. My
5 responsibilities have not changed significantly since becoming
6 employed with the CA.

7
8 Q. What is the purpose of your testimony before the Tennessee
9 Regulatory Authority ("TRA")?

10 A. The purpose of my testimony is to present the CA's recommended
11 revenue requirement for Docket #97-00982 for Chattanooga Gas
12 Company ("Company"). The CA is recommending a rate reduction
13 of \$1.393 million. A summary of the revenue requirement issues is
14 found in Schedule A of my exhibit. Mr. Dan McCormac will present
15 direct testimony regarding the forecast of revenues. Mr. Archie
16 Hickerson, Director of the CA staff will present direct testimony and
17 exhibits regarding the Company's proposed acquisition adjustment.
18 Dr. Stephen Brown will present direct testimony and exhibits as to
19 the just and reasonable cost of equity. Additionally, I will present my
20 opinion on behalf of the CA as to the appropriate operating expenses
21 for the attrition year October 1, 1997 to September 30, 1998 for the
22 Company. Also, I will present my opinion as to the appropriate

1 calculation of other taxes, income taxes, rate base and depreciation
2 expense for the attrition year.

3
4 **Q. Please identify the issues regarding operating expenses for**
5 **Chattanooga Gas Company in Docket #97-00982?**

6 A. The CA Exhibit, Schedule 10 indicates the differences in the
7 forecasted amounts between the CA and the Company. The operating
8 expenses projected by the CA are \$2.239 million lower than the
9 operating expenses projected by the Company for the attrition year.
10 The issues regarding this \$2.239 million include the following: (1)
11 the CA has excluded \$1.497 million in excessive expense growth due
12 to the allocation of charges from the Company's corporate parent,
13 Atlanta Gas Light ("AGL"); (2) a reduction of \$.227 million in
14 forecasted expenses associated with promotional advertising; (3) a
15 \$.219 million reduction in projected uncollectible expense; (4) a
16 reduction of \$.192 million in expenses primarily due to excessive
17 growth rates; and (5) \$.142 million in rate case expense and
18 miscellaneous income deductions. (This includes \$.038 million of
19 miscellaneous income deductions per CA Exhibit, Schedule 8, Line
20 10). Additionally, a reconciliation of all revenue requirement
21 differences between the CA and the Company is provided in Buckner
22 Exhibit, Schedule A.

1 Q. Please explain your opinion as to the forecasted difference of
2 \$1.497 million in forecasted allocation of AGL expenses of the
3 Company and the CA for the attrition year.

4 A AGL performs most of the management and financial operations of
5 the Company. AGL performs these same operations for its customers
6 in Georgia. As of June 30, 1997, AGL serves nearly 1.37 million
7 customers in Georgia and just over 53,000 in Tennessee or 3.73% of
8 AGL's total customers. Since AGL personnel perform the same
9 operations for both states, their costs are allocated between the two
10 jurisdictions. The Company has included \$5.227 million of allocated
11 operating expenses from AGL in its forecast for the attrition year.
12 This amount is 5.13% of AGL's forecasted total of \$102 million in
13 expenses subject to allocation and is disproportionate to the number
14 of customers in Chattanooga. In my opinion, the TRA should reject
15 the Company's expense allocation amount because it simply seeks to
16 impose the highest possible costs on Chattanooga consumers instead
17 of just and reasonable costs. The CA has included in its forecast
18 \$3.730 million of allocated operating expenses from AGL, resulting
19 in a difference of \$1.497 million. The total difference in allocation is
20 \$1.497 million in the following three areas: (1) \$1.253 million in
21 allocation based on the current number of customers of the Company
22 to total AGL; (2) \$.151 million in excessive rate of return on net

1 investment; and (3) \$.093 million of allocated AGL expenses that
2 should be charged to non-utility operations rather than regulated
3 ratepayers.

4 First, in my opinion, a change is required as to the result from the
5 allocation methodology proposed by the Company to one based on
6 the percentage of Company customers to the total number of
7 customers served by AGL (3.73%). My opinion is based on several
8 criteria.

9 (A) Financial: AGL's proposed forecast of charges allocated to the
10 Company is nearly 300% higher than the 1996 amount (an increase of
11 \$3.908 million). This increase causes results that are not logical.
12 According to the Company's accounting records, the new allocation
13 methodology was implemented October 1, 1996. While the
14 theoretical multi-component allocation methodology proposed by the
15 Company seems reasonable, the practical end result of the
16 methodology is not reasonable to the ratepayer. Mr. James E. Kissel,
17 who filed direct testimony on behalf of the Company, explains the
18 allocation methodology change. In his testimony, he states the
19 following:

20 "Chattanooga Gas Company is expected to see an
21 increase of approximately \$2.3 million in the total
22 amount being allocated versus the estimated amount to
23 be allocated using the prior method....The new
24 methodology allocates 3.7% of the central services costs

1 to Chattanooga Gas Company "

2
3 As previously mentioned, the Company has forecasted a \$3.908
4 million increase over fiscal year end 1996 (New allocation
5 methodology over old allocation methodology). Also in contrast,
6 AGL forecasts 5.13% of the total costs subject to allocation to be
7 charged to Chattanooga. Mr. Kissel did not testify to the validity of
8 the Company's forecasted allocation amount, nor is there any
9 assurance that AGL is following Mr. Kissel's recommended
10 allocation methodology with precision.

11 Further, as an offset, the Company has reduced its local employee
12 level from an average of 127 in 1996 to an average of 91 for year-to-
13 date May 1997. As a result, the Company realized \$2.267 million in
14 personnel related cost savings. Despite the lower number of
15 employees, the Company's forecast of operations and maintenance
16 expenses does not reflect a decline in expense for the attrition year,
17 but is unjustifiably 15% higher than fiscal year ended September 30,
18 1996 (See Buckner Exhibit, Schedule B). Additionally, the 1996
19 amount is abnormally high because it includes \$2.8 million of one-
20 time employee severance expenses for the Company's restructuring.
21 Further, AGL's 1996 annual report to its shareholders reports that,
22 "Fiscal 1996 was a record earnings year for us." AGL is merely
23 shifting costs previously charged to their Georgia operations to their

1 Tennessee operations. If a rate increase is granted from this issue, the
2 net result is an increase in profit for AGL.

3 (B) Regulatory: In my opinion, the CA's recommended
4 methodology is consistent with the findings of the preliminary draft
5 of the TRA staff compliance audit dated July 29, 1997. It is standard
6 practice for the operating utility companies regulated by the TRA to
7 apply a single percentage allocation formula when allocating
8 corporate charges. A single component allocation eliminates the
9 potential for recovering over or under 100% of its allocated common
10 costs. Also, this practice offers consistent treatment of costs in all
11 jurisdictions, thereby eliminating the potential for cost manipulation
12 between entities by AGL management. The use of a multi-
13 component allocation method is problematic. For example, while
14 using the multi-component method, the actual fiscal year-to-date May
15 1997 charges from AGL to the Company are 4.36% of the total
16 subject to allocation and not AGL's forecast of 5.13%. If the year-to-
17 date factor of 4.36% is applied to AGL's forecasted \$102 million
18 subject to allocation, then the allocated expense is \$.780 million in
19 lower expenses. Also, AGL has reduced its level of employees by
20 over 70 since year end December 31, 1996. Consequently, if the
21 TRA approves the Company's proposed allocated amount for the
22 attrition year, the Company will over recover costs using its current

1 allocation methodology. When the single allocation percent of 3.73%
2 based on number of customers is applied, the allocated charges from
3 AGL are lowered by \$1 253 million or an additional \$ 473 million in
4 lower allocated expenses.

5 Finally, if either the Georgia and the Tennessee regulatory agencies
6 set rates using other than rate base regulation, i.e. incentive
7 regulation, then a temptation exists for the Company to maximize
8 costs in one jurisdiction over another.

9 (C) Practicality: The use of a single allocation component makes a
10 cleaner trail to audit and to verify the accuracy of the charges
11 allocated to both Chattanooga and Georgia customers. A regulatory
12 agency usually has limited time and resources to validate the financial
13 records of the Company. The Company's external auditors rarely, if
14 ever, certify the accuracy of charges between jurisdictions, but
15 usually examine only the Company's operations in total.
16 Consequently, the Company's use of a multi-component allocation
17 method makes the regulator's audit exponentially more difficult. If
18 the multi-components change from month to month, then the
19 regulator is forced to examine every employee's record of time, every
20 paid invoice and every financial accounting change for its veracity.
21 The use of a multi-component allocation method significantly
22 improves the regulator's oversight abilities.

1 (D) Equity By using a single component allocation method, every
2 customer bears equally the charges from corporate's common costs.
3 When dealing with common or joint costs, there is no way to pinpoint
4 the party that actually causes the cost. By definition, common or
5 joint cost is not associated with any particular party. It is a fine
6 notion in attempting to pinpoint every cost causation to a particular
7 customer or a group of customers, but that is not practical. The
8 TRA's goal should be one of providing excellent utility service for
9 every customer at a just and reasonable price. For example, if a main
10 is in need of repair for a particular neighborhood, all the customers of
11 the Company bear the cost in repairing the main, not only the
12 neighborhood. Further, when the Company expands the service, all
13 of the customers bear the cost of the expansion.

14 Secondly, the forecasted AGL allocations for the attrition year
15 include a return component on the net investment used for both
16 jurisdictions (For example, the AGL corporate office building). This
17 return amount is calculated using the Georgia Public Service
18 Commission authorized rate of return of 9.32% in AGL's last rate
19 case. By updating the rate of return to the just and reasonable rates at
20 this time, based upon the opinion of Dr. Stephen Brown, the CA
21 recommends 8.85% as the rate of return using the net investment of
22 April 1997. Based upon that just and reasonable return, the rate of

1 return component is reduced by \$.151 million.

2 Finally, AGL has not allocated any of its corporate office costs to
3 non-utility operations. This finding was made in the previously
4 mentioned TRA staff compliance audit report. The Company has
5 stated in response that it will change its allocation to non-utility
6 operations beginning October 1, 1997. This change results in a
7 reduction in allocated expenses of \$92,503.

8 In summary, it is germane to the TRA and the ratepayer that the
9 allocation of AGL expenses should be based on a consistent
10 methodology. Most importantly, the expenses borne by the ratepayer
11 must be just and reasonable. Although the Company trumpets its
12 efficiency from restructuring, the results are not evident in what AGL
13 is asking the customer to pay. Finally, AGL's proposed rates should
14 not be granted to placate Company management, but only if they are
15 just and reasonable.

16
17 **Q. Please explain the forecasted difference in sales promotion**
18 **expense amounting to \$.227 million.**

19 A. The CA has excluded \$.227 million in sales promotion expenses.
20 The sales promotion expense proposed by the CA meets the standard
21 criteria of 5% of revenues in determining the amount of expense to
22 allow for advertising. This standard criteria was set in Tennessee

1 Public Service Commission ("TPSC") Docket U-85-7355 for
2 Nashville Gas Company as a surrogate for actually identifying the
3 advertising expense by category because most of the advertising
4 expense was promotional in nature. This is consistent with positions
5 taken by the Commission Staff in subsequent gas company rate cases
6 i.e. United Cities Gas Company, Docket #92-02987. Further,
7 regarding advertising expenses Commission rule 1220-4-5- 45 states,
8 "A utility may not recover from any person other than their
9 shareholders (or other owners) any direct or indirect expenditure for
10 promotional or political advertising. The term 'promotional
11 advertising' means any advertising for the purpose of encouraging
12 any person to select or use gas service or additional gas service or the
13 selection or installation of any appliance or equipment designed to
14 use gas service."

15 The TPSC found the .5% to be consistent with the rule and
16 departure from the policy is inappropriate under existing legal
17 standards which require the agency to follow existing rules and
18 practices.

19
20 **Q. Please explain the forecasted difference in uncollectible expense**
21 **of \$.219 million.**

22 **A. The CA's uncollectible expense for the attrition year was calculated**

1 based on the Company's most recent seven years and eight months
2 experience of net write-offs. The CA uncollectible expense amount
3 for the attrition year is \$165,968. This amount is \$219,051 lower than
4 the Company's amount of \$385,019 which was based on a 12 month
5 average from March 1996 to February 1997. The Company's
6 selected time period is an aberrant and abnormal time period for
7 forecasting purposes and is more than double the historical amounts
8 for the previous six fiscal years. The Company has not presented
9 substantial and material evidence which shows that the expense will
10 continue at that unusual rate. Further, the Company forecasted
11 amount is not indicative of even their current expense. The Company
12 booked \$14,293 for uncollectible expense in May 1997.

13

14 **Q. Please explain the difference in the forecasted expense growth**
15 **rates of the Company and the CA for the attrition year.**

16 A. The Company has used a compound customer and inflation ("CPI")
17 growth rate of 15.62% for the majority of the operating expense
18 accounts excluding salaries and wages. The Company grew these
19 accounts for the test year, the fiscal year ended September 30, 1996,
20 by 15.62% to arrive at their attrition year amounts. It is generally
21 accepted that CPI overstates inflation. Because use of the CPI
22 overstates inflation, it creates more than a just and reasonable

1 expense

2 In my opinion and the opinion of most experts the GDP is a better
3 indicator than CPI. The CA used one half of the annual customer
4 growth rate of 4.65% and an annual inflation ("GDP") rate of 2.36%
5 which generates a compound growth rate of 7.25% from the nineteen
6 months ended May 31, 1997 through September 30, 1998. The
7 information used to determine the CA's inflation factor was taken
8 from the publication "Blue Chip Indicators". The difference between
9 GDP and CPI results in \$.057 million in lower operations and
10 maintenance expenses. Also, the CA used a later test period from
11 June 30, 1996 through May 31, 1997. This period is used because it
12 is more indicative of the Company's post-restructuring costs and of
13 their current cost of operation. The annual customer growth rate was
14 based on the Company's projections of customer growth.
15 Additionally, the CA priced out employee's salaries and wages for
16 the attrition year resulting in \$.052 million lower expense.
17 Consequently, it was not necessary to grow salary and wage expense
18 from the test period using an inflation factor. The cumulative effect
19 of the difference in the compound inflation rates, customer growth
20 rates and test period differences amounts to \$.192 million.

1 Q. Please explain the difference in the forecasted rate case expenses
2 and miscellaneous income deductions of the Company and the CA
3 for the attrition year and your opinion on these differences.

4 A. The CA included \$144,500 of Company anticipated costs for this
5 rate filing to be amortized over three years or \$48,167 for the attrition
6 year plus one year's amortization of Docket #95-02116 at \$16,167.
7 The excess expense difference between the CA calculated amount
8 and the Company projection amounts to \$.104 million. The
9 Company has taken the fiscal 1996 year end amount and has
10 increased it for "CPI" inflation and customer growth. The
11 Company's adjustment has no relationship to historic or prospective
12 amortization amounts from rate filings.

13 Finally, the CA disallowed approximately \$37,540 in miscellaneous
14 expenses as proposed by the Company which are not allowed for use
15 in setting rates. In my opinion, the CA position on this item is
16 consistent with previous positions taken by the TRA Staff.

17

18 Q. Please identify the issues and your opinion regarding other taxes
19 and income taxes for Chattanooga Gas Company in Docket #97-
20 00982?

21 A. The CA Exhibit, Schedule 11 indicates the differences in the
22 forecasted amounts between the CA and the Company. In my

1 opinion, the projected other taxes are \$ 401 million lower than the tax
2 amounts projected by the Company for the attrition year. My opinion
3 regarding this \$.401 million includes the following: (1) I exclude
4 approximately \$.207 million in excessive property tax expense; (2) a
5 reduction of \$.151 million in forecasted Tennessee gross receipts tax
6 expense; (3) a reduction of \$26,340 in forecasted Tennessee state
7 franchise tax expense; (4) approximately \$6,800 in lower payroll
8 taxes and the TRA inspection fee; and (5) income taxes per Schedule
9 12 are due to the difference in taxable net operating income.

10

11 **Q. Please explain your opinion as to the forecasted difference in**
12 **other taxes of approximately \$.401 million.**

13 A. The Company has erroneously mixed un-equalized property
14 assessment value with equalized property assessment value in its
15 calculation of average property assessment growth from 1991 through
16 1996. The Company's use of assessment history, beside its inherent
17 error in calculation, does not reflect current trends. I calculated
18 property taxes using the 1996 tax rates and equalized property
19 assessment values which reflects the most recent historical increases
20 (1995-1996). This results in a \$.217 million adjustment to remove
21 the overstated projected property tax expense proposed by the
22 Company.

1 In addition, the Company has used a five year average of effective
2 Tennessee State Gross Receipts Tax rates to calculate the amount of
3 Tennessee Gross Receipts Tax for the attrition period. The
4 Company's use of a five year average does not reflect the current
5 effective tax rate for use in setting rates and consequently overstates
6 the Tennessee Gross Receipts Tax. For example, the Gross Receipts
7 Tax to be paid is offset by the amount of Tennessee Franchise and
8 Excise Tax paid in the prior year. The Excise tax is calculated based
9 on normalized tax depreciation. The use of accelerated tax
10 depreciation reduces the Tennessee excise tax, but conversely
11 increases the Tennessee Gross Receipts Tax. For setting rates, both
12 the Company and the CA have ignored accelerated tax depreciation
13 rates for calculating Tennessee Excise Tax. The Company, however,
14 has used the normalized tax depreciation benefit when calculating its
15 Gross Receipts Tax. The difference in calculated amounts between
16 the Company and the CA amounts to \$.151 million for the attrition
17 year.

18 The Company has included an acquisition adjustment in its
19 calculation of Tennessee State Franchise Tax. This is an
20 inappropriate inclusion for calculating franchise tax expense in
21 setting rates. I excluded this amount resulting in \$26,340 lower
22 franchise tax expense.

1 Additionally, the payroll taxes for the attrition year are overstated
2 by the Company by approximately \$4,141 due to an overstated salary
3 and wage calculation by the Company.

4 Finally, the Company has overstated the TRA inspection fee by
5 \$2,746 primarily due to overstated revenues for the inspection fee
6 period.

7
8 **Q. Please explain the forecasted difference in income taxes.**

9 A. The difference in the CA and Company's income taxes is due to
10 lower operating expenses by the CA and the difference in capital cost,
11 specifically the cost of debt.

12
13 **Q. Please define, "Rate Base."**

14 A. Simply put, Rate Base is the net investment upon which the
15 Company is allowed to earn a just and reasonable rate of return. A
16 summary comparison of the rate base amounts for both the CA and
17 the Company is found in the CA Exhibit, Schedule 3.

18
19 **Q. Please explain you opinion and the forecasted difference in Rate**
20 **Base.**

21 A. The CA Rate Base is \$6.783 million lower than the Company and
22 my opinion relies on the following:

1 Net Acquisition Adjustment - The CA has excluded \$13.356
2 million Acquisition Adjustment and \$4 196 million of Accumulated
3 Amortization of Acquisition Adjustment for a net reduction in rate
4 base of \$9 160 million. As previously mentioned, Mr. Archie
5 Hickerson, Director of the CA will address these amounts in his
6 direct testimony.

7 Working Capital - The CA is \$1.636 million higher than the
8 Company primarily due to an erroneous customer deposit amount by
9 the Company in its forecast. According to the Company, there is a
10 transposition error in their filing of forecasted customer deposits.

11 Net Utility Plant in Service - The CA used a simple average rather
12 than a thirteen month average to develop the two major Rate Base
13 components, Utility Plant and Service and Accumulated
14 Depreciation. This amounts to the CA being a net \$.691 million
15 higher than the Company.

16
17 **Q. How did you calculate depreciation expense for the attrition**
18 **year?**

19 A. The average attrition year plant balances were multiplied by the
20 Company proposed depreciation rates. I am not expressing an
21 opinion on the accuracy of the Company's request to reduce the
22 composite depreciation rate from 3.66% to 3.61%. The CA did not

1 have sufficient time nor the resources to investigate the
2 reasonableness of the Company proposed depreciation rates. The
3 calculated result, however, is \$4.811 million in depreciation expense
4 for the attrition year. This amount is \$9,875 lower than Company
5 amount. This amount is due to the CA's exclusion of depreciation
6 expense on Land and Land Rights as proposed by the Company. In
7 my opinion, Land and Land Rights should not be depreciated.

8

9 **Q. Does this conclude your testimony?**

10 **A.** Yes, it does.

11

12

13

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BEFORE THE
TENNESSEE PUBLIC SERVICE COMMISSION

In Re Petition of United Cities Gas Company to Place Into Effect a Revised
Natural Gas Tariff

Docket No 95-02258

DIRECT TESTIMONY

OF

R TERRY BUCKNER

September 25, 1995

1 Q. Please state your name for the record.

2 A. My name is R. Terry Buckner.

3 Q. By whom are you employed and what is your position?

4 A. I am employed by the Consumer Advocate Division ("CA") in the
5 State of Tennessee Attorney General's Office as a Senior Regulatory
6 Analyst.

7 Q. How long have you been employed in the utility industry?

8 A. Approximately eighteen years. Before my employment with the
9 Attorney General, I was employed with the Tennessee Public Service
10 Commission ("Commission") as a financial analyst for approximately
11 six years. Prior to my employment with the Commission, I was
12 employed by Telephone and Data Systems ("TDS") for eight years
13 and the First Utility District of Knox County for three years.

14 Q. What is your educational background and what degrees do you
15 hold?

16 A. I have a Bachelors degree in Business Administration from the
17 University of Tennessee, Knoxville with a major in Accounting. I am
18 also a Tennessee Certified Public Accountant and a member of the
19 American Institute of Certified Public Accountants.

20 Q. Would you briefly describe your responsibilities as a Regulatory
21 Analyst since your employment with the CA?

22 A. I prepared testimony and exhibits as an employee with the

1 Commission before becoming a member of the CA. My
2 responsibilities have not been altered significantly since my
3 employment change.

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to present information to the
6 Commission on the appropriate operating expenses other than
7 depreciation and salaries and wages for the attrition year December 1,
8 1995 to November 30, 1996 for United Cities Gas Company
9 ("Company"). Additionally, I will present the CA's calculation of
10 other non-payroll taxes and income taxes for the attrition year.

11 **Q. Please identify the issues regarding operating expenses for United**
12 **Cities Gas Company in Docket #95-02258?**

13 A. The CA Exhibit, Schedule 5, indicates the differences in the
14 forecasted amounts between the CA and the Company. The non-
15 payroll operating expenses projected by the CA are \$3.166 million
16 lower than the non-payroll operating expenses projected by the
17 Company for the attrition year. The eight principle issues regarding
18 this \$3.166 million include the following: (1) The CA Exhibit,
19 Schedule 4, Line 11 has included \$1.502 million in annual savings as
20 found in the Management Audit of the Company by The Liberty
21 Consulting Group ("Liberty"). Liberty was employed at the direction
22 of the Commission to conduct the management audit of the Company

1 in Docket #92-02987. The Commission ordered in Docket #92-
2 02987 that the results of the audit be considered in the next rate filing
3 which is this Docket #95-02258. Liberty has completed the audit and
4 has provided the report to the Commission. Liberty representatives
5 will testify as to the validity of the annual savings amount. The CA
6 relied on their expertise in incorporating the identified annual savings
7 in its forecast for the attrition year as found in Liberty's management
8 audit report; (2) The Company has overstated \$.694 million in
9 forecasted non-payroll operating expenses originating from the CA's
10 test period reconciliation; (3) The Company overstated \$.390 million
11 in projected employee health insurance; (4) The CA recommends
12 \$.334 million in disallowed and non-recurring expenses; (5) The CA
13 inflation and customer growth rate used for non-payroll expenses is
14 \$.244 million in higher than the Company for the attrition year; (6)
15 The CA proposes a disallowance of \$.198 million in forecasted sales
16 promotion expense; (7) The Company has improperly included \$.189
17 million of interest on customer deposits with operating expenses.
18 The CA has recognized this item for presentation purposes as interest
19 expense and as a separate line item in the comparative income
20 statement; (8) The CA has disallowed Company adjustments of \$.103
21 million in storage expense, postage expense, and management audit
22 amortization expense.

1 **Q. Please explain the \$.694 million difference in the test period non-**
2 **payroll operating expense amount of the Company and the CA**
3 **used in forecasting non-payroll expenses for the attrition year.**

4 A. The Company has over-allocated non-payroll costs to Tennessee
5 operations for the test year 1994 by \$.694 million. Approximately
6 \$.656 million of this amount is classified in the General and
7 Administrative expenses. The Company has four major divisions of
8 operation and allocation of costs: (1) The Division Corporate Office;
9 (2) The Illinois/Tennessee Division; (3) The Virginia/East Tennessee
10 Division; and (4) The Tennessee Division. Tennessee operations
11 receive an allocation of payroll and non-payroll expenses from each
12 Division for reporting purposes and setting rates. The allocation
13 amounts in the Company's filing are not consistent with the actual
14 test period 1994 Divisional income statements ("R50400") furnished
15 to the CA by the Company. Consequently, the allocation percentages
16 used by the Company in its rate filing to allocate costs to Tennessee
17 are overstated and are not consistent with the actual amounts or the
18 factors used in Commission Docket #92-02987, the last rate increase
19 for the Company.

20 **Q. Please explain the forecasted difference in employee health**
21 **insurance amounting to \$.390 million.**

22 A. The Company has proposed an increase of nearly 50% in health

1 insurance expense from 1994 to the attrition year. A review of actual
2 growth has been well below this level of growth. The medical claims
3 furnished to the CA have grown closer to the annual inflation rate of
4 2% to 3% for 1994 over 1993. Additionally, year to date 1995
5 annualized amounts are approximately at the same level as 1994.

6 **Q. Please explain the forecasted difference in disallowed and non-**
7 **recurring amounts of \$.334 million.**

8 A. The Company has included \$.334 million in expenses from the 1994
9 test period which are not valid for setting rates or are non-recurring in
10 nature. These expenses include the following: (1) expenses for Non-
11 competition agreements primarily with Union Gas Company incurred
12 during acquisition of their natural gas systems. These payments in
13 effect represent a premium paid in excess of the book value of the
14 Union Gas Company and are not a cost of providing utility service to
15 Tennessee customers. This position is supported by Liberty. In its
16 management audit report, Liberty agrees that this cost should not be
17 recognized for setting rates (See pages II-45,48). Further, the
18 Commission has historically recommended that these costs be borne
19 by the shareholder of the Company and not the ratepayer; (2)
20 expenses for an equity funding fee were also excluded in the CA's
21 attrition year forecast. Simply put, the Company relies upon the
22 earnings of an affiliated company, Energy Company, in order to issue

1 utility bonds, therefore, justifying a fee. However, the affiliated
2 Energy company generates most of its earnings from captive
3 financing agreements with the Company. The Commission Staff has
4 historically not allowed this expense in setting rates. Additionally,
5 Liberty recommended that this equity funding fee be eliminated (See
6 pages II-44,45); and (3) The CA excluded one-time expenses incurred
7 by the Company in 1994 through a class-action lawsuit alleging price
8 fixing in East Tennessee in the 1980's. In February 1995, the
9 Company reached a settlement agreement with the Tennessee
10 Attorney General in the amount of \$80,000. This settlement was
11 pending the United States District Court's approval according to the
12 Company's audited 1994 annual report to the stockholders. This is
13 not a normal or recurring expense.

14 **Q. Please explain the forecasted difference in expense growth rates**
15 **amounting to \$.244 million.**

16 A. The Company has proposed a growth factor of 6.71% to increase
17 most of its non-payroll operating expenses. The CA used a
18 compound growth factor of 9.81% from the twelve months ended
19 December 31, 1994 to November 30, 1996. The CA used an annual
20 weighted customer growth rate of 2.5% and an inflation rate of
21 2.56%. The information used to determine the CA's inflation factor
22 was taken from the publication *Blue Chip Indicators*. The cumulative

1 effect of the difference in the compound growth rate of non-payroll
2 expense amounts to \$.244 million more than the Company.

3 **Q. Please explain the forecasted difference in sales promotion**
4 **expense amounting to \$.198 million.**

5 A. The CA has excluded \$.198 million in sales promotion expenses. The
6 sales promotion expense proposed by the CA meets the standard
7 criteria of .5% of revenues in determining the amount of expense to
8 allow for advertising. This standard criteria was set in Commission
9 Docket U-85-7355 for Nashville Gas Company and is consistent with
10 positions taken by the Commission Staff in subsequent gas company
11 rate cases i.e. United Cities Gas Company, Docket #92-02987. In
12 addition, Commission rule 1220-4-5- 45 states, "A utility may not
13 recover from any person other than their shareholders (or other
14 owners) any direct or indirect expenditure for promotional or political
15 advertising. The term 'promotional advertising' means any
16 advertising for the purpose of encouraging any person to select or use
17 gas service or additional gas service or the selection or installation of
18 any appliance or equipment designed to use gas service." While this
19 rule prohibits promotional advertising, safety and informational
20 advertising is allowed. In previous years, disagreements have arisen
21 as to the proper classification of advertising expenses. The .5%
22 allowance threshold was adopted in lieu of specifically identifying

1 the type of advertising expense.

2 **Q. Please explain the forecasted difference in storage expense,**
3 **management audit amortization, and postage expense amounting**
4 **to \$.103 million.**

5 A. Storage expense amount of \$42,334 is excluded by the CA because
6 the test year amount in the Company's exhibit (See Exhibit 7, Page 1,
7 Line 7, Column 2) does not reconcile to the amount in the Company's
8 corporate division income statement.

9 Also, the CA has amortized the management audit expense over a
10 four year period. A four year period more adequately reflects the
11 potential life of the management audit investment cost. This is
12 consistent with the Commission Staff recommended amortization
13 period as stated in their compliance audit report dated September 13,
14 1995. In the Company's rate filing, an amortization period of three
15 years was used resulting in excess expense for the attrition year of
16 \$29,791.

17 Finally, the Company has included a \$31,137 increase for postage
18 expense. As previously mentioned, the CA has already recognized
19 this increase through the growth factor applied to all non-payroll
20 expenses. (See p. 7, Line 2).

21 **Q. Please identify and explain the issues regarding other taxes and**
22 **income taxes for United Cities Gas Company in Docket #95-**

1 **02258.**

2 A. The CA Exhibit, Schedule 8 indicates the differences in the
3 forecasted amounts between the CA and the Company. Other taxes
4 are a separate tax category for classification purposes and are non-
5 income taxes. The other taxes projected by the CA are a net \$60,000
6 lower than the tax amounts projected by the Company for the attrition
7 year. The issue regarding this \$60,000 include primarily the
8 calculated net differences in gross receipts tax, property tax and
9 franchise tax.

10 Income taxes are higher per Schedule 10 primarily due to the
11 difference in taxable net operating income. However, based on the
12 capital structure of Dr. Brown, the CA has included \$.600 million in
13 additional interest expense in its calculation of income taxes,
14 Schedule 9, Line 15. This inclusion reduces income taxes, but also
15 the CA has included permanent differences, items which are not
16 deductible for income tax purposes, of \$.164 million which increases
17 income taxes. These permanent differences have apparently been
18 excluded by the Company in its tax calculation.

19 **Q. Does this conclude your testimony?**

20 A. Yes, it does.

21

22

1 Q. Please state your name for the record.

2 A. My name is R. Terry Buckner.

3 Q. By whom are you employed and what is your position?

4 A. I am employed by the Consumer Advocate Division ("CA") in the
5 State of Tennessee Attorney General's Office as a Senior Regulatory
6 Analyst.

7 Q. How long have you been employed in the utility industry?

8 A. Approximately eighteen years. Before my employment with the
9 Attorney General, I was employed with the Tennessee Public Service
10 Commission ("Commission") as a financial analyst for approximately
11 six years. Prior to my employment with the Commission, I was
12 employed by Telephone and Data Systems ("TDS") for eight years
13 and the First Utility District of Knox County for three years.

14 Q. What is your educational background and what degrees do you
15 hold?

16 A. I have a Bachelors degree in Business Administration from the
17 University of Tennessee, Knoxville with a major in Accounting. I am
18 also a Tennessee Certified Public Accountant and a member of the
19 American Institute of Certified Public Accountants.

20 Q. Would you briefly describe your responsibilities as a Regulatory
21 Analyst since your employment with the CA?

22 A. I prepared testimony and exhibits as an employee with the

1 Commission before becoming a member of the CA. My
2 responsibilities have not been altered significantly since my
3 employment change.

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to present information to the
6 Commission on the appropriate operating expenses other than
7 depreciation for the attrition year October 1, 1995 to September 30,
8 1996 for Chattanooga Gas Company ("Company"). Additionally, I
9 will present the CA's calculation of other taxes and income taxes for
10 the attrition year.

11 **Q. Please identify the issues regarding operating expenses for**
12 **Chattanooga Gas Company in Docket #95-02116?**

13 A. The CA Exhibit, Schedule 10 indicates the differences in the
14 forecasted amounts between the CA and the Company. The operating
15 expenses projected by the CA are \$1.854 million lower than the
16 operating expenses projected by the Company for the attrition year.
17 The issues regarding this \$1.854 million include the following. (1)
18 the CA has excluded approximately \$.577 million in excessive
19 expense growth and inappropriate expenses for setting rates for the
20 ratepayer; (2) a reduction of \$.398 million in forecasted salaries and
21 wages associated with advertising; (3) a reduction of \$.280 million in
22 forecasted medical insurance; (4) \$.248 million reduction in projected

1 uncollectible expense, sales promotion expense, management audit
2 expense, and miscellaneous expense; (5) \$.194 million in legal and
3 rate case expense; and (6) \$.157 million in payroll clearings.

4 **Q. Please explain the difference in forecasted expense growth of the**
5 **Company and the CA for the attrition year.**

6 A. The Company has used a compound customer and inflation growth
7 rate of 18.06% for the majority of the operating expense accounts
8 excluding salaries and wages. The CA used an annual customer
9 growth rate of 4.65% and an annual inflation rate of 2.56% which
10 generates a compound growth rate of 9.89% from the twelve months
11 ended September 30, 1994 through September 30, 1996. The
12 information used to determine the CA's inflation factor was taken
13 from the publication "Blue Chip Indicators". The annual customer
14 growth rate was based on the Company's projections of customer
15 growth. The cumulative effect of the difference in the compound
16 growth of non salary and wage expense amounts to \$.310 million.

17 The CA's calculation of salaries and wages is approximately \$.220
18 million lower than the Company. This difference is due to
19 overstatement of salaries and wages in the Company's filing when
20 reconciled with the price-out of employee's salaries, the exclusion of
21 one employee, and lower salary increases for management and non-
22 union supervisory personnel. The Company included an employee

1 who is no longer with the organization in its projection of salary and
2 wages. Additionally, the Company projected annual increases of 5%
3 and 4.5% for it's non-union management and supervisory personnel.
4 The CA limited the increase for these employees to a 4% annual
5 increase, the same level agreed to by the union supervisory personnel
6 in year one of their contract.

7 The remaining \$47,000 difference is due to the erroneous exclusion
8 by the Company of flex vacation deduction amounts of
9 approximately \$28,000; and approximately \$19,000 of under-
10 allocated costs to non-regulated operations and capitalization.

11 **Q. Please explain the forecasted difference in sales promotion**
12 **salaries and wages expense amounting to \$.398 million.**

13 A. The CA has excluded \$.398 million in sales promotion salaries and
14 wage expenses. The sales promotion expense proposed by the CA
15 meets the standard criteria of .5% of revenues in determining the
16 amount of expense to allow for advertising. This standard criteria
17 was set in Commission Docket U-85-7355 for Nashville Gas
18 Company and is consistent with positions taken by the Commission
19 Staff in subsequent gas company rate cases i.e. United Cities Gas
20 Company, Docket #92-02987. Further, regarding advertising
21 expenses Commission rule 1220-4-5- 45 states, "A utility may not
22 recover from any person other than their shareholders (or other

1 owners) any direct or indirect expenditure for promotional or political
2 advertising. The term 'promotional advertising' means any
3 advertising for the purpose of encouraging any person to select or use
4 gas service or additional gas service or the selection or installation of
5 any appliance or equipment designed to use gas service."

6 **Q. Please explain the forecasted difference in employee health and**
7 **life insurance expense of \$.280 million.**

8 A. The Company erroneously used the projected 1997 amount for
9 employee insurance expense rather than the appropriate 1996 per
10 Company workpapers. Further, the Company failed to allocate a
11 portion of these expenses to capitalization and non-regulated
12 operations. The correction of these "oversights" amounts to
13 approximately \$.280 million.

14 **Q. Please explain the forecasted difference in uncollectible expense,**
15 **sales promotion expense, and management audit expense**
16 **accumulating to \$.248 million.**

17 A. The CA's uncollectible expense for the attrition year was calculated
18 based on the most recent five year history of net write-offs. The CA
19 amount is approximately \$65,000 lower than the Company's amount
20 which excludes an abnormally high recovery amount for 1994, but
21 fails to exclude the abnormally high write-off as well. The CA
22 amount reflects both exclusions.

1 The CA has excluded \$90,226 in additional Company proposed sales
2 promotion expenses. As previously discussed, the sales promotion
3 expense proposed by the CA meets the standard criteria of .5% of
4 revenues in determining the amount of expense to allow for
5 advertising. This standard criteria was set in Commission Docket U-
6 85-7355 for Nashville Gas Company and is consistent with positions
7 taken by the Commission Staff in subsequent gas company rate cases
8 i.e. United Cities Gas Company, Docket #92-02987.

9 Also, the CA has amortized the management audit expense over a
10 four year period. This is consistent with the Commission Staff
11 recommended amortization period as stated in their compliance audit
12 report dated August 28, 1995. In it's rate filing, the Company
13 amortized the management audit expense over a two year period
14 resulting in excess expense of \$49,347.

15 Finally, the CA disallowed approximately \$42,000 in miscellaneous
16 expenses as proposed by the Company which are not allowed for use
17 in setting rates. The CA position on this item is consistent with
18 previous positions taken by the Commission Staff.

19 **Q. Please explain the forecasted difference in legal and rate case**
20 **expense of \$.194 million.**

21 **A.** The Company included legal costs for Federal Regulatory Energy
22 Commission ("FERC") orders incurred in or prior to the test year and

1 have no basis for inclusion in the attrition year. The CA included
2 \$48,500 of anticipated costs for this rate filing to be amortized over
3 three years or \$16,167 for the attrition year. The excess expense
4 difference between the CA calculated amount and the Company
5 projection amounts to \$.194 million.

6 **Q. Please explain the forecasted difference in payroll clearings of**
7 **\$.157 million.**

8 A. The Company has included in its calculation of non-salary and
9 wage expenses, \$.157 million in payroll clearing. The Company
10 calculated its attrition year salaries and wages expense including
11 amounts charged to clearing accounts. Some employees charge their
12 work time to a clearing account. A portion of the clearing account
13 amount is redistributed to expense accounts. The redistributing or
14 clearing process allocates payroll charged to clearing accounts to an
15 expense account based on salaries and wages charged directly to
16 expense accounts. However, through the Company's accounting
17 processes, the payroll clearing amount is recognized as non-payroll
18 dollars. The Company has in effect double-counted the \$.157 million
19 payroll clearing dollars by including them in their salaries and wages
20 expense calculation and also in their calculation of non-salary and
21 wage expenses.

1 **Q. Please identify the issues regarding other taxes and income taxes**
2 **for Chattanooga Gas Company in Docket #95-02116?**

3 A. The CA Exhibit, Schedule 11 indicates the differences in the
4 forecasted amounts between the CA and the Company. The other
5 taxes projected by the CA are \$.400 million lower than the tax
6 amounts projected by the Company for the attrition year. The issues
7 regarding this \$.400 million include the following: (1) the CA has
8 excluded approximately \$.200 million in excessive property tax
9 expense; (2) a reduction of \$.106 million in forecasted Tennessee
10 gross receipts tax expense; (3) a reduction of \$45,550 in forecasted
11 Tennessee state franchise tax expense; (4) approximately \$30,000 in
12 lower payroll taxes; and (5) income taxes per Schedule 13 which are
13 primarily due to the difference in taxable net operating income.

14 **Q. Please explain the forecasted difference in other taxes of**
15 **approximately \$.400 million.**

16 A. The Company has assumed a significant property tax rate change for
17 Hamilton County during the attrition year. There is no evidence to
18 support this rate change. Further, the composite tax rate for the
19 Company has not changed significantly over the last three years. The
20 CA has calculated property taxes using the 1994 tax rates and
21 property assessment values which reflects recent historical increases.
22 This results in \$.200 million in overstated projected property tax

1 expense by the Company.

2 The Company has used a five year average of effective Tennessee
3 State Gross Receipts Tax rates to calculate the amount of Tennessee
4 Gross Receipts Tax for the attrition period. The effective tax rate has
5 declined by 20% over the last five years. The Company's use of a
6 five year average does not reflect the current effective tax rate and
7 consequently overstates the Tennessee Gross Receipts Tax. The CA
8 has used an average of actual and projected gross receipts for the
9 attrition year at the actual tax rate less 1994 estimated franchise and
10 excise taxes. The difference in calculated amounts between the
11 Company and the Staff amounts to \$.107 million for the attrition
12 year.

13 The Company has included an acquisition adjustment in its
14 calculation of Tennessee State Franchise Tax. This is an
15 inappropriate inclusion for calculating franchise tax expense in
16 setting rates. The CA has excluded this amount resulting in \$45,550
17 lower franchise tax expense.

18 Additionally, the payroll taxes for the attrition year are overstated by
19 approximately \$30,000 due to an overstated salary and wage
20 calculation by the Company.

1 **Q. Please explain the forecasted difference in income taxes.**

2 A. The difference in the CA and Company's income taxes is due to
3 lower operating expenses by the CA and the difference in capital
4 structure, specifically the cost of debt.

5 **Q. Does this conclude your testimony?**

6 A. Yes, it does.

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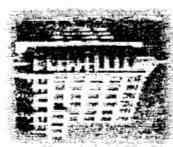
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ATTACHMENT B



Division of **Energy Regulation**

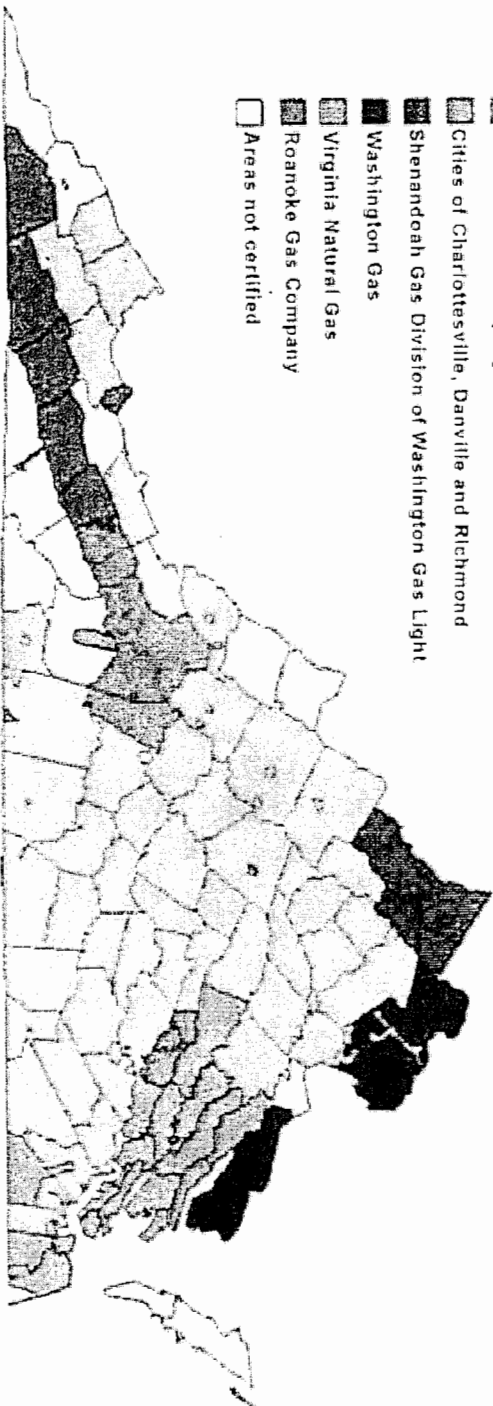
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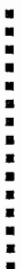


Map of Service Territories

- ☐ Virginia Gas Distribution Company
- ☐ Atmos Energy
- ☐ Columbia Gas of Virginia
- ☐ Southwestern Virginia Gas Company
- ☐ Roanoke Gas Company
- ☐ Cities of Charlottesville, Danville and Richmond
- ☐ Shenandoah Gas Division of Washington Gas Light
- ☐ Washington Gas
- ☐ Virginia Natural Gas
- ☐ Roanoke Gas Company
- ☐ Areas not certified



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A Brief History of the Manufactured Gas Industry in the United States

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Although coal gas was first produced and consumed in Great Britain in 1792, inventive minds and entrepreneurs in the United States were quick to see the potential value of this fuel source. At the close of the 18th century, experiments using manufactured gas as a source of illumination were well underway in the United States. At first coal gas was seen as a novelty, or at most, a source of household illumination employed by the hobbyist who was amused by eccentric technologies. It was, however, from these small beginnings that the gas industry grew.

Among these early experiments with manufactured gas were those of the M. Ambrose & Company of Philadelphia, Pennsylvania. In 1796, the company, which specialized in the manufacture of fireworks, used coal gas to illuminate elaborate and fanciful chandeliers at a public gathering in a local amphitheater. In 1802, illuminating gas was used in a "sideshow" at the Haymarket Gardens in Richmond, Virginia.

In Baltimore, Maryland, one of the pioneers of the American gas industry opened the nation's eyes to the potential of this lighting source in 1816. In June of that year, artist Rembrandt Peale (1778-1860) used coal gas to illuminate an exhibit at his museum and gallery. The novelty of gaslight was said to have aroused the public's admiration far more than the items Peale had placed on exhibit.

Peale's use of gas lighting was so well received that on July 17, 1816, the City of Baltimore passed an ordinance permitting Peale and his associates to manufacture gas, to lay distribution pipes, and to supply the city with coal gas for street lights. In February of 1817, Peale and associates chartered the Gas Light Company of Baltimore, the first coal gas company founded in the US.

In Newport Rhode Island, yet another pioneer of the manufactured gas industry was at work. There along the shores of Narragansett Bay, David Melville began introducing coal gas into the homes and factories of the Northeast. As early as 1813, Melville had used coal gas, generated from a small backyard plant, to light his own home. By 1813 he had obtained a patent for his method of manufacturing coal gas and had convinced the owners of small textile mills in Watertown, MA and Pawtucket, RI, to install gaslights in their factories.

Based upon the success of this operation and consumer demand for gas lighting, commercial plants soon sprang up across the nation. Most of these early manufactured gas plants were owned and operated by private-sector entrepreneurs. Many of these were small plants, built from kits that were manufactured in New York City, and shipped to communities throughout the country. By 1859, 297 manufactured gas companies existed in the US. These companies, capitalized at \$42 million, served an estimated 4,857,000 customers.

The success of these small operations fueled an ever-growing demand for manufactured gas. The demand for coal gas among residential consumers grew at an amazing rate. Soon the small kit-type plants were not sufficient to meet demand, and larger gas plants sprang up in cities and towns across the land. Concurrent with the industry's expansion to meet residential needs was a growing demand by industry. It did not take factory owners long to see the advantages of gas lighting and of gas powered engines. As demand grew, more and bigger manufactured gas plants

were constructed to meet demand. It is estimated that by the mid-1870s, most American communities with a population of 10,000 or more were home to at least one manufactured gas plant.

By the time of the Great Centennial in 1876, manufactured gas had assumed an integral role in the nation's economy. Gas powered machinery helped drive the phenomenal growth of America's economy in the decades following the Civil War. Indeed, the use of manufactured gas by industrial consumers soon vastly outpaced the use of coal gas in the home. As the emphasis shifted from supplying residential customers to industrial consumers, the gas industry itself industrialized. Plants grew larger in size, and a wave of mergers and consolidations swept the industry. At the residential level, it was this period that witnessed the growth of municipally owned and operated manufactured gas plants.

New technologies were also developed during this time, which led to the manufacture of more efficient forms of coal gas, most notably carburetted water gas. One of the advantages of carburetted water gas was that it could be economically supplied to small and large markets alike. Indeed, it seems that the Roaring Twenties witnessed the peak of the manufactured gas industry in the US. Thus, we see in the period between 1900 and 1920 that gas plants, many of which were municipally owned, were constructed in communities with just a few thousand residents.

At the same time, advances in the manufacture of high pressure pipes and pumping systems led to a shake up in distribution technology in the nation's larger cities. The so-called "central station" distribution system came into being. No longer was it necessary to supply customers from small, neighborhood gas plants. Utility companies whether private or municipal could construct enormous gas plants and pipe their product under pressure over substantial distances to their customers.

The years between the end of WWI and the beginning of WWII witnessed the decline of the Manufactured Gas Industry. Natural gas, electricity, coal and petroleum products usurped many of the roles formerly played by manufactured gas in the industrial and residential sectors. No longer was coal gas the essential fuel that illuminated the nation's homes and factories--no longer did manufactured gas fuel the nation's factories. At the same time that demand for the gas itself declined, so too did demand for the by-products of gas plants as the chemical industry shifted to petroleum-based chemicals to supply its needs. During the post-WWII era, the nation grew ever more dependent upon oil and natural gas. As ever more and larger petroleum refineries were constructed and tens of thousands of miles of natural gas pipelines were laid, the coal gas industry continued its decline. A few manufactured gas plants continued in operation into the second half of the 20th century, supplying those few industrial operations that had not converted to other energy sources or other sources of feedstocks. The last plants to supply residential consumers with coal gas ceased operations by the mid-1960s.

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What is Manufactured Gas?

Manufactured gas should not be confused with natural gas, the primary fuel gas of our day. Manufactured, or artificial gas, was produced from coal, coal and oil mixtures, or from petroleum.

Almost without exception, in the US manufactured gas was produced by means of three processes:

- Coal Carbonization
- Carburetted Water Gas
- Oil Gas

Coal Carbonization / Coal Gas Process

This was the primary, commercial mode of manufacturing gas from ca 1816 to 1875. After 1875, newer processes and technologies gradually replaced coal carbonization.

Coal gas was produced through the distillation of bituminous coal in heated, anaerobic vessels called retorts. In this process, coal was broken down into its volatile components through the action of heat in a nearly oxygen free environment.

During the retorting phase, approximately two-fifths of the coal's weight was converted into volatile non-solids or gases. Most of the remaining amount of the coal was converted into solids, primarily coke. From the retort, the gases were drawn off into a device known as the hydraulic main where some of the vapors were converted to liquids and remained in gaseous state.

The liquids, or liquors as they were often referred to, consisted of (contaminated) water and coal tar, and its associated wastes.

The remaining vaporous material was coal gas. After exiting the hydraulic main, the gas ran through a condenser where the gas cooled and additional coal tar and other impurities were removed.

Quite often, the gas was next funneled through a device known as an exhauster, which further cooled the gas.

The coal gas, however, still contained impurities, primarily gaseous ammonia and sulfur compounds. These were removed by "washing" the gas in water and by running the gas through beds of moist lime or moist iron oxides.

After this final purification process, the coal gas passed through the station meter, where it was measured, and on to gas storage holder. From the holder the gas was distributed via street mains to the consumer.

Carburetted Water Gas Process

In 1873, Professor L. Lowe of Pennsylvania invented the carburetted water gas process—a technological advance that spurred on the growth of America's manufactured gas industry. At its core, the process consisted of enriching a form of coal gas, known as water gas (blue gas) and thus increasing its caloric / energy value. By injecting oil into a vessel containing heated water gas, the oil and vapor combined, forming a gaseous fuel with a thermal content of approximately 300-350 Btu per cubic foot.

Within a few short years, carburetted water gas came to dominate the manufactured gas industry in the US, as residential and industrial consumer alike demanded the more efficient fuel source.

Typically, a carburetted water gas plant consisted of a brick-lined, cylindrical, steel vessel, the generator, the carburetor (carburetter), and a superheater. It was in the generator that the coal or coke was distilled to generate gaseous product. As the gas was drawn off from the generator and passed into the carburetor, the oil was introduced into the vapor. The oil-gas mixture then traveled down through the carburetor and up through the superheater. During the course of its passage through the superheater, the oil was thermally cracked and became "fixed" – thoroughly mixed and bonded with the coal gas. Carburetted water gas was, then, a mixture of the gaseous products of coal and petroleum.

From the superheater, the carburetted water gas was fed into a sealed wash box where the gas cooled slightly, allowing some the impurities in the form of coal tar (and associated wastes) to condense and settle out. The gas was then passed through the condensers where it was cooled even further, and additional coal tar and impurities were removed.

The gas was also passed through a scrubber, a device that brought the vapor into direct contact with water, thus removing even more impurities from the gas.

Depending upon the size and design of the plant, some facilities employed additional mechanical scrubbing devices to produce carburetted water gas. Common scrubber processes included:

The wire drawing or friction method - - while still heated, the gas was driven through a series of fine orifices. As a result of friction and changes in the velocity of flow, impurities, including coal tar, settled from the vapor.

The shaving scrubber method - - the vapor was passed through beds of absorbent materials (wood chips, lime and iron oxides were sometimes used), thus removing coal tar and other contaminants from the gas.

Direct current electrical precipitation method- - electrical currents were passed through the vapor, charging the particles of coal tar and other impurities in such a manner that they precipitated out from the gas.

After scrubbing, the gas was moved into the relief holder, which served as a reservoir that provided a continuous gas supply to the exhauster. From the relief holder, the gas passed through the exhauster, through the final stage purifiers, into the station meter, and on to the storage holder. From there the gas entered the distribution system and was delivered to the consumer.

Oil Gas Process

The oil gas process is the only one of the three manufactured gas processes discussed here that did not use coal as a raw material.

The first large-scale oil gas plant went on line in Oakland, CA, in 1902. The process as a whole was very similar to carburetted water gas process. In essence, the oil gas process consisted of thermo-cracking oil in a steam environment to produce the raw gas rather than distilling coal. The oil was heated and cracked in a vessel similar to the generator used in the carburetted water gas

process. From there the gas passed to a vaporizer, where it was enriched with additional injections of oil and then routed through the superheater. After exiting the superheater, the gas was scrubbed and processed for distribution in much the same way as was carburetted water gas

Many of the same waste products associated with the production of coal gases, notably tars containing PAHs, were also generated during the manufacture of oil gas.

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**HERITAGE RESEARCH CENTER, LTD.**

Who Owned and Operated Manufactured Gas Plants?

Although many municipalities across the country owned and/or operated gas works, especially during the Progressive Era (1880-1920), the majority of plants in the US were owned by corporate entities. In 1904, over 91 percent of manufactured gas plants were under corporate ownership. By 1909 that figure had decreased somewhat, to approximately 84 percent, but throughout the history of the industry, corporate ownership was the rule rather than the exception.

- From circa 1870 to circa 1960, many railroad companies operated manufactured gas plants at their larger yards and terminals. These facilities, known as Pintsch plants, produced compressed illuminating gas for use in passenger rail cars.
 - Between 1845 and 1945 many military installations, posts, and bases operated manufactured gas plants.
- From the 1820s into the 1950s and 1960s many private homes were equipped with domestic / residential gas plants.
 - Between 1850 and 1950 it was quite common for large institutions--hotels, resorts, hospitals, prisons, colleges, schools, etc—to own and operate their own gas works.
- From circa 1880 to circa 1950 many industrial facilities operated their own, onsite gas works and manufactured what was known as Producer Gas. Producer Gas was used as fuel to power machinery and equipment and to feed furnaces or kilns in smelters, iron and steel plants, brick, and cement plants.
 - Between 1912 and 1940 many cities were home to bottled manufactured gas plants. These facilities produced manufactured gas that was compressed into bottles / gas cylinders for sale to a variety of customers.
- From ca 1910 to the 1990s, the US Bureau of Mines operated manufactured gas plants at various times and various locations across the country. Some were pilot plants to showcase new technologies and processes, others were experimental plants to develop these technologies and to test coal and other fuels.
 - Between circa 1890 and the present, hundreds of so-called "merchant coke works" operated in the US. While the primary product of these plants was coke, gas, and coal tar (and associated waste / byproducts) were produced at these facilities.



HERITAGE RESEARCH CENTER, LTD.



What are the Environmental and Human-Health Effects from Wastes Generated by Manufactured Gas Plants?

2-methylnaphthalene . . . Acenaphthylene . . .
 Ancenaphthene . . . Anthracene . . . Arsenic . . . Benzene .
 . . Benzo(a)anthracene . . . Benzo(a)pyrene . . . Benzo(b)
 fluoranthene . . . Benzo(k)fluoranthene . . . Chromium . . .
 Chrysene . . . Cyanide . . . Dibenzo(a,h)anthracene . . .
 Dibenzofuran . . . Ethylbenzene . . . Fluoranthene . . .
 Fluorene . . . Indeno(1,2,3-cd)pyrene . . . Lead . . .
 Methylphenol . . . Napthalene . . . Phenanthrene . . .
 Phenols . . . Polynuclear / Polycyclical Aromatic
 Hydrocarbons (PAHs). . . Pyrene . . . Semi-Volatile
 Organic Compounds (SVOCs). . . Toluene . . . Volatile
 Organic Compounds (VOCs). . . Xylenes

For over a century and a half the manufactured gas industry played a vital role in the nation's economy. More than 50,000 gas works operated at various times during that period. During the life span of the industry **tens of billions of gallons** of extremely hazardous wastes were generated by the industry . . . **tens of billions of gallons.**

As anyone who follows the nightly news is aware, there is an intense, ongoing debate among many in our society regarding the nature of the hazards and dangers posed by certain of the COCs that are a byproduct of our industrialized civilization. In most cases, the debate does not focus on whether or not these substances pose threats to the environmental and human health. The debate focuses on maximum contaminant levels (MCLs), the amount of these COCs needed to pose the threat.

Two branches of the US Department of Health & Human Services, the National Library of Medicine and the Agency for Toxic Substances and Disease Registry (ATSDR) provide information on these and many more COCs. Both of these agencies rely upon a wide range of sources for their information. Drawing upon this information one can see why many are concerned about the COCs found in coal tar and other wastes generated by the manufactured gas industry.

If we examine just a handful of those hundreds of COCs that are found in coal tar, we can begin to see the potential hazards posed by the wastes generated at manufactured gas plants.

- Arsenic
- Benzene
- Chromium
- Lead
- Phenols
- Polynuclear Aromatic Hydrocarbons (PAHs)
- Toluene

- Xylenes

The fact that all of these COCs have been found at current or former National Priorities List (NPL) sites, provides some sense of the extent to which they are of concern as environmental contaminants in the US. Of course, not all of those NPL sites are associated with the manufactured gas industry. NPL sites are those identified by US EPA as being the most serious hazardous waste sites in the nation and those that are targeted for long-term federal cleanup activities.

- Arsenic has been found in at least 1,014 of the 1,598 current or former NPL sites.
- Benzene has been found in at least 816 of the 1,428 current or former NPL sites.
- Chromium has been found in at least 1,036 of the 1,591 current or former NPL sites.
- Lead has been found in at least 1,026 of the 1,467 current or former NPL sites.
- Phenol has been found in at least 481 of the 1,467 current or former NPL sites.
- Polynuclear Aromatic Hydrocarbons (PAHs) have been found in at least 600 of the 1,467 current or former NPL sites.
- Toluene has been found in at least 851 of the 1,467 current or former NPL sites.
- Xylene has been found in at least 658 of the 1,467 current or former NPL sites.

Arsenic

Arsenic exists naturally and occurs widely in the natural environment. It is also a very common by-product of past and present industrial activities. Many of the anthropogenic arsenical compounds are especially soluble in water, thus presenting a threat to water supplies.

At high levels, arsenic can act as both a chronic and acute poison to humans and to animal and plant life. Indeed, arsenic has at times been widely marketed as a commercial pesticide.

Aside from its properties as a poison, there is a substantial body of evidence indicating that arsenic compounds are carcinogenic in nature. The Department of Health and Human Services (DHHS), the International Agency for Cancer Research (IARC), US EPA and the World Health Organization (WHO) believe that there is sufficient evidence to classify certain arsenical compounds carcinogens.

Benzene

Although benzene is commonly found in the environment, it appears that its ultimate source is past and present industrial activities. Benzene breaks down relatively slowly in water and soil. It is water-soluble and can pass through the soil into underground water..

At relatively high exposure levels, benzene is extremely toxic, even fatal, to humans and other organisms. The Department of Health and Human Services (DHHS), the International Agency for Cancer Research (IARC), and US EPA have determined that benzene is carcinogenic to humans. Benzene is known to cause blood disorders and damage to immune systems in humans and other organisms. Some studies indicate that benzene may be harmful to the reproductive organs and produce harmful effects on the developing fetus.

It is also worth considering that benzene served as the raw material from which such substances as DDT and PCB were manufactured.

Chromium

Chromium is a naturally occurring element found in rocks, animals, plants, soil, and in volcanic dust and gases.

Certain chromium compounds do not appear to have adverse environmental or human health effects..

In humans, other chromium compounds have been linked to stomach ulcers, convulsions, kidney and liver damage, and at high levels to death. The Department of Health and Human Services (DHHS), World Health Organization (WHO), and the International Agency for Cancer Research (IARC) have determined that some chromium compounds are carcinogenic to humans.

It is believed that chromium can concentrate in human fetuses and that it can be transmitted from mother to infant through breast milk.

Reproductive disorders have been observed in animals that were exposed to certain chromium compounds. Death, skeletal deformities and impaired development of the reproductive system have been observed in newborn animals that ingested certain chromium compounds.

Lead

Although lead compounds are naturally occurring, most of the lead found throughout the environment comes from anthropogenic activities. Certain lead compounds are water-soluble and pose a threat to plants and animals and to human water supplies.

In humans and other animals lead acts as a central nervous system toxin. High levels of exposure may cause brain damage. Lead exposure is also linked to blood disorders, kidney damage, miscarriages, and reproductive disorders.

The Department of Health and Human Services (DHHS) and the World Health Organization (WHO) have determined that certain lead compounds are carcinogenic to humans.

Phenols

Although phenol occurs naturally, it is important to note that some phenol compounds are used as pesticides.

In humans, high exposure to phenols can result in: muscle pain, anorexia, liver damage, weight loss, blood disorders, and fatigue and to increased risks of respiratory cancer, heart disease, immune system disorders.

In animals, high exposure to phenols can result in: muscle tremors and loss of coordination, paralysis, severe injury to the heart, kidneys, liver, and lungs, followed by death in some cases.

Although animal studies suggest a link between phenols and cancer, it has not yet been definitively classified as a human carcinogen.

Polynuclear / Polycyclical Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals that are formed during the incomplete combustion of organic materials. They can occur naturally, however, most PAHs found today in the environment are the result of anthropogenic activities. While ATSDR recognizes more 100 different PAHs, other sources estimate that there are as many as 3,000 possible combinations of PAH compounds.

In the environment PAHs are slow to breakdown or degrade and thus comprise long-terms sources of environmental contamination.

The Department of Health and Human Services (DHHS) has determined that the following PAHs are likely to be carcinogenic:

benz[a]anthracene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene.

The International Agency for Research on Cancer (IARC) has determined that the following PAHs are likely to be carcinogenic:

benz[a]anthracene and benzo[a]pyrene benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, and indeno[1,2,3-c,d]pyrene,

US EPA has determined that the following PAHs are likely to be carcinogenic:

benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene.

Toluene

Although it is naturally occurring, most of the toluene found throughout the environment comes from anthropogenic activities.

In humans, toluene has been linked to headaches, confusion, and memory loss. Evidence also suggest that toluene can cause damage to the lungs, liver, and kidneys.

In animals, toluene has been observed to adversely effect the nervous system. Animals exposed to toluene may also show slightly adverse effects in their liver, kidneys, and lungs.

Toluene has not yet been definitively classified as a human carcinogen.

Xylenes

Although they are naturally occurring, most of the xylene compounds found throughout the environment come from anthropogenic activities.

In humans, exposure to xylenes can cause irritation of the skin, eyes, nose, and throat; and impaired functioning of the lungs, liver and kidneys. Xylene exposure can also result in damage to the nervous system. Exposure to very high levels of xylene for even a short period can result in death.

Exposure of pregnant women to high levels of xylene may cause harmful effects to the fetus. Animal studies indicate that xylene exposure may cause increased numbers of deaths, decreased weight, skeletal changes, and delayed skeletal development.

Xylene has not yet been definitively classified as a human carcinogen.

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MAR 17 1997

March 13, 1997

Andy Shivas
Division of Superfund
Tennessee Department of Environment & Conservation
Nashville Central Office
4th Floor, L&C Annex
401 Church Street
Nashville TN 37243-1538

RE: VOAP Facility ID#90-513-CC80 - Community Relations Plan

Dear Mr. Shivas,

Enclosed is the revised Community Relations Plan for the Tennessee Street site in Johnson City, Tennessee. A copy of this plan is being sent to you and a copy to Alan Hayes in the Johnson City Field office. The changes incorporate the two comments from Phill Hendricks' February 21, 1997, letter, and the change of TDEC contact from your February 20, 1997, letter.

United Cities Gas proposes to publish the first Public Notice for the site entering the Voluntary Program on Wednesday, March 26, 1997, in the "Johnson City Press", in the Metro section, provided that we have received written approval from the Division of the revised wording.

I have also enclosed a copy of the "Fact Sheet" which United Cities has prepared for distribution to local officials and interested parties.

If you have any questions regarding the Community Relations Plan or the Public Notice, please contact me at 615-373-0104 extension 400. Thank you for your time.

Sincerely,

A handwritten signature in cursive script that reads "Karol Sole".

Karol Sole, CHMM
Principal Engineer - Environmental

cc: Alan Hayes
G. W. Price
J.P. O'Brien
D. Lindsey

FACT SHEET

MAR 17 1997

Issue 1

Tennessee Street Former Manufactured Gas Plant

March, 1997

United Cities Enters VOAP

United Cities Gas Company ("*United Cities*") has entered the Voluntary Cleanup, Oversight, and Assistance Program ("*VOAP*") with the State of Tennessee Division of Superfund to investigate the

State of Tennessee
Department of Environment and Conservation
Division of Superfund
Accepts United Cities Gas Company
Former Manufactured Gas Plant
Tennessee Street Site/Johnson City
into the Voluntary Cleanup, Oversight and Assistance
Program

The Division of Superfund (DSF) is accepting the Tennessee Street Site into the Voluntary Cleanup, Oversight and Assistance Program (VOAP) which allows willing and able parties to conduct an investigation and cleanup of an inactive hazardous substance site with oversight from Division staff.

The Tennessee Street Site is located in Johnson City/Washington County/Tennessee Street & Security Lane. The site is composed of a former manufactured gas plant, a propane air plant, and natural gas operations facilities. The site operated as a manufactured gas plant from approximately 1915 until 1945, when propane air production began. In 1954, natural gas replaced propane production.

The public is encouraged to contact Alan Hayes, Geologist III, at Division of Superfund, Johnson City Environmental Field Office, 2305 Silverdale Rd., Johnson City, Tennessee 37601-2162, (423) 854-5466 for more information concerning the site or proposed investigation.

DSF is accepting written public comments on the proposed investigation until April 25, 1997. If there is sufficient public interest for site information, a public meeting can be requested or interested parties can be placed on a mailing list for future site information.

Comments should be mailed to Phillip Hendricks, VOAP Community Relations Coordinator, Division of Superfund, 4th Floor, L&C Annex, 401 Church St., Nashville, Tennessee 37243-1538 no later than April 25, 1997.

Copy of Notice to be Placed in the Johnson City Press
3/26/97

property owned by United Cities at Tennessee St. and Security Ln. in Johnson City, TN ("*the Site*").

Background. United Cities discovered petroleum impacted soil and groundwater following the removal of a 2,000 gallon gasoline underground

storage tank in October 1995. Laboratory testing revealed other chemicals were present in the soil and groundwater as well. These chemicals were typical of residuals commonly associated with feedstock (coal and oil) and residuals (coke and tar) from the manufacturing of coal and water gas.

In December 1996, United Cities approached the Division of Superfund about entering the VOAP to investigate potential environmental impacts from the historical use of the site as a former manufactured gas plant ("*FMGP*"). In January 1997, United Cities agreed via a consent order to investigate the site under the VOAP.

Site History. From 1915 until 1954 the site was used to manufacture gas for lighting, heating, and cooking in the Johnson City and Elizabethton, Tennessee area. In January 1954, natural gas arrived in the East Tennessee area and the gas plant was converted to a service center for utility construction and service crews.

Gas Manufacturing Process. Several gas manufacturing processes were used at the site including coal gas, water gas, propane-air, and the Hasche process.

Coal gas was manufactured by heating coal in an oven at a high temperature. As the coal became heated and turned into coke, vapors were released from the coal. These vapors were captured and processed to remove unwanted chemicals, such as ammonia. The remaining gas was captured in large aboveground tanks called gas holders until the gas was sold and was placed into the distribution system.

**Community Relations Plan
Tennessee Street FMGP Site
Johnson City, Tennessee**

Facility ID #90-513-CC80

Revised March 1997

Prepared for:

Tennessee Department of Environment and Conservation
Division of Superfund
Voluntary Cleanup, Oversight and Assistance Program
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, Tennessee 37601

Prepared by:

United Cities Gas Company
5300 Maryland Way
Brentwood, Tennessee 37027

Community Relations Plan

Overview

This community relations plan (CRP) is for the Tennessee Street Former Manufactured Gas Plant (FMGP) in Johnson City, Tennessee. This CRP is undertaken to determine how to disseminate information and otherwise keep area residents and other interested parties informed regarding activities to be conducted at the site under the Tennessee Voluntary Cleanup, Oversight and Assistance Program.

Site Description

The Tennessee Street FMGP was initially constructed in 1915 by Washington County Gas at what is now the northwest corner of the intersection of State of Franklin Road and Tennessee Street, covering approximately 1.9 acres. The geographic coordinates for the site are 36° 18' 59" N latitude and 82° 21' 57" W longitude. The site is immediately east of the property used by East Tennessee State University for storage of coal. The vicinity of the site is primarily industrial/commercial, with other known hazardous substance sites in the area. The site is relatively secure, with a 7 foot fence surrounding the majority of the facility.

From its completion until 1945, the plant produced coal gas utilizing the coal and water gas (Tenney) processes. A propane-air plant was installed in 1945 to replace coal gas. In 1951 the Hasche process was utilized to manufacture gas from H-Fuel, and continued to operate until the introduction of natural gas in January, 1954. The facility has been used as a natural gas operations center since 1954 until recently.

On October 18, 1995, an underground storage tank located on the northwest corner of the property was excavated and closure samples collected. Analytical results indicated total petroleum hydrocarbons greater than the State of Tennessee, Division of Underground Storage Tanks allowable concentration. Although gasoline was the only product historically stored in the underground storage tank, diesel was the primary constituent detected in the closure samples.

The chemicals typically associated with manufactured gas plants include a mixture of semi-volatile compounds referred to as polynuclear aromatic hydrocarbons (PAHs), and more volatile compounds including benzene, toluene, ethyl benzene and xylenes (BTEX). Phenolic compounds, inorganic nitrogen and sulfur and traces of metals used in the gas purification process have also been found on such sites. While pure PAHs are odorless, various constituents in coal tar typically impart a creosote smell to coal tar wastes. The PAHs and BTEX constituents in the wastes are generally the primary cause of concern because of the volatility and the potential links of some compounds to cancer.

The H-Fuel used in the Hasche process was a fuel oil, similar to gasoline and diesel. BTEX constituents would also be expected to be found if residuals of the H-Fuel remain on the property.

Ground water in the vicinity of the site is a shallow perched aquifer on top of rock, with water encountered at 6 to 7 feet. There are no wells or springs used for drinking water sources within a 1 mile radius of the site. Brush Creek flows along the northern side of the property.

Community Background

Johnson City, Tennessee, is located in Washington County in the Tennessee Valley in extreme northeastern Tennessee in an area of gently rolling and hilly terrain. Mountain ranges begin within ten miles of Johnson City to the southeast and west, with peaks and ridges rising to 4,000 and 6,000 feet. The elevation of Johnson City is listed at 1,635 feet. Historic Jonesborough, Tennessee's oldest town, is the Washington County seat. Washington County, the first County in Tennessee, was named for G. Washington, the first U.S. President. Johnson City was first settled in the 1700's, originally being named St. John's Mill.

Present day Johnson City has a population of approximately 50,000; Washington County 92,000. It is located in the active Tri-Cities region of Tennessee, along with Bristol and Kingsport. The Tri-Cities area population is approximately 450,000. In 1915, when the FMGP was constructed, Johnson City was a small, primarily residential, town with an estimated population of 11,865. The former location of Johnson City's oldest industry, the Johnson City Foundry and Machine Works, is south across State of Franklin Road from the FMGP site.

East Tennessee State University with its approximately 12,000 students is located in Johnson City.

Techniques and Timing

The community relations program will include the following approaches:

An information repository will be established at the Johnson City Public Library, 103 South Roan Street, Johnson City, Tennessee.

Public Notice of the site entering the Voluntary Program will be published in the "Johnson City Press". Attachment A contains the proposed copy for this publication.

Public Notice prior to the Department's finalization of the Record of Decision (ROD) will be published in the "Johnson City Press". The proposed copy for this will be drafted and submitted to the Department for approval of the wording as the ROD approaches finalization.

A fact sheet will be prepared and distributed to public officials prior to publication of the initial newspaper publication. Additional fact sheets will be prepared and distributed, if developments dictate, either at meetings or by mail to those who have expressed an interest, to the media, and to public officials. Attachment B contains the proposed mailing list.

The precise scheduling of these activities is dependent on the schedules of the Department, the Company, site activities, and the approval processes. The listed activities do not reflect all CRP activities that may be carried out in relation to the Tennessee Street FMGP site.

ATTACHMENT A

**State of Tennessee
Department of Environment and Conservation
Division of Superfund
Accepts United Cities Gas Company
Former Manufactured Gas Plant
Tennessee Street Site/Johnson City**

into the Voluntary Cleanup, Oversight and Assistance Program

The Division of Superfund (DSF) is accepting the Tennessee Street Site into the Voluntary Cleanup, Oversight and Assistance Program (VOAP) which allows willing and able parties to conduct an investigation and cleanup of an inactive hazardous substance site with oversight from Division staff.

The Tennessee Street Site is located in Johnson City/Washington County/Tennessee Street & Security Lane. The site is composed of a former manufactured gas plant, a propane air plant, and natural gas operations facilities. The site operated as a manufactured gas plant from approximately 1915 until 1945, when propane air production began. In 1954, natural gas replaced propane production.

The public is encouraged to contact Alan Hayes, Geologist III, at Division of Superfund, Johnson City Environmental Field Office, 2305 Silverdale Rd., Johnson City, Tennessee 37601-2162, (423) 854-5466 for more information concerning the site or proposed investigation.

DSF is accepting written public comments on the proposed investigation until April 25, 1997. If there is sufficient public interest for site information, a public meeting can be requested or interested parties can be placed on a mailing list for future site information.

Comments should be mailed to Phillip Hendricks, VOAP Community Relations Coordinator, Division of Superfund, 4th Floor, L&C Annex, 401 Church St., Nashville, Tennessee 37243-1538 no later than April 25, 1997.

*Johnson City Press
P.O. Box 1717
Johnson City, TN 37605-1717
423-929-3111
Publish date: March 26, 1997*

Attachment B

Mailing List

Tennessee St & Security Lane FMGP

Johnson City, Tennessee

A.	Federal Elected Officials	Phone
	U.S. Senator Bill Frist 28 White Bridge Pike Nashville TN 37205	615-351-9411
	U. S. Senator Fred Thompson 3322 West End Ave Nashville TN 37203	615-736-5129
	U.S. Representative William L. Jenkins Kingsport District Office 157 Federal Post Office Bldg Kingsport TN 37662	202-225-6356 423-247-8161
B.	State Elected Officials	
	Honorable Don Sundquist Governor State Capitol Nashville TN 37243	615-741-2001
	State Senator Rusty Crowe War Memorial Bldg Ste 321 Nashville TN 37243-0024	615-741-2468
	State Representative Bobby Hicks 212 War Memorial Bldg Nashville TN 37243	615-741-1717
	State Representative Robert D Patton 1117 College Heights Dr Johnson City TN 37604	615-741-2511 423-929-1723
C.	State Officials and Agencies	
	Andy Shivas, Manager Voluntary Cleanup Oversight and Assistance Program Division of Superfund Nashville Central Office 4th Floor, L&C Annex 401 Church Street Nashville, TN 37243-1538	615-532-0912

Alan Hayes
Geologist III
Division of Superfund
Johnson City Environmental Field Office
2305 Silverdale Rd
Johnson City, TN 37601-2162

423-854-5466

D. Local Officials and Agencies

Washington County Commission

County Executive: George Jaynes
Commission Members

- 1: Ken Green, Patsy Sanders, Paul Woodby
- 2: Pat Collins, Frank Richardson, Ronnie Slagle
- 3: Robert Good, Martha Nan Meredith, Jim Powell
- 4: Sid Campbell, Phil McPeak, Wendell Messimer
- 5: Mary Lee Bagwell, William Biles, Jack Rutherford
- 6: Sue Chinouth, W. C. Rowe, Kyle Shell
- 7: Howell Jenkins, Roy McLain
- 8: Evert Jarrett, Marion Light, John Matthews

Washington County Health Department
415 State of Franklin Road
Johnson City, TN 37604

423-928-7125

E. Johnson City Government

City of Johnson City
Municipal & Safety Building
P. O. Box 2150
Johnson City, TN 37605-2150

423-929-9171

City Manager: John Campbell

Board of Commissioners:
Mickii Carter, Mayor
Pete Paduch
Dan Mahoney
Bob May
P. C. Snapp

City Clerk: Jim Crumley

G. Media

Newspaper

Johnson City Press
PO Box 1717
Johnson City TN 37605-1717

423-929-3111
423-929-7484 (fax)

Radio

WQUT/WJCW/WKIN/WKOS
Tri-Cities Radio Group
P. O. Box 8668
Gray, TN 37615

423-477-1000
423-477-4747 (fax)

WXBQ
P. O. Box 1389
Bristol, VA 24203

423-926-2151
423-247-9836 (fax)

WTFM
P. O. Box WKPT-WTFM
Kingsport, TN 37662

423-926-1919
423-247-9836 (fax)

Television

WJHL
P. O. Box 1130
Johnson City, TN 37605-1130

423-926-2151
423-926-9080 (fax)

WCYB
P. O. Box 2069
Bristol, VA 24201

540-645-1522
540-645-1554 (fax)

WKPT
P. O. Box WKPT
Kingsport, TN 37662

423-926-1919
423-247-6397 (fax)

H. Repository

Johnson City Public Library
103 South Roan Street
Johnson City, TN

Contact: John Hart

423-434-4450

File 90-513
NCO copy

Legal

From: "Schulz, Stuart P" <Stuart.Schulz@atmosenergy.com>
To: "Kevin Rice" <Kevin.Rice@state.tn.us>
Date: 1/23/06 10:57:39 AM
Subject: RE: Revised Johnson City Land Use Restrictions

O.k., I will change the dates as appropriate. Hopefully, I can get it recorded this week. Maybe next week at the latest. I will send you and Andy copies.

Thanks.

-Stuart

-----Original Message-----

From: Kevin Rice [mailto:Kevin.Rice@state.tn.us]
Sent: Monday, January 23, 2006 9:53 AM
To: Schulz, Stuart P
Subject: Re: Revised Johnson City Land Use Restrictions

DIVISION OF REMEDIATION
2006 FEB - 1 AM 9:39

Stuart,

The land use restrictions document is approved. The dates should be changed to the appropriate dates in 2006. When do you expect these restrictions will be recorded? After the document is recorded, please forward copies to Andy Shivas and myself for the Division files.

Sincerely,

Kevin

J. Kevin Rice
Division of Remediation
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, TN 37601-2162
(423) 854-5468
Kevin.Rice@state.tn.us

>>> "Schulz, Stuart P" <Stuart.Schulz@atmosenergy.com> 1/23/06 10:23:58 AM >>>
Kevin,

Attached is a revised land use restriction document for the Johnson City site for your review and approval.

Thanks,

Stuart

Stuart Schulz, RPG, CHMM
Environmental Specialist
Atmos Energy Corporation
810 Crescent Centre Drive
Suite 600

This instrument prepared by:

Douglas Walther, Esq.
Atmos Energy Corporation
1800 Three Lincoln Centre
5430 LBJ Freeway
Dallas, Texas 75240

90-513
Legal

NOTICE OF LAND USE RESTRICTIONS

Notice is hereby given that pursuant to T.C.A. Section 68-212-225 of the *Hazardous Waste Management Act of 1983*, the Commissioner of the Tennessee Department of Environment and Conservation ("TDEC") has determined that land use restrictions are an appropriate remedial action at the below-described property. Pursuant to T.C.A. Section 68-212-225(d) the register of deeds shall record this Notice and index it in the grantor index under the names of the owners of the land.

Witnesseth:

WHEREAS, the Grantor is the owner of the real property described in a Deed of record with the Washington County Register of Deeds as Note Book No. 9, Page 220; Deed Book 228, Page 538 and Note Book No. 28, Page 109; Deed Book 460, Page 238 herein after referred to as the "Property," and,

WHEREAS, the Property has been remediated, to the extent practicable, consistent with the National Contingency Plan and to levels protective of human health and the environment in a commercial/industrial area; and,

WHEREAS, the Grantor has agreed to impose certain land use restrictions on the Property as set forth hereinafter and has agreed to preserve and maintain these restrictions.

NOW, THEREFORE, in consideration of the foregoing, the Grantor hereby declares that the Property should be held, sold, and conveyed subject to the following land use restrictions. Said land use restrictions shall run with the land and shall be binding on all parties having any right, title, or interest in the Property or any part thereof, their heirs, successors, successors-in-title, and assigns, and shall inure to the benefit of each owner thereof and to TDEC and the respective successors and assigns of such parties:

STATE OF TENNESSEE, WASHINGTON COUNTY

I, Ginger B. Jilton, Register of Deeds do hereby certify that the foregoing is a true exact copy of a Notice of Land Use Restrictions from Atmos Energy Corp. to Atmos Energy Corp. as same

appears of record in official records, Film Roll 486 Image 2071.
Witness my hand and official seal at office in Jonesborough, Tennessee.

This 5 day of January, 20 07
Ginger B. Jilton, Register of Deeds

Deputy Register Christina W. [Signature]



Location of Contamination

Benzene, naphthalene, arsenic and manganese migrating from the United Cities Gas Company (now Atmos Energy Corporation) property located at the northwest corner of the intersection of Tennessee Street and State of Franklin Road has affected the groundwater that underlies the Property owned by the Grantor. The United Cities Gas Company property is described as: beginning at the intersection of the southwesterly right-of-way line of Tennessee Street with the southwesterly right-of-way line of the Norfolk-Southern Railway, and running thence in a southeasterly direction along said Tennessee Street right-of-way S 18°10'06" W a distance of 61.22 feet, S 11°11'53" E a distance of 78.38 feet and S 17°24'44" W a distance of 59.3 feet to the intersection with a point in the northern right-of-way line of State of Franklin Road (S.R. 381); thence with said State of Franklin Road right-of-way line the following two (2) calls; S 55°55'06" W a distance of 142.02 feet and S 61°30'06" W a distance of 140.09 feet to the corner with State of Tennessee (ETSU coal storage yard); thence along line with State of Tennessee N 28°19'49" W a distance of 229.99 feet to a point on the Norfolk-Southern southern right-of-way line; thence with said right-of-way line with a curve to the right having a length of 384.79 feet, a radius of 5,699.58 feet, and a delta angle of 03°52'05" to the point of beginning, containing 1.8756 acres, more or less according to United Cities Gas Company Tennessee Street property map, which reflects property sold to City for Tennessee Street street improvements.

The maximum concentrations of benzene, naphthalene, arsenic and manganese detected in the groundwater underneath the Property of the Grantor are: benzene 0.475 milligrams/liter, naphthalene 1.25 milligrams/liter, arsenic 0.007 milligrams/liter, and manganese 1.55 milligrams/liter. The detected concentration of benzene exceeds the Maximum Contaminant Level currently allowed for a potable water supply as established by the United States Environmental Protection Agency. The detected contaminant concentrations also collectively provide for an elevated non-carcinogenic risk to an industrial worker that is directly exposed to groundwater over an extended period of time, based on current risk assessment methods approved by the United States Environmental Protection Agency.

Land Use Restrictions:

Prior to any part of the Property being used for a residence, domicile, daycare, school, or church with an outdoor playground, the Grantor, its successors, and/or assigns must notify TDEC and must demonstrate to the satisfaction of TDEC that any such proposed use listed above will not pose a danger to public health, safety, or the environment.

The Grantor, its successors, and/or assigns must notify TDEC prior to any invasive activity on the Property including soil borings, groundwater wells or other excavation activities. The Grantor, its successors, and/or assigns must demonstrate to the satisfaction of TDEC, through sampling and analysis or by other means approved by TDEC, that any invasive activity will not pose a danger to public health, safety, or the environment. Any approval granted by TDEC for the restricted uses shall be in writing, must contain a reference to this instrument, and shall be filed with the Washington County Register of Deeds.

Enforcement

Any owner of the land or any unit of local government having jurisdiction over any part of the subject property may enforce this Notice of Land Use Restrictions by means of a civil action. The Commissioner of TDEC may enforce this Notice of Land Use Restrictions through the issuance of an Administrative Order or by means of a civil action, including one to obtain an injunction against present or threatened violations of the restriction. Pursuant to T.C.A. Section 68-212-213, any person who fails, neglects or refuses to comply with a land use restriction commits a Class B misdemeanor and is subject to the assessment of a civil penalty of up to ten thousand dollars (\$10,000) per day.

Term

This Notice of Land Use Restrictions shall run with and bind the Property unless/until this Declaration shall be made less stringent or canceled as set forth under the paragraph entitled "Amendment and Termination."

Amendment and Termination

This Notice of Land Use Restrictions may be made less stringent or canceled by the Commissioner of TDEC if the risk has been eliminated or reduced so that less restrictive land use controls are protective of human health and the environment. No amendment to or termination of this Notice of Land Use Restrictions shall be effective until such amendment or instrument terminating this Notice of Land Use Restrictions is recorded by the Washington County Register of Deeds.

Severability

Invalidation of any of these covenants or restrictions by judgement or court order shall in no way affect any other provisions, which shall remain in full force and effect.

IN WITNESS WHEREOF, the undersigned has executed this instrument this 25th day of January 2006.

GRANTOR:

ATMOS ENERGY CORPORATION

By: Louis P. Gregory

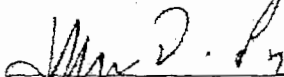
Louis P. Gregory
Sr. Vice President & General Counsel

STATE OF TEXAS)
) ss
COUNTY OF DALLAS)

ROLL 486 IMAGE 2076

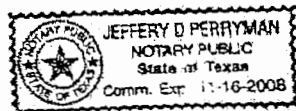
Before me, the undersigned Notary Public in and for the State aforesaid, personally appeared Louis P. Gregory and by his signature executed the foregoing instrument for the purpose therein contained.

WITNESS, this 25th day of January, 2006.



Notary Public

Commission Expiration



ROLL 486 IMAGE 2077

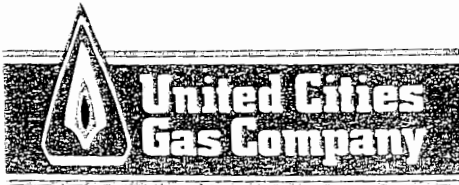
State of Tennessee, County of WASHINGTON
Received for record the 21 day of
FEBRUARY 2006 at 11:55 AM. (RECEIVED)
Recorded in official records
File Roll #86 Issue 2077-2077
State Tax \$.50 Clerk's Fee \$.50
Recordings \$ 27.00 Total \$ 28.00
Register of Deeds GINGER S. HILTON
Deputy Registrar TERESA SUMAN

Roll 486, ^{Image} 2077

2073 - 2077

2/21/06

TAL 8/28
on report RCP: 7/22



July 17, 2002

Mr. Harold Mattraw
Geologist
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

**RE: 2002 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035**

Dear Mr. Mattraw:

This letter serves as the 2002 Waste Removal Report for the above referenced site. The following information is for the previous Tennessee Department of Environment and Conservation ("TDEC") fiscal year (July 1, 2001 to June 30, 2002) and project cumulative.

During the previous TDEC fiscal year United Cities accomplished the following tasks:

- Completed Post-Interim Action Groundwater Monitoring
- Submitted Post-Interim Action Monitoring Report
- Submitted Risk Assessment
- Disposed of Investigation Derived Waste
- Completed Demolition of Existing Structures

United Cities spent \$119,545.17 in TDEC fiscal year 2002 on the above listed tasks. Of this total, \$66,542.00 is associated with the investigation costs associated with the Post-Interim Action Monitoring, Post-Interim Action Report, and Risk Assessment. Disposal of investigation derived waste (drill cuttings and purge water) and building demolition debris comprises \$35,083.95 of the total. Analytical cost associated with the Post-Interim Action Monitoring comprises \$8,230.85 of the total.

Page 2

Mr. Harold Mattraw

July 17, 2002

During TDEC fiscal year 2002, United Cities reimbursed DSF \$9,689.22 for administrative and oversight costs associated with the Order. Reimbursement costs prior to TDEC fiscal year 2002 totaled \$15,787.56. The cumulative DSF administration and oversight costs to date are \$25,476.78.

The project cumulative total cost as a result of the Order is \$580,325.79. A table summarizing the costs associated with the Order is attached to this letter. The costs reported include invoices received through June 30, 2002. This report is believed to be accurate and complete, however it may or may not represent the final project accounting as recorded by United Cities.

If you have any questions concerning this report please contact me at (615) 771-8405 or by e-mail at stuart.schulz@unitedcitiesgas.com.

Sincerely,

A handwritten signature in cursive script, appearing to read "Stuart Schulz".

Stuart Schulz, RPG

Project Geologist

cc: Dan Lindsey
Doug Walther, ATMOS
Robert Powell, DSF, NCO
David Randolph, DSF, NCO

Attachment: Tennessee St. FMGP VOAP Cost Summary Table

Tennessee St. FMGP
VOAP Cost Summary

Fiscal Year	<i>Investigation Cost</i>	<i>Treatment Cost</i>	<i>Disposal Cost</i>	<i>Analytical Cost</i>	<i>DSF Oversight Cost</i>	<i>Total Cost</i>
1997	\$0.00	\$0.00	\$0.00	\$0.00	\$6,110.86	\$6,110.86
1998	\$4,163.18	\$0.00	\$0.00	\$15,571.00	\$3,629.41	\$23,363.59
1999	\$21,997.27	\$0.00	\$0.00	\$0.00	\$1,167.19	\$23,164.46
2000	\$139,639.19	\$0.00	\$0.00	\$0.00	\$2,301.52	\$141,940.71
2001	\$154,307.15	\$64,480.20	\$11,041.20	\$33,793.87	\$2,578.58	\$266,201.00
2002	\$66,542.00	\$0.00	\$35,083.95	\$8,230.00	\$9,689.22	\$119,545.17
	\$386,648.79	\$64,480.20	\$46,125.15	\$57,594.87	\$25,476.78	\$580,325.79

Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

March 23, 1999

Mr. Stuart Schulz
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Schedule for Environmental Activities
United Cities Gas Company, Johnson City, DSF # 90-513

Dear Mr. Schulz,

The Division of Superfund in the Environmental Assistance Center-Johnson City (Division) is in receipt of the Tennessee Street FMGP Site Schedule. A copy of the final schedule with original signatures is enclosed, and a copy has been appended to the VOAP Consent Order and Agreement.

The Division is looking forward to working with United Cities Gas to achieve closure of the Tennessee Street Site. If you have any questions concerning this correspondence, please do not hesitate to contact me at (423) 854-5469 in the Johnson City Environmental Assistance Center.

Sincerely,

Karin M. Burnette
Environmental Specialist
Division of Superfund

Enclosure

cc: Karol Sole, United Cities Gas
Dan Lindsey, United Cities Gas
Andy Shivas, DSF, NCO
David Randolph, DSF, NCO
DSF File # 90-513

TENNESSEE STREET FMGP SCHEDULE

I. Remedial Investigation

Within thirty (30) days of submittal of this schedule an assessment conference will be held between United Cities Gas Company ("*United Cities*") and the Tennessee Department of Environment and Conservation, Division of Superfund ("*DSF*") to discuss the scope of work for the Remedial Investigation ("*RI*"). Within forty-five (45) days of the assessment conference, United Cities will submit to DSF a draft Remedial Investigation Work Plan ("*RIWP*") for DSF review and approval. The RIWP will include a Sampling and Analysis Plan ("*SAP*"), a Quality Assurance Project Plan ("*QAPP*"), and a Health and Safety Plan ("*HSP*").

United Cities will respond to DSF comments on the RIWP within thirty (30) days. Within forty-five (45) days of DSF approval of the RIWP, United Cities will begin fieldwork associated with the RI. Within ninety (90) days of beginning fieldwork associated with the RI, United Cities will submit a Remedial Investigation Report ("*RI Report*") to DSF. The DSF will review the RI Report and provide comments to United Cities within thirty (30) days. If the DSF can not provide comments within thirty (30) days of report submittal, the DSF will provide written documentation of the review status. United Cities will respond to DSF RI Report comments within thirty (30) days.

II. Interim Action

Following completion of the remedial investigation, United Cities and DSF may determine that an interim action ("*IA*") could expedite the achievement of remedial action goals at the Site. In that event, United Cities will submit a brief proposal of IA activities to DSF. Upon DSF approval of the proposal, United Cities will submit an Interim Action Work Plan ("*IAWP*") to DSF for review and approval at the same time the RI Report is submitted. The DSF will review the IAWP and provide comments to United Cities within thirty (30) days. If the DSF can not provide comments within thirty (30) days of work plan submittal, the DSF will provide written documentation of the review status. United Cities will respond to DSF IAWP comments within thirty (30) days.

Within forty-five (45) days of DSF approval of the IAWP, but no sooner than October 1, 1999, United Cities will initiate the approved IA. If necessary, United Cities will submit monthly progress reports to DSF. Within ninety (90) days of beginning the approved IA, United Cities will submit an Interim Action Final Report ("*IA Final Report*") to DSF for review and approval. The DSF will review the IA Final Report and provide comments to United Cities within thirty (30) days. If the DSF can not provide comments within thirty (30) days of report submittal, the DSF will provide written documentation of the review status. United Cities will respond to DSF IA Final Report comments within thirty (30) days.

III. Assessment Conference

Within thirty (30) days of DSF approval of the IA Final report, or approval of the RI Report if no IA is planned, United Cities and the DSF will meet at an assessment conference to discuss the information gathered during the RI, results of the IA, and future actions, if necessary, to meet the remedial action goals for the Site.

IV. Request for Time Extensions

In accordance with Section X-D of the Order, United Cities may request a time extension for any deadline included in this schedule prior to the deadline. The time extension may be granted through mutual consent of the parties for good cause shown. Any mutual agreement to extend a deadline shall be documented in writing, shall be signed on behalf of the DSF and United Cities, and appended to the Order.

The individuals signing below on behalf of United Cities and the Division represent that they are a duly authorized agent, capable of entering into a binding agreement on behalf of the parties.

DEPARTMENT:

Division of Superfund
Johnson City Environmental Assistance Center
2305 Silverdale Road
Johnson City, TN 37601-2162

By: Darrell S. Hale

Print Name: Darrell S. Hale

Title: Field Office Manager

RESPONDENT:

United Cities Gas Company
810 Crescent Centre Drive
Suite 600
Franklin, TN 37067-6226

By: Dan L. Lindsey

Print Name: Dan L. Lindsey

Title: V. P.-Technical Services

EAC-JC-DSF# 90-513
United Cities Gas
1998

DIVISION OF
SUPERFUND



1999 FEB 22 AM 10:38

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

+ faxed 12/10/98 KMB

3-8-99
sf

December 10, 1998

CERTIFIED MAIL#Z49743542
RETURN RECEIPT REQUESTED

Ms. Karol Sole
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027-5038

RE: Site # 90-513 United Cities Gas Site

SUBJECT: Compliance with VOAP Consent Order and Agreement

Dear Ms. Sole:

This letter is written to request the submission of the waste removal report as required by the VOAP Consent Order and Agreement (Order). The Tennessee Division of Superfund (DSF) requires the following submission annually for each site.

Prior to August 1 of each year, a report that includes the site name, site number and following data for the previous fiscal year (July 1 to June 30) and project cumulative is to be submitted:

- (a) Name and amount (in kg) of each hazardous substance containing material (e.g. soil) removed from the site
- (b) Pre- and post-treatment concentrations (if treatment occurs on-site)
- (c) Volume of material treated on-site
- (d) Cost associated with the implementation of the Order with separate breakouts for investigation, treatment, disposal, and analytical costs. Administrative and oversight costs are to be included in the report.

The DSF is mandated by law to keep the legislature informed concerning the progress of hazardous substance site clean up each year. Therefore, this data is necessary to accurately reflect the progress being made.

Ms. Karol Sole
December 10, 1998
Page 2 of 2

The DSF requests that you provide the waste and cost information no later than December 24, 1998. If you have any comments or questions concerning this request please call me at (423) 854-5469 or Robert Powell, Enforcement and Cost Recovery Section, at (615) 532-0916.

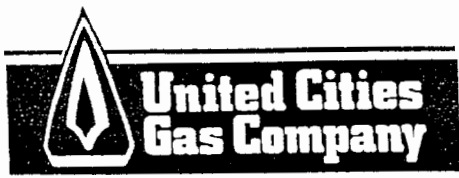
Sincerely,

A handwritten signature in cursive script that reads "Karin M. Burnette". The signature is written in dark ink and includes a long, sweeping horizontal line at the end.

Karin M. Burnette
Environmental Specialist
Division of Superfund

cc: Robert Powell, DSF, NCO
David Randolph, DSF, NCO
DSF File # 90-513

kmb:90513ucg/waster98



DIVISION OF
SUPERFUND

Rlp -12/21
JBM 12/21

1998 DEC 21 PM 4:43

TENNESSEE DEPARTMENT
OF ENVIRONMENT AND
CONSERVATION

December 16, 1998

Ms. Karin M. Burnette
Environmental Specialist
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

RE: 1998 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035

Dear Ms. Burnette:

This letter serves as the 1998 Waste Removal Report for the above referenced site. The following information is for the previous fiscal year (July 1 to June 30) and project cumulative.

To date no hazardous substance or hazardous substance containing material has been removed from the site as a result of the Consent Order and Agreement ("Order") dated January 23, 1997 between the Tennessee Department of Environment and Conservation and United Cities Gas Company ("United Cities").

In November of 1997 United Cities conducted a Preliminary Site Investigation ("PSI") at the site. The PSI was conducted using in-house personnel at a cost of \$19,734.18. This figure does not include personnel time. The portion of PSI cost for analytical was \$15,571.00.

During fiscal year 1997, United Cities reimbursed the Division of Superfund ("DSF") \$3,629.41 for administrative and oversight costs associated with the Order. Reimbursement costs prior to fiscal year 1997 totaled \$6,110.86. The cumulative DSF administration and oversight costs to date are \$9,740.27.

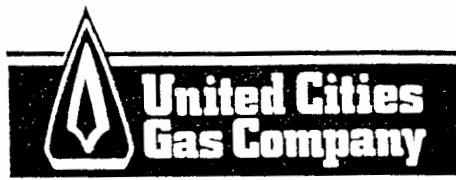
The project cumulative total costs as a result of the Order are \$29,474.45.

If you have any questions concerning this report please contact me at (615) 373-0104 ext. 405.

Sincerely,

Stuart Schulz, RPG
Project Geologist

cc: Karol Sole
Dan Lindsey
Doug Walther, ATMOS
Robert Powell, DSF, NCO
David Randolph, DSF, NCO



DIVISION OF
SUPERFUND

1998 OCT 21 PM 4:43

TENNESSEE DEPARTMENT
OF ENVIRONMENT
AND CONSERVATION

December 16, 1998

Ms. Karin M. Burnette
Environmental Specialist
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

RE: 1998 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035

Dear Ms. Burnette:

This letter serves as the 1998 Waste Removal Report for the above referenced site. The following information is for the previous fiscal year (July 1 to June 30) and project cumulative.

To date no hazardous substance or hazardous substance containing material has been removed from the site as a result of the Consent Order and Agreement ("Order") dated January 23, 1997 between the Tennessee Department of Environment and Conservation and United Cities Gas Company ("United Cities").

In November of 1997 United Cities conducted a Preliminary Site Investigation ("PSI") at the site. The PSI was conducted using in-house personnel at a cost of \$19,734.18. This figure does not include personnel time. The portion of PSI cost for analytical was \$15,571.00.

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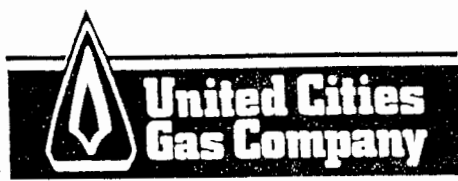
The project cumulative total costs as a result of the Order are \$29,474.45.

If you have any questions concerning this report please contact me at (615) 373-0104 ext. 405.

Sincerely,

Stuart Schulz, RPG
Project Geologist

cc: Karol Sole
Dan Lindsey
Doug Walther, ATMOS
Robert Powell, DSF, NCO
David Randolph, DSF, NCO



DIVISION OF
SUPERFUND

1998 DEC 15 PM 4:22

TENNESSEE DEPARTMENT
OF ENVIRONMENT AND
CONSERVATION

December 14, 1998

Ms. Karin M. Burnette
Environmental Specialist
Johnson City Environmental Assistance Center
Division of Superfund
Tennessee Department of Environment and Conservation
2306 Silverdale Road
Johnson City, Tennessee 37601-2162

RE: Tennessee St. FMGP
DSF # 90-513
Case # 96-035

Dear Ms. Burnette:

Thank you for meeting with United Cities Gas Company ("*United Cities*") in Nashville on November 20, 1998 and the opportunity to present United Cities' redevelopment goals for the site. As requested at the meeting and in the Division of Superfund ("*DSF*") letter dated November 24, 1998, United Cities is preparing a schedule for completion of the Remedial Investigation ("*RI*") at the site.

On December 3, 1998, United Cities submitted requests for proposal to several consulting firms for completion of the RI. Responses to the request for proposal are due to United Cities by January 15, 1999. United Cities' management meeting is scheduled for January 25, 1999. As stated in your letter, a schedule for completion of the RI is due to DSF within 15 days of United Cities' management meeting. United Cities requests the detailed schedule be due to DSF on Monday, February 8, 1999. This date is 15 days from the scheduled management meeting date.

Unless United Cities hears from DSF otherwise, we will assume the February 8, 1999 submittal date is acceptable to DSF. If you have any questions please call me at 615-373-0104 ext. 405.

Sincerely,

Stuart Schulz, RPG
Project Geologist

cc: Karol Sole
Dan Lindsey
Doug Walther, ATMOS
Darrell Hale, DSF, JCEAC
Andy Shivas, DSF, NCO
David Randolph, DSF, NCO

WALLER LANSDEN DORTCH & DAVIS

A PROFESSIONAL LIMITED LIABILITY COMPANY

NASHVILLE CITY CENTER

511 UNION STREET, SUITE 2100

POST OFFICE BOX 198966

NASHVILLE, TENNESSEE 37219-8966

(615) 244-6380

File in Siles 05-515

62-507 26-516

65-502 41-508

68-501 59-509

74-507 68-502

78-505 82-529

82-530 85-502

90-512 83-518

809 SOUTH MAIN STREET

P. O. Box 1035

COLUMBIA, TN 38402-1035

(615) 388-6031

FACSIMILES
(615) 244-6804
(615) 244-5686

Edward M. Callaway
(615) 252-2470

December 4, 1997

(3)

Mr. Andrew P. Shivas
Tennessee Department of Environment
and Conservation
4th Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243

Re: *Annual Waste Removal Report:*
East Tennessee Natural Gas
Midwestern Gas Transmission Company - 83-518

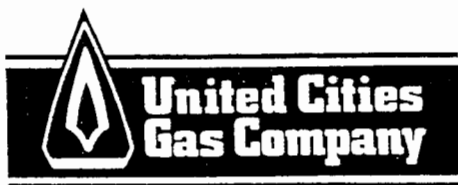
Dear Andy:

In accordance with the Consent Orders and Agreements covering remediation activities at compressor stations located in Tennessee along the two above-referenced pipelines, we submit this letter on behalf of East Tennessee Natural Gas and Midwestern Gas Transmission Company to comply with the requirement of filing an annual waste removal report.

Between July 1, 1996 and June 30, 1997, no remediation activities were conducted at any of the compressor stations covered by the Consent Orders and Agreements. Thus, no waste was removed from any site or treated on-site. No costs were incurred for investigation, treatment, disposal, or laboratory analysis.

Liquefied Natural Gas Storage 90-512 is part of this group. JLD 12-9-97

entered 8/1/97



DIVISION OF
SUPERFUND
1997 AUG -1 P. 1-10
TENNESSEE DEPARTMENT
OF ENVIRONMENT AND CONSERVATION

July 31, 1997

Mr. Floyd Heflin
Tennessee Department of Environment and Conservation
Division of Superfund
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1538

RE: 1997 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513

Dear Mr. Heflin:

This letter serves as the 1997 Waste Removal Report for the above referenced site. The following information is for the previous fiscal year (July 1 to June 30) and project cumulative.

To date no hazardous substance or hazardous substance containing material has been removed from the site as a result of the Consent Order and Agreement ("Order") dated January 23, 1997 between the Tennessee Department of Environment and Conservation and United Cities Gas Company ("United Cities").

Asbestos containing insulation from two vaporizers present on-site was removed during the renovation of the vaporizers for use at another United Cities facility (See 1/8/97 letter to Phil Hendricks). On March 7, 1997, approximately 105 cubic feet (57 bags) of regulated asbestos containing material ("RACM") was removed for off-site disposal by E. Luke Greene Company, Inc. of Strawberry Plains, Tennessee. This material was disposed of by landfilling on March 26, 1997 at Carolina Grading, Inc. in Eastover, South Carolina (SCDHEC Permit IWP 223).

This waste removal was not conducted as part of the Order and thus its quantity and cost do not affect the quantity of waste removed from the site or the cost of implementation of the Order.

If you have any questions concerning this report please contact me at (615) 373-0104 ext. 405.

Sincerely,

A handwritten signature in cursive script, appearing to read "Stuart Schulz".

Stuart Schulz, RPG
Project Geologist

cc: Karin Burnette - TDEC, Johnson City Field Ofc.
Gary Price - United Cities
Karol Sole - United Cities
Dan Lindsey - Atmos Energy

Executive Summary

ARCADIS Geraghty & Miller, Inc. has prepared this Phase II Remedial Investigation (RI) Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) (Site) in Johnson City, Tennessee. This Phase II RI presents the results from the investigation and groundwater-monitoring activities conducted in October 1999 and February 2000 at the Site. These activities and subsequent report were undertaken in accordance with the Tennessee Department of Environment and Conservation – Division of Superfund (TDEC-DSF) Voluntary Cleanup, Oversight, and Assistance Program (VOAP) Consent Order.

The objectives of the Phase II RI investigation include: 1) evaluation of the magnitude and extent of impact and identification of migration pathways and receptors of any releases or threatened releases of hazardous substances; 2) collection of site-specific data to determine acceptable constituent concentrations or cleanup levels using established regulatory levels, background evaluation, or risk assessment; and 3) collection of site and constituent information allowing the selection of a remedial technology, if cleanup is necessary. Tasks completed during the Phase II RI included the installation of ten shallow groundwater monitor wells (nine onsite and one offsite); three deep, bedrock wells (onsite); ten soil borings (onsite); the installation of a stream staff gauge; residual sample collection; two rounds of groundwater monitoring; slug testing; and associated laboratory analyses. These data were used, together with historical information, to evaluate any risks to human health and/or the environment that may be posed by the Site.

The Site was operated as a MGP from 1915 until 1946, and a gas making plant from 1946 to 1954 when natural gas became available to Johnson City. From 1954 to 1996, the Site was operated as a service center for utility service and construction crews. The Site has been vacant and inactive since 1996. The current land use at and in the immediate vicinity of the Site is zoned heavy industrial. A non-drinking water-supply classification is an appropriate designation for the Site.

The topography at the Site is generally flat and the Site is covered with asphalt, concrete, and a few remaining FMGP buildings. Storm-water runoff is collected and discharged to Brush Creek, located on the northern edge of the site property. A layer of cinders and gravel was noted across the Site beginning just below the asphalt and extending up to 3 feet below land surface (ft bls). The underlying lithology at the Site consists of silty sands and clays ranging from 5.5 to 7.9 ft thick. This residuum is underlain by dark gray limestone, dipping approximately southeast. Groundwater at the Site is relatively shallow with an average depth of approximately 3.49 ft bls. The estimated groundwater flow velocity is 0.88 ft/day. The shallow groundwater flows

north-northeast, while the bedrock groundwater flows south-southeast. Because of the shallow nature of both the groundwater and the underlying bedrock, shallow groundwater discharges to Brush Creek.

In 1997, potential source areas identified during the Preliminary Site Investigation included the former aboveground and underground storage tank locations in the northwest corner of the property; and the tar well; tar/water separator; former holders; and former purifiers. Based on Phase II RI analytical results, upon removal, certain of the FMGP residuals at these areas may exhibit concentrations of benzene and sulfides that exceed characteristic thresholds. Application of the Toxicity Characteristic Leaching Procedure (TCLP) test to FMGP residuals is uncertain based on pending litigation.

For the purpose of an initial screening of the Phase II RI data, comparison of historical and Phase II RI data to the preliminary remediation goals (PRGs) resulted in the identification of five volatile organics, ten extractable organics, and four metals in soil as constituents exceeding the PRGs. The constituents identified in groundwater as exceeding PRGs include four volatile organics, seven extractable organics, five metals, and free cyanide. The constituents that are common to both soil and groundwater are: extractable petroleum hydrocarbons, benzene, xylenes, benzo(b)fluoranthene, benzo(a)pyrene, 2-methynaphthalene, naphthalene, arsenic, iron, and lead.

For both soil and groundwater, the extent of volatile, extractable organic, and metal constituents exceeding PRGs is generally site wide due to the historic use of residuals (e.g., ash, clinkers) being used as fill and/or surfacing materials, yet concentrated in the potential source areas. Free-phase tar residuals were observed in two of the three bedrock monitor wells. Free cyanide concentrations exceeding the PRG are limited to the area surrounding Monitor Well MW-3.

The Site exhibits strong aerobic conditions upgradient, an anaerobic core, and a recovering aerobic buffer downgradient. The dissolved-phase shallow groundwater volatile organic and metal plume and the bedrock groundwater metal plume appear stable via aerobic and anaerobic degradation processes. However, the shallow dissolved-phase extractable organic and bedrock volatile organic/extractable organic plumes do not appear to be degrading significantly.

The Site does not present an immediate or short-term threat to human health or the environment. Using the current land use scenario, a potential on-site commercial worker was identified as a potential receptor. Using the most appropriate future land-use scenario, redevelopment of the property for continued commercial use, a commercial worker and a construction worker were identified as the potential on-site

receptors. The potential future off-site receptor would include a future off-site construction worker potentially exposed to constituents in shallow groundwater during excavation activities.

Based on this information and data, the remedial action objectives for the Site include:

- Protection of potential current on-site commercial worker and future on-site commercial and construction workers from all constituents in on-site soil and groundwater; and
- Protection of off-site surface-water quality and off-site groundwater from constituents from the source areas.

Recommendations for future actions at the Site include performance of FMGP residual removal and disposal/treatment activities in the source locations, and performance of a Baseline Risk Assessment to quantify site-specific risk-based criteria and focus any future remedial actions.

1.0 Introduction

ARCADIS Geraghty & Miller, Inc. has prepared this Phase II Remedial Investigation (RI) Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Figure 1-1). The purpose of this Phase II RI is to investigate, collect, develop, and evaluate site-specific data to 1) further characterize the Site; 2) increase the working knowledge of the Site; 3) determine the need for risk assessment and/or remedial action; and 4) support the selection of a remedy that protects human health, public welfare, and the environment. The proposed activities have been structured to determine and support remedial action objectives (RAOs) for the Site.

The Phase II RI is being conducted in accordance with the Consent Order and Agreement (COA) between United Cities and the Tennessee Department of Environment and Conservation (TDEC) signed January 23, 1997, by which United Cities entered into the Voluntary Cleanup Oversight and Assistance Program (VOAP) with the TDEC - Division of Superfund (DSF). Interaction between United Cities and TDEC-DSF began in 1997 with the signing of the COA. United Cities subsequently prepared and submitted a Phase I Site Evaluation, in accordance with the COA, in May 1997 (United Cities Gas Company 1997a). Based on the Phase I Site Evaluation, United Cities performed a preliminary site investigation and submitted a Preliminary Site Investigation (PSI) Report to TDEC-DSF in March 1998 (United Cities Gas Company 1998). Based on the PSI findings, ARCADIS Geraghty & Miller was contracted by United Cities to conduct a Phase II RI.

The Phase II RI Work Plan (Work Plan) (ARCADIS Geraghty & Miller, Inc. 1999a) previously submitted to TDEC-DSF was approved on November 24, 1999. The objectives of the Phase II RI include:

- Evaluation of the magnitude and extent of impact and identification of migration pathways and receptors of any releases or threatened releases of hazardous substances;
- Collection of site-specific data to determine acceptable constituent concentrations or cleanup levels using established regulatory levels, background evaluation, or risk assessment; and
- Collection of site and constituent information allowing selection of a remedial technology, if cleanup is necessary.

The Phase II RI Report was prepared in accordance with VOAP Guidance (Tennessee Department of Environment and Conservation 1996a) and begins with a discussion of physical setting and site history in Section 2.0. The potential source areas and constituents of potential concern (COPCs) identified from the PSI data are also discussed in this section. Site characterization data and information on geology and hydrogeology, which constitute the site conceptual model, are presented in Section 3.0. The nature and extent of constituents detected at the Site are outlined in Section 4.0. Development of preliminary remediation goals (PRGs) used to screen the Phase II RI data and comparison to site data is presented in Section 5.0. Section 6.0 provides a preliminary risk characterization, followed by the conclusions and recommendations in Section 7.0.

2.0 Physical Setting and Site History

The following section presents information on the physical setting and conditions of the Site and a brief history of site operations, regulatory history, and investigative work conducted at the Site. Also, included in this section is an overview of the regional and site hydrogeologic conditions, potential source areas, and a COPC characterization based on the previously collected physical and analytical data.

2.1 Physical Setting

The United Cities Tennessee Street FMGP facility is located on the northwest corner of the intersection between State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures 1-1 and 2-1). The Site is approximately 1.8 acres, fenced, and largely open and paved. The Site is currently inactive and vacant. Several buildings remain onsite from when the FMGP was in operation. The Site and surrounding terrain are generally flat and located within the 100-year floodplain of Brush Creek. On-site and regional features, such as geology, demography, and land use, are discussed in the following subsections.

2.1.1 Geography and Topography

Johnson City is located in the eastern portion of Washington County, which is situated in eastern Tennessee. Johnson City lies within the Great Valley of the Valley and Ridge Physiographic Province (Great Valley), which is characterized by numerous low ridges and valleys, generally trending from the northeast to the southwest. Topography within the Great Valley consists of rolling hills with relief ranging from 50 feet (ft) to 3,000 ft. However, the United Cities site and adjacent properties are relatively flat with an approximate site elevation of 1,643 ft above mean sea level (msl) (Figure 2-2) (United States Geological Survey 1968). The Tennessee Street FMGP geographic coordinates are 36°18'59" North latitude and 82°21'57" West longitude (North 713,600 and East 3,071,300 Tennessee Carter Coordinates).

Regional surface drainage is controlled by minor creeks and streams, like Brush Creek, located in the bottoms of the valleys comprising the Valley and Ridge Physiographic Province. Brush Creek is the major drainage feature for the east-southeast portion of Johnson City (Figure 2-3). The drainage area includes properties located both north and south of Brush Creek. Surface-water runoff from the Site drains to the east and west with the center of the Site acting as a divide (Figure 2-2). Surface drainage onsite is controlled by storm-water drains which collect surface water and direct it either north into Brush Creek or east under Tennessee Street toward a vacant lot and ultimately Brush Creek.

2.1.2 Demography and Land Use

The United Cities site and surrounding property remained essentially undeveloped until around 1915. Since this time, the Site and surrounding properties have supported a mix of industrial and commercial activities, including a foundry located directly south of the Site across State of Franklin Road. The current land use in the immediate vicinity of the Site remains heavy industrial (Johnson City Zoning Code I-2) (United Cities Gas Company 1997a) (Figure 2-4).

The property to the south and southwest of the Site, across State of Franklin Road where the foundry once existed, is currently a parking lot on the campus of East Tennessee State University (ETSU) (Figure 2-4). The property bounding the Site to the west is also owned by ETSU and is currently used to stockpile coal for the university. Located further to the west is the Johnson City Continuing Education Center, which was once an industrial site known to have elevated barium concentrations in soil and groundwater. The Site is bound to the east by Tennessee Street and a vacant lot owned by Johnson City. Bordering the Site to the north is the Gordon's Furniture manufacturing facility and a railroad spur operated by Norfolk Southern Railway Company (located between the two properties) (Figure 2-4).

2.1.3 Water Use

Johnson City obtains its domestic water supply from springs and surface water (Watauga River). The springs that supply Johnson City are located along Indian Creek approximately 10 miles south of the city (United States Geological Survey 1962). During previous investigative activities, no domestic water-supply wells were identified within a 0.5-mile radius of the Site (United Cities Gas Company 1998). Since the current and historic land use at and in the immediate vicinity of the Site is heavy industrial, it is unlikely domestic water-supply wells exist in this area. No industrial supply wells have been identified in the area.

2.1.4 Climate and Meteorology

The Site is located in Washington County, Tennessee, in the eastern portion of the state, and experiences a temperate, continental climate characterized by hot summers and relatively short, mild winters. The mean annual precipitation for the area ranges between 50 to 54 inches per year.

2.2 Site Operational History

Prior to 1915, the Site was undeveloped land. A MGP was constructed in 1915 and was operational from 1915 to 1946. The Site was operated as a gas making plant from 1946 to 1954, when natural gas became available in Johnson City. Operation of the MGP was ceased in 1954 and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996 and has not been used for commercial purposes except for equipment and vehicle storage since 1996 (Figure 2-5).

Included in the PSI Report is a detailed discussion of historic site operations, the different manufacturing and production processes used at the Site, and names of the various site owner/operators (United Cities Gas Company 1998). The following subsections provide a summary of that information and a review of site improvements/modifications and regulatory history.

2.2.1 Historic Operational Processes

In the summer of 1915, the Site opened as the Washington County Gas Company MGP operating at a daily production rate of approximately 66,000 cubic feet (cf) of gas. In 1944, with a facility name change to the Watauga Valley Gas Company, the plant reached a peak daily production of 124,725,000 cf of gas. A mix of coal gas and water gas were manufactured using a process where coal was heated in the absence of oxygen, then sprayed with water and oil. The resulting reaction between the incandescent coal and oil/water spray produced gas which was then collected, purified, stored, and distributed to local consumers via gas piping. Residuals from these processes, such as coal tar, are the potential sources of the chemical constituents detected in soil and groundwater at the Site during the previous site investigations (United Cities Gas Company 1998).

As previously mentioned, manufactured coal and water gas were produced at the Site from 1915 until 1946. In 1946, the Site was converted to support a new technology (propane-air gas) in order to meet area usage demands. Propane-air gas production was the only process used from 1946 until 1950; however in 1950, the water-gas production system was brought back on-line to supplement gas production and meet consumer demands during peak load events (United Cities Gas Company 1998).

In 1951, the gas manufacturing process was converted from propane-air to the Hasche process, and in 1953 the site name was changed to the Volunteer Natural Gas Company (Figure 2-5). As with the former production process, the Hasche method of gas production was supplemented by water-gas production during times of peak demand. The Hasche process of gas production was used at the Site until January 1954, when

natural gas became available to Johnson City and the surrounding area (United Cities Gas Company 1998).

With the introduction of natural gas to the area in 1954, the site was converted into a service center for utility field crews. From 1954 until 1996, site uses included: storage areas for field vehicles, equipment, and supplies; minor vehicular maintenance; and refueling of the field service vehicles. The field maintenance and service vehicles refueled from a 2,000-gallon gasoline underground storage tank (UST) formally located in the northwest portion of the property (Figure 2-5) (United Cities Gas Company 1998).

During the 1970s, site improvements/modifications included the dismantling and removal of equipment associated with former gas production operations at the Site (Figure 2-5). These improvements began in 1972 with the removal of boilers and the Hasche reforming equipment. In the summer of 1973, the remaining gas production equipment (holders, purifiers, and separators) was removed from the Site. Two on-site buildings, which once housed process equipment, were also dismantled and removed from the Site in 1973. A total of 12 cylindrical, propane-style, aboveground storage tanks (ASTs) used for gas storage were sold and removed from the Site in 1974. In 1976, an oil AST associated with gas production processes also was sold and removed from the Site (United Cities Gas Company 1998).

2.2.2 Regulatory History

The gasoline UST associated with the former field service and construction crew support operations (Figure 2-5) was utilized until 1995. Although the installation date of the UST is not known, the UST was removed by excavation in October 1995, at which time closure activities were performed per TDEC - Division of Underground Storage Tanks (DUST) regulations. Findings from these UST closure activities indicated a potential release had occurred and further investigation was warranted (United Cities Gas Company 1997a).

Between October 1995 and January 1997, negotiations between United Cities, TDEC-DUST, and TDEC-DSF were conducted concerning the selection of the appropriate regulatory oversight for the Site. On January 23, 1997, United Cities and TDEC-DSF signed the COA to manage the Site under the state VOAP program. In accordance with VOAP (Tennessee Department of Environment and Conservation 1996) under the authority of the COA, United Cities submitted a Phase I Site Evaluation Report (Phase I Report) to TDEC-DSF on May 22, 1997. This Phase I Report was approved by TDEC-DSF on July 10, 1997, and in September 1997, United Cities submitted a work plan to conduct a PSI at the FMGP facility (United Cities Gas

Company 1997b). TDEC-DSF accepted a modified version of the PSI Work Plan on October 13, 1997, and field work for the PSI was conducted in November 1997. The PSI Report was submitted to TDEC-DSF in March 1998 (United Cities Gas Company 1998). In November 1998, an assessment conference was held between United Cities and TDEC-DSF to discuss TDEC-DSF comments on the PSI Report and to address potential future land development at the Site.

Based on results from the PSI Report and the November 1998 assessment conference, an expanded site investigation (Phase II) was determined to be the next appropriate action at the FMGP facility. ARCADIS Geraghty & Miller was contracted in January 1999 to represent United Cities in the next phases of work associated with the Site. Activities included developing a schedule for Phase II RI activities, holding an assessment conference with TDEC-DSF (ARCADIS Geraghty & Miller, Inc. 1999b), and preparing a Work Plan for the Phase II RI field work (ARCADIS Geraghty & Miller, Inc. 1999a). Upon approval by TDEC-DSF, ARCADIS Geraghty & Miller performed the field activities proposed in the Phase II RI Work Plan and subsequently prepared this Phase II RI Report detailing field activities, data collection, analytical results, and recommendations for future action at the Site.

2.3 Previous Investigative Work

Two previous investigations were conducted at the Site prior to the Phase II RI. In October 1995, a UST closure investigation was conducted at the Site. The investigation was conducted during the removal of the former gasoline UST (Figure 2-5), and included the collection of four soil samples from the UST excavation, one water sample from groundwater which entered the UST excavation, and four samples from the excavated, stockpiled soils for laboratory analysis. The soil and groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH) in the diesel and gasoline range of organics (DRO and GRO), respectively, and for polycyclic aromatic hydrocarbons (PAHs). The soil samples collected from the soil stockpile were analyzed for BTEX, TPH-DRO, TPH-GRO, and toxicity characteristic leaching procedure (TCLP) for lead in order to profile the soil for disposal. Benzene and TPH concentrations in the soil sample collected from the northeast corner of the UST excavation and in the one groundwater sample exceeded TDEC-DUST action levels (United Cities Gas Company 1998).

Based on the soil and groundwater analytical results from the UST closure investigation and in agreement with the signed TDEC-DSF COA, a PSI was conducted at the Site. The scope of work for the PSI included collecting soil, residual, surface-water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil properties borings, and four FMGP residual borings were

installed at the Site using direct-push technology (e.g., Geoprobe™) (Figure 2-6) (Appendix A). From those boring locations, 24 soil samples, and eight residual samples were collected. Of these samples, 12 soil samples and four residual samples, along with one duplicate sample for each media, were sent to a fixed-based laboratory for analysis. Groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-01 through GW-04) (Figure 2-6). Groundwater samples were collected from each of these four temporary wells and sent to the laboratory for analysis. One permanent, off-site monitor well, was installed in 1996 by the City of Johnson City during investigation at the Johnson City Continuing Education Site (TriAd 1996). This well is approximately 600 ft west of the Site. United Cities was granted permission to sample this well for background comparison. Surface-water and sediment samples were also collected at the Site from three locations along Brush Creek to determine current conditions (Figure 2-6).

As presented in the PSI (United Cities Gas Company 1998) and the Work Plan (ARCADIS Geraghty & Miller, Inc. 1999a), analytical results from the PSI field activities reported the detection of several constituents in soil, groundwater, and residual samples above background concentrations (Appendix B). Detected constituents included: BTEX, methyl-tertiary-butyl-ether (MTBE), PAHs, arsenic, barium, cadmium, chromium, lead, selenium, cyanide, phenolics, and mercury. Surface-water and sediment samples collected from Brush Creek did not report elevated levels of any of the aforementioned analytes and therefore, are not media of concern.

No hydrological testing, such as pump tests, drawdown tests, or slug tests were conducted onsite during the PSI field investigations. Instead, two undisturbed soil samples, SP-01 and SP-02 (Figure 2-6), were collected at the Site using Shelby tube samplers and tested for physical and geotechnical soil properties (e.g., grain size and percent moisture content) (Appendix C). These geotechnical results were utilized to calculate a hydraulic conductivity (K) of 8.1×10^{-5} centimeters per second (cm/sec) (United Cities Gas Company 1998). Step-drawdown and slug test data obtained from the Johnson City Continuing Education Site (TriAd 1996) was also reviewed (Appendix D). These data indicate a hydraulic conductivity of 5×10^{-5} cm/sec. These measurements were used to characterize the underlying residuum and to estimate groundwater flow rates at the Site.

2.4 Preliminary Constituent Characterization

Constituent characterization was achieved using historical information from on-site FMGP processes and the analytical results from the PSI. These data assisted in

defining potential source areas, identifying the major COPCs detected at the Site, and defining the distribution of the major COPCs in soil and groundwater at the Site.

2.4.1 Potential Source Areas

Reviewing the historic processes used at the Site for the production and manufacturing of gas and the FMGP facility layout, several potential source areas were identified onsite (Figure 2-7). These areas include: the former UST and AST locations in the northwest corner of the property; the former tar well; the former water-gas/tar-water separator; and the former holders and purifiers. Analytical results from soil, residual, and groundwater samples collected during the PSI and the Phase II RI confirm these areas as potential sources.

2.4.2 Preliminary Constituents of Potential Concern

In order to determine the preliminary COPCs for the Site, the maximum measured concentration for detected constituents from PSI data (Appendix B) were compared to previously published limits and risk-based screening values. Concentrations were first compared to background concentrations, if available, then to appropriate state or Federal previously published limits and criteria. If no state or Federal previously published limit existed for a constituent, then appropriate risk-based numbers were used for comparison. In order to be conservative, constituents that did not have any previously published limit or screening value for comparison were included as COPCs based on the need for further evaluation (ARCADIS Geraghty & Miller, Inc. 1999a).

These comparisons of maximum measured concentrations and screening values identified a list of COPCs for each media (Table 2-1). A total of 15 organic and three inorganic constituents were identified as preliminary COPCs in soil. In groundwater, a total of 14 organic constituents, six inorganic constituents; and cyanide were identified as preliminary COPCs. No COPCs were identified for sediments or surface water at the Site based on the PSI analytical data collected at the Site.

This preliminary COPC determination was conducted to identify the groups of constituents (i.e., volatile organics, metals, etc.) that soil and groundwater samples would be analyzed for during Phase II RI activities. Based on this comparison, and as incorporated into the Work Plan (ARCADIS Geraghty & Miller, Inc. 1999a), all analytes were sampled for in the potential source areas and, based on those analytical results, a focused analyte list was determined for soil and groundwater (Appendix E).

3.0 Site Characterization

Using the physical and analytical data collected during the PSI and Phase II RI activities, knowledge of the site geology and hydrology is formed. By combining the information and data collected, a site conceptual model was developed, which describes how the surface and subsurface geologic and hydrogeologic features at the Site interact with COPCs. In the following sections, a summary of the field work conducted during the Phase II RI and a description of the site geology and hydrogeology characteristics are presented.

3.1 Phase II Remedial Investigation Field Activities

3.1.1 Fall 1999

In October 1999, following TDEC-DSF verbal approval of the Work Plan (ARCADIS Geraghty & Miller, Inc. 1999a), field activities were initiated at the Site. Tasks completed at the Site included the installation of ten groundwater monitor wells (nine shallow, residuum wells and one deep, bedrock well), the installation of three soil borings, and the installation of a stream staff gauge (Tables 3-1 and 3-2) (Appendix A). Soil samples were collected from both the soil and well borings during installation following USEPA SW-846 Method 5035 and analyzed for the Target Compound List (TCL) and Target Analyte List (Appendix E). Soil samples were targeted to be collected from the surficial soil interval [0 to 1 ft below land surface (bls)] and from the subsurface soil directly above the soil/groundwater interface. However, the depth to bedrock, shallow nature of the groundwater, and the materials underlying the Site (e.g., brick, cinders, wood, etc.), inhibited the collection of soil samples in some of the Work Plan designated locations. All soil removed from the borings was containerized, labeled, and stored onsite.

After the ten groundwater monitor wells were installed, completed, developed, and purged, groundwater samples were collected from each well. All development and purge water was containerized, labeled, and stored onsite. Groundwater samples were analyzed for the same analyte list as the soil samples (Appendix E), but including biogeochemical parameters. Only one monitor well (MW-6) was not sampled for the full analyte list. Groundwater samples for metals and extractable organics were not collected at MW-6 because the well did not recharge fully after purging to provide sufficient sample volume.

In November and December 1999, a total of five slug tests were performed at the Site to obtain hydrologic data. The first four slug tests were conducted at Monitor Wells MW-1, MW-1D, MW-4, and MW-7. Due to technical equipment complications with

the first slug test performed at MW-1D, a second slug test was required. Results from the analyses of the data collected during these aquifer tests is attached (Appendix D) and the data interpretations are discussed in the Section 4.0.

The remaining tasks scoped in the Work Plan were the installation of a stream staff gauge in Brush Creek and the collection of one composite residual sample from three potential source areas. A stream staff gauge was installed in Brush Creek during the October 1999 field activities. The gauge, however, was destroyed sometime during the latter part of November due to high water in Brush Creek after a rain event. The residual sample was not collected during the October 1999 field event due to overhead utilities in one location, prohibiting the use of a drill rig, and the presence of thick concrete at another location (Appendix F).

3.1.2 Spring 2000

In December 1999, United Cities and ARCADIS Geraghty & Miller determined that additional investigation at the Site was warranted, based on analytical data collected during October 1999, and visual observations recorded in the field during the October, November, and December 1999 field activities. In January 2000, TDEC-DSF granted a 90-day extension of the Phase II RI Report deadline to allow the collection of additional data at the Site. To obtain a better understanding of site conditions, two additional bedrock groundwater monitor wells were installed (MW-3D and MW-4D) (Figure 2-1). Also, a 1-inch monitor well (MW-10) was also installed offsite across Tennessee Street north-northeast of the Site to help further define downgradient conditions in shallow groundwater and the extent of COPC distribution (Figure 2-1).

During the February 2000 drilling activities, the proposed residual sample was also collected from the three previously approved potential source locations (WS) (Figure 2-1). Residual samples were collected from these three locations utilizing a direct-push rig and were composited into one sample to be analyzed for several hazardous waste characterization and/or disposal criteria parameters (Appendix E).

Following the installation and development of the three new monitor wells, groundwater samples were collected for both field and laboratory analyses from all of the existing and the new monitor wells. A focused analyte list (Appendix E) was selected for this sampling event based on the analytical results from the October 1999 sampling event, with the addition of cyanide speciation.

3.2 Geology

The regional geology consists of mainly sedimentary rocks ranging from Precambrian to Ordovician in age. For the Johnson City area of the Great Valley, the following formations, from oldest to youngest, represent the stratigraphic sequence: the Precambrian Complex; Chilhowee Group; Shady Dolomite; Rome Formation; Honaker Dolomite; Upper Conasauga Group; Knox Group; Sevier Shale; and the late Tertiary to recent, fluvial and alluvial deposits found along the streams and terraces of the valleys (Table 3-3). The predominate structural feature in the area is the Stony Creek syncline, which is part of the Shady Valley thrust sheet (United Cities Gas Company 1998).

Using the lithologic data collected during the installation of the soil borings and groundwater monitor wells associated with the PSI (United Cities Gas Company 1998) and Phase II RI data (Appendix A), generalized cross sections were constructed (Figures 3-1 and 3-2). These cross sections help to identify and characterize subsurface conditions that could potentially influence groundwater flow.

The Site is underlain by various fill material to a depth of approximately 3 ft below the paved surface. In many of the borings, coal, cinders or clinker-like materials were encountered within the fill material. A fine-grained silty sand layer was common beneath the fill material extending to a depth of 4 ft. The silty sand then graded into silt and/or clay to an average depth of 6 ft. A thin, stiff clay layer (generally 0.5 ft thick) was encountered above the soil bedrock interface. The depth to bedrock is variable across the Site (Table 3-1), lending to an irregular bedrock surface (Figure 3-3) with a bedrock high trending northeast-southwest. The bedrock consists of dark-blue-gray limestone of the Knox Group. Insight into the underlying limestone bedrock was also achieved by observing rock outcrops in the channel of Brush Creek, from rock coring obtained from Monitor Well MW-1D, and air rotary drilling at Monitor Wells MW-3D and MW-4D. The limestone in the outcrop exhibits beds dipping generally to the southeast and observations during the installation of the three bedrock monitor wells indicates fractures do exist in the bedrock.

3.3 Hydrogeology

Thirteen monitor wells were constructed during Phase II RI activities (Table 3-2). The continued collection of groundwater-level measurements at the Site has aided in a refinement of hydrogeologic site characterization (Table 3-4) (Figures 3-4 through 3-7). Groundwater monitor wells were gauged using a down-hole electronic water-level indicator. Using the elevation of a known measuring point at each well location (top of casing), groundwater elevations, relative to msl, were recorded across the Site. These

data aided in the determination of groundwater flow and gradient in both the shallow and deep water-bearing units.

Using the March 2000 data, the depth to groundwater at the Site in the shallow water-bearing unit ranged from 1.75 (MW-4) to 9.21 (MW-10) ft bls with an average depth to groundwater of approximately 3.49 ft bls. As the water-table contour maps show (Figures 3-4 through 3-7), the dominant groundwater flow direction in the shallow unit is north-northeast, toward Brush Creek. The depth to groundwater in the three bedrock wells ranged from 2.80 (MW-4D) to 3.40 (MW-1D) ft bls with an average depth to groundwater of 3.04 ft bls. The potentiometric water contours indicate a bedrock groundwater flow direction to the south-southeast.

Hydraulic gradients vary across the Site due to the presence of a bedrock high in the center of the Site. A shallow gradient is present from MW-2 to MW-3, then along the perimeter of the Site, as depth to bedrock and the proximity to Brush Creek increases, gradients increase. Based on Phase II RI data collected in March 2000, the average horizontal hydraulic gradient averaged across the Site for the shallow water-bearing unit is approximately 0.005 feet per foot (ft/ft) generally trending to the north-northeast. The average horizontal hydraulic gradient in the bedrock water-bearing unit is 0.004 ft/ft, trending to the south-southeast.

The orientation of vertical gradient was determined by comparing water-level measurements from paired shallow and bedrock monitor wells (MW-1/MW-1D, MW-3/MW-3D, and MW-4/MW-4D). Based on March 2000 data, the vertical gradient appears downward.

Slug testing was performed at the Site during Phase II RI activities. Both slug-in and slug-out tests were performed at four monitor wells; three wells in the shallow zone (MW-1, MW-4, and MW-7) and one bedrock well (MW-1D) (Appendix D). Data for the slug test performed at MW-7 was suspect due to logger error and was not used for interpretation of the shallow K value. The average K observed in the shallow zone was 6.86×10^{-3} cm/sec [19.45 feet per day (ft/day)] and for the bedrock was 1.24×10^{-6} cm/sec (0.00353 ft/day). These slug tests indicate that the K value of the bedrock zone is much lower than the shallow zone reflective of the differences in lithology.

The effective porosity (n) for the Site was estimated to be 11 percent using geotechnical analyses of Site soil (Appendix C) and literature values for the Site lithology (United Cities Gas Company 1998). Based on site-specific parameters, groundwater flow direction (northeast), average horizontal hydraulic gradient (0.005 ft/ft), hydraulic conductivity (19.45 ft/day), and the effective porosity (11 percent), the average

horizontal groundwater flow velocity is approximately 0.88 ft/day toward the north-northeast.

3.4 Groundwater/Surface Water Interaction

Surface water is a prominent hydrogeologic feature at the Site due to the location of Brush Creek relative to groundwater flow direction. Brush Creek crosses the site property on the northern edge of the Site and flows west to east (Figures 2-1 and 2-3). This is a small tributary, approximately 3 to 4 ft wide and approximately 1 ft deep on average, which collects and channels surface-water runoff from the Site and surrounding properties. As previously mentioned, the limestone bedrock underlying the area outcrops in Brush Creek's channel on the northern and eastern sides of the property.

Water-table and stream-flow elevations were measured on February 7, 2000 and March 30, 2000 to determine the interaction of shallow groundwater at the Site and Brush Creek (Table 3-4). Based on observed water-table elevations at site boundary wells MW-5, MW-6, and MW-7 next to Brush Creek, these data indicate that Brush Creek is a discharge point for groundwater within the local watershed.

3.5 Site Conceptual Model

A detailed site conceptual model was developed for the Site after reviewing the physical and analytical data collected during the PSI and Phase II RI activities (Figure 3-8). The site conceptual model shows not only the location of the potential source areas identified during the PSI, but also geology and hydrology at the Site that could influence constituent migration in the subsurface. The underlying lithology at the Site consists of silty sands and clays ranging from 5.5 ft to 7.9 ft thick. This residuum is underlain by dark gray limestone and appears to be dipping approximately southeast. A layer of cinders and gravel was noted across the Site during the installation of the soil borings (Figure 3-8).

As previously discussed, the shallow groundwater appears to be flowing generally toward the north-northeast toward Brush Creek. Groundwater in the bedrock, however, is flowing almost in the opposite direction southeast. Because of the location of Brush Creek, and the shallow nature of both the groundwater and the underlying bedrock (Figure 3-8), shallow groundwater discharges to Brush Creek.

4.0 Nature and Extent of Detected Constituents

Using the site physical and analytical data collected during both the PSI and the Phase II RI activities, the nature and extent of detected constituents was evaluated. Analytical results for the composite sample collected from the three residual sample locations at the potential source areas (WS-1, WS-2, and WS-3) (Figure 2-1), were evaluated in an effort to characterize these source areas.

To simplify the presentation of the soil and groundwater analytical data collected during the investigations and their distribution across the Site, groups of constituents are discussed in the following subsections. Based on the analytical results (Appendices B and G), limited volatile and extractable organics were detected; therefore, the distribution of total BTEX, TPH/GRO, extractable petroleum hydrocarbons (EPH), and total PAHs are presented. Various metals were detected in both soil and groundwater at potentially elevated levels and are also discussed. The soil data is discussed for both surficial (0 to 2 ft bls) and subsurface (>2 ft bls) soil; however, the distribution of the constituents is presented for soil as a whole on the site maps. This was performed not only to simplify the presentation of the data, but also due to the shallow nature of the residuum soil across the Site.

4.1 Residuals

During the Site's operation, three primary residuals were produced from the gas manufacturing process. These included solids, hydrocarbon liquids, and aqueous residuals. Residuals were produced during both the gas production and gas purification processes. Solid residuals included coke, ash, and clinkers (conglomerated ash). At the Tennessee Street FMGP, some amounts of ash and clinkers were spread across the Site to fill in low areas and maintain roads (United Cities Gas Company 1997a).

The purification of gas often involved the reaction and/or adsorption of gas constituents with solids which produced inorganic solid residuals. The most common of these residuals were spent lime, spent oxide, and ammonium sulfate. The presence of these residuals is evident at the Site by elevated levels of iron and sulfate and the elevated pH measured at Monitor Well MW-3 (see Sections 4.2 and 4.3).

Hydrocarbon residuals produced during the gas manufacturing processes included heavy hydrocarbons, such as coal tar and tar/water emulsions, that were settled in the tar well and tar/water separator. Aqueous residuals produced from the gas purification process consisted mainly of ammonia liquor. The presence of these residuals is also evident at the Site at known locations (i.e., tar well and tar/water separator) and the presence of elevated sulfate concentrations (see Sections 4.2 and 4.3).

The source of cyanide at the Site is attributed to the presence of purifier box materials generated during the FMGP gas-purification process. Prior to distribution, the manufactured gas stream was commonly passed through iron oxide to remove impurities, mainly hydrogen sulfide (H_2S) and hydrogen cyanide (HCN). The iron oxide reacted with the gas stream removing the H_2S and HCN yielding sulfur oxide and complex metallic cyanide solids, predominantly complex iron cyanide, with lesser quantities of other metal cyanide complexes. Iron cyanide complexes have a high degree of stability and can disassociate to free cyanide only under aggressive conditions (e.g., heat, extreme acidity, and high sunlight intensity).

As discussed previously, residual samples were collected in February 2000 from three potential source locations (former UST/AST area, tar/water separator, and the tar well) (Figures 2-1 and 2-7) utilizing direct-push methods and were composited into one sample to be analyzed for several hazardous waste characterization and/or disposal criteria parameters (Table 4-1).

In accordance with TDEC Chapter 1200-1-11-.02, solid waste may be considered hazardous if it exhibits certain characteristics. The residual sample for the Site does not exhibit characteristics for ignitability (has flashpoint greater than 200 degrees Fahrenheit) or corrosivity [pH is neutral at 7.2 standard units (SU)]. However, the residual sample may exhibit reactivity characteristics due to the sulfide concentrations [70 milligrams per kilogram (mg/kg)]. Further, the TCLP result for benzene [0.960 milligrams per liter (mg/L)] does exceed the regulatory standard of 0.5 mg/L (Table 4-1). Therefore, upon removal, certain of the residuals may exhibit concentrations of benzene and sulfide, for samples prepared using TCLP, that exceed characteristic thresholds.

Application of the TCLP characteristic test to residuals from FMGP sites is currently under challenge. On April 21, 2000, in *Association of Battery Recyclers, Inc. v. USEPA*, Case No. 98-1381, in the United States Circuit Court of Appeals for the District of Columbia Circuit, the Federal Court of Appeals struck down application of the TCLP test for characteristic hazardous waste as it applies to FMGP residuals.

4.2 Soil

As previously discussed, a total of nine soil borings were installed during the PSI, and an additional three soil borings and 13 groundwater wells were installed during the Phase II RI activities. From these soil and well borings, a total of nine surficial soil samples and 21 subsurface soil samples were collected across the Site (Tables 4-2 and 4-3, and Appendices B and G). In review of the analytical data, the aforementioned groups of constituents (total BTEX, TPH/GRO, EPH, total PAHs, and various metals), concentrations and distribution are discussed.

Considering surficial soil samples first, total BTEX was only detected in three of the nine surficial soil samples (MW-1, MW-3, and MW-4) with the maximum BTEX concentration detected in boring MW-3 at 94.069 mg/kg. Concentrations of TPH/GRO were detected in only one surficial soil sample, MW-3, at 307 mg/kg, while EPH concentrations were detected in eight of the nine samples. The maximum detected EPH concentration was again detected in soil boring MW-3 at 17,800 mg/kg. Total PAHs were also detected in surficial soil occurring in seven of the nine samples collected. The maximum detected total PAH concentration was reported in MW-3 at 14,132 mg/kg. Of the metals detected in surficial soil, aluminum, arsenic, iron, and lead were detected at potentially elevated levels. The maximum detected concentration of aluminum was reported at 5,484.56 mg/kg in MW-1, while the maximum detected concentrations for arsenic, iron, and lead (26.294 mg/kg, 44,073.80 mg/kg, and 216.612 mg/kg, respectively) were all reported in MW-3 (Table 4-2).

The analytical results from the 21 subsurface soil samples collected indicated that total BTEX concentrations were reported in eight of the samples collected, with the maximum detected concentration being reported in SB-02 at 13.25 mg/kg likely due to the former gasoline UST. Concentrations of TPH/GRO were detected in seven of the 21 subsurface soil samples, with the maximum detected concentration reported in SB-02 at 2,680 mg/kg. The detection of EPH in subsurface soil samples was reported in 13 samples. The maximum detected EPH concentration was reported in SB-02 at 3,280 mg/kg. Total PAHs were detected in ten of the 21 subsurface soil samples at a maximum concentration of 1,633.54 mg/kg in Soil Boring SB-04. The maximum detected concentration of aluminum (14,031.60 mg/kg) and iron (23,421.60 mg/kg) were reported in SB-12 and MW-9, respectively. The maximum detected concentration for arsenic (85.3 mg/kg) and lead (35.5 mg/kg) were both reported in SB-05 (Table 4-3).

Using the maximum concentration detected in soil samples collected from the 25 installed soil and well borings, the horizontal distribution of total BTEX, TPH/GRO, EPH, total PAHs, and metals (as listed above) in soil is presented. The distribution of total BTEX across the Site is limited to three focused areas around SB-02, SB-04, and MW-3 (Figure 4-1). TPH/GRO and EPH concentrations, however, are distributed over the majority of the Site with the maximum concentrations being localized in the vicinity of MW-3 (Figure 4-2). Elevated total PAH concentrations in the soil are localized around SB-04 and MW-3, with the maximum detected concentrations being present in the area of MW-3 (Figure 4-3). The metals detected in the soil at elevated concentrations are again spread across the Site with concentrations in excess of the background soil sample (MW-8) being observed on the east side of the property (Figure 4-4).

4.3 Groundwater

A total of 13 monitor wells have been installed at the Site, ten residuum or shallow wells (MW-1 through MW-10) and three bedrock or deep wells (MW-1D, MW-3D, and MW-4D) (Figure 2-1). The monitor wells installed during the October 1999 field activities (MW-1 through MW-9 and MW-1D) were analyzed for an extensive list of analytes (Appendix E). Based on the analytical results, two additional deep wells (MW-3D and MW-4D) and one shallow well (MW-10) were installed in February 2000. After installation, monitor wells were resampled for a focused list of analytes, including cyanide speciation, based on the October 1999 data (Appendices E and G).

Due to the nature of the groundwater system at the Site and the differences in analytical results between the deep and the shallow groundwater samples (Table 4-4), these two water-bearing zones are discussed separately. For presentation purposes, and the fact that only three deep groundwater monitor wells exist, analytical data for both zones are represented on the same constituent distribution maps (Figures 4-5 through 4-9). As with the soil data, the distribution of total BTEX, TPH/GRO, EPH, total PAHs, and select metals across the Site are discussed. The concentration and distribution of cyanide (total, free, and available) is also presented.

4.3.1 Shallow Aquifer

For the February 2000 sampling event, total BTEX, TPH/GRO, EPH, and/or total PAHs were not analyzed for Monitor Wells MW-2, MW-8, and MW-9 due to below detection limit (BDL) or low concentration analytical results in October 1999 (Table 4-4). Total BTEX was detected in six of the 13 groundwater samples collected in February 2000. The maximum detected concentration of total BTEX (1.111 mg/L) was located at MW-3, with groundwater concentrations extending from MW-1, northeast to MW-5 (Figure 4-5). TPH/GRO and EPH concentrations in groundwater, like in soil, are distributed across the majority of the Site, with the maximum detected concentrations of both (1.62 mg/L and 15.30 mg/L, respectively) occurring in MW-3 (Figure 4-6).

Total PAHs in groundwater were also detected in several of the shallow groundwater samples. Again, the maximum concentration (9.880 mg/L) was observed in MW-3 with concentrations extending north and east of MW-1 and MW-3 (Figure 4-7). Metals detected in groundwater at potentially elevated concentrations include: arsenic, barium, iron, lead, and manganese (Table 4-4). The maximum detected concentration of barium (1.12 mg/L) was observed at MW-7, while the maximum concentration of both arsenic and lead (0.212 mg/L and 0.046 mg/L, respectively) were found in MW-3. The maximum iron and manganese concentrations (14.4 mg/L and 3.45 mg/L, respectively) were detected at MW-6 (Figure 4-8).

Total cyanide was detected in eight of the shallow groundwater monitor wells (Figure 4-9); two wells (MW-8 and MW-9) were not analyzed for cyanide based on the October 1999 groundwater sampling event results. Of those eight wells, seven were analyzed for free and available cyanide and only two wells (MW-2 and MW-3) reported elevated detections. From these analyses, the maximum detected concentrations of free, total, and available cyanide were all detected in MW-3 (Table 4-4).

4.3.2 Deep Aquifer

Using the groundwater data collected in February 2000, total BTEX concentrations were detected in all three of the bedrock monitor wells (Table 4-4). The maximum detected concentration of BTEX (6.045 mg/L) was reported in MW-4D (Figure 4-5). As would be expected, the maximum TPH/GRO concentration, 7.92 mg/L, was also detected in MW-4D. The maximum EPH concentration in groundwater (8.78 mg/L), however, was detected in MW-3D (Figure 4-6) likely due to the observed presence of free-phase tar residuals in the well. Total PAHs in groundwater were also detected in all of the deep groundwater monitor wells, with the maximum concentration (9.70 mg/L) occurring in MW-3D (Figure 4-7). Free-phase tar residuals were also observed in Monitor Well MW-1D.

The maximum detected concentration of arsenic (0.010 mg/L) and barium (0.453 mg/L) was reported in MW-4D, while the maximum concentrations for iron, lead, and manganese (16.80 mg/L, 0.007 mg/L, and 1.49 mg/L, respectively) were all detected in MW-3D (Figure 4-8). However, as the groundwater sample from Monitor Well MW-3D was collected immediately following well installation and development, elevated turbidity (Table 4-5) was observed potentially creating artificially high metal concentrations. Although total cyanide was detected in all three deep monitor wells, with a maximum concentration of 0.30 mg/L (MW-3D), no detections of either free or available cyanide were reported (Table 4-4 and Figure 4-9).

4.3.3 Biogeochemistry

Natural attenuation sampling and evaluation was performed at the Site during the October 1999 and February 2000 monitoring events to determine, evaluate, confirm, and quantify the presence and relative contributions of both aerobic and anaerobic biodegradation in remediation of COPC impacts in groundwater. Specifically, hydrocarbon biodegradation is an oxidation-reduction reaction where the hydrocarbon is oxidized (donates electrons) and an electron acceptor (e.g., oxygen) is reduced (accepts electrons). There are a number of different compounds that can act as electron acceptors including oxygen, nitrate, iron oxides, sulfate, water, and carbon

dioxide. Aerobic bacteria use molecular oxygen as the electron acceptor. Anaerobic bacteria use other compounds such as nitrate, iron, and sulfate as electron acceptors.

Analysis of several biogeochemical parameters (Table 4-5) in site groundwater was performed in select shallow and bedrock monitor wells. Groundwater was analyzed for biogeochemical parameters to confirm the status of upgradient, within plume, and downgradient attenuation processes. Evidence of bioattenuation processes were evaluated by comparing COPCs and biogeochemical data in impacted and non-impacted groundwater. All monitor wells were measured for field parameters including pH, temperature, conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), alkalinity, and ferrous iron. Several monitor wells were included in the natural attenuation monitoring analyses, including a non-impacted upgradient well (MW-8), two impacted wells within the plume (MW-1 and MW-3), and one less-impacted downgradient well (MW-5).

During the monitor well purging process and prior to sample collection, real-time field measurements were obtained periodically using digital water-quality meters. Purging was considered complete when the readings for the indicator parameters were within 10 percent of the previous data reading for three consecutive data points, or until the well was dry. Additional groundwater was then collected in appropriate containers and submitted to an analytical laboratory for analysis of COPCs, nitrate/nitrite, sulfate, and dissolved gases (O_2 , CO, CO_2 , N_2 , and CH_4).

4.3.3.1 pH/Temperature/Conductivity

The pH of groundwater has an effect on the presence and activity of microbial populations in groundwater. In general, microbes which are capable of degrading hydrocarbons generally prefer pH values ranging from 6 to 8 SU. For the February 2000 monitoring event, pH values ranged from 6.57 SU (MW-4) to 10.84 SU (MW-3) with an average of 7.38 SU indicating that the pH is within the optimum range for biodegradation processes to occur in all areas of the plume with the exception of MW-3.

Groundwater temperature affects both the metabolic activity of bacteria, as well as the solubility of DO. Published data suggest that groundwater temperatures below 5 degrees Celsius tend to inhibit biodegradation. In addition, the rate of hydrocarbon biodegradation roughly doubles for every 10 degrees Celsius increase, over the range from 5 to 25 degrees Celsius. The temperature range of 9.92 to 17.37 degrees Celsius for this site is within sufficient range to allow biodegradational processes to occur.

Conductivity measurements are used to ensure that the groundwater samples collected at a site are representative of the saturated zone. At this site, the conductivity values for the shallow groundwater ranged from 62.6 microseimens per centimeter ($\mu\text{S}/\text{cm}$) to 182 $\mu\text{S}/\text{cm}$. The conductivity values for the bedrock unit ranged from 78.4 $\mu\text{S}/\text{cm}$ to 97 $\mu\text{S}/\text{cm}$. In general, the conductivity values are consistent to indicate that the groundwater being analyzed in the respective unit monitor wells is from the respective water-bearing units.

4.3.3.2 Oxidation/Reduction (Redox) Potential

The redox potential of groundwater is indicative of the relative tendency of the water to accept or transfer electrons. Since redox reactions in aromatic hydrocarbon-impacted groundwater are usually biologically mediated, the redox potential of a groundwater system usually depends upon and influences biodegradational rates. Redox potentials for natural groundwater generally range from approximately -400 millivolts (mV) to 800 mV.

At this site, upgradient groundwater indicates a redox potential of +238 mV (MW-8) indicating aerobic conditions. Positive redox potential is also present near MW-2 (+270 mV). The low redox potentials measured in the shallow plume (+19 mV to -115 mV) and the bedrock unit (-14 mV to -110 mV) suggest that the biodegradational activity in these areas is anaerobic in nature (Figure 4-10).

4.3.3.3 Alkalinity

The total alkalinity of a groundwater system is indicative of the capacity of the system to neutralize acid. This is important in maintaining the pH of groundwater, since adequate alkalinity can buffer the groundwater system against the accumulation of acids produced during aerobic and anaerobic biodegradation. In general, impacted groundwater exhibits a higher total alkalinity than non-impacted areas. This observation is consistent with the data at this site, where background levels were 218 mg/L in MW-8, while impacted levels were 319 mg/L (MW-1) to 696 mg/L (MW-5). The overall alkalinity concentrations in the groundwater also suggest that the system is adequately buffered to support biodegradation processes. However, buffering capacity appears limited in the vicinity of Monitor Well MW-3.

4.3.3.4 Dissolved Oxygen/Carbon Dioxide

DO analysis of background and non-impacted groundwater from wells MW-8 and MW-9 was 1.35 mg/L and 2.09 mg/L, respectively (Table 4-5). These levels of DO are indicative of a shallow water table and are available to support aerobic

biodegradation of dissolved-phase hydrocarbons. At impacted shallow wells MW-1 and MW-3, the DO concentrations were 1.04 mg/L and 1.11 mg/L, respectively, and at impacted bedrock wells MW-1D and MW-4D, the DO concentrations were 2.01 mg/L and 0.21 mg/L, respectively, suggesting that any biodegradation in the plume area is anaerobic. At downgradient wells (MW-5, MW-6, and MW-7), the DO slightly increases indicating that the dissolved-phase plume appears to be stable with downgradient aerobic buffering conditions likely due to influence from Brush Creek (Figure 4-11).

Carbon dioxide is a by-product of both aerobic and anaerobic biodegradational processes. The carbon dioxide concentration in MW-8 (25.95 mg/L) and MW-1 (42.57 mg/L) compared to the more impacted downgradient well MW-3 (<0.60 mg/L), indicates the transition from aerobic to anaerobic degradation in the plume area (Figure 4-11). Declining carbon dioxide levels within impacted groundwater at MW-3 are likely indicative of carbon dioxide utilization and subsequent reduction to methane (methanogenesis) (Section 4.3.3.8) in the anaerobic portion of the plume. Rebounding carbon dioxide concentration in downgradient well MW-5 (113.1 mg/L) again indicates a rebounding of aerobic activity.

4.3.3.5 Nitrate Utilization (Denitrification)

After DO has been depleted, available nitrate may be used as an alternate electron acceptor for anaerobic degradation. This process is known as denitrification. Nitrate was not detected (<0.1 mg/L) in wells MW-8 and MW-9. However, wells MW-2 and MW-4 indicated a nitrate concentration of 2.18 mg/L and 0.16 mg/L, respectively. Nitrate was not detected above the method detection limit in all other monitor wells at the Site. These data suggest that nitrate utilization may be occurring in the plume, but natural aquifer supply is limited.

4.3.3.6 Iron Reduction

At some sites, ferric iron (III) is used as an alternate electron acceptor for anaerobic biodegradation, resulting in the reduction of ferric iron (III) to ferrous iron (II). At this site, background ferrous iron concentration in MW-8 was 0.54 mg/L. Ferrous iron increases at MW-1 (11.2 mg/L), decreases at MW-3 (0.26 mg/L), and increases again at MW-5 (113.1 mg/L) (Figure 4-11). These data generally indicate ferrous iron production in the impacted areas; however, it should be noted that the ferrous iron measurements at the Site are likely conservative, particularly in the area of MW-3, due to sulfate reduction processes, since sulfides and ferrous iron complexing as ferrous sulfide will reduce the ferrous iron concentrations. This complexing may explain why some ferrous iron concentrations within the plume are low.

4.3.3.7 Sulfate Reduction (Sulfanogenesis)

After nitrate and bioavailable iron have been depleted, sulfate reduction may occur, resulting in the production of sulfide. At this site, background sulfate concentration in MW-8 was 38.2 mg/L. Sulfate concentrations decrease at MW-1 (1.80 mg/L) suggesting sulfanogenesis in this area (Figure 4-11). Sulfate concentrations increase at MW-3 and MW-5 likely due to the nature of the FMGP coal gas process and the residuals. Therefore, it appears that sulfate reduction is occurring and is a component of anaerobic biodegradation in the vicinity of impacted wells.

4.3.3.8 Carbon Dioxide Utilization (Methanogenesis)

As described in the Section 4.3.3.4 (Dissolved Oxygen/Carbon Dioxide), carbon dioxide in Monitor Well MW-3 is most likely being utilized and reduced to methane (methanogenesis) in this impacted area. These data are further supported by the presence of methane in this well at levels above the less impacted areas (i.e., 3.67 mg/L methane in MW-3 versus 0.01375 mg/L in MW-8). Consequently, methanogenesis also appears to be a component of the biodegradation process at this site (Figure 4-11).

4.3.4 Assimilative Capacity Calculations

Utilization of oxygen, nitrate, iron, sulfate, and carbon dioxide as electron acceptors in aerobic and anaerobic bioattenuation processes can be quantified by comparing concentrations of these compounds in impacted wells and non-impacted wells. A conservative approach was used to determine the site electron acceptor concentrations (i.e., selecting the average of impacted and non-impacted wells) for the shallow and bedrock aquifers, so that the assimilative capacity calculations for BTEX and naphthalene would also be conservative.

The individual average site-specific electron acceptor concentrations for the shallow groundwater unit (MW-8, MW-1, MW-3, and MW-5) used in the assimilative capacity calculations are as follows (the sulfate concentration in MW-5 appears elevated during the February 2000 event, therefore, October 1999 data was conservatively used in the calculations):

- DO 1.21 mg/L
- Nitrate reduction 0.05 mg/L [one half of method detection limit (MDL)]
- Ferrous iron (Fe^{2+}) 7.75 mg/L
- Sulfate 18.95 mg/L
- Methane 1.73 mg/L

The individual average site-specific electron acceptor concentrations for the bedrock groundwater unit (MW-1D, MW-3D, and MW-4D) used in the assimilative capacity calculations are as follows (methane was not analyzed in the bedrock wells):

- DO 1.11 mg/L
- Nitrate 0.05 mg/L (one half of MDL)
- Ferrous iron (Fe²⁺) 5.82 mg/L
- Sulfate 4.67 mg/L

These site-specific electron acceptor concentrations were then multiplied by the following stoichiometric relationships, which determine the amount of a given electron acceptor required to metabolize a unit quantity of BTEX and naphthalene (U.S. Environmental Protection Agency 1998):

- *DO* - 0.32 milligrams (mg) of BTEX (0.33 mg naphthalene) is degraded for every 1.0 mg of oxygen consumed;
- *Nitrate Reduction* - 0.21 mg BTEX (0.22 mg naphthalene) is degraded for every 1.0 mg of nitrate utilized;
- *Iron Reduction* - 0.046 mg of BTEX (0.02 mg naphthalene) is degraded for every 1.0 mg of ferrous iron produced;
- *Sulfate Reduction* - 0.21 mg of BTEX (0.22 mg naphthalene) is degraded for every 1.0 mg of sulfate reduced; and
- *Methanogenesis* - 1.28 mg of BTEX (0.88 mg naphthalene) is degraded for every 1.0 mg of methane produced (carbon dioxide utilized).

Based on the average electron acceptor concentrations and the given stoichiometric utilization rates, the following site-specific assimilative capacity calculations were performed:

- DO $0.32 \times 1.21 \text{ mg/L} = 0.39 \text{ mg/L total BTEX}$
- Nitrate Reduction $0.21 \times 0.05 \text{ mg/L} = 0.01 \text{ mg/L total BTEX}$
- Iron Reduction $0.046 \times 7.75 \text{ mg/L} = 0.37 \text{ mg/L total BTEX}$
- Sulfate Reduction $0.21 \times 18.95 \text{ mg/L} = 3.98 \text{ mg/L total BTEX}$
- Methanogenesis $1.28 \times 1.73 \text{ mg/L} = 2.21 \text{ mg/L total BTEX}$

Total Assimilative Capacity (Shallow Unit) = 6.96 mg/L total BTEX.

- DO $0.33 \times 1.21 \text{ mg/L} = 0.40 \text{ mg/L naphthalene}$
- Nitrate Reduction $0.22 \times 0.05 \text{ mg/L} = 0.01 \text{ mg/L naphthalene}$
- Iron Reduction $0.02 \times 7.75 \text{ mg/L} = 0.15 \text{ mg/L naphthalene}$

- Sulfate Reduction $0.22 \times 18.95 \text{ mg/L} = 4.17 \text{ mg/L naphthalene}$
- Methanogenesis $0.88 \times 1.73 \text{ mg/L} = 1.52 \text{ mg/L naphthalene}$

Total Assimilative Capacity (Shallow Unit) = 6.25 mg/L naphthalene.

The highest total BTEX concentration in the most impacted shallow unit monitor well at the Site (MW-3) was 1.111 mg/L. The conservative assimilative capacity (6.96 mg/L BTEX) exceeds this maximum concentration indicating that the natural shallow biogeochemistry can assimilate existing BTEX at the Site. However, with the highest naphthalene detected at MW-3 of 9.6 mg/L, and a calculated conservative assimilative capacity for naphthalene of 6.25 mg/L, the shallow biogeochemical conditions do not presently appear to be able to fully degrade the naphthalene.

For the bedrock aquifer,

- DO $0.32 \times 1.11 \text{ mg/L} = 0.36 \text{ mg/L total BTEX}$
- Nitrate Reduction $0.21 \times 0.05 \text{ mg/L} = 0.01 \text{ mg/L total BTEX}$
- Iron Reduction $0.046 \times 5.82 \text{ mg/L} = 0.27 \text{ mg/L total BTEX}$
- Sulfate Reduction $0.21 \times 4.67 \text{ mg/L} = 0.98 \text{ mg/L total BTEX}$

Total Assimilative Capacity (Bedrock Unit) = 1.62 mg/L total BTEX.

- DO $0.33 \times 1.11 \text{ mg/L} = 0.37 \text{ mg/L naphthalene}$
- Nitrate Reduction $0.22 \times 0.05 \text{ mg/L} = 0.01 \text{ mg/L naphthalene}$
- Iron Reduction $0.02 \times 5.82 \text{ mg/L} = 0.12 \text{ mg/L naphthalene}$
- Sulfate Reduction $0.22 \times 4.67 \text{ mg/L} = 1.03 \text{ mg/L naphthalene}$

Total Assimilative Capacity (Bedrock Unit) = 1.53 mg/L naphthalene.

The highest total BTEX (MW-4D - 6.054 mg/L) and naphthalene (MW-3D - 9.7 mg/L) concentrations in the bedrock unit monitor wells at the Site were detected in February 2000. The conservative assimilative capacity (1.62 mg/L BTEX and 1.53 mg/L naphthalene) for the bedrock aquifer biogeochemistry does not appear sufficient to fully degrade these COPCs.

In summary, based on the biogeochemical evaluation and assimilative capacity calculations, the site shallow groundwater exhibits strong aerobic conditions upgradient, an anaerobic core, and a recovering aerobic buffer downgradient. The highest concentrations of COPCs near MW-1 and MW-3 are anaerobic in nature with evidence of electron acceptor usage (Figure 4-11). The dissolved-phase light hydrocarbon (BTEX and TPH/GRO) plume appears stable within the shallow aquifer via significant

aerobic degradation and anaerobic sulfate reduction. However, the shallow dissolved-phase heavy hydrocarbon (EPH and PAHs) plume does not appear to be degrading. The bedrock aquifer exhibits strong anaerobic conditions and limited bioactivity. The light and heavy hydrocarbon plume is present at sufficient concentrations to inhibit significant biodegradation.

5.0 Development of Preliminary Remediation Goals

PRGs are an initial step in the establishment of remediation goals. Final remediation goals may be based upon containment and institutional controls. The PRGs are based on an initial screening of regulatory guidance and/or acceptable risk levels related to assumptions regarding ultimate land uses and contaminant pathways. PRGs are periodically revised throughout the Remedial Investigation/Feasibility Study (RI/FS) process because of new guidance requirements and promulgated, updated applicable or relevant and appropriate requirements (ARARs), the collection of additional characterization/remedial data; the performance of a site-specific risk assessment (RA), and/or the performance of a Focused Feasibility Study (FFS). PRGs are not formally finalized into remedial goals (RGs) until the approval of the Record of Decision (ROD). Specifically, PRGs are used to estimate areas and volumes of impacted media and set performance standards for potential remedial alternatives.

To establish PRGs in accordance with TDEC Regulation 1200-1-13.08, soil and groundwater data collected during the PSI and Phase II RI were compared to representative background concentrations, available previously published guidance levels [e.g., ambient water-quality criteria (AWQC)] (Tennessee Department of Environment and Conservation 1999), and risk-based values [e.g., U.S. Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals] (U.S. Environmental Protection Agency 1999), to assist in identifying COPCs. Constituents not exceeding these screening criteria were not considered COPCs, and therefore not carried forward in the PRG process. These screening levels have been established or used by TDEC and/or the USEPA as initial screening levels. Data screening conducted for the Site's data set utilized USEPA Region 9 PRGs, recently utilized by TDEC-DSF because these screening levels are an initial starting point.

A PRG was proposed for all COPCs that exceed background concentrations and have a chemical-specific ARAR or risk-based concentrations (RBCs). If no chemical-specific ARAR exists or no RBC is available, then a PRG was not determined. If a PRG is not proposed for a COPC, then it is not used in the RA or to define the areas requiring remediation. However, it is likely that other COPCs that have PRGs are located in the same area that will define the risk and/or remedial requirements.

5.1 Groundwater Classification

In accordance with the TDEC-DUST Tennessee UST Reference Handbook (Tennessee Department of Environment and Conservation 1996b), Environmental Assessment Guidelines, Section L, a water-use survey was conducted for a 0.5-mile radius of the Site and did not identify any groundwater users (United Cities Gas Company 1998).

Also, groundwater samples collected during Phase II RI activities from background well MW-8 were also analyzed for several primary and secondary drinking water analyses that assist in the determination of the site groundwater classification. Of these analyses, parameters for aluminum, iron, and manganese failed to meet standards (Table 4-4). Further, a pump test performed at the upgradient and adjacent property (Johnson City Continuing Education Site) (Appendix D) indicated that the maximum yield from the aquifer was less than or equal to 0.5 gallons per minute.

Also, recent TDEC Regulation 1200-4-3-.07, Ground Water Classification, outlines the criteria for classifying groundwater sources. As per 1200-4-3-.07(2)(d), groundwater at the Tennessee Street FMGP may qualify for classification as a Site-Specific Impaired Groundwater based on the following:

- 1) groundwater has been impacted by human activity;
- 2) it is not technologically feasible to remediate site groundwater to the level required by other classifications [i.e., maximum contaminant levels (MCLs) for a drinking water aquifer]; and
- 3) costs of such a remediation substantially outweigh the benefits of the restored resource.

According to the criteria outlined in the TDEC-DUST Guidelines and the TDEC Groundwater Classification regulation, site data and information demonstrate that a non-drinking water-supply classification is an appropriate designation for the Site. This designation is further supported by the fact that 1) the Site is zoned heavy industrial; 2) future hypothetical residential use of the Site is unlikely due to the foreseeable future land use; and 3) water supplies in the area are withdrawn from springs and surface water located greater than 1 mile from the Site. Therefore, a non-drinking water classification was applied in the determination of PRGs.

5.2 Background Concentrations

Volatile organics and extractable organics (i.e., PAHs) are a byproduct of the incomplete combustion of organic material, and are found in everything from grilled meats to used oil to FMGP residuals. In present day, the incomplete combustion of fossil fuels from heating systems, automobile exhausts, garbage incineration, crude oil processing, and many other practices release PAHs into the atmosphere where they tend to adhere to particles in suspension. Some of these suspended particles ultimately fall back on surface soils or aquatic environments. Establishing the background concentration of these hydrocarbon-based organics at FMGP sites is therefore a

significant challenge. Although these anthropogenic background organics may be determined in a RA, for the purposes of this Phase II RI and the development of PRGs, the background levels for volatile and extractable organics are assumed to be zero.

Because metals are naturally occurring in the environment, efforts were made to determine naturally occurring background concentrations in soil and groundwater. In doing so, it is important that analytical data be collected from unimpacted soil and groundwater in the same geologic formation as the Site. Background soil concentrations were determined using data collected from soil borings SB-01 and MW-8 (Table 5-1 and Figure 2-1). Background groundwater metal concentrations were determined using February 2000 data collected from Monitor Well MW-8 (Table 5-2). These data were used because the October 1999 metals data appeared artificially elevated due to field-observed turbidity, likely due to sampling immediately following well installation and development.

The soil data set was analyzed according to USEPA Office of Solid Waste and Emergency Response (OSWER) guidance (U.S. Environmental Protection Agency 1995) to calculate background concentrations for each constituent. The mean concentration for each constituent detected in soil was calculated and then multiplied by two to obtain the representative background concentration (Table 5-1). For groundwater, however, the analytical results from the February 2000 sampling event were used as the representative background concentrations (Table 5-2) because only one sampling event had been conducted since the monitor wells were allowed to fully equilibrate.

5.3 Applicable or Relevant and Appropriate Requirements

TDEC's rules provide for the determination of remediation goals that may be based upon several criteria and alternatives, including containment and institutional controls. An evaluation of ARARs assists in identifying legal requirements and can be used in the analysis of remediation goals. ARARs are not always the remediation goals used for a VOAP response.

"Applicable" requirements include cleanup standards, standards of control (technology- or activity-based), and other environmental protection criteria promulgated under federal or state law that specifically address constituent(s), remedial action, location, or other circumstances at the Site. "Relevant and appropriate requirements" include cleanup standards, standards of control, and other environmental protection criteria promulgated under federal or state law that, while not "applicable" to a constituent, remedial action, location, or other circumstance at the Site, address situations or problems similar to those encountered at other sites. ARARs can be any promulgated

standard, requirement, criterion, or limitation under federal and state environmental laws and regulations. ARARs may be chemical-, location-, or action-specific. To-be-considered (TBC) documents are guidance documents and advisories to be considered in the RI/FS process.

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies that establish concentration or discharge limits for particular chemical constituents. Location-specific ARARs may restrict activities within specific locations such as floodplains or wetlands. Action-specific requirements may set controls or restrictions for particular treatment and disposal activities related to the management and/or remediation of hazardous wastes. Tables 5-3 and 5-4 present the federal and state ARARs for soil and groundwater, respectively, considered in this Phase II RI Report. These are ARARs and TBCs that potentially regulate the release of chemical constituents to on-site and off-site air, surface water, groundwater, and land. These ARARs may also restrict the implementation of some remedial actions.

5.3.1 Soil

Tennessee UST regulations are considered chemical-specific ARARs applicable to petroleum releases from the former UST. Analysis for TPH in soil is with respect to the Tennessee UST regulations. Tennessee UST regulations provide soil cleanup levels for TPH that are based on the groundwater classification and the soil permeability. Based on the non-drinking water classification and the soil permeability (Appendix C) for the Site, for petroleum released from the former UST, a TPH (GRO and EPH) ARAR action level for soil of 1,000 mg/kg has been established.

Action-specific ARARs include Occupational Health and Safety Administration (OSHA) requirements that apply to workers at the Site. Applicable location-specific ARARs focus on the fact that the Site is located within the 100-year floodplain of Brush Creek, and concern local restrictions on the construction of improvements within the flood plain. These ARARs will be further evaluated during performance of the FFS.

5.3.2 Groundwater

Table 5-4 summarizes potential ARARs for groundwater, some of which may not apply during remediation. Currently, no location-specific ARARs are applicable or relevant and appropriate for the Site. Action-specific ARARs include OSHA requirements that apply to workers at the Site. Chemical-specific ARARs for groundwater at the Site are AWQC promulgated by the Water Quality Control Board, including site specific criteria, and Tennessee UST regulations.

Tennessee AWQCs. In accordance with TDEC-DSF Regulation 1200-1-13-.08(3)(a)(1)(ii), groundwater not used or classified as drinking water, domestic, or residential water supply, shall be evaluated for ARARs using the water-quality criteria established by the Tennessee Water Quality Control Board under Chapter 1200-4-3, with the exception of TPH.

Tennessee UST Regulations. Tennessee UST regulations are considered applicable for groundwater affected by the past release of petroleum products from USTs. Tennessee UST regulations provide groundwater cleanup levels for TPH that are defined based on the classification of groundwater as "drinking" or "non-drinking." Based on the non-drinking water classification for the Site, for groundwater affected by petroleum released from the former UST, a TPH (GRO and EPH) ARAR action level of 1.0 mg/L has been established.

As noted above, the ARARs analysis does not include an evaluation of containment and institutional controls. In review of the circumstances at this Site, containment and institutional controls likely will be the remediation goals.

5.4 Risk-Based Criteria

In determining the risk-based goals, consideration is given to the projected future uses of the land. The Site is presently a non-residential area (site is zoned heavy industrial) and will not be used for agricultural purposes, and is expected to continue to serve as a non-residential area in the foreseeable future. Therefore, USEPA Region 9 PRGs (U.S. Environmental Protection Agency 1999) are considered for the industrial scenario for soil.

As with soil, determination of the groundwater risk-based goals gives consideration to the current and projected future uses of the land. Although an industrial scenario and a non-drinking water classification apply to the Site, and no groundwater use has been identified at or in the area of the Site, USEPA Region 9 PRGs present RBCs for tap water only. Because these RBCs are often evaluated by TDEC-DSF, initially they will be considered in the determination of the site-specific PRGs. Upon completion of a RA, following approval of the Phase II RI Report, site-specific RBCs may be calculated and the site-specific PRGs revised accordingly.

5.5 Tennessee Street FMGP Site Preliminary Remediation Goals

Based on currently available ARARs and RBCs, site-specific PRGs were determined for soil (Table 5-5) and groundwater (Table 5-6). Because a non-drinking water classification applies to the Site, to determine the appropriate site-specific PRG in soil

and groundwater, the maximum listed value of either the ARAR or the RBC was used as the PRG. If no ARAR was listed, as in the case for soil, then the PRG was set to the listed RBC.

In order to identify areas of potential risks and/or remediation, soil and groundwater data were screened against appropriate background concentrations and the site-specific PRGs. The result of this screening identifies areas of potential concern. The first step in the determination of COPCs at the Site was to compare the detected constituents to background concentrations. If the detected concentration did not exceed the background concentration, then the constituent was not considered a COPC. If the detected concentration was reported in excess of the background concentration, then the detected value was compared to the site-specific PRG. If the concentration of the detected constituent exceeded the background concentration and the PRG, it was considered a COPC. It is noted that several background metal concentrations also exceed the site-specific PRGs. To be conservative, if a constituent was detected in excess of the background concentration and no PRG was listed, the constituent was considered a COPC. Constituents that are considered essential nutrients (e.g., calcium, magnesium, potassium, and sodium) were not included as COPCs. Further, if no background concentration was available and the detected concentration was greater than the PRG, or no PRG was available, the constituent was also considered a COPC.

The identification of a constituent as a COPC does not indicate that a risk to human health or the environment exists. Rather, it indicates that COPCs exceed screening levels and require further analysis in the risk assessment process. This screening approach results in an inclusive characterization and also identifies those areas to be considered for remediation.

Soil data collected during the PSI and Phase II RI activities and groundwater data collected during Phase II RI were compared to background and site-specific PRGs (Tables 5-7 and 5-8). From this comparison, a total of five volatile organics, ten extractable organics (PAHs), five metals, and free cyanide were identified as COPCs in soil (Table 5-9). The COPCs identified in groundwater also include four volatile organics, seven extractable organics (PAHs), five metals, and free cyanide (Table 5-9). The COPCs that are common to both soil and groundwater include EPH, benzene, xylenes, benzo(b)fluoranthene, benzo(a)pyrene, 2-methylnaphthalene, naphthalene, arsenic, iron, and lead.

Using COPCs common to both soil and groundwater [EPH, benzo(a)pyrene, naphthalene, arsenic, and iron], potential risk and/or remediation areas can be identified. In review of the distribution of these COPCs in both soil and groundwater, a general pattern forms. For both soil and groundwater, the distribution of EPH is

found across the majority of the Site. This is due to the EPH analysis being a general analytical test for the heavier organics (i.e., all extractable organics) and the fact that historic residuals produced from the processes were used for fill and surfacing material (e.g., ash, clinkers) or remain (e.g., tar) at the Site. As would be expected, the areas identified as potential source areas are identified as areas where remedial action may be appropriate. In review of the concentrations of benzo(a)pyrene and naphthalene, two extractable organic COPCs, a better definition of the impacted areas is achieved. By reviewing these COPC concentrations, it is evident that if remedial actions were applied to the area bounded by SB-04 to SB-05, to SB-06, to MW-4/SB-09, and west towards SB-04, the majority of the impacted areas would be addressed. In review of three COPC metals (arsenic, barium, and iron), the area defined above is again outlined. Lastly, the free cyanide concentration exceeding the PRG is located in the vicinity of MW-3.

6.0 Preliminary Risk Characterization

To assist in identifying potential risks to both human health and the environment, a conceptual risk model was developed for the Site (Figure 6-1). The development of the conceptual risk model was accomplished by reviewing the site conceptual model (Figure 3-8) and potential source areas (Figure 2-7), identifying mechanisms of COPC releases from these areas, and modes of transport for the COPCs (e.g., wind borne, groundwater flow). Next, potential receptors were identified along with potential routes of exposure through which receptors might come into contact with the COPCs. For potential risk to exist at a site, a pathway must be complete. If one element is missing (e.g., an exposure route or a mode of transport), then the pathway is incomplete and no risk exists.

6.1 Modes of Release and Transport from Source Areas

As previously discussed, several potential source areas have been identified (Figure 2-7). Although not likely under current site conditions due to paving, COPCs in these areas could potentially be released by wind erosion, volatilization, or leaching and percolation. Secondary sources, which could result from these release mechanisms, would include air particulates, subsurface soils, and groundwater. Once the primary source areas and secondary sources were identified, potential receptors were selected which could potentially come in contact with COPCs measured in the different media.

6.2 Potential Exposure Pathways and Receptors

When selecting potential receptors for the conceptual risk model, appropriate on- and off-site receptors were considered using both the current land use scenario and the most probable potential future land use scenario. The Site has remained inactive since 1996 and any time spent at the Site by a United Cities employee or subcontractor would be of limited duration. The current site layout and conditions would limit the potential for exposure to COPCs in soil or groundwater. Because site access is restricted (the Site is fully fenced), trespassers or visitors were not considered potential receptors. Using the current land use scenario, an on-site commercial worker was the only identified potential receptor.

The on-site commercial worker could potentially be exposed to COPCs in surficial soil via inhalation (vapors or particulates), direct dermal contact, and incidental ingestion. Potential exposure also exists via inhalation of COPC vapors originating from constituent concentrations measured in the subsurface soil and shallow groundwater.

Using the most appropriate future land use scenario, redevelopment of the property for continued commercial use, an on-site commercial worker and an on- and off-site construction worker were identified as the potential on-site receptors. Potential exposure to hypothetical future on-site commercial workers could occur via inhalation of airborne COPCs (vapors or particulates), direct dermal contact (skin), inhalation, and incidental ingestion of reworked surficial soils containing COPCs. In addition, a future on-site construction worker could potentially be exposed to COPCs in surficial soils, subsurface soils, and shallow groundwater during construction activities via inhalation, incidental ingestion, and direct dermal contact. The potential future off-site receptor identified was a hypothetical off-site construction worker, exposed to COPCs in shallow groundwater during excavation activities (Figure 6-1).

Based on the results of the Phase II RI investigation and the preliminary risk characterization, a quantitative RA is warranted for the Site. However, an interim action involving removal of source area residuals to the top of bedrock could eliminate or substantially reduce the potential risk associated with current and future on- and off-site receptors. The quantitative RA would also be used to revise PRGs accordingly to determine the final remedial actions and end points required for the Site.

6.3 Remedial Action Objectives

After the compilation and review of all available data for the Tennessee Street FMGP facility, establishment of and data comparison to the site-specific PRGs, and determination of COPCs, and a preliminary risk characterization, site RAOs were determined. RAOs are developed to specify the COPC(s) and media of interest, potential exposure pathways, and PRGs that permit a range of treatment and/or containment remedial alternatives to be developed. These RAOs were developed to state the goals to be achieved and to help direct the future activities at the Site. The RAOs for the Site are as follows:

- Protect potential future on-site commercial and construction workers from all COPCs in on-site soil and groundwater; and
- Protect off-site surface-water quality and off-site groundwater from COPCs from source areas.

These RAOs may be refined and quantified following the RA and FFS and will help ensure that human health and the environment are protected, while meeting both United Cities and TDEC-DSF goals for the Site.

7.0 Conclusions and Recommendations

A detailed review of the historical data and operational history of the Tennessee Street FMGP, together with the PSI and Phase II RI data collected, provide significant information to determine characterization of the Site and qualification of associated risks. The conclusions and recommendations for future actions are discussed below.

7.1 Site Characterization

- The Site is inactive and current land use at and in the immediate vicinity of the Site is zoned heavy industrial.
- Potential source areas identified include: the former UST and AST locations in the northwest corner of the property; the tar well; the tar/water separator; and the former holders and purifiers.
- Tasks completed during the Phase II RI included the installation of ten shallow groundwater monitor wells (nine onsite and one offsite); three deep, bedrock wells (onsite); three soil borings (onsite); the installation of a stream staff gauge; residual sample collection; two rounds of groundwater monitoring; slug testing; and associated laboratory analyses.
- The topography at the Site is generally flat and the Site is covered with asphalt, concrete, and a few remaining buildings. Storm-water runoff is collected and discharged to Brush Creek, located on the northern edge of the site property. The underlying lithology at the Site consists of silty sands and clays ranging from 5.5 to 7.9 ft thick. This residuum is underlain by dark gray limestone, which from the outcrop in Brush Creek, appears to be dipping approximately southeast. A layer of cinders and gravel was noted across the Site beginning just below the asphalt and extending up to 3 ft bls.
- Groundwater at the Site is relatively shallow with an average depth of approximately 3.49 ft bls. Due to an average hydraulic conductivity of 6.86×10^{-3} cm/sec, and a low horizontal groundwater gradient at the Site (0.005 ft/ft), the estimated groundwater flow velocity is 0.88 ft/day. The shallow groundwater flows north-northeast, while the bedrock groundwater flows south-southeast. Because of the shallow nature of both the groundwater and the underlying bedrock, shallow groundwater discharges to Brush Creek.

7.2 Nature and Extent of Detected Constituents

- Residuals - based on Phase II RI analytical results, the FMGP residuals remaining at the Site may exhibit concentrations of benzene and sulfides, for samples prepared using TCLP, that exceed characteristic thresholds, upon removal/management offsite. Application of the TCLP test to FMGP residuals is uncertain based on pending litigation.
- Soil - the distribution of total BTEX across the Site is limited to the areas around SB-02, SB-04, and MW-3. TPH/GRO and EPH concentrations, however, are distributed over the majority of the Site with the maximum concentrations being localized in the vicinity of MW-3 (307 mg/kg and 17,800 mg/kg, respectively). Elevated total PAH concentrations in the soil are localized around SB-04 and MW-3 with the maximum detected concentrations being present in the area of MW-3 (14,132 mg/kg). The metals detected in the soil at elevated concentrations (primarily aluminum, arsenic, iron, and lead) are again spread across the Site with concentrations in excess of the background soil sample (MW-8), being observed on the east side of the property. The maximum concentration of aluminum was observed at SB-12 (14,031.60 mg/kg), while the maximum concentration for arsenic, iron, and lead are all in the area of MW-3 (26,294 mg/kg, 44,073.80 mg/kg, and 216.612 mg/kg, respectively).
- Shallow Groundwater - the maximum detected concentration of total BTEX was at MW-3, with detectable BTEX concentrations extending from MW-1 northeast to MW-5. TPH/GRO and EPH concentrations in groundwater, like in soil, are distributed across the majority of the Site, with the maximum detected concentrations of both occurring in MW-3 (1.62 mg/L and 15.30 mg/L, respectively). Total PAHs in groundwater are also detected in several of the shallow groundwater samples, again the maximum concentration observed in MW-3 (9.88 mg/L) and concentrations extending north and east of MW-1 and MW-3. Metals detected in groundwater at potentially elevated concentrations include arsenic, barium, iron, lead, and manganese with varying concentrations across the Site. Total cyanide is distributed in the eastern portion of the Site and free cyanide is concentrated in the area of MW-3.
- Deep Groundwater - total BTEX and TPH/GRO concentrations were detected in all three of the deep groundwater monitor wells with the maximum detected concentrations reported in MW-4D (6.045 mg/L and 7.92 mg/L, respectively). The maximum EPH concentration in groundwater, however, was detected in MW-3D (8.78 mg/L). Free-phase tar residuals were observed in bedrock Monitor Wells MW-1D and MW-3D. Total PAHs in groundwater were also detected in all of the deep groundwater monitor wells, with the maximum concentration occurring in MW-3D (9.70 mg/L). The maximum detected

concentrations of arsenic (0.010 mg/L) and barium (0.453 mg/L) were reported in MW-4D, while the maximum concentrations for iron (16.80 mg/L), lead (0.05 mg/L), and manganese (1.49 mg/L) were all detected in MW-3D. Although total cyanide was detected in all three deep monitor wells, with a maximum concentration in MW-3D (11.20 mg/L), no detections of either free or available cyanide were reported from any of the deep groundwater monitor wells.

- Biogeochemistry - the Site exhibits strong aerobic conditions upgradient, an anaerobic core, and a recovering aerobic buffer downgradient. The highest concentrations of COPCs near MW-1 and MW-3 are anaerobic in nature with evidence of electron acceptor usage. The dissolved-phase BTEX plume appears stable within the shallow aquifer via significant aerobic degradation and anaerobic sulfate reduction. However, the shallow dissolved-phase naphthalene and bedrock BTEX/naphthalene plumes do not appear to be degrading significantly.

7.3 Development of Preliminary Remediation Goals

- A non-drinking water-supply classification is an appropriate designation for the Site based on criteria set forth in Tennessee UST and Groundwater Classification regulations.
- The background levels for volatile and extractable organics are assumed to be zero in soil and groundwater. Background metal concentrations were determined using data collected from borings SB-01 and MW-8 (soil) and Monitor Well MW-8 (groundwater).
- Soils ARARs -- Action-specific ARARs include OSHA requirements that are currently adhered to at the Site. A location-specific ARAR applies to the Site due to the 100-year floodplain of Brush Creek. Tennessee UST regulations are considered an applicable chemical-specific ARAR for TPH due to petroleum released from the former UST.
- Groundwater ARARs - Action-specific ARARs include OSHA requirements that are currently adhered to at the Site. Chemical-specific ARARs for groundwater at the Site are Tennessee UST regulations for TPH applicable to past petroleum released from the former UST and the Tennessee AWQCs established by the Water Quality Control Board.
- USEPA Region 9 PRGs are considered for the RBCs under the industrial scenario for soil. Although an industrial scenario and a non-drinking water classification apply at the Site, and no groundwater use has been identified at or in the area of the Site, USEPA Region 9 PRGs were initially considered in the determination of the site-specific PRGs for groundwater.

- Comparison of PSI and Phase II RI data to the site-specific PRGs resulted in the identification of five volatile organics, ten extractable organics (PAHs), and four metals in soil as COPCs exceeding the PRGs. The COPCs identified in groundwater as exceeding PRGs include four volatile organics, seven extractable organics (PAHs), five metals, and free cyanide. The COPCs that are common to both soil and groundwater include EPH, benzene, xylenes, benzo(b)fluoranthene, benzo(a)pyrene, 2-methylnaphthalene, naphthalene, arsenic, iron, and lead.

7.4 Preliminary Risk Characterization

- The Site does not present an immediate or short-term threat to human health or the environment.
- Using the current land use scenario, an on-site commercial worker was identified as a potential receptor.
- Using the most appropriate future land use scenario, redevelopment of the property for continued commercial use, a commercial worker and a construction worker were identified as the potential on-site receptors. The potential future off-site receptor would include a future off-site construction worker potentially exposed to COPCs in shallow groundwater during excavation activities.
- An interim action to remove source area residuals would eliminate or substantially reduce the long-term risk at the Site. After an interim removal action, an updated exposure assessment (i.e., Risk Assessment) should be performed to determine quantitative site-specific RBCs that may be used to revise PRGs and establish remediation end points.
- The RAOs for the Site include:
 - Protect potential future on-site commercial and construction workers from all COPCs in on-site soil and groundwater; and
 - Protect off-site surface-water quality and off-site groundwater from COPCs from the source areas.

7.5 Recommendations

- Performance of interim actions involving residual removal to the top of bedrock and subsequent disposal/treatment activities in the locations of the former AST/UST, the former tar well; and the former tar/water separator. These actions will mitigate future plume growth by removing source materials and enhancing the assimilative capacity of the aquifer.

- Following interim actions, performance of a Baseline Risk Assessment to quantify site-specific risk-based criteria, potentially revise PRGs, and focus future remedial actions, if necessary.

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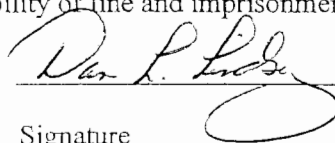
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Certification

9.0 Certification

I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this Phase II Remedial Investigation Report and on any attachments, is true, accurate and complete to the best of my knowledge, information, and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violation.

Dan L. Lindsey



4/11/00

Owner's Representative

Signature

Date

Vice President - Technical Services

Title

STATE OF TENNESSEE

COUNTY OF WILLIAMSON

Sworn to and subscribed before me by Dan L. Lindsey on this date 4/11/00

My Commission expires on May 28, 2003

Terry Lynn Russell



4/11/00

Notary Public

Signature

Date

Stuart Schulz



4/11/00

Professional Geologist

Signature

Date

TN 1498

Tennessee Registration #

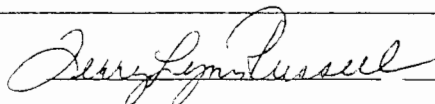
STATE OF TENNESSEE

COUNTY OF WILLIAMSON

Sworn to and subscribed before me by Stuart Schulz on this date 4/11/00

My Commission expires on May 28, 2003

Terry Lynn Russell



4/11/00

Notary Public

Signature

Date

- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Future Use (Offsite)

- Potential future risks and hazards from exposure to soil are acceptable.
- Potential future risks and hazards from exposure to shallow groundwater are acceptable.
- Potential future risks and hazards from exposure to deep groundwater are acceptable because there are no exposure pathways.
- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Conclusions and Path Forward

Current risk from the Site is acceptable. However, if in the future, the pavement currently covering the majority of the Site were breached or deteriorated, risks from exposure to indoor air in buildings constructed over impacted areas and from contact with soil and shallow groundwater may be unacceptable onsite. Risks offsite could be unacceptable if shallow groundwater were to migrate offsite in the future at concentrations near current on-site maximums. However, the physical removal of the tar waste and subsequent monitoring data indicate that the application of ORC[®] during the interim action has reduced shallow groundwater concentrations and significant off-site concentrations are not expected.

The recommended path forward for the Site is to assess the efficacy of the interim action and review the findings of the risk assessment with respect to the groundwater monitoring data from February 2002. Subsequently, an Assessment Conference with TDEC-DSF will be held. The Assessment Conference will focus on addressing any TDEC-DSF comments on the risk assessment and future actions necessary to move the Site toward closure including institutional controls, access restrictions, and focused monitoring.

Acronyms

AST	aboveground storage tank
ABS _d	dermal absorption efficiencies
ABS _o	oral absorption efficiencies
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COPCs	constituents of potential concern
cm/sec	centimeters per second
CSF	cancer slope factor
DRO	diesel range organics
DSF	Division of Superfund
ELCR	excess lifetime cancer risk
EPH	extractable petroleum hydrocarbons
ETSU	East Tennessee State University
FMGP	Former Manufactured Gas Plant
ft	feet
ft/day	feet per day
gpm	gallons per minute
HEAST	Health Effects Assessment and Summary Tables
HI	hazard index
HQ	hazard quotient
IRIS	USEPA Integrated Risk Information System
kg	kilograms
Kp	permeability coefficients
m ³	cubic meters
mg/kg	milligrams per kilogram
NOAEL	no observed adverse effects level
ORC*	Oxygen Release Compound*
PAHs	polycyclic aromatic hydrocarbons
PRGs	preliminary remediation goals
PSI	Preliminary Site Investigation
RBCs	risk-based concentrations
RfCs	reference concentrations
RfDs	reference dose
RI	remedial investigation
Site	Tennessee Street FMGP
SVOCs	semivolatile organic compounds
TAL	Target Analyte List
TCL	Target Compound List
TDEC	Tennessee Department of Environment and Conservation
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
United Cities	United Cities Gas Company
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOAP	Voluntary Cleanup Oversight and Assistance Program
VOCs	volatile organic compounds
WQC	water-quality criteria
µg/m ³	micrograms per cubic meter

Executive Summary

ARCADIS prepared this Risk Assessment Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (the Site), located west of downtown Johnson City, Washington County, Tennessee (Figure ES-1). The risk assessment was prepared in accordance with requirements of the Tennessee Department of Environment and Conservation (TDEC) Division of Superfund (DSF), Voluntary Cleanup Oversight and Assistance Program (VOAP). The purpose of this risk assessment is to evaluate potential risks to human health and the environment associated with residual impacts from past site operations. The risk assessment focuses on risks to human health because the Site is located in an industrial area that does not provide significant ecological habitat. However, potential risks to aquatic receptors in Brush Creek are addressed by comparison of predicted creek concentrations to TDEC and U.S. Environmental Protection Agency (USEPA) Region IV ecological screening levels.

Site Description and History

The United Cities Tennessee Street FMGP facility is on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures ES-1 and ES-2). The Site, approximately 1.8 acres, is currently inactive and vacant. Several buildings remaining from when the FMGP was in operation were recently demolished and removed from the Site. The majority of the former industrial area of the Site is paved and fenced, and there are areas of gravel fill from the interim action. The Site and surrounding terrain are generally flat and located within the 100-year floodplain of Brush Creek.

Brush Creek is the major drainage feature for the east-southeast portion of Johnson City. Surface drainage onsite is controlled by storm-water drains which collect surface water and direct it either north into Brush Creek or east under Tennessee Street toward a vacant lot and ultimately Brush Creek.

The Site and surrounding property remained essentially undeveloped until around 1915. Since that time, the Site and surrounding properties have supported a mix of industrial and commercial activities. Land in the immediate vicinity of the Site is zoned heavy industrial.

Johnson City obtains its domestic water supply from springs and surface water (Watauga River). The springs that supply Johnson City are along Indian Creek

approximately 10 miles south of the city. During previous investigative activities, no domestic water-supply wells were identified within a 0.5-mile radius of the Site. Groundwater in the shallow unconsolidated zone is not suitable for general use because of poor quality and yield. In addition, a city of Johnson City ordinance, and the policy of the City's water department, severely limits the installation of groundwater wells in the vicinity of the Site.

The Site is underlain by various fill materials to a depth of approximately 3 feet (ft) below the paved surface. Silty sand, silts, and clays underlie the fill to the top of bedrock. The depth to bedrock is variable across the Site ranging from 5.5 to 7.9 ft below land surface (bls). The bedrock consists of dark-blue-gray limestone of the Knox Group. Observations of outcrops in Brush Creek and during the installation of the three bedrock monitor wells indicate that bedrock generally dips to the southeast and is fractured.

Based on data collected since 1999, the average depth to groundwater at the Site in the shallow water-bearing unit is 3.41 ft bls. The dominant groundwater flow direction in the shallow unit is north-northeast, toward Brush Creek. Water-level data indicate a bedrock groundwater flow direction to the south-southeast. Shallow groundwater discharges to Brush Creek, which is approximately 3 to 4 ft wide and 1 ft deep near the Site.

A MGP was constructed in 1915 at the Site and was operational from 1915 to 1946. The Site was operated as a gas making plant from 1946 to 1954, when natural gas became available in Johnson City. Operation of the MGP was ceased in 1954 and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996. It has not been used for commercial purposes except for equipment and vehicle storage since 1996. During the 1970s, site improvements/modifications included the dismantling and removal of equipment associated with former gas production operations at the Site and the dismantling of two on-site buildings. Removal of aboveground storage tanks (ASTs) was conducted in 1974 and removal of underground storage tanks (USTs) was performed in 1995.

Findings from the UST closure activities indicated a potential release had occurred and further investigation was warranted. On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order Agreement to manage the Site under the state VOAP. A Phase I Report was approved by TDEC-DSF on July 10, 1997 and a Preliminary Site Investigation (PSI) was conducted in 1997. A Phase II Remedial Investigation (RI) was conducted in the fall of 1999 and the spring 2000. Benzene,

ethylbenzene, toluene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), and metals were identified as preliminary constituents of potential concern (COPCs) in the Phase II RI Report. Additional groundwater monitoring was conducted in February 2001 in preparation for interim action activities.

An interim action was implemented at the Site in June 2001. Former source areas, including the UST Area, Tar-Water Separator Area, Storage Holder Pad, and Tar Well Area, were excavated (Figure ES-2) and post-excavation confirmatory subsurface soil samples were collected at the four areas. One new monitor well (MW-3R) was also installed at this time to replace MW-3, which was destroyed in the excavation of the Storage Holder Pad. Oxygen Release Compound (ORC[®]) was applied during backfilling of the excavated areas to enhance natural attenuation processes. Post-interim action groundwater monitoring was performed from July 2001 to February 2002.

Risk Assessment

Conclusions from the risk assessment are summarized on Table ES-1 and discussed below.

Current Use (Onsite and Offsite)

- There are currently no complete exposure pathways for potential on-site or off-site receptors. Therefore, current risk from the Site is acceptable.

Future Use (Onsite)

- Potential future risks and hazards to industrial workers exposed to constituents migrating from soil or groundwater to indoor air are acceptable.
- Potential future risks and hazards from direct exposure to soil are acceptable for an industrial worker, excavation worker, and trespasser receptors.
- Potential future risk for an excavation worker exposed to shallow groundwater is within acceptable targets for exposure to potentially carcinogenic compounds, but slightly exceeds the noncancer target hazard index (HI), although none of the individual constituent HIs exceed 1.
- Potential future risks and hazards from exposure to deep groundwater are acceptable because there are no exposure pathways.

- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Future Use (Offsite)

- Potential future risks and hazards from exposure to soil are acceptable.
- Potential future risks and hazards from exposure to shallow groundwater are acceptable.
- Potential future risks and hazards from exposure to deep groundwater are acceptable because there are no exposure pathways.
- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Conclusions and Path Forward

Current risk from the Site is acceptable. However, if in the future, the pavement currently covering the majority of the Site were breached or deteriorated, risks from exposure to indoor air in buildings constructed over impacted areas and from contact with soil and shallow groundwater may be unacceptable onsite. Risks offsite could be unacceptable if shallow groundwater were to migrate offsite in the future at concentrations near current on-site maximums. However, the physical removal of the tar waste and subsequent monitoring data indicate that the application of ORC[®] during the interim action has reduced shallow groundwater concentrations and significant off-site concentrations are not expected.

The recommended path forward for the Site is to assess the efficacy of the interim action and review the findings of the risk assessment with respect to the groundwater monitoring data from February 2002. Subsequently, an Assessment Conference with TDEC-DSF will be held. The Assessment Conference will focus on addressing any TDEC-DSF comments on the risk assessment and future actions necessary to move the Site toward closure including institutional controls, access restrictions, and focused monitoring.

Acronyms

AST	aboveground storage tank
ABS _d	dermal absorption efficiency
ABS _o	oral absorption efficiency
amsl	above mean sea level
Atmos	Atmos Energy Corporation
BaP	benzo(a)pyrene
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
City	City of Johnson City
COC	constituent of concern
COPC	constituent of potential concern
cm/sec	centimeters per second
CSF	cancer slope factor
DO	dissolved oxygen
Domermuth	Domermuth Environmental Services
DRO	diesel range organic compounds
DSF	Division of Superfund
DSWM	Division of Solid Waste Management
ELCR	excess lifetime cancer risk
EPC	exposure point concentration
EPH	extractable petroleum hydrocarbons
ETSU	East Tennessee State University
FFS	Focused Feasibility Study
FMGP	Former Manufactured Gas Plant
ft	feet
GI	gastrointestinal
gpm	gallons per minute
GRO	gasoline range organics
HEAST	Health Effects Assessment Summary Tables
HI	hazard index
HQ	hazard quotient
IDW	investigation derived waste
IRIS	Integrated Risk Information System
kg	kilograms
Koc	carbon partition coefficient
Kp	permeability coefficient
m ³	cubic meters
MCL	maximum contaminant level

MDL	method detection limit
mg	milligrams
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGP	Manufactured Gas Plant
mV	millivolt
NOAEL	no observed adverse effects level
NTU	nephelometric turbidity units
ORC*	Oxygen Release Compound*
ORP	oxidation reduction (redox) potential
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PRG	Preliminary Remediation Goal
PSI	Preliminary Site Investigation
RAF	relative absorption factor
RBC	risk-based concentration
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
Site	Tennessee Street FMGP
SU	standard unit
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
United Cities	United Cities Gas Company
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOAP	Voluntary Cleanup Oversight and Assistance Program
VOC	volatile organic compound
WQC	water quality criteria
µg/m ³	micrograms per cubic meter
µS/m	microseimens per meter

Executive Summary

ARCADIS prepared this report on behalf of Atmos Energy Corporation (Atmos) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (the Site) in Johnson City, Tennessee (Figures ES-1 and ES-2). The purpose of this report is to further the understanding of groundwater conditions in bedrock at the Site and to evaluate potential risks to human health and the environment associated with residual impacts from historical operations. The supplemental groundwater investigation and risk assessment were conducted in accordance with requirements of the Tennessee Department of Environment and Conservation (TDEC) - Division of Superfund (DSF) Voluntary Cleanup Oversight and Assistance Program (VOAP).

Five additional bedrock wells and one lithologic boring were installed on and near the Site between October 28 and November 8, 2002 (Figure ES-2). Groundwater samples were collected from all 18 monitor wells and two piezometers during November 2002. Lithologic and water-level data collected during the supplemental groundwater investigation have been integrated with information obtained during the 1998 Preliminary Site Investigation and 2000 Phase II Remedial Investigation to formulate a conceptual model of hydrogeologic conditions at the Site.

Based on the interim action effectiveness, biogeochemical evaluation, and assimilative capacity calculations, groundwater in the unconsolidated zone exhibits fluctuating aerobic/anaerobic conditions upgradient, a mixed aerobic/anaerobic core, and a stable aerobic buffer downgradient. The affected area is stable within the unconsolidated zone. Data suggest that significant and multiple biodegradational processes are ongoing with sufficient assimilative capacity to degrade on-site constituents. The bedrock-zone groundwater exhibits anaerobic conditions and increased bioactivity. The affected area for bedrock-zone groundwater is reduced yet stable, remains localized to the center of the Site, and possesses the natural assimilative capacity to degrade site constituents over time.

The results of historical investigations that defined source areas, the interim-action removal of those source areas, the refined hydrogeologic conceptual model, and the current distribution of groundwater impacts indicate that the existing well network is sufficient to monitor horizontal and vertical constituent concentrations and migration. The extent of impact has been defined such that a risk assessment can be performed.

Results of the risk assessment indicate that there are no current complete exposure pathways for the Site and no future risk from groundwater discharging into Brush Creek. Potential future risks/hazards (Table ES-1) include the following:

- incidental ingestion and/or dermal contact with on-site bedrock-zone groundwater;
- incidental ingestion and/or dermal contact with on-site surface soil;
- inhalation of vapors migrating from on-site subsurface soil to indoor air; and
- incidental ingestion and/or dermal contact with off-site bedrock-zone groundwater.

The recommended path forward for the Site is to prepare a Focused Feasibility Study (FFS). The FFS will document the site remedial goals, based on the results of previous investigations and the evaluation of risks and hazards in the risk assessment, which will serve as the criteria necessary to support selection of a specific response action. The FFS will provide a detailed evaluation of the feasibility and effectiveness of implementing alternative response actions with respect to the remedial goals and the estimated time to achieve them and will recommend a preferred alternative. The FFS will move the Site toward closure, including but not limited to institutional controls and access restrictions.

Acronyms

AST	aboveground storage tank
ABS _d	dermal absorption efficiencies
ABS _o	oral absorption efficiencies
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COPCs	constituents of potential concern
cm/sec	centimeters per second
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SVOCs	semivolatile organic compounds
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VOCs	volatile organic compounds
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Executive Summary

ARCADIS prepared this Risk Assessment Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (the Site), located west of downtown Johnson City, Washington County, Tennessee (Figure ES-1). The risk assessment was prepared in accordance with requirements of the Tennessee Department of Environment and Conservation (TDEC) Division of Superfund (DSF), Voluntary Cleanup Oversight and Assistance Program (VOAP). The purpose of this risk assessment is to evaluate potential risks to human health and the environment associated with residual impacts from past site operations. The risk assessment focuses on risks to human health because the Site is located in an industrial area that does not provide significant ecological habitat. However, potential risks to aquatic receptors in Brush Creek are addressed by comparison of predicted creek concentrations to TDEC and U.S. Environmental Protection Agency (USEPA) Region IV ecological screening levels.

Site Description and History

The United Cities Tennessee Street FMGP facility is on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures ES-1 and ES-2). The Site, approximately 1.8 acres, is currently inactive and vacant. Several buildings remaining from when the FMGP was in operation were recently demolished and removed from the Site. The majority of the former industrial area of the Site is paved and fenced, and there are areas of gravel fill from the interim action. The Site and surrounding terrain are generally flat and located within the 100-year floodplain of Brush Creek.

Brush Creek is the major drainage feature for the east-southeast portion of Johnson City. Surface drainage onsite is controlled by storm-water drains which collect surface water and direct it either north into Brush Creek or east under Tennessee Street toward a vacant lot and ultimately Brush Creek.

The Site and surrounding property remained essentially undeveloped until around 1915. Since that time, the Site and surrounding properties have supported a mix of industrial and commercial activities. Land in the immediate vicinity of the Site is zoned heavy industrial.

Johnson City obtains its domestic water supply from springs and surface water (Watauga River). The springs that supply Johnson City are along Indian Creek

approximately 10 miles south of the city. During previous investigative activities, no domestic water-supply wells were identified within a 0.5-mile radius of the Site. Groundwater in the shallow unconsolidated zone is not suitable for general use because of poor quality and yield. In addition, a city of Johnson City ordinance, and the policy of the City's water department, severely limits the installation of groundwater wells in the vicinity of the Site.

The Site is underlain by various fill materials to a depth of approximately 3 feet (ft) below the paved surface. Silty sand, silts, and clays underlie the fill to the top of bedrock. The depth to bedrock is variable across the Site ranging from 5.5 to 7.9 ft below land surface (bls). The bedrock consists of dark-blue-gray limestone of the Knox Group. Observations of outcrops in Brush Creek and during the installation of the three bedrock monitor wells indicate that bedrock generally dips to the southeast and is fractured.

Based on data collected since 1999, the average depth to groundwater at the Site in the shallow water-bearing unit is 3.41 ft bls. The dominant groundwater flow direction in the shallow unit is north-northeast, toward Brush Creek. Water-level data indicate a bedrock groundwater flow direction to the south-southeast. Shallow groundwater discharges to Brush Creek, which is approximately 3 to 4 ft wide and 1 ft deep near the Site.

A MGP was constructed in 1915 at the Site and was operational from 1915 to 1946. The Site was operated as a gas making plant from 1946 to 1954, when natural gas became available in Johnson City. Operation of the MGP was ceased in 1954 and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996. It has not been used for commercial purposes except for equipment and vehicle storage since 1996. During the 1970s, site improvements/modifications included the dismantling and removal of equipment associated with former gas production operations at the Site and the dismantling of two on-site buildings. Removal of aboveground storage tanks (ASTs) was conducted in 1974 and removal of underground storage tanks (USTs) was performed in 1995.

Findings from the UST closure activities indicated a potential release had occurred and further investigation was warranted. On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order Agreement to manage the Site under the state VOAP. A Phase I Report was approved by TDEC-DSF on July 10, 1997 and a Preliminary Site Investigation (PSI) was conducted in 1997. A Phase II Remedial Investigation (RI) was conducted in the fall of 1999 and the spring 2000. Benzene,

ethylbenzene, toluene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), and metals were identified as preliminary constituents of potential concern (COPCs) in the Phase II RI Report. Additional groundwater monitoring was conducted in February 2001 in preparation for interim action activities.

An interim action was implemented at the Site in June 2001. Former source areas, including the UST Area, Tar-Water Separator Area, Storage Holder Pad, and Tar Well Area, were excavated (Figure ES-2) and post-excavation confirmatory subsurface soil samples were collected at the four areas. One new monitor well (MW-3R) was also installed at this time to replace MW-3, which was destroyed in the excavation of the Storage Holder Pad. Oxygen Release Compound (ORC[®]) was applied during backfilling of the excavated areas to enhance natural attenuation processes. Post-interim action groundwater monitoring was performed from July 2001 to February 2002.

Risk Assessment

Conclusions from the risk assessment are summarized on Table ES-1 and discussed below.

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Future Use (Onsite)

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- Potential future risks and hazards from exposure to deep groundwater are acceptable because there are no exposure pathways.

- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Future Use (Offsite)

- Potential future risks and hazards from exposure to soil are acceptable.
- Potential future risks and hazards from exposure to shallow groundwater are acceptable.
- Potential future risks and hazards from exposure to deep groundwater are acceptable because there are no exposure pathways.
- Potential future risks and hazards from exposure to surface water and sediment are acceptable.

Conclusions and Path Forward

Current risk from the Site is acceptable. However, if in the future, the pavement currently covering the majority of the Site were breached or deteriorated, risks from exposure to indoor air in buildings constructed over impacted areas and from contact with soil and shallow groundwater may be unacceptable onsite. Risks offsite could be unacceptable if shallow groundwater were to migrate offsite in the future at concentrations near current on-site maximums. However, the physical removal of the tar waste and subsequent monitoring data indicate that the application of ORC[®] during the interim action has reduced shallow groundwater concentrations and significant off-site concentrations are not expected.

The recommended path forward for the Site is to assess the efficacy of the interim action and review the findings of the risk assessment with respect to the groundwater monitoring data from February 2002. Subsequently, an Assessment Conference with TDEC-DSF will be held. The Assessment Conference will focus on addressing any TDEC-DSF comments on the risk assessment and future actions necessary to move the Site toward closure including institutional controls, access restrictions, and focused monitoring.

List of Acronyms

ARARs	applicable or relevant and appropriate requirements
ASTs	aboveground storage tanks
Atmos	Atmos Energy Corporation
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	constituents of concern
COPCs	constituents of potential concern
DRO	diesel range organics
DSF	Division of Superfund
EAB	enhanced aerobic bioremediation
ELCR	excess lifetime cancer risk
ETSU	East Tennessee State University
FFS	Focused Feasibility Study
FMGP	Former Manufactured Gas Plant
ft	foot/feet
gpm	gallons per minute
H ₂ O ₂	hydrogen peroxide
HI	hazard index
ISCO	In-Situ Chemical Oxidation
KMnO ₄	potassium permanganate
MCLs	maximum contaminant levels
mg/L	milligram(s) per liter
MGP	Manufactured Gas Plant
MNA	monitored natural attenuation
MnO ₄ ⁻	permanganate ion
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	operation and maintenance
ORC*	Oxygen Release Compound*
PAHs	polycyclic aromatic hydrocarbons
PRGs	preliminary remediation goals
PSI	Preliminary Site Investigation
RAOs	remedial action objectives
RBCs	risk-based concentrations
RD	Remedial Design
RGs	remediation goals
RI	remedial investigation
ROD	Record of Decision
SAP	Sampling and Analysis Plan
Site	Former Tennessee Street Manufactured Gas Plant facility
SVOCs	semi-volatile organic compounds
TAL	Target Analyte List
TBC	to be considered
TCL	Target Compound List
TDEC	Tennessee Department of Environment and Conservation

TI	technical impracticability
TPH	total petroleum hydrocarbons
TSD	treatment, storage, and disposal
United Cities	United Cities Gas Company
USEPA	U.S. Environmental Protection Agency
USTs	underground storage tanks
VOAP	Voluntary Cleanup, Oversight, and Assistance Program
VOCs	volatile organic compounds

Executive Summary

The Tennessee Department of Environment and Conservation -- Division of Superfund (TDEC-DSF) has requested Atmos Energy Corporation (Atmos) to prepare a focused feasibility study (FFS) to document the development, screening, and detailed analysis of remedial alternatives for the Johnson City Site (Site). The FFS builds on previous investigations and interim actions including the Phase II Remedial Investigation (RI) Report, Interim Action Report, and Supplemental Groundwater Investigation and Risk Assessment Report.

The process used to prepare this FFS included the presentation of site assessment data; summarization of the risk assessment findings; determination of preliminary remediation goals (PRGs), identification of remedial action objectives (RAOs); and the identification and screening of remedial technologies applicable to the Site. Following these steps, site-wide remedial alternatives were developed and evaluated based on several criterion. Finally, a preferred remedial alternative was selected, and an associated conceptual design was developed.

The Site is located on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee. A manufactured gas plant was constructed in 1915 and was operational until 1954, when natural gas became available in Johnson City. During the 1970s, site improvements/modifications included the dismantling and removal of equipment and two buildings associated with the former manufactured gas plant operations. The Site currently occupies approximately 1.8 acres and is inactive and vacant. The Site and surrounding properties support a mix of industrial and commercial land uses. Land in the immediate vicinity is zoned heavy industrial. No private residences exist on parcels adjacent to the Site. No water-supply wells have been identified within a 0.5-mile radius of the Site.

On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order and Agreement to manage the Site under the state Voluntary Cleanup, Oversight, and Assistance Program (VOAP). Several investigations were conducted over the next several years. These investigations indicate that surficial soil and unconsolidated groundwater are impacted on site and that benzene and naphthalene extend off site to the northeast.

Based on temporal biogeochemical evaluations, multiple biodegradational processes are ongoing within the groundwater to sufficiently degrade existing constituents. The results of historical investigations that defined source areas, the interim-action removal of those source areas, the refined hydrogeologic conceptual model, and the current distribution of

groundwater impacts indicate that the existing well network is sufficient to monitor horizontal and vertical constituent concentrations and migration.

Atmos conducted an interim action in June 2001 to supplement requirements in the Consent Order and Agreement within the VOAP. The purpose of the interim action was the removal of identified coal tar mass and surrounding impacted soils to reduce the source term. Coal tar/impacted soil was excavated from four separate areas. A total of 921.36 tons of coal tar/impacted soil was excavated from these areas and transported off site for thermal treatment.

All excavations were backfilled following confirmation sampling and application of Oxygen Release Compound® (ORC®). The addition of ORC® to the former source areas was designed to increase the dissolved oxygen levels within the saturated zone, resulting in enhancement and acceleration of the natural attenuation processes at the Site. In addition, the remaining buildings were demolished to ground and/or foundation level and removed from the Site.

Results of the risk assessment indicate that there are no current complete exposure pathways for the Site, and no future risk from groundwater discharging into Brush Creek. Potential future risks/hazards include the following:

- Incidental ingestion and/or dermal contact with on-site bedrock-zone groundwater;
- Incidental ingestion and/or dermal contact with on-site surface soil;
- Inhalation of vapors migrating from on-site subsurface soil to indoor air; and
- Incidental ingestion and/or dermal contact with off-site bedrock-zone groundwater.

RAOs were designed to focus on the protection of human health and the environment for these potential future risks. Three RAOs have been developed for the Site:

Objective 1: To protect a) potential future off-site groundwater users from unacceptable risk from use of groundwater as a potable and/or industrial water source; b) future on-site industrial workers from potentially unacceptable risk from exposure to groundwater via incidental ingestion and/or dermal contact on site; c) future on-site industrial and excavation workers from potentially unacceptable risk from dermal contact with and incidental ingestion of soils; and d) future on-site industrial workers from potentially unacceptable risk from vapor migration to indoor air from subsurface soils. An excess cancer risk of 10^{-5} is selected as the appropriate risk standard for carcinogenic risks, and a HI of 1 is selected as the appropriate risk standard for non-carcinogenic risks.

Objective 2: To protect human health and the environment by minimizing the potential for expansion of the impacted area beyond its current extent.

Objective 3: To comply with federal and state applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) guidance related to remediation implementation.

Remedial technologies were selected to achieve the RAOs, screened for site-specific applicability including effectiveness, implementability, and cost, and combined to form site-wide remedial alternatives for further evaluation. The four alternatives evaluated in the FFS are:

- Alternative 1: No Action;
- Alternative 2: Land-Use Restrictions, Capping, and Monitored Natural Attenuation;
- Alternative 3: Land-Use Restrictions, Capping, Enhanced Aerobic Bioremediation, and Monitored Natural Attenuation; and
- Alternative 4: Land-Use Restrictions, Capping, Pump-and-Treat with Vacuum Enhanced Recovery, and Monitored Natural Attenuation.

Individual and comparative analyses of these alternatives were conducted to evaluate each option according to the following seven criteria:

- 1) Protection of human health, welfare, and the environment;
- 2) Compliance with ARARs;
- 3) Long-term effectiveness and permanence;
- 4) Reduction of mobility, toxicity, or volume through treatment;
- 5) Short-term effectiveness;
- 6) Implementability; and
- 7) Cost.

Two remaining criteria, state acceptance and community acceptance, will be further evaluated after TDEC-DSF and the community have reviewed the FFS.

Alternative 2 (Land-Use Restrictions, Capping, and Monitored Natural Attenuation) is recommended as the preferred remedy for the Site. Alternative 2 provides a high

degree of overall protectiveness to human health and the environment and will provide the maximum flexibility for potential site redevelopment. Alternative 2 complies with ARARs and will significantly reduce risk posed by potential future exposure pathways. Alternative 2 provides long-term effectiveness and permanence by removing the potential for exposure to COCs, and through natural attenuation processes.

The equipment and controls needed for Alternative 2 are reliable, used commonly in other remedial activities, and require minimal O&M cost. The implementation time for Alternative 2 is estimated to be less than 2 years. The time required to achieve RAOs is estimated to be 30 years. However, 5-year reviews with TDEC-DSF will allow a determination to be made whether RAOs have been met, and whether no further action is appropriate. Alternative 2 is easily implementable, and approval from TDEC-DSF is anticipated based on 1) the degree of future risk reduction provided by the remedial components; 2) flexibility for site redevelopment and/or to implement other remedial actions (if warranted); and 3) cost effectiveness.

The total construction and present worth operation and maintenance (O&M) costs for each alternative is detailed below.

Alternative 2. Land-Use Restrictions, Capping, and Monitored Natural Attenuation		Alternative 3. Land-Use Restrictions, Capping, Enhanced Aerobic Bioremediation, and Monitored Natural Attenuation		Alternative 4. Land-Use Restrictions, Capping, Pump-and-Treat with Vacuum Enhanced Recovery, and Monitored Natural Attenuation	
Capital Cost =	\$547,500	Capital Cost =	\$747,800	Capital Cost =	\$1,109,155
		EAB Injection =	\$257,700		
O&M Present Worth Cost =	\$784,600	O&M Present Worth Cost =	\$652,700	O&M Present Worth Cost =	\$1,536,500
Future Closure Cost =	\$8,700	Future Closure Cost =	\$33,400	Future Closure Cost =	\$29,200
Contingency Cost =	\$201,100	Contingency Cost =	\$253,700	Contingency Cost =	\$401,200
30-Year Est. Cost =	\$1,541,900	15-Year Est. Cost =	\$1,945,300	15-Year Est. Cost =	\$3,076,100

ARCADIS

Focused Feasibility Study

Executive Summary

Atmos and ARCADIS have prepared this FFS in accordance with TDEC-DSF VOAP requirements, and to satisfy requirements outlined in the Consent Order and Agreement. In conjunction with input from TDEC-DSF and the public, the FFS will determine future environmental actions by serving as a foundation for developing the Record of Decision and a Remedial Design.

1.0 Introduction

ARCADIS prepared this Focused Feasibility Study (FFS) on behalf of Atmos Energy Corporation (Atmos), formerly known as United Cities Gas Company (United Cities), for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Figure 1-1). The FFS was prepared in accordance with requirements of the Tennessee Department of Environment and Conservation (TDEC), Division of Superfund (DSF), Voluntary Cleanup, Oversight, and Assistance Program (VOAP). The FFS process consists of the identification of remedial action objectives (RAOs) including: preliminary remediation goals (PRGs); identification, evaluation, and screening of remedial technologies; development, screening, and detailed analysis of remedial alternatives; selection of a preferred alternative; and conceptual design of the preferred remedial alternative.

This FFS Report describes the formation of remedial alternatives, screening of these alternatives (based on effectiveness, implementability, and cost), and analyses of the alternatives that pass the screening process. This screening process reduces the number of technologies requiring a detailed analysis, while retaining flexibility for choosing technologies during design. This report is based on site analytical data and existing information about currently available technologies. The findings and conclusions presented herein may be revised based on additional information and data that may be collected in the future. However, in conjunction with input from TDEC-DSF and the public, the FFS will determine future environmental actions by serving as a foundation for the Record of Decision (ROD) and a Remedial Design (RD).

This FFS examines the feasibility of various remedial alternatives for control and/or remediation of residual constituents remaining from past site operations and serves as the principal document supporting Atmos' selection of a recommended remedial alternative for the areas of concern. Atmos has previously prepared a *Phase II Remedial Investigation (RI) Report* (ARCADIS Geraghty & Miller, Inc. 2000) and a *Supplemental Groundwater Investigation and Risk Assessment Report* (ARCADIS G&M, Inc. 2003) that describe the Site, the nature and extent of impacted media, and potential risks to human health and the environment.

1.1 Physical Setting

The Site is on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures 1-1 and 1-2). The Site occupies approximately 1.8 acres and is currently

inactive and vacant. Former operation/office buildings associated with the FMGP were demolished and removed from the Site in August and September 2001. The majority of the Site is paved and fenced, and there are areas of gravel fill from the interim action (Section 2.0). The Site and surrounding terrain are generally flat and are located within the 100-year floodplain of Brush Creek (Figure 1-3).

The Site and surrounding properties remained essentially undeveloped until around 1915. Since that time, they have supported a mix of industrial and commercial activities, including the former Johnson City Foundry, which was located directly south of the Site across State of Franklin Road. Land in the immediate vicinity is zoned heavy industrial (Johnson City Zoning Code I-2) (United Cities Gas Company 1997).

The property south and southwest of the Site, across State of Franklin Road where the foundry once existed, is currently a parking lot on the campus of East Tennessee State University (ETSU) (Figure 1-3). The property west of the Site is also owned by ETSU and is currently used to stockpile coal for the university. A railroad spur operated by Norfolk Southern Railway Company and the former Thomasville Furniture manufacturing facility lie to the north. Tennessee Street and a grassy vacant lot owned by Johnson City lie east of the Site. Southeast of the Site, another grassy vacant lot lies diagonally across the intersection of State of Franklin Road and Tennessee Street (near a McDonald's restaurant). No private residences exist on parcels adjacent to the Site.

Johnson City obtains its municipal water supply from springs and surface water (Watauga River). The springs are located along Indian Creek approximately 10 miles south of the city (United States Geological Survey 1962). During previous investigations, no domestic water-supply wells were identified within a 0.5-mile radius of the Site (United Cities Gas Company 1998).

1.2 Site History

Prior to 1915, the Site was undeveloped land. A manufactured gas plant (MGP) was constructed in 1915 and was operational until 1954, when natural gas became available in Johnson City. Operation of the MGP ceased in 1954, and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996. It has not been used for commercial purposes since 1996, except for equipment and vehicle storage (ARCADIS Geraghty & Miller, Inc. 2000).

During the 1970s, site improvements/modifications included the dismantling and removal of equipment and two buildings associated with FMGP operations. A total of

12 cylindrical, propane-style, aboveground storage tanks (ASTs) used for gas storage were sold and removed from the Site in 1974. In 1976, an oil AST associated with gas production processes was sold and removed from the Site (United Cities Gas Company 1998). A gasoline underground storage tank (UST) associated with the former field service and construction crew support operations was utilized until 1995, when the tank was removed under TDEC-Division of Underground Storage Tank regulations (Figure 1-2).

1.3 Investigation History

Findings from the UST closure activities indicated a potential release had occurred and further investigation was warranted (United Cities Gas Company 1997). On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order and Agreement to manage the Site under the state VOAP. The *Phase I Report* was approved by TDEC-DSF on July 10, 1997 (United Cities Gas Company 1997).

A Preliminary Site Investigation (PSI) was conducted in 1997. The scope of work for the PSI included collecting and analyzing soil, residual, surface water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil properties borings, and four FMGP residual borings were installed at the Site using direct-push technology (Figure 1-2). Groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-02 through GW-05) (Figure 1-2). One permanent, off-site monitor well (GW-01) was installed in 1996 by the City of Johnson City during an unrelated investigation at the Johnson City Continuing Education Site. Well GW-01 is approximately 600 feet (ft) west of the Site. Surface-water and sediment samples were also collected from three locations along Brush Creek to determine current conditions (Figure 1-2). Samples were analyzed for selected volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and inorganic compounds. The PSI Report was submitted to TDEC-DSF in March 1998.

ARCADIS was contracted in January 1999 to assist United Cities in the next phase of work associated with the Site. A Phase II RI was conducted during the fall of 1999 and spring of 2000. Tasks completed at the Site during 1999 included the installation of ten groundwater monitor wells (nine in the unconsolidated zone and one in the bedrock zone), and the installation of three soil borings (Figure 1-2). Soil samples collected during installation of the soil and well borings were analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) metals. Groundwater samples were

analyzed for the same analytes as the soil samples and additional biogeochemical parameters.

During February 2000, two additional bedrock groundwater monitor wells (MW-3D and MW-4D) were installed to obtain a better understanding of site conditions (Figure 1-2). Also, a 1-inch monitor well (MW-10) was installed across Tennessee Street northeast of the Site to further define downgradient off-site conditions in unconsolidated-zone groundwater (Figure 1-2). Following the installation and development of the three new monitor wells, groundwater samples were collected for field and laboratory analyses from the previously existing and new monitor wells. A focused analyte list was selected for this sampling event based on the analytical results from the October 1999 sampling event. The Phase II RI Report was approved by TDEC-DSF in September 2000 (ARCADIS Geraghty & Miller, Inc. 2000). Benzene, ethylbenzene, toluene, and xylenes (BTEX), PAHs, and specific metals were identified as preliminary constituents of potential concern (COPCs) in the Phase II RI Report. Additional groundwater monitoring was conducted during February 2001 in preparation for interim-action activities (Section 2.0).

Subsequently, ARCADIS conducted a supplemental groundwater investigation and risk assessment to further the understanding of groundwater conditions in bedrock at the Site, and to evaluate potential risks to human health and the environment associated with residual impacts from historical operations. Five additional bedrock wells and one lithologic boring were installed on and near the Site between October 28 and November 8, 2002 (Figure 1-2). Groundwater samples were collected from all 18 monitor wells and two piezometers during November 2002. Lithologic and water-level data collected during the supplemental groundwater investigation have been integrated with information obtained during the 1998 PSI and 2000 Phase II RI to formulate a conceptual model of hydrogeologic conditions at the Site.

Based on the interim-action effectiveness, biogeochemical evaluation, and assimilative capacity calculations, groundwater in the unconsolidated zone exhibits fluctuating aerobic/anaerobic conditions upgradient, a mixed aerobic/anaerobic core, and a stable aerobic buffer downgradient. The affected area is stable within the unconsolidated zone. Data suggest that significant and multiple biodegradational processes are ongoing with sufficient assimilative capacity to degrade on-site constituents. The bedrock-zone groundwater exhibits anaerobic conditions and increased bioactivity. The affected area for bedrock-zone groundwater is reduced yet stable, remains localized to the center of the Site, and possesses the natural assimilative capacity to degrade site constituents over time.

Introduction

The results of historical investigations that defined source areas, the interim-action removal of those source areas, the refined hydrogeologic conceptual model, and the current distribution of groundwater impacts indicate that the existing well network is sufficient to monitor horizontal and vertical constituent concentrations and migration.

Acronyms

bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COPCs	constituents of potential concern
DO	dissolved oxygen
DSF	Division of Superfund
EPH	extractable petroleum hydrocarbons
FFS	Focused Feasibility Study
FMGP	Former Manufactured Gas Plant
ft	foot (feet)
GRO	gasoline range organics
MDL	method detection limit
mg	milligram(s)
mg/L	milligram(s) per liter
mL/min	milliliter(s) per minute
mS/m	milliseimen(s) per meter
mV	millivolt(s)
ORC*	Oxygen Release Compound*
ORP	oxidation-reduction potential
PAHs	polycyclic aromatic hydrocarbons
PSI	Preliminary Site Investigation
RI	remedial investigation
Site	Tennessee Street FMGP
SU	standard unit
SVOCs	semivolatile organic compounds
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characterization Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
TOC	total organic carbon
TPH	total petroleum hydrocarbons
United Cities	United Cities Gas Company
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds

1.0 Introduction

ARCADIS has prepared this Post-Interim-Action Groundwater Monitoring Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Exhibit 1-1). This groundwater monitoring event was conducted in accordance with the Tennessee Department of Environment and Conservation (TDEC) Division of Superfund (DSF) approved recommendations outlined in the Post-Interim-Action Monitoring - January 2002 Report (ARCADIS G&M, Inc. 2002). The purpose of this groundwater monitoring report is to evaluate the effectiveness of interim actions conducted during the summer of 2001 with regard to source removal, constituent of potential concern (COPC) concentration reduction in groundwater, and overall effect on the project closure schedule.

Section 2.0 of this report provides a summary of site characterization and interim-action activities. Groundwater sampling methods are described Section 3.0. Section 4.0 discusses groundwater flow conditions and analytical results from the February 2002 sampling event. Discussions of biogeochemistry, natural attenuation status, and mass reduction are also included in Section 4.0. Report conclusions are presented in Section 5.0. References are provided in Section 6.0. A certification is located in Section 7.0.

2.0 Site Characterization and Remediation History

2.1 Site Investigations

On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order Agreement to manage the Site under the state Voluntary Cleanup Oversight and Assistance Program. A Phase I Site Evaluation Report was approved by TDEC-DSF on July 10, 1997.

A Preliminary Site Investigation (PSI) was conducted during 1997 in accordance with the PSI Work Plan (United Cities Gas Company 1997a). The scope of work for the PSI included collecting and analyzing soil, residual material, surface-water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil-properties borings, and four FMGP residual material borings were installed at the Site using direct-push technology. A groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-02 through GW-05). One permanent, off-site monitor well (GW-01) was installed in 1996 by the City during an unrelated investigation at the Johnson City Continuing Education Site. Well GW-01 is approximately 600 feet (ft) west of the Site. Surface-water and sediment samples were also collected at the Site from three locations along Brush Creek during the PSI. Samples were analyzed for selected volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and inorganic compounds.

A Phase II remedial investigation (RI) was conducted during the fall of 1999 and the spring of 2000. Tasks completed at the Site in 1999 included the installation of ten groundwater monitor wells (nine shallow, residuum wells and one deep, bedrock well) (Exhibit 2-1), the installation of three soil borings, and the installation of a stream staff gauge. Soil samples were collected from the soil and well borings and analyzed for Target Compound List (TCL) organic compounds and Target Analyte List (TAL) metals.

Two additional bedrock groundwater monitor wells (MW-3D and MW-4D) were installed during February 2000 to obtain a better understanding of site conditions (Exhibit 2-1). A 1-inch monitor well (MW-10) was installed across Tennessee Street (northeast of the Site) to further define downgradient conditions in shallow groundwater (Exhibit 2-1). Following the installation and development of those three monitor wells, groundwater samples were collected for field and laboratory analyses from all wells. A focused analyte list was selected for that sampling event based on analytical results from the October 1999 sampling event. The resulting Phase II RI Report was approved by TDEC-DSF in September 2000 (ARCADIS Geraghty & Miller, Inc. 2000). Benzene,

ethylbenzene, toluene, and xylenes (BTEX), PAHs, and select metals were identified as preliminary COPCs in the Phase II RI Report. Additional groundwater baseline monitoring was conducted during February 2001 in preparation for interim-action activities.

2.2 Interim Action

Former source areas were excavated during June 2001 (ARCADIS G&M, Inc. 2001c). These areas included the following: 1) UST Area; 2) Tar-Water Separator Areas; 3) Storage Holder Pad; and (4) Tar Well Area (Figure 2-1). The objectives of the interim action were to

- Remove residual material from identified source areas;
- Pre-treat residual material potentially containing benzene at concentrations exceeding 0.5 milligrams per liter (mg/L) [Toxicity Characteristics Leaching Procedure (TCLP) method] in accordance with the U.S. Environmental Protection Agency (USEPA) Area of Contamination policy;
- Apply Oxygen Release Compound (ORC[®]) and porous backfill material to enhance natural attenuation of groundwater impacts; and
- Transport non-hazardous residual material off site for thermal treatment.

A total of 921.36 tons of coal tar and impacted soil was excavated and removed from the Site; a total of 8,006 gallons of impacted water was removed from the Site; and 660 pounds of ORC[®] was added to the excavation areas during backfilling.

Post-excavation confirmatory subsurface soil samples were collected at the four areas. One new monitor well (MW-3R) was also installed at that time to replace MW-3, which was removed to excavate the former Storage Holder Pad (Exhibit 2-1). A soil sample was collected from the boring for the replacement monitor well. Soil samples were analyzed for a focused list of analytes, including selected VOCs, semivolatile organic compounds (SVOCs), and selected metals. ORC[®] was applied during gravel backfilling of the excavated areas to enhance natural attenuation processes and reduce groundwater concentrations. In addition, from August through September 2001, remaining buildings were demolished to ground level and removed from the Site.

2.3 Post-Interim-Action Monitoring

Post-interim-action groundwater field monitoring was conducted from July 2001 (ARCADIS G&M, Inc. 2001b) through January 2002 (ARCADIS G&M, Inc. 2002).

ARCADIS

Post-Interim-Action Groundwater Monitoring Report

Site Characterization and
Remediation History

Several field biogeochemical parameters were measured in selected wells to assess the effectiveness of the interim actions, particularly source removal and ORC[®] application. Samples were collected from four wells located near the excavated areas (MW-1, MW-3R, MW-5, and MW-7) in July 2001 and analyzed for BTEX. In October 2001, MW-1, MW-3R, MW-5, MW-6, and MW-7 were sampled and analyzed for BTEX and selected PAHs. Field measurements collected in January 2002 indicated that the ORC[®] was no longer releasing significant DO concentrations. Therefore, the post-interim-action groundwater monitoring event was conducted in February 2002.



Infrastructure, buildings, environment, communications

Mr. Harold C. Mattraw, Jr.
Division of Superfund
Tennessee Department of Environment and Conservation
Environmental Assistance Center
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

ARCADIS G&M, Inc.
97 Midway Lane
Oak Ridge
Tennessee 37830
Tel 865 481 3000
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www.arcadis-us.com

Environmental

Subject:
Post-Interim-Action Groundwater Monitoring Report
Former Tennessee Street MGP Site
Johnson City, Tennessee
TDEC-DSF No. 90-513

Date:
1 May 2002

Dear Mr. Mattraw:

ARCADIS, on behalf of United Cities Gas Company (United Cities), has prepared the enclosed Post-Interim-Action Groundwater Monitoring Report presenting effectiveness monitoring results from July 2001 through February 2002.

Contact:
Greg Page

Upon Tennessee Department of Superfund (TDSF) review of the subject report, ARCADIS and United Cities would like to schedule an Assessment Conference to discuss overall interim action effectiveness and the path forward for the site.

Phone:
3130

Email:
gpage@arcadis-us.com

Should you have any questions or require additional information, please call.

Sincerely,
ARCADIS G&M, Inc.

Our Ref:
TN0005070005

Clair Lueke, PG
Staff Scientist

J. Brad Stephenson, PG
Project Manager

Gregory B. Page, P.E.
Senior Engineer

Enclosures (2)

Copies:
Jim O'Brien, Baker & McKenzie
David Randolph, TDSF, Nashville Central Office
Stuart Schulz, United Cities Gas Company
Doug Walther, Atmos Energy Corporation

Part of a bigger picture

GBP/bf
OR-02-207

17-57-1-113-12

INTERIM ACTION REPORT

FORMER MANUFACTURED GAS PLANT
JOHNSON CITY, TENNESSEE

TDEC-DSF SITE NO. 90-513

Prepared for:

Voluntary Cleanup, Oversight and Assistance Program
Tennessee Department of Environment and Conservation
Division of Superfund
2305 Silverdale Road
Johnson City, Tennessee 37601

Prepared by:

UNITED CITIES GAS COMPANY
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226



September 4, 2001

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Figure 1-1, Confirmation Soil Sample Locations

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EXECUTIVE SUMMARY

This report describes in detail the results of the interim action completed by United Cities Gas Company ("*United Cities*"), at the Former Manufactured Gas Plant ("*FMGP*") Site located at Tennessee Street and State of Franklin Road in Johnson City, Tennessee ("*the Site*"). United Cities conducted the interim action under a Consent Order and Agreement with the Tennessee Department of Environment and Conservation, Division of Superfund ("*TDEC-DSF*") within the Voluntary Cleanup, Oversight and Assistance Program.

Previous activities at the Site have included a Phase I Site Evaluation, a Preliminary Site Investigation, and a Phase II Remedial Investigation. Results of previous investigations identified four areas of concern: a tar well, a tar-water separator, an aboveground storage tank containment box, and an aboveground gas holder foundation. Based upon these results an interim action was identified as a means to eliminate or reduce residual source material from contact with site soil and groundwater thus eliminating or reducing one or more pathways of exposure from hazardous substances.

On September 5, 2000, United Cities submitted a Proposal for Interim Action ("*Proposal*") to the TDEC-DSF. The Proposal described the conceptual and technical aspects of the interim action. On September 19, 2000, TDEC-DSF approved the Proposal and the designation of the Site as an Area of Contamination ("*AOC*") under the guidance of USEPA's AOC policy. On January 19, 2001 United Cities submitted an Interim Action Work Plan to TDEC-DSF for review and approval. Conditional approval was granted by TDEC-DSF on February 8, 2001. The interim action was consistent with the final cleanup action. The objectives of the interim action were:

- Remove residual material from identified source areas;
- Pre-treat residual material following the USEPA Area Of Contamination policy that may contain benzene at concentrations exceeding 0.5 mg/l using the TCLP method;
- Use slow release oxygen release compound with backfill material to enhance natural attenuation of groundwater contamination; and
- Transport non-hazardous residuals off-site for thermal treatment to Three Seasons, Inc. thermal desorption facility located in Saltville, Virginia.

Fieldwork began on June 4, 2001 and was completed on June 29, 2001. A total of 921.36 tons of coal tar impacted soil was excavated from source areas and transported off-site for thermal treatment. Eight thousand and six (8,006) gallons of coal tar impacted water was collected and transported off-site for disposal. Additionally, 660 pounds of oxygen release compound was added to the excavation areas during the backfilling process. Post-interim action monitoring is scheduled for a six-month period to monitor the effectiveness of the interim action.

1.0 INTRODUCTION

This report describes in detail the results of the interim action completed by United Cities Gas Company ("*United Cities*") between June 4 and June 29, 2001, at the Former Manufactured Gas Plant ("*FMGP*") Site located at Tennessee Street and State of Franklin Road in Johnson City, Tennessee ("*the Site*"). United Cities conducted the interim action under a Consent Order and Agreement ("*Order*") with the Tennessee Department of Environment and Conservation, Division of Superfund ("*TDEC-DSF*") within the Voluntary Cleanup, Oversight and Assistance Program ("*VOAP*"). The objectives of the interim action were:

- Remove residual material from identified source areas;
- Pre-treat residual material under the USEPA Area Of Contamination policy that may contain benzene at concentrations exceeding 0.5 mg/l using the TCLP method;
- Use slow release oxygen release compounds with backfill material to enhance natural attenuation of groundwater contamination; and
- Transport non-hazardous residuals off-site for thermal treatment to Three Seasons, Inc. thermal desorption facility located in Saltville, Virginia.

The overall goal of the interim action was to eliminate or reduce residual source material from contact with site soil and groundwater thus eliminating or reducing one or more pathways of exposure to hazardous substances. The interim action was consistent with the final cleanup action.

1.1 Summary of Previous Investigations

Previous investigations at the Site have included:

- Phase I Report completed in July 1997;
- Preliminary Site Investigation completed in March 1998; and
- Phase II Remedial Investigation completed in September 2000.

On September 5, 2000, United Cities submitted a Proposal for Interim Action to TDEC-DSF for review and approval (United Cities, 2000). The proposal described the conceptual and technical approach to the removal of FMGP residuals from identified source areas and the use of the USEPA's Area of Contamination ("*AOC*") policy to facilitate the treatment and movement of FMGP residuals that may exhibit a hazardous characteristic. TDEC-DSF approved the proposal and the use of the AOC policy on September 19, 2000.

1.2 Interim Action Work Plan

On January 19, 2001, United Cities submitted the Interim Action Work Plan ("IAWP") to TDEC-DSF for review and approval. TDEC-DSF granted conditional approval on February 8, 2001. United Cities responded to the conditional approval on February 12, 2001 and began implementation of the IAWP. On May 11, 2001, United Cities submitted an updated IAWP reflecting changes in thermal desorption facilities and notification of the start of field activities beginning June 4, 2001.

2.0 PROJECT MANAGEMENT

United Cities assembled a team of professionals to carry out the interim action. Each team member had an important role to play in the successful completion of the interim action. Four Seasons Environmental was responsible for residual material excavation, pretreatment, staging, excavation backfilling, and loading dump trailers for transportation off-site. Environmental Operations was responsible for ambient air monitoring. Arcadis Geraghty & Miller was responsible for pre-mobilization groundwater field parameter monitoring, confirmation sampling, and oxygen release compound application review and oversight.

2.1 Project Manager

Mr. Stuart Schulz served as the United Cities Project Manager. Mr. Greg Olin served as the Four Seasons Project Manager. Mr. Gary Schnell served as the Environmental Operations Project Manager. Mr. Greg Page served as the Arcadis Geraghty & Miller Project Manager.

2.2 Site Construction Supervisor

Mr. Charles Fleming served as the Four Seasons Site Construction Supervisor.

2.3 Health and Safety Officer

Mr. Stuart Schulz served as the overall Health & Safety Officer during Site activities. Mr. Yoke P. Chung (Four Seasons) prepared the Health and Safety Plan on behalf of United Cities.

2.4 Air Monitoring Technician

Mr. Tom Gartke served as Air Monitoring Technician.

3.0 MOBILIZATION

3.1 Pre-Mobilization Tasks

Prior to mobilizing to the site for the interim action, several tasks were completed. Pre-mobilization tasks include:

- Community relations plan
- Groundwater sampling and analysis
- Establishment of utilities;
- Setting up ambient air monitoring stations; and
- Collection of baseline air quality data.

3.1.1 Community Relations Plan

United Cities prepared and implemented a community relations plan as a pre-mobilization task. The community relations plan consisted of preparing a fact sheet about the project; updating the information repository at the Johnson City Public Library; interviewing selected officials and community leaders in Johnson City to notify them of the upcoming project and noting any issues or concerns; issuance of press releases, news media interviews; and face-to-face meetings with nearby property and business owners. In general, United Cities received favorable response from the public in response to the community relations activities.

3.1.2 Groundwater Sampling and Analysis

On February 8, 2001, groundwater at existing monitoring wells was sampled and analyzed for constituents of potential concern ("COPC's") and field parameters were measured. The purpose of the groundwater monitoring event was to establish baseline conditions prior to implementation of the interim action. COPC's consisted of those previously identified in the Phase II Remedial Investigation Report (ARCADIS Geraghty & Miller, Inc., September 2000). Field parameters included pH, conductivity, temperature, dissolved oxygen, oxidation-reduction potential, alkalinity, ferrous iron, and turbidity using downhole instruments and field kits. Additional biogeochemical analysis were performed at the project lab (Test America, Inc., Nashville, Tennessee). Field parameters were measured again on June 11, 2001, immediately prior to the start of excavation tasks.

3.1.3 Establishment of Utilities

Electric and water utilities were temporarily reconnected at the site. Three temporary electrical drops were installed to power stationary air monitoring equipment and other project equipment. Water service was reestablished and a faucet was installed adjacent to the meter shop along Tennessee Street.

LIST OF ACRONYMS

ASTs	aboveground storage tanks
AWQC	ambient water-quality criteria
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTU	British Thermal Unit
cf	cubic feet
cm/sec	centimeters per second
COA	Consent Order and Agreement
COPCs	constituents of potential concern
DQOs	data quality objectives
DRO	diesel range organics
DSF	Division of Superfund
DUST	Division of Underground Storage Tanks
EPH	extractable petroleum hydrocarbons
ETSU	East Tennessee State University
FSP	Field Sampling Plan
ft	feet
Great Valley	Great Valley of the Valley and Ridge Physiographic Province
GRO	gasoline range organics
HASP	Health and Safety Plan
MCLs	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGP	Manufactured Gas Plant
msl	mean sea level
MTBE	methyl tertiary butyl ether
Order	Consent Order
PAHs	polycyclic aromatic hydrocarbons
Phase I Report	Phase I Site Evaluation Report
PRGs	Preliminary Remediation Goals
PSI	Preliminary Site Investigation
QAPP	Quality Assurance Project Plan
RAOs	remedial action objectives
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
SAP	Sampling and Analysis Plan
Site	former Tennessee Street MGP facility, Johnson City, Tennessee
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leachate procedure
TDEC	Tennessee Department of Environment and Conservation
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
United Cities	United Cities Gas Company
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOAP	Voluntary Cleanup Oversight and Assistance Program

1.0 Introduction

ARCADIS Geraghty & Miller, Inc. has prepared this Phase II Remedial Investigation (RI) Work Plan on behalf of United Cities Gas Company (United Cities) for the former Tennessee Street Manufactured Gas Plant (MGP) facility (Site), located just west of downtown Johnson City, Washington County, Tennessee (Figure 1-1). The purpose of this Phase II RI is to further characterize the Site by investigating site conditions, collect and evaluate data, and increase the working knowledge of the Site. The proposed activities have been structured to support the remedial action objectives (RAOs) developed for the Site. The RAOs consist of protecting off-site groundwater, future on-site commercial and construction workers, and on-site surface-water ecology.

The Phase II RI is being conducted as required by a Consent Order (Order) between United Cities and the Tennessee Department of Environment and Conservation (TDEC) signed January 23, 1997, by which United Cities entered into the Voluntary Cleanup Oversight and Assistance Program (VOAP) with the TDEC - Division of Superfund (DSF). Interaction between United Cities and TDEC-DSF began with a meeting in Johnson City, Tennessee in November 1998 where results from the Preliminary Site Investigation (PSI) (United Cities Gas Company 1998), submitted to TDEC - DSF in March 1998, were presented. Based on this meeting and the PSI findings, ARCADIS Geraghty & Miller was contracted to represent United Cities as the Site proceeds within the VOAP program.

The Phase II RI Work Plan begins with a discussion of site background and physical setting in Section 2.0. The potential source areas, constituents of potential concern (COPCs), and COPC distribution are also discussed in this section. The initial evaluation of the Site, pertaining to the site conceptual model for potential migration and exposure pathways and the evaluation of potential risks to human health and the environment, is presented in Section 3.0. Also discussed in Section 3.0 are the RAOs developed for the Site and the data quality objectives (DQOs) for Phase II RI activities. The specific Phase II RI tasks are outlined in Section 4.0, and the schedule for these proposed activities is outlined in Section 5.0. Supplements to this Phase II RI Work Plan include: Summary of Historical Analytical Data, collected during the PSI (Appendix A); Sampling and Analysis Plan (SAP) Volume I: Field Sampling Plan (FSP) (Appendix B) and SAP Volume II: Quality Assurance Project Plan (QAPP) (Appendix C); and the site-specific Health and Safety Plan (HASP) (Appendix D).

2.0 Site Background and Physical Setting

The following section is an introduction to the physical setting and conditions of the Site and a brief history of site operations and investigative work conducted at the Site. Also, included in this section is an overview of the regional and site hydrogeologic conditions and a constituent characterization based on the previously collected physical and analytical data.

2.1 General Setting

The United Cities former Tennessee Street MGP facility is located on the northwest corner of the intersection between State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figure 2-1). On-site and regional features, such as geology, demography, and land use, are discussed in the following subsections.

2.1.1 Geography

Johnson City is located in the eastern portion of Washington County which is situated in eastern Tennessee. Johnson City lies within the Great Valley of the Valley and Ridge Physiographic Province (Great Valley), which is characterized by numerous, low ridges and valleys generally trending from the northeast to the southwest. Topography within the Great Valley consists of rolling hills with elevational differences ranging from 50 feet (ft) to 3,000 ft. However, the 1.8-acre United Cities site and adjacent properties are relatively flat with an approximate site elevation around 1,640 ft above mean sea level (msl) (Figure 1-1) (U.S. Geological Survey 1968).

Regional surface drainage is controlled by minor creeks and streams, like Brush Creek, located in the bottoms of the valleys comprising the Valley and Ridge Physiographic Province. Surface drainage onsite is controlled by storm-water drains which collect surface water and directs it either north into Brush Creek or east under Tennessee Street toward the vacant lot and ultimately Brush Creek (Figure 2-1).

2.1.2 Demography and Land Use

The United Cities site and surrounding property remained essentially undeveloped until around 1915. Since this time, the Site and surrounding properties have supported a mix of industrial and commercial activities including a foundry located directly south of the Site across State of Franklin Road. The current land use in the immediate vicinity of the Site remains industrial/commercial (Figure 2-2).

The property to the south and southwest of the Site, across State of Franklin Road where the foundry once existed, is currently a parking lot on the campus of East Tennessee State University (ETSU) (Figure 2-2). The property bounding the site to the west is also owned by ETSU and is currently used to stockpile coal for the university (Figure 2-1). Laying further to the west is the Continuing Education Center which was once an industrial site known to have elevated barium concentrations in soil and groundwater as compared to background concentrations. The Site is bound to the east by Tennessee Street and a vacant lot owned by Johnson City. Bordering the Site to the north is the Gordon's Furniture manufacturing facility and a railroad spur operated by Norfolk Southern Railway Company (located between the two properties) (Figure 2-1).

2.1.3 Water Use

Potable water is supplied to the Site and the surrounding businesses by the local municipality. During previous investigative activities, no domestic water-supply wells were identified within a 0.5-mile radius of the Site (United Cities Gas Company 1998). Since the current and historic land use at and in the immediate vicinity of the Site is industrial, it is unlikely domestic water-supply wells exist in this area. No industrial supply wells have been identified in the area.

2.1.4 Climate and Meteorology

The Site is located in Washington County, Tennessee, in the eastern portion of the state, and experiences a temperate, continental climate characterized by hot summers and relatively short, mild winters. The mean annual precipitation for the area ranges between 50 to 54 inches per year.

2.2 Site Operational History

Prior to 1915, the Site was undeveloped land. A MGP was constructed in 1915 and was operational from 1915 to 1946. The Site was operated as a gas making plant from 1946 to 1954 when natural gas became available in Johnson City. The Site was utilized as a service center for utility service and construction crews from 1954 to 1996 and has not been used for commercial purposes except for equipment and vehicle storage since 1996.

Included in the PSI Report is a detailed discussion of historic site operations, the different manufacturing and production processes used at the Site, and names of the various site owner/operators (United Cities Gas Company 1998). This section is a summary of that data and a review of site improvements and regulatory history.

2.2.1 Historic Operational Processes

In the summer of 1915, the Site opened as the Washington County Gas Company manufactured gas plant (MGP) operating at a daily production rate of approximately 66,000 cubic feet (cf) of gas. In 1944, with a facility name change to the Watauga Valley Gas Company, the plant reached a peak daily production of 124,725,000 cf of gas. A mix of coal gas and water gas were manufactured using a process where coal was heated in the absence of oxygen then sprayed with water and oil. The resulting reaction between the incandescent coal and oil/water spray produced gas which was then collected, purified, stored, and distributed to local consumers via gas piping. Residuals from these process, such as coal tar, are the potential source of the chemical constituents detected in soil and groundwater at the Site during the previous site investigations (United Cities Gas Company 1998).

As previously mentioned, manufactured coal and water gas were produced at the Site from 1915 until 1946. In 1946, the Site was converted to support a new technology, propane-air gas, in order to meet area usage demands. Propane-air gas production was the only process used from 1946 until 1950; however in 1950, the water-gas production system was brought back on-line to supplement gas production and meet consumer demands during peak load events (United Cities Gas Company 1998).

In 1951, the gas manufacturing process was converted from propane-air to the Hasche process, and in 1953 the site name was changed to the Volunteer Natural Gas Company. As with the former production process, the Hasche method of gas production was supplemented by water-gas production during times of peak demand. The Hasche process of gas production was used at the Site until January 1954, when natural gas became available to Johnson City and the surrounding area (United Cities Gas Company 1998).

With the introduction of natural gas to the area in 1954, the site was converted into a service center for utility field crews. From 1954 until 1996, site uses included: storage areas for field vehicles, equipment, and supplies; minor vehicular maintenance; and refueling of the field service vehicles. The field maintenance and service vehicles refueled from a 2,000-gallon underground storage tank (UST) located in the northwest portion of the property (Figure 2-3) (United Cities Gas Company 1998).

2.2.2 General Site Improvements and Regulatory History

During the 1970s, site improvements facilitated the dismantling and removal of equipment associated with former gas production operations at the Site (Figure 2-3). These improvements began in 1972 with the removal of boilers and the Hasche

reforming equipment. In the summer of 1973, the remaining gas production equipment (holders, purifiers, and separators) was removed from the site. Two on-site buildings, which once housed process equipment, also were dismantled and removed from the Site in 1973. A total of 12 cylindrical, propane-style, aboveground storage tanks (ASTs) used for gas storage were sold and removed from the Site in 1974. In 1976, a petroleum AST associated with gas production processes also was sold and removed from the Site (United Cities Gas Company 1998).

The gasoline UST associated with the former field service and construction crew support operations (Figure 2-3) was utilized until 1995. Although the installation date of the UST is not known, the UST was removed by excavation in October 1995, at which time closure assessment activities were performed per TDEC - Division of Underground Storage Tanks (DUST) regulations. Findings from these investigative activities indicated a potential release to the environment had occurred and further investigation was warranted (United Cities Gas Company 1998).

Between October 1995 and January 1997, negotiations between United Cities and TDEC-DSF were conducted concerning the selection of the appropriate regulatory oversight for management of the Site. On January 23, 1997, United Cities and TDEC-DSF signed the Consent Order and Agreement (COA) to manage the Site under the State VOAP program. In accordance with VOAP (Tennessee Department of Environment and Conservation 1996a) under the authority of the COA, United Cities submitted a Phase I Site Evaluation Report (Phase I Report) to TDEC-DSF on May 22, 1997. This Phase I Report was approved by TDEC-DSF on July 10, 1997, and in September 1997, United Cities submitted a Work Plan to conduct a PSI at the former MGP facility. TDEC-DSF accepted a modified version of the PSI Work Plan on October 13, 1997, and field work for the PSI was conducted in November 1997. The PSI Report was submitted to TDEC-DSF in March 1998. In November 1998, an assessment conference was held between United Cities and TDEC-DSF to discuss TDEC-DSF comments on the PSI Report and to address potential future land development at the Site (United Cities Gas Company 1998).

Based on results from the PSI Report and the November 1998 assessment conference, an expanded site investigation was determined the next appropriate action at the former MGP facility. ARCADIS Geraghty & Miller was contracted in January 1999 to represent United Cities in the next phases of work associated with the Site. Activities included developing a schedule for Phase II RI activities, holding an assessment conference with TDEC-DSF, and preparing a Work Plan for the Phase II RI field work (ARCADIS Geraghty & Miller, Inc. 1999). Upon approval by TDEC-DSF, ARCADIS Geraghty & Miller also will perform the field activities proposed in this Phase II RI Work Plan and prepare the Phase II RI Report detailing field activities, data collected, analytical results, and the next appropriate action for the Site. The schedule for the

Executive Summary

ARCADIS Geraghty & Miller, Inc. has prepared this Phase II Remedial Investigation (RI) Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) (Site) in Johnson City, Tennessee. This Phase II RI presents the results from the investigation and groundwater-monitoring activities conducted in October 1999 and February 2000 at the Site. These activities and subsequent report were undertaken in accordance with the Tennessee Department of Environment and Conservation – Division of Superfund (TDEC-DSF) Voluntary Cleanup, Oversight, and Assistance Program (VOAP) Consent Order.

The objectives of the Phase II RI investigation include: 1) evaluation of the magnitude and extent of impact and identification of migration pathways and receptors of any releases or threatened releases of hazardous substances; 2) collection of site-specific data to determine acceptable constituent concentrations or cleanup levels using established regulatory levels, background evaluation, or risk assessment; and 3) collection of site and constituent information allowing the selection of a remedial technology, if cleanup is necessary. Tasks completed during the Phase II RI included the installation of ten shallow groundwater monitor wells (nine onsite and one offsite); three deep, bedrock wells (onsite); ten soil borings (onsite); the installation of a stream staff gauge; residual sample collection; two rounds of groundwater monitoring; slug testing; and associated laboratory analyses. These data were used, together with historical information, to evaluate any risks to human health and/or the environment that may be posed by the Site.

The Site was operated as a MGP from 1915 until 1946, and a gas making plant from 1946 to 1954 when natural gas became available to Johnson City. From 1954 to 1996, the Site was operated as a service center for utility service and construction crews. The Site has been vacant and inactive since 1996. The current land use at and in the immediate vicinity of the Site is zoned heavy industrial and groundwater is not used for drinking water purposes at or in the vicinity of the Site.

The topography at the Site is generally flat and the Site is covered with asphalt, concrete, and a few remaining FMGP buildings. Storm-water runoff is collected and discharged to Brush Creek, located on the northern edge of the site property. A layer of cinders and gravel was noted across the Site beginning just below the asphalt and extending up to 3 feet below land surface (ft bls). The underlying lithology at the Site consists of silty sands and clays ranging from 5.5 to 7.9 ft thick. This residuum is underlain by dark gray limestone, dipping approximately southeast. Groundwater at the Site is relatively shallow with an average depth of approximately 3.49 ft bls. The estimated groundwater flow velocity is 0.88 ft/day. The shallow groundwater flows

north-northeast, while the bedrock groundwater flows south-southeast. Because of the shallow nature of both the groundwater and the underlying bedrock, shallow groundwater discharges to Brush Creek.

In 1997, potential source areas identified during the Preliminary Site Investigation included the former aboveground and underground storage tank locations in the northwest corner of the property; and the tar well; tar/water separator; former holders; and former purifiers. Based on Phase II RI analytical results, upon removal, certain of the FMGP residuals at these areas may exhibit concentrations of benzene and sulfides that exceed characteristic thresholds. Application of the Toxicity Characteristic Leaching Procedure (TCLP) test to FMGP residuals is uncertain based on pending litigation.

For the purpose of an initial screening of the Phase II RI data, comparison of historical and Phase II RI data to the preliminary remediation goals (PRGs) resulted in the identification of five volatile organics, ten extractable organics, and four metals in soil as constituents exceeding the PRGs. The constituents identified in groundwater as exceeding PRGs include four volatile organics, seven extractable organics, five metals, and free cyanide. The constituents that are common to both soil and groundwater are: extractable petroleum hydrocarbons, benzene, xylenes, benzo(b)fluoranthene, benzo(a)pyrene, 2-methynaphthalene, naphthalene, arsenic, iron, and lead.

For both soil and groundwater, the extent of volatile, extractable organic, and metal constituents exceeding PRGs is generally site wide due to the historic use of residuals (e.g., ash, clinkers) being used as fill and/or surfacing materials, yet concentrated in the potential source areas. Free-phase tar residuals were observed in two of the three bedrock monitor wells. Free cyanide concentrations exceeding the PRG are limited to the area surrounding Monitor Well MW-3.

The Site exhibits strong aerobic conditions upgradient, an anaerobic core, and a recovering aerobic buffer downgradient. The dissolved-phase shallow groundwater volatile organic and metal plume and the bedrock groundwater metal plume appear stable via aerobic and anaerobic degradation processes. However, the shallow dissolved-phase extractable organic and bedrock volatile organic/extractable organic plumes do not appear to be degrading significantly.

The Site does not present an immediate or short-term threat to human health or the environment. Using the current land use scenario, a potential on-site commercial worker was identified as a potential receptor. Using the most appropriate future land-use scenario, redevelopment of the property for continued commercial use, a commercial worker and a construction worker were identified as the potential on-site

receptors. The potential future off-site receptor would include a future off-site construction worker potentially exposed to constituents in shallow groundwater during excavation activities.

Based on this information and data, the remedial action objectives for the Site include:

- Protection of potential current on-site commercial worker and future on-site commercial and construction workers from all constituents in on-site soil and groundwater; and
- Protection of off-site surface-water quality and off-site groundwater from constituents from the source areas.

Recommendations for future actions at the Site include performance of FMGP residual removal and disposal/treatment activities in the source locations, and performance of a Baseline Risk Assessment to quantify site-specific risk-based criteria and focus any future remedial actions.

1.0 Introduction

ARCADIS Geraghty & Miller, Inc. has prepared this Phase II Remedial Investigation (RI) Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Figure 1-1). The purpose of this Phase II RI is to investigate, collect, develop, and evaluate site-specific data to 1) further characterize the Site; 2) increase the working knowledge of the Site; 3) determine the need for risk assessment and/or remedial action; and 4) support the selection of a remedy that protects human health, public welfare, and the environment. The proposed activities have been structured to determine and support remedial action objectives (RAOs) for the Site.

The Phase II RI is being conducted in accordance with the Consent Order and Agreement (COA) between United Cities and the Tennessee Department of Environment and Conservation (TDEC) signed January 23, 1997, by which United Cities entered into the Voluntary Cleanup Oversight and Assistance Program (VOAP) with the TDEC - Division of Superfund (DSF). Interaction between United Cities and TDEC-DSF began in 1997 with the signing of the COA. United Cities subsequently prepared and submitted a Phase I Site Evaluation, in accordance with the COA, in May 1997 (United Cities Gas Company 1997a). Based on the Phase I Site Evaluation, United Cities performed a preliminary site investigation and submitted a Preliminary Site Investigation (PSI) Report to TDEC-DSF in March 1998 (United Cities Gas Company 1998). Based on the PSI findings, ARCADIS Geraghty & Miller was contracted by United Cities to conduct a Phase II RI.

The Phase II RI Work Plan (Work Plan) (ARCADIS Geraghty & Miller, Inc. 1999a) previously submitted to TDEC-DSF was approved on November 24, 1999. The objectives of the Phase II RI include:

- Evaluation of the magnitude and extent of impact and identification of migration pathways and receptors of any releases or threatened releases of hazardous substances;
- Collection of site-specific data to determine acceptable constituent concentrations or cleanup levels using established regulatory levels, background evaluation, or risk assessment; and
- Collection of site and constituent information allowing selection of a remedial technology, if cleanup is necessary.

The Phase II RI Report was prepared in accordance with VOAP Guidance (Tennessee Department of Environment and Conservation 1996a) and begins with a discussion of physical setting and site history in Section 2.0. The potential source areas and constituents of potential concern (COPCs) identified from the PSI data are also discussed in this section. Site characterization data and information on geology and hydrogeology, which constitute the site conceptual model, are presented in Section 3.0. The nature and extent of constituents detected at the Site are outlined in Section 4.0. Development of preliminary remediation goals (PRGs) used to screen the Phase II RI data and comparison to site data is presented in Section 5.0. Section 6.0 provides a preliminary risk characterization, followed by the conclusions and recommendations in Section 7.0.

2.0 Physical Setting and Site History

The following section presents information on the physical setting and conditions of the Site and a brief history of site operations, regulatory history, and investigative work conducted at the Site. Also, included in this section is an overview of the regional and site hydrogeologic conditions, potential source areas, and a COPC characterization based on the previously collected physical and analytical data.

2.1 Physical Setting

The United Cities Tennessee Street FMGP facility is located on the northwest corner of the intersection between State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures 1-1 and 2-1). The Site is approximately 1.8 acres, fenced, and largely open and paved. The Site is currently inactive and vacant. Several buildings remain onsite from when the FMGP was in operation. The Site and surrounding terrain are generally flat and located within the 100-year floodplain of Brush Creek. On-site and regional features, such as geology, demography, and land use, are discussed in the following subsections.

2.1.1 Geography and Topography

Johnson City is located in the eastern portion of Washington County, which is situated in eastern Tennessee. Johnson City lies within the Great Valley of the Valley and Ridge Physiographic Province (Great Valley), which is characterized by numerous low ridges and valleys, generally trending from the northeast to the southwest. Topography within the Great Valley consists of rolling hills with relief ranging from 50 feet (ft) to 3,000 ft. However, the United Cities site and adjacent properties are relatively flat with an approximate site elevation of 1,643 ft above mean sea level (msl) (Figure 2-2) (United States Geological Survey 1968). The Tennessee Street FMGP geographic coordinates are 36°18'59" North latitude and 82°21'57" West longitude (North 713,600 and East 3,071,300 Tennessee Carter Coordinates).

Regional surface drainage is controlled by minor creeks and streams, like Brush Creek, located in the bottoms of the valleys comprising the Valley and Ridge Physiographic Province. Brush Creek is the major drainage feature for the east-southeast portion of Johnson City (Figure 2-3). The drainage area includes properties located both north and south of Brush Creek. Surface-water runoff from the Site drains to the east and west with the center of the Site acting as a divide (Figure 2-2). Surface drainage onsite is controlled by storm-water drains which collect surface water and direct it either north into Brush Creek or east under Tennessee Street toward a vacant lot and ultimately Brush Creek.

2.1.2 Demography and Land Use

The United Cities site and surrounding property remained essentially undeveloped until around 1915. Since this time, the Site and surrounding properties have supported a mix of industrial and commercial activities, including a foundry located directly south of the Site across State of Franklin Road. The current land use in the immediate vicinity of the Site remains heavy industrial (Johnson City Zoning Code I-2) (United Cities Gas Company 1997a) (Figure 2-4).

The property to the south and southwest of the Site, across State of Franklin Road where the foundry once existed, is currently a parking lot on the campus of East Tennessee State University (ETSU) (Figure 2-4). The property bounding the Site to the west is also owned by ETSU and is currently used to stockpile coal for the university. Located further to the west is the Johnson City Continuing Education Center, which was once an industrial site known to have elevated barium concentrations in soil and groundwater. The Site is bound to the east by Tennessee Street and a vacant lot owned by Johnson City. Bordering the Site to the north is the Gordon's Furniture manufacturing facility and a railroad spur operated by Norfolk Southern Railway Company (located between the two properties) (Figure 2-4).

2.1.3 Water Use

Johnson City obtains its domestic water supply from springs and surface water (Watauga River). The springs that supply Johnson City are located along Indian Creek approximately 10 miles south of the city (United States Geological Survey 1962). During previous investigative activities, no domestic water-supply wells were identified within a 0.5-mile radius of the Site (United Cities Gas Company 1998). Since the current and historic land use at and in the immediate vicinity of the Site is heavy industrial, it is unlikely domestic water-supply wells exist in this area. No industrial supply wells have been identified in the area.

2.1.4 Climate and Meteorology

The Site is located in Washington County, Tennessee, in the eastern portion of the state, and experiences a temperate, continental climate characterized by hot summers and relatively short, mild winters. The mean annual precipitation for the area ranges between 50 to 54 inches per year.

2.2 Site Operational History

Prior to 1915, the Site was undeveloped land. A MGP was constructed in 1915 and was operational from 1915 to 1946. The Site was operated as a gas making plant from 1946 to 1954, when natural gas became available in Johnson City. Operation of the MGP was ceased in 1954 and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996 and has not been used for commercial purposes except for equipment and vehicle storage since 1996 (Figure 2-5).

Included in the PSI Report is a detailed discussion of historic site operations, the different manufacturing and production processes used at the Site, and names of the various site owner/operators (United Cities Gas Company 1998). The following subsections provide a summary of that information and a review of site improvements/modifications and regulatory history.

2.2.1 Historic Operational Processes

In the summer of 1915, the Site opened as the Washington County Gas Company MGP operating at a daily production rate of approximately 66,000 cubic feet (cf) of gas. In 1944, with a facility name change to the Watauga Valley Gas Company, the plant reached a peak daily production of 124,725,000 cf of gas. A mix of coal gas and water gas were manufactured using a process where coal was heated in the absence of oxygen, then sprayed with water and oil. The resulting reaction between the incandescent coal and oil/water spray produced gas which was then collected, purified, stored, and distributed to local consumers via gas piping. Residuals from these processes, such as coal tar, are the potential sources of the chemical constituents detected in soil and groundwater at the Site during the previous site investigations (United Cities Gas Company 1998).

As previously mentioned, manufactured coal and water gas were produced at the Site from 1915 until 1946. In 1946, the Site was converted to support a new technology (propane-air gas) in order to meet area usage demands. Propane-air gas production was the only process used from 1946 until 1950; however in 1950, the water-gas production system was brought back on-line to supplement gas production and meet consumer demands during peak load events (United Cities Gas Company 1998).

In 1951, the gas manufacturing process was converted from propane-air to the Hasche process, and in 1953 the site name was changed to the Volunteer Natural Gas Company (Figure 2-5). As with the former production process, the Hasche method of gas production was supplemented by water-gas production during times of peak demand. The Hasche process of gas production was used at the Site until January 1954, when

natural gas became available to Johnson City and the surrounding area (United Cities Gas Company 1998).

With the introduction of natural gas to the area in 1954, the site was converted into a service center for utility field crews. From 1954 until 1996, site uses included: storage areas for field vehicles, equipment, and supplies; minor vehicular maintenance; and refueling of the field service vehicles. The field maintenance and service vehicles refueled from a 2,000-gallon gasoline underground storage tank (UST) formally located in the northwest portion of the property (Figure 2-5) (United Cities Gas Company 1998).

During the 1970s, site improvements/modifications included the dismantling and removal of equipment associated with former gas production operations at the Site (Figure 2-5). These improvements began in 1972 with the removal of boilers and the Hasche reforming equipment. In the summer of 1973, the remaining gas production equipment (holders, purifiers, and separators) was removed from the Site. Two on-site buildings, which once housed process equipment, were also dismantled and removed from the Site in 1973. A total of 12 cylindrical, propane-style, aboveground storage tanks (ASTs) used for gas storage were sold and removed from the Site in 1974. In 1976, an oil AST associated with gas production processes also was sold and removed from the Site (United Cities Gas Company 1998).

2.2.2 Regulatory History

The gasoline UST associated with the former field service and construction crew support operations (Figure 2-5) was utilized until 1995. Although the installation date of the UST is not known, the UST was removed by excavation in October 1995, at which time closure activities were performed per TDEC - Division of Underground Storage Tanks (DUST) regulations. Findings from these UST closure activities indicated a potential release had occurred and further investigation was warranted (United Cities Gas Company 1997a).

Between October 1995 and January 1997, negotiations between United Cities, TDEC-DUST, and TDEC-DSF were conducted concerning the selection of the appropriate regulatory oversight for the Site. On January 23, 1997, United Cities and TDEC-DSF signed the COA to manage the Site under the state VOAP program. In accordance with VOAP (Tennessee Department of Environment and Conservation 1996) under the authority of the COA, United Cities submitted a Phase I Site Evaluation Report (Phase I Report) to TDEC-DSF on May 22, 1997. This Phase I Report was approved by TDEC-DSF on July 10, 1997, and in September 1997, United Cities submitted a work plan to conduct a PSI at the FMGP facility (United Cities Gas

Company 1997b). TDEC-DSF accepted a modified version of the PSI Work Plan on October 13, 1997, and field work for the PSI was conducted in November 1997. The PSI Report was submitted to TDEC-DSF in March 1998 (United Cities Gas Company 1998). In November 1998, an assessment conference was held between United Cities and TDEC-DSF to discuss TDEC-DSF comments on the PSI Report and to address potential future land development at the Site.

Based on results from the PSI Report and the November 1998 assessment conference, an expanded site investigation (Phase II) was determined to be the next appropriate action at the FMGP facility. ARCADIS Geraghty & Miller was contracted in January 1999 to represent United Cities in the next phases of work associated with the Site. Activities included developing a schedule for Phase II RI activities, holding an assessment conference with TDEC-DSF (ARCADIS Geraghty & Miller, Inc. 1999b), and preparing a Work Plan for the Phase II RI field work (ARCADIS Geraghty & Miller, Inc. 1999a). Upon approval by TDEC-DSF, ARCADIS Geraghty & Miller performed the field activities proposed in the Phase II RI Work Plan and subsequently prepared this Phase II RI Report detailing field activities, data collection, analytical results, and recommendations for future action at the Site.

2.3 Previous Investigative Work

Two previous investigations were conducted at the Site prior to the Phase II RI. In October 1995, a UST closure investigation was conducted at the Site. The investigation was conducted during the removal of the former gasoline UST (Figure 2-5), and included the collection of four soil samples from the UST excavation, one water sample from groundwater which entered the UST excavation, and four samples from the excavated, stockpiled soils for laboratory analysis. The soil and groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH) in the diesel and gasoline range of organics (DRO and GRO), respectively, and for polycyclic aromatic hydrocarbons (PAHs). The soil samples collected from the soil stockpile were analyzed for BTEX, TPH-DRO, TPH-GRO, and toxicity characteristic leaching procedure (TCLP) for lead in order to profile the soil for disposal. Benzene and TPH concentrations in the soil sample collected from the northeast corner of the UST excavation and in the one groundwater sample exceeded TDEC-DUST action levels (United Cities Gas Company 1998).

Based on the soil and groundwater analytical results from the UST closure investigation and in agreement with the signed TDEC-DSF COA, a PSI was conducted at the Site. The scope of work for the PSI included collecting soil, residual, surface-water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil properties borings, and four FMGP residual borings were

installed at the Site using direct-push technology (e.g., Geoprobe™) (Figure 2-6) (Appendix A). From those boring locations, 24 soil samples, and eight residual samples were collected. Of these samples, 12 soil samples and four residual samples, along with one duplicate sample for each media, were sent to a fixed-based laboratory for analysis. Groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-01 through GW-04) (Figure 2-6). Groundwater samples were collected from each of these four temporary wells and sent to the laboratory for analysis. One permanent, off-site monitor well, was installed in 1996 by the City of Johnson City during investigation at the Johnson City Continuing Education Site (TriAd 1996). This well is approximately 600 ft west of the Site. United Cities was granted permission to sample this well for background comparison. Surface-water and sediment samples were also collected at the Site from three locations along Brush Creek to determine current conditions (Figure 2-6).

As presented in the PSI (United Cities Gas Company 1998) and the Work Plan (ARCADIS Geraghty & Miller, Inc. 1999a), analytical results from the PSI field activities reported the detection of several constituents in soil, groundwater, and residual samples above background concentrations (Appendix B). Detected constituents included: BTEX, methyl-tertiary-butyl-ether (MTBE), PAHs, arsenic, barium, cadmium, chromium, lead, selenium, cyanide, phenolics, and mercury. Surface-water and sediment samples collected from Brush Creek did not report elevated levels of any of the aforementioned analytes and therefore, are not media of concern.

No hydrological testing, such as pump tests, drawdown tests, or slug tests were conducted onsite during the PSI field investigations. Instead, two undisturbed soil samples, SP-01 and SP-02 (Figure 2-6), were collected at the Site using Shelby tube samplers and tested for physical and geotechnical soil properties (e.g., grain size and percent moisture content) (Appendix C). These geotechnical results were utilized to calculate a hydraulic conductivity (K) of 8.1×10^{-5} centimeters per second (cm/sec) (United Cities Gas Company 1998). Step-drawdown and slug test data obtained from the Johnson City Continuing Education Site (TriAd 1996) was also reviewed (Appendix D). These data indicate a hydraulic conductivity of 5×10^{-5} cm/sec. These measurements were used to characterize the underlying residuum and to estimate groundwater flow rates at the Site.

2.4 Preliminary Constituent Characterization

Constituent characterization was achieved using historical information from on-site FMGP processes and the analytical results from the PSI. These data assisted in

defining potential source areas, identifying the major COPCs detected at the Site, and defining the distribution of the major COPCs in soil and groundwater at the Site.

2.4.1 Potential Source Areas

Reviewing the historic processes used at the Site for the production and manufacturing of gas and the FMGP facility layout, several potential source areas were identified onsite (Figure 2-7). These areas include: the former UST and AST locations in the northwest corner of the property; the former tar well; the former water-gas/tar-water separator; and the former holders and purifiers. Analytical results from soil, residual, and groundwater samples collected during the PSI and the Phase II RI confirm these areas as potential sources.

2.4.2 Preliminary Constituents of Potential Concern

In order to determine the preliminary COPCs for the Site, the maximum measured concentration for detected constituents from PSI data (Appendix B) were compared to previously published limits and risk-based screening values. Concentrations were first compared to background concentrations, if available, then to appropriate state or Federal previously published limits and criteria. If no state or Federal previously published limit existed for a constituent, then appropriate risk-based numbers were used for comparison. In order to be conservative, constituents that did not have any previously published limit or screening value for comparison were included as COPCs based on the need for further evaluation (ARCADIS Geraghty & Miller, Inc. 1999a).

These comparisons of maximum measured concentrations and screening values identified a list of COPCs for each media (Table 2-1). A total of 15 organic and three inorganic constituents were identified as preliminary COPCs in soil. In groundwater, a total of 14 organic constituents, six inorganic constituents; and cyanide were identified as preliminary COPCs. No COPCs were identified for sediments or surface water at the Site based on the PSI analytical data collected at the Site.

This preliminary COPC determination was conducted to identify the groups of constituents (i.e., volatile organics, metals, etc.) that soil and groundwater samples would be analyzed for during Phase II RI activities. Based on this comparison, and as incorporated into the Work Plan (ARCADIS Geraghty & Miller, Inc. 1999a), all analytes were sampled for in the potential source areas and, based on those analytical results, a focused analyte list was determined for soil and groundwater (Appendix E).

EXECUTIVE SUMMARY

United Cities Gas Company ("*United Cities*") is the current owner of a former manufactured gas plant ("*FMGP*") in Johnson City, Tennessee ("*the Site*"). On January 23, 1997, United Cities entered into a consent agreement with the Tennessee Department of Environment and Conservation, Division of Superfund ("*Division*"), to manage the site under the Voluntary Cleanup, Oversight, and Assistance Program ("*VOAP*"). On May 22, 1997, United Cities submitted a Phase I Site Evaluation Report to the Division. The Phase I Site Evaluation Report summarized the site history and identified the need for additional site investigation to confirm the presence of FMGP residuals on-site and determine if a release to the environment has occurred.

Depending upon the gas manufacturing process a variety of residuals may have been generated including tar, ammonia liquor, coke, ash and clinker, lampblack, gas purification by-products, tar emulsions, and other chemical by-products and various sludges. Some of the residuals consisted of by-products which were usable or marketable. Residuals which could not be sold or used, including ash and clinker, gas purification by-products, sludges, and some tars, usually were disposed of.

This work plan details the sampling and analysis plan for the Preliminary Site Investigation ("*PSI*") planned for the site. Non-random sampling will be conducted to determine if FMGP residuals are present on-site, whether a hazardous substance release has occurred to the environment, and whether the substances have impacted, or may impact, human health and the environment. The plan directs field personnel to collect residual source, subsurface soil, surface water, sediment, and groundwater grab samples. In addition, appropriate background samples will be collected from locations determined to be unaffected by any previous site activities on all media collected.

The project team will consist of the Project Director (Ms. Karol Sole, CHMM, United Cities Gas Co.), Project Manager (Mr. Stuart Schulz, RPG, United Cities Gas Co.), Project Laboratory (Specialized Assays Environmental Laboratory, Nashville, TN), and Geoprobe Contractor (Hitch Environmental).

The schedule for the proposed field work is that mobilization to the site is expected to begin within 30 days of receipt of written approval of the work plan. Site investigation activities are anticipated to last two days. The report of findings will be delivered to the Division within ninety (90) days of completion of site investigation activities.

1.0 INTRODUCTION

United Cities Gas Company ("*United Cities*") is the current owner of a former manufactured gas plant ("*FMGP*") in Johnson City, Tennessee ("*the Site*"). On January 23, 1997, United Cities entered into a consent agreement with the Tennessee Department of Environment and Conservation, Division of Superfund ("*Division*"), to manage the site under the Voluntary Cleanup, Oversight, and Assistance Program ("*VOAP*"). On May 22, 1997, United Cities submitted a Phase I Site Evaluation Report to the Division. The Phase I Site Evaluation Report summarized the site history and identified the need for additional site investigation to confirm the presence of FMGP residuals on-site and determine if a release to the environment has occurred.

1.1 Phased Management Approach

In the past, most resources were spent on site characterization followed by risk assessment, followed by feasibility studies, etc., which was an expensive and time consuming process. Experience gained from other FMGP sites has lead to the development of a "phased management approach". The phased management approach to FMGP sites typically includes the following phases:

- 1) Preliminary Site Investigation;
- 2) Interim Removal Action; and
- 3) Risk-Based Corrective Action ("*RBCA*").

Phase I, Preliminary Site Investigation, is generally a limited site investigation aimed at confirming the presence of historical process residuals on-site and determining if a release to the environment has occurred. Information gained during this phase is used to develop an interim removal action work plan.

If the results of Phase I indicate that residuals remain on-site, an interim removal action to remove the "source" areas is often warranted. Commonly, tar remains on-site in below grade process tanks (tar wells and tar/water separators). Adjacent soils may be impacted by tar as well. Presently, recycling options exist for FMGP residuals and impacted soil through co-burning in utility boilers.

With the information and results gained from phases I and II, a RBCA approach to site closure is typically the final phase to FMGP site management. The RBCA process utilizes a tiered approach where corrective action activities are tailored to site-specific conditions and acceptable risk levels. This approach satisfies the requirements of the consent agreement and is consistent with the goals of the VOAP.

This work plan describes in detail the various tasks of the preliminary site inspection phase of the site management. The Site Health and Safety Plan is presented in Appendix A.

2.0 SITE INFORMATION

2.1 Location

The Tennessee St. FMGP is located at the southwest corner of the intersection of Tennessee Street and Security Lane in Washington County, Tennessee. The geographic coordinates of the site are 36°18'59" North latitude and 82°21'57" West longitude (North 713,600 and East 3,071,300 Tennessee Carter Coordinates) at an approximate elevation of 1,640 feet above mean sea level based on the 1969 Johnson City, Tennessee 7.5 Minute Topographic map. *Figure 2-1, Site Location Map*, depicts the site location in relation to area landmarks.

2.2 Description

The Tennessee St. FMGP is on property owned by United Cities Gas Company, and is located near downtown Johnson City in a mixed industrial, commercial, and residential area. The site is bounded on the north by Norfolk Southern railroad tracks and Gordon's Furniture manufacturing facility, on the south by State of Franklin Road, on the east by Tennessee St. and vacant property owned by the City of Johnson City, and on the west by a coal storage pile owned by the State of Tennessee, East Tennessee State University. The site is approximately 1.8 acres in area, fenced, largely open and paved.

The site is currently vacant. Several buildings remain on-site from when the FMGP was in operation. The site and surrounding terrain are generally flat and are located within the 100 year flood zone. Surface water run-off from the site drains to the east and west with the center of the site acting as a divide. Several stormwater catch basins are located on-site and drain into Brush Creek located along the north edge of the site. *Figure 2-2, Site Map*, depicts the current site layout.

2.3 Geologic Setting

The site is located in the Valley and Ridge province. Most of the ridges in the Valley and Ridge province are north-eastward striking monoclines. The higher ridges are composed of resistant sandstone and the lower ridges of cherty limestone and dolomite. Chert and clay weathered from the limestone and dolomite form a residual cover. Surface drainage is well formed in most of the area and all streams eventually flow into the Watauga River, which in turn flows north-westward and joins the Holston River near Kingsport, Tennessee.

The site is underlain by rocks of the Knox group of Late Cambrian and Early Ordovician age. Bedrock is believed to be approximately 7 to 10 feet below ground based on observations during the UST closure and rock outcrops in Brush Creek. The strike of the rocks is generally northeast and the dip is southwest.

Native soil at the site is composed of the Lindsides silt loam. The Lindsides silt loam is a light-brown imperfectly drained soil occurring in stream bottoms in limestone valleys. It mainly

EXECUTIVE SUMMARY

United Cities Gas Company ("*United Cities*") is the current owner of a former manufactured gas plant ("*FMGP*") located at Tennessee Street and State of Franklin Road in Johnson City, Washington County, Tennessee ("*the Site*"). The Site was used to manufacture coal and water gas from 1915 until 1946, and as a gas making plant from 1946 until 1954 when natural gas became available in Johnson City. Beginning in 1954, the Site was used as a service center for utility construction and service crews. The Site has not been used for commercial purposes except equipment and vehicle storage since 1996.

On January 23, 1997, United Cities and the Tennessee Department of Health and Environment, Division of Superfund ("*DSF*") signed a Consent Order and Agreement ("*COA*") to manage the Site under the State of Tennessee Voluntary Oversight and Assistance Program ("*VOAP*").

Previous activities at the Site have included a Phase I Site Evaluation, a Preliminary Site Investigation, and a Phase II Remedial Investigation. The remedial investigation phase of the project was completed in September 2000. Results of previous investigations have identified four areas of concern: a tar well, a tar-water separator, an aboveground storage tank containment box, and an aboveground gas holder foundation.

On September 5, 2000, United Cities submitted a Proposal for Interim Action ("*Proposal*") to the DSF. The Proposal described the conceptual and technical aspects of the interim action. On September 19, 2000, the DSF approved the Proposal and the designation of the Site as an Area of Contamination ("*AOC*") under the guidance of USEPA's AOC policy.

This work plan describes in detail the various tasks included in the interim action. The objectives of the interim action are:

- Remove residual material from identified areas of concern;
- Pre-treat residual material that may exhibit a toxicity characteristic within the AOC;
- Use slow release oxygen release compounds with backfill material to enhance natural attenuation of groundwater contamination; and
- Transport non-hazardous residuals off-site for thermal treatment at the Soil Restoration and Recycling ("*SR-2*") thermal desorption facility located in Chattanooga, Tennessee.

The overall goal of the interim action is to eliminate or reduce residual source material from contact with site soil and groundwater and thus eliminate or reduce one or more pathways of exposure from hazardous substances. This interim action is consistent with the final cleanup action.

1.0 INTRODUCTION

United Cities Gas Company ("*United Cities*") is the current owner of a former manufactured gas plant ("*FMGP*") located on the northwest corner of the intersection of Tennessee Street and State of Franklin Road in Johnson City, Washington County, Tennessee ("*the Site*"). The Site was used to manufacture coal and water gas from 1915 until 1946, and as a gas making plant from 1946 until 1954 when natural gas became available in Johnson City. Beginning in 1954, the Site was used as a service center for utility construction and service crews. The Site has not been used for commercial purposes except equipment and vehicle storage since 1996. *Figure 1-1, Site Location Map*, depicts the Site location in relation to area landmarks.

This work plan describes in detail the various tasks included in the interim action planned for the Site. The objectives of the interim action are:

- Remove residual material from identified areas of concern;
- Pre-treat residual material that may exhibit a toxicity characteristic within the AOC;
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The overall goal of the interim action is to eliminate or reduce residual source material from contact with site soil and groundwater and thus eliminate or reduce one or more pathways of exposure from hazardous substances. This interim action is consistent with the final cleanup action.

United Cities is conducting the interim action under a Consent Order and Agreement ("*Order*") with the Tennessee Department of Environment and Conservation, Division of Superfund ("*DSF*") within the Voluntary Cleanup, Oversight, and Assistance Program ("*VOAP*").

1.1 Summary of Previous Investigations

In October 1995, a gasoline underground storage tank ("*UST*") was removed from service at the Site. Residuals consistent with FMGP operations and gasoline storage were identified during the UST removal. From October 1995 until January 1997, negotiations between United Cities and the Tennessee Department of Environmental Quality ("*TDEC*"), Division's of Underground Storage Tanks ("*DUST*") and DSF were conducted to select the appropriate regulatory oversight for management of the Site. On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order and Agreement ("*COA*") to manage the Site under the State of Tennessee Voluntary Oversight and Assistance Program ("*VOAP*").

In accordance with VOAP requirements, United Cities submitted a Phase I Report to TDEC-DSF summarizing the Site history and use (United Cities, 1997a). The Phase I Report was accepted by TDEC-DSF on July 10, 1997. In September 1997, United Cities submitted a Preliminary Site Investigation ("PSI") work plan to TDEC-DSF (United Cities, 1997b). The PSI was designed to investigate potential source areas at the Site and collect preliminary data on the nature and extent of impacts at the Site. In March 1998, United Cities submitted the PSI Report to TDEC-DSF (United Cities, 1998). The PSI Report identified a tar well, a tar-water separator, and former aboveground storage tank ("AST") and former UST location as areas of concern and identified impacts from the former MGP to shallow soils and groundwater. No impacts to Brush Creek were identified. In November 1998, an assessment conference was held between United Cities and TDEC-DSF to discuss TDEC-DSF comments on the PSI Report and to address future land development opportunities at the Site.

Based on the results of the PSI and the November 1998 assessment conference, an expanded site investigation was determined to be the next appropriate action at the Site. In January 1999, United Cities contracted with ARCADIS Geraghty & Miller ("ARCADIS") to conduct a Phase II Remedial Investigation ("Phase II RI"). In September 1999, United Cities submitted a Phase II RI Work Plan to TDEC-DSF for review and approval (ARCADIS, 1999). The Phase II Work Plan was conditionally approved in October 1999 and fieldwork began on October 18, 1999. The Phase II Work Plan document was officially approved on November 24, 1999. The Phase II RI investigation included the installation of 8 shallow monitoring wells and 1 bedrock monitoring well. Preliminary results from the Phase II RI confirmed the results of the PSI and indicated that the downgradient extent of soil and shallow groundwater contamination was not defined and that the uppermost bedrock aquifer was impacted by MGP constituents. Therefore, a supplemental phase of investigation was designed and implemented in February 2000. Results from the supplemental investigation indicated that the downgradient extent of shallow soil and groundwater contamination is limited to the Site. However, free phase tar was identified in the limestone bedrock beneath the Site to depths of at least 45 feet. The Phase II RI Report was submitted to TDEC-DSF on April 18, 2000 (ARCADIS, 2000).

On May 17, 2000, an assessment conference was held between United Cities and TDEC-DSF to discuss the results of the Phase II RI Report and future actions at the Site. The general consensus from the meeting was that an interim action to remove source area residuals would speed up the remedial process at the Site and was selected as the next appropriate action at the Site.

On July 24, 2000, the DSF notified United Cities that responses to DSF comments on the Phase II RI Report had been received and approved and at the time DSF received the revised sections of the report the remedial investigation phase of the Site would be concluded. On September 1, 2000, United Cities submitted the revised sections as requested thus bringing a close to the remedial investigation phase.

On September 5, 2000, United Cities submitted a Proposal for Interim Action to DSF for review and approval (United Cities, 2000). The proposal described the conceptual and technical approach to the removal of FMGP residuals from identified source areas and the use of the USEPA's Area of Contamination ("AOC") policy to facilitate the treatment and movement of FMGP residuals that may exhibit a hazardous characteristic. The DSF approved the proposal

and the use of the AOC policy on September 19, 2000.

1.2 Source Areas of Concern

Source areas of concern identified from the PSI and Phase II RI include the tar well, the tar/water separator, the AST/UST area, and the aboveground gas storage holder foundation. *Figure 1-2, Source Areas of Concern*, depicts the source areas of concern discussed above in relation to site features.

1.3 Interim Action Strategy

On April 30, 1998, the Environmental Protection Agency ("EPA") issued treatment standards for certain MGP residuals and soils known as the Phase IV Land Disposal Restrictions ("LDRs"). The Phase IV LDRs became effective August 28, 1998. The LDR regulations require that actively managed MGP residuals that exhibit a hazardous characteristic be treated to eliminate any hazardous characteristics and to achieve the Universal Treatment Standards ("UTS") for any underlying hazardous constituents prior to land disposal. Application of the LDRs to MGP residuals was struck down by the United States Circuit Court of Appeal in American Battery Recyclers, Inc. v. USEPA, 208 F. 3d 1047 (D.C. Cir., 2000). Although application of the LDRs is in substantial doubt, United Cities assumes for the purpose of the Interim Action Work Plan ("IAWP") that the LDR restrictions apply. The EPA defines land disposal as placement in a landfill, surface impoundment, waste pile, or container intended for disposal.

Preliminary analysis of residual material from the areas of concern has indicated that some residual material might have benzene concentrations exceeding 0.5 mg/L using the TCLP procedure. Therefore, United Cities has designed the Interim Action Work Plan ("IAWP") based on the EPA's Area of Contamination ("AOC") policy (USEPA, 1996). The EPA developed the AOC policy to facilitate the management of waste during remediation programs. In the AOC policy, the EPA states that the movement/placement of wastes within the areas of "generally dispersed contamination" at a remediation site is not considered land disposal and does not trigger the land disposal restrictions.

Under the AOC policy, "hot spots" of material can be consolidated with less contaminated media within the excavation (including associated areas outside of the excavation designated as being within the AOC) to improve the physical characteristics of the material to facilitate subsequent treatment or disposal. United Cities has identified off-site thermal desorption as the appropriate treatment option for Site residuals. Moisture and volatile organic content are limiting physical and chemical characteristics of the residuals that must be within the acceptable limits of the thermal desorption facility. The physical characteristics of the residual material at the Site will be improved by consolidation and through the use of blending agents such as lime. Testing to determine the regulatory classification of the residual material will be conducted after the material has been improved but prior to the material leaving the AOC. A copy of the EPA's AOC Policy Memorandum is provided in Appendix A.

2.0 PROJECT MANAGEMENT

All participants in the interim action are directly subject to the requirements of the IAWP. United Cities has assembled a team of professionals to carry out the interim action. Each team member has a vital and important role to play in the successful completion of the interim action. Four Seasons Environmental is responsible for residual excavation, pretreatment, staging, excavation backfilling, and loading dump trailers for transportation off-site. Environmental Operations is responsible for ambient air monitoring. Arcadis Geraghty & Miller is responsible for pre-mobilization groundwater field parameter monitoring, confirmation sampling, and ORC[®] application review and oversight. The organizational structure of the project team is illustrated on *Figure 2-1, Project Management Team*. The responsibilities of the members of the project team are described below.

2.1 Project Manager

The Project Manager will report to United Cities' Project Manager who will provide technical and administrative oversight on the project. The Project Manager is the primary contact with United Cities for implementation of the IAWP. The Project Manager has primary responsibility for planning, authorizing, and control of the technical tasks of the project to ensure the work is completed within budget and on schedule. The Project Manager will also oversee the implementation of the fieldwork, and will ensure that all day-to-day activities are performed in accordance with the Plan. The Project Manager will coordinate with United Cities' Project Manager any communications between the Project Manager and DSF during the project.

2.2 Site Construction Supervisor

The Site Supervisor is responsible for directing all field operations in compliance with the requirements of the IAWP. The Site Supervisor will be responsible for coordinating excavation and pretreatment tasks with sample collection, analysis, and transportation of residuals to SR-2 in Chattanooga, TN. As the coordinator of field operations, the Site Supervisor will also be responsible for ensuring field technician compliance with applicable requirements of the IAWP.

2.3 Health and Safety Officer

The Health and Safety Officer is responsible for proper implementation of the Health and Safety Work Plan ("HSP"). The Health and Safety Officer will be the primary contact for matters relating to site health and safety and will be consulted when any changes to the HSP are required. The Health and Safety Officer will be responsible for ensuring that the Site Supervisor is correctly implementing the HSP.

2.4 Air Monitoring Technician

The Air Monitoring Technician is responsible for implementation of the Ambient Air Monitoring Plan ("AAMP"). It is the Air Monitoring Technician's responsibility to monitor air quality at the site during implementation of the IAWP and notify the Site Construction Supervisor if action levels are exceeded.

3.0 MOBILIZATION

3.1 Pre-Mobilization Tasks

Prior to mobilizing to the site for the interim action, several tasks must be completed. Pre-mobilization tasks include:

- measurement of groundwater field parameters
- establish utilities;
- setting up ambient air monitoring stations; and
- collection of baseline air quality data.

3.1.1 Measurement of Groundwater Field Parameters

Field measurements will be made at existing groundwater monitoring wells to establish baseline conditions. Field parameters to be measured will include depth to groundwater, pH, conductivity, temperature, dissolved oxygen, oxidation-reduction potential, alkalinity, ferrous iron, and total dissolved solids. These parameters (specifically water levels and dissolved oxygen) will assist in: determining the likely soil confirmation sampling interval, the saturated interval amenable for ORC[®] activation, evaluating the radial extent of the ORC[®] during post interim action monitoring, and evaluating the effectiveness of the interim action.

3.1.2 Establish Utilities

Electric and water/sewer utilities are disconnected at the site. Therefore, it will be necessary to establish a temporary electrical drop to power stationary air monitoring equipment and other project equipment. Water is available, but not connected at the present time. Portable toilets will be delivered to the Site for the duration of the project.

3.1.3 Air Monitoring Station Set-Up

Four stationary air monitoring stations (including one duplicate station) and one meteorological station will be set-up on-site as part of the ambient air monitoring program. It is anticipated that air monitoring stations will be established at upwind, downwind, and crosswind locations around the perimeter of the site. The actual location of the air monitoring stations will be determined in the field based upon the historical wind direction data for the March/April time frame, potential off-site receptors, and existing Site features that could impact air quality data. A detailed discussion of the air monitoring program is provided in the Ambient Air Monitoring Plan located in Appendix D.

3.1.4 Collection of Baseline Air Quality Data

Baseline ambient air samples will be collected for three consecutive 24-hour periods prior to commencing removal activities. Baseline air quality data will include real-time measurements of Volatile Organic Compounds ("VOCs"), benzene, particulates (dust), and time-averaged measurements of Polycyclic Aromatic Hydrocarbons ("PAHs") by EPA Method TO-13 and

VOCs by EPA Method TO-14. The purpose of the baseline air quality survey is to measure and establish local air quality conditions prior to remediation (excavation) activities. Air monitoring data collected during the remediation activities will be evaluated against the baseline data. A detailed discussion of the air monitoring program is provided in the Ambient Air Monitoring Plan located in Appendix D.

3.2 Mobilization Tasks

Field mobilization will include the following work elements:

- Installation of project construction fence;
- Install windscreens along perimeter fence line;
- Establish decontamination area;
- Prepare residual material staging area(s);
- Set-up wastewater storage facilities;
- Identify boundaries of excavations;
- Installation of storm water control measures; and
- Evaluation of emergency procedures.

3.2.1 Installation of Project Construction Fence

Upon mobilization of personnel and equipment to the Site, a temporary 8-ft. high chain-link project construction fence (with gates) will be installed along Security Lane. Security Lane is a private drive along the north edge of the Site. Temporary fencing is necessary since removal activities at the AST/UST and storage holder area will require that the permanent Site fence be dismantled to complete the excavations. The permanent fencing will be reinstalled at the conclusion of the project.

3.2.2 Install Windscreens on Perimeter Fence Line

Windscreens will be installed on all perimeter fence lines. Windscreens serve as a particulate (dust) barrier between the Site work area and adjacent properties and to deter curious by-standers from standing at the fence line for extended periods of time.

3.2.3 Establish Decontamination Area

A heavy equipment and personnel decontamination area will be installed on the east end of the Site. Heavy equipment will be cleaned directly over a lined containment area sloped such that all rinse water and sludge will drain to one end for collection. Immediately adjacent to the heavy equipment decontamination area will be facilities for boot and glove washing, disposable coverall removal, and hand washing. Decontamination stations and procedures are described in detail in the Health and Safety Plan located in Appendix B.

3.2.4 Prepare Residual Material Staging Areas

Residual material staging areas will be prepared adjacent to each of the four excavation areas. The residual material staging areas will be constructed by placing plastic sheeting on the ground. Dry soil and lime may be used during the pretreatment process and will be delivered to the Site prior to the start of excavation activities. Section 6.0, Pretreatment Process, describes the staging areas and the residual material improvement process.

3.2.5 Set-Up Wastewater Storage Facilities

A 20,000-gallon frac tank will be delivered to the Site and set-up for the collection of wastewater generated during the project. The frac tank will be setup at a central location on Site but in a location where it will be out of the way of Site activities.

3.2.6 Identify Excavation Boundaries

During the mobilization stage, the preliminary limits of each excavation will be marked on the ground with paint. Preliminary excavation areas have been identified on Figures 4-1 and 4-2. Actual excavation areas may differ based on conditions observed in the field during the excavation activities. Section 4.0, *Excavation Design*, describes the excavation areas in detail.

3.2.7 Installation of Storm Water Control Measures

To contain and control storm water run-off and prevent storm water run-off from entering the drop inlet near the northwestern boundary of the property various erosion and storm water control measures will be installed on the perimeter of the property and at drop inlets on the Site. The principal control measure will be through the use of hay bales and silt fences. Drop inlets will be covered to prevent storm water run-off from entering and discharging to Brush Creek.

3.2.8 Evaluate Emergency Procedures

The emergency procedures to be followed in the event of an accident and/or a release of hazardous substances will be discussed during the mobilization phase. Emergency response procedures are discussed in the Health and Safety Plan ("*HSP*") located in Appendix B.

4.0 EXCAVATION DESIGN

Excavation designs are based on historical site plans, field observations, and evaluation of Phase II RI analytical data. During the PSI and the RI, the 3-dimensional boundaries of the subsurface structures were determined. Each excavation area is discussed in the following subsections.

4.1 Tar Well Excavation

Tar was produced as a by-product of the gas making process and was collected and sold. Prior to shipping the tar to market it was stored in a tar well. The tar well is identified on the 1945 site plan as circular in shape and located on the northwest corner of the warehouse (former retort) building. Based on information from an employee with historical knowledge of the Site and previous field investigations, the tar well is constructed of steel with a concrete lid and is 15 ft. in diameter and 7 ft. deep (46 cubic yards or 69 tons). The contents of the tar well will be pre-treated in place by adding lime and rigorously consolidating the residual material with a backhoe or trackhoe to produce a relatively homogeneous material. Once this has been achieved, the residual material will be excavated and placed on plastic sheeting. After the tar well has been emptied of its contents, the structure will be inspected and then excavated and staged on-site for disposal. Over excavation of the tar well will continue to a maximum dimension of 30' long ("L") x 20' width ("W") x 8' deep ("D") for a total of 178 cubic yards or 267 tons, including the contents of the tar well. Upon completion of the tar well area excavation, it will be backfilled with gravel and amended with Oxygen Release Compound ("ORC[®]"). *Table 4-1, Summary of Excavation Plan*, summarizes the volume and weight of material by excavation area. *Figure 4-1, Tar Well Excavation Design*, illustrates the limits of excavation.

4.2 Tar-Water Separator Excavation

Tar produced from the water gas process exited the water gas machine as a tar and water emulsion. In order to separate the tar from the water, the emulsion was piped to a tar-water separator where the tar, being denser than water, would separate and settle to the bottom of the separator. Periodically, the tar would be recovered from the tar-water separator and sold.

Construction details of the tar-water separator are known from a June 14, 1928 drawing and material list (*See Figure 4-2, Tar-Water Separator Design*). The tar-water separator was constructed of "first grade Cypress" wood with instructions for "all seams to be caulked water tight with oakum" and "all points where wood touches wood to be painted with tar before nailing". Additionally, the wood box was to be "painted with tar before setting". All of these steps were taken to prevent leakage.

Two borings have been drilled into the tar-water separator: one during the PSI and one during the Phase II RI. Based on these borings, the tar-water separator is filled with limestone gravel to a depth of 1.5 feet followed by sandy clay fill with some red brick fragments to a depth of 4 feet. From 4 to 6 feet depth the fill consists of tar stained gravel. Water was encountered at 4 feet depth inside the tar-water separator. Tar was observed in the bottom 2 inches of the tar-water separator. One sample collected during the PSI from a depth of 1.5 to 4 feet had a benzene concentration of 19.3 mg/kg, but was less than 0.5 mg/L for TCLP benzene analysis.

Based on historical drawings and field investigations the tar-water separator is constructed of cypress wood and has the dimensions of 15'L x 5'W x 6'D (17 cubic yards or 26 tons). The contents of the tar-water separator will be pre-treated in place by adding lime and rigorously consolidating the residual material with a backhoe or trackhoe to produce a relatively homogeneous material. Once this has been achieved, the residual material will be excavated and placed on plastic sheeting. After the tar-water separator has been emptied of its contents, the structure will be inspected and then excavated and staged on-site for disposal. Over excavation of the tar-water separator will continue to a maximum dimension of 25'L x 10'W x 8'D for a total of 74 cubic yards or 111 tons, including the contents of the tar-water separator. Upon completion of the tar-water separator area excavation, it will be backfilled with gravel and amended with ORC®. *Table 4-1, Summary of Excavation Plan*, summarizes the volume and weight of material by excavation area. *Figure 4-3, Tar-Water Separator Excavation Design*, illustrates the limits of the excavation.

4.3 Aboveground Gas Holder Foundation Excavation

Manufactured gas was stored in gas holders prior to distribution. The simplest form of a gas holder consisted of a cylindrical holder shell which floated in a tank of water, a guide frame, and pipes to introduce or draw off the gas above the level of the water. Most MGP facilities used multiple holders consisting of a "relief holder" to store the raw, unpurified gas; and a "storage holder" to hold purified gas for delivery. Prior to 1900, holder tanks were commonly brick structures that were built below-grade. However, between 1900 and 1920, holder design transitioned from below grade foundations to "slab-on-grade" foundations (EPRI, 1999). Slab-on-grade foundations were used at the Tennessee St. MGP.

Based on historical site drawings, two slab-on-grade gas holders were used at the Site: a relief holder and a storage holder. Both holders were dismantled in July 1973 down to their concrete slabs. Subsequently, an office building was expanded over the relief holder slab and the storage holder slab was paved over to make a parking lot.

Results of soil data collected at boring SB/MW-3 indicate that the maximum detected concentration of constituents of concern are located adjacent to the former gas storage holder pad. Therefore, the concrete pad of the former aboveground gas storage holder will be excavated as well as impacted soil beneath and surrounding the pad.

Based on historical drawings the concrete pad is 32.5 feet in diameter. The thickness of the concrete pad is unknown but is anticipated to range from 3 to 5 feet thick (92 cubic yards to 154 cubic yards of concrete). The concrete pad will be excavated and staged on-site. After the concrete pad is removed, the soil beneath the pad will be excavated down to bedrock anticipated at 8 feet depth (154 cubic yards or 231 tons). Over excavation of the pad will continue to a maximum dimension of 5 feet past the outside edge of the holder pad for a total of 173 cubic yards or 260 tons. *Table 4-1, Summary of Excavation Plan*, summarizes the volume and weight of material by excavation area. *Figure 4-4, Storage Holder Excavation Design*, depicts the limits of the storage holder excavation.

Monitoring well MW-3, which will be destroyed during the over excavation, will be replaced following the backfilling of the excavation. Deep monitoring well MW-3D will not be disturbed during the over excavation. Upon completion of the gas holder area excavation, it will be backfilled with the remnants of the concrete pad, gravel, and amended with ORC®.

4.4 Aboveground Storage Tank Containment Structure Excavation

Petroleum fuels were used in the water gas making process. These fuels consisted of light and heavy hydrocarbons and were stored on-site in aboveground storage tanks. Two of these aboveground storage tanks ("AST's") are depicted on a 1948 Sanborn map located near the northwest corner of the Site. It is believed that these AST's were installed when the new water gas house was built in 1928 and remained on-site until July 1973 when they were removed during renovation of the service center. The most westerly AST was placed in a concrete containment structure. During the PSI, a soil boring was drilled into the structure and elevated concentrations of petroleum hydrocarbons were found. Therefore, the contents of the AST containment structure will be excavated.

Based on aerial photographs the dimensions of the concrete containment structure are 40' L x 15' W x 6' D for a total of 133 cubic yards or 200 tons of soil. All residual material inside the containment structure will be excavated and staged on-site. The concrete structure will not be excavated. The material inside the structure consists of approximately 1 foot of gravel and then clay fill to a depth of 4 feet. Gravel fill is present from 4 to 6 feet depth. Water is present inside the structure at a depth of approximately 4 feet. *Table 4-1, Summary of Excavation Design*, lists the anticipated volume and weight for each excavation area. The limits of AST structure excavation are illustrated on *Figure 4-5, AST Structure Excavation Design*.

4.5 Underground Storage Tank Pit Excavation

In 1975 (approximate date) a 2,000 gallon steel underground storage tank was installed between the two AST's for gasoline storage. During the closure and removal of the gasoline underground storage tank in October 1995, closure samples indicated that soil on the northeast corner of the UST pit exceeded the DUST non-drinking water cleanup requirements of 1,000 ppm total petroleum hydrocarbons. Samples collected during the PSI indicated that petroleum contaminated soil at concentrations greater than 1,000 ppm extended at least 20 feet in a northeast direction but not more than 40 feet.

The UST area excavation will begin at the northeast corner of the former UST pit and continue in a northeast direction. The dimensions of the excavation will be determined in the field based on visual observations and photoionization measurements but will not exceed 40'L x 20'W x 8'D for a total of 237 cubic yards or 356 tons. The excavated material will be staged on plastic on-site until transported off-site. Upon completion of the UST area excavation, it will be backfilled with gravel amended with ORC®. *Table 4-1, Summary of Excavation Design*, lists the anticipated volume and weight of each excavation area. The limits of the UST pit excavation are presented on *Figure 4-6, UST Pit Excavation Design*.

5.0 EXCAVATION PROCEDURES

5.1 Excavation Equipment

Based on the size and depth of the excavation areas, a rubber-tired backhoe and/or trackhoe may be used to excavate and pre-treat residual material. A front-end loader will be used to load residual material onto dump trailers for transportation to the thermal treatment facility, and backfill excavations in a timely and safe manner.

5.2 Fugitive Emissions and Odor Control

Excavation and material handling activities at MGP sites may generate fugitive emissions that can cause a nuisance or perceived hazard to the surrounding community. Experience at MGP sites indicates that the impact of air emissions, odors, and dust from excavations can be effectively managed by employing excavation practices and engineering controls that minimize the release of gaseous contaminants and particulates. Excavation activities will be conducted to minimize fugitive emissions at all times.

Excavation practices to minimize fugitive emissions include the pacing of excavation activities and/or the placement of additives or absorbents such as coal fines, clay, synthetic foams, or other non-hazardous materials into the excavation, or by covering the excavation with plastic sheeting. Dust can be controlled by maintaining the appropriate soil moisture content of the excavated material.

Excavation practices used during the interim action will consist of improving the chemical and physical characteristics of the residual material *in-situ* by consolidating "hot spots" with less impacted soils and adding lime to the residual material to reduce the moisture content.

Concurrently, the air space in and around the excavation will be monitored using real-time contaminant detection instruments. Real-time monitoring of fugitive dust (particulates) will be conducted using a Grimm Dust Monitor (Model #1.100, or equivalent). Real-time monitoring for VOCs will be conducted using a Photoionization Detector ("PID") as a screening device to non-selectively monitor VOCs. Selective VOC monitoring of benzene concentrations in air will be accomplished via use of a portable Gas Chromatograph ("GC"). If the action levels established in the Ambient Air Monitoring Plan are exceeded, excavation activities will temporarily stop and the excavation will be covered. Clay may be placed on top of exposed residual material if necessary to control emissions. Once real-time air monitoring indicates that the ambient air conditions have returned to acceptable levels, excavation activities may resume. The Site Health and Safety Plan, located in Appendix B, identifies the concentration limits which, if exceeded at any time, would require the use of respiratory protective equipment by workers.

Air monitoring will also be conducted at three predetermined locations (upwind, downwind, and crosswind) around the perimeter of the property to ensure that excavation activities are protective of human health. Ambient air sampling will be conducted using stationary integrated samplers and USEPA Compendium Methods TO-13 (PAHs) and TO-14 (VOCs). Consistent with USEPA guidance on conducting ambient air monitoring at Superfund sites, time-averaged air samples

will be collected over 24-hour periods during 50% of the site work (USEPA, 1993). The Ambient Air Monitoring Plan, located in Appendix C, details the site-specific air monitoring program developed for the interim action.

5.3 Water Management

A shallow groundwater table, approximately 4 feet depth, was identified during the PSI and RI. The shallow water table is not anticipated to impact the excavation of residuals since the excavation activities initially will occur within the residual structures, *i.e.*, the structures should act as a barrier. However, during the excavation of the structures and over excavation, groundwater could be encountered at sufficient volumes to impede the excavation. In that event, groundwater will be pumped from the excavation zone. Groundwater will be pumped only to permit the completion of the excavation and not for groundwater recovery.

Collected groundwater will be temporarily contained in a 20,000-gallon frac tank until it can be characterized and properly disposed. Wastewater will be conveyed to the frac tank using submersible pumps, vacuum trucks, and diaphragm pumps.

5.4 Wastewater Disposal

Waters collected during the removal action may include groundwater, decon water, and rain water. All non-hazardous wastewater collected will be disposed of off-site at Four Seasons' Patton Avenue facility in Greensboro, North Carolina. A waste characterization sample will be collected prior to disposal to determine the waste classification of the collected water. In the event the wastewater is determined to be hazardous, it will be disposed of at an approved facility based upon analytical results.

6.0 MATERIAL HANDLING

Tar impacted residual material contained in the tar well and tar-water separator may contain benzene at concentrations exceeding 0.5 mg/L using the TCLP procedure. In order to provide a feed material acceptable to SR-2, tar impacted residuals will be pretreated in their respective structures prior to generation.

6.1 Residual Pretreatment

Pretreatment will consist of rigorously consolidating the contents of the tar well and tar water separator prior to excavation to produce a relatively homogeneous material. Lime will be added during the consolidation phase to improve the physical and chemical characteristics of the material. Initially, an addition of approximately 2% lime by weight will be mixed into the residual material. Pretreatment in this manner should effectively reduce the moisture content and eliminate the potential toxicity characteristic without increasing the heating value of the resulting material beyond the acceptance criteria of SR-2.

6.2 Temporary Storage of Excavated Material

After the tar-impacted residual material has been pretreated, it will be temporarily staged on plastic sheeting awaiting waste classification and transportation off-site. Staged material will be placed on plastic sheeting and completely covered when Site activities are not occurring to control runoff, leachate generation, dust, and volatile emissions.

7.0 TRANSPORTATION OF RESIDUALS OFF-SITE

All pretreated residual material will be transported off-site for thermal treatment at the SR-2 facility in Chattanooga, Tennessee. Dump trailers will be utilized for transportation of the material. All trailer beds will be covered by tarpaulins in accordance with DOT regulations. Non-hazardous waste manifests will be completed for each load leaving the Tennessee Street FMGP. Transportation of residual material will be subcontracted to Vic Davis Construction of Bristol, Tennessee.

8.0 THERMAL DESORPTION FACILITY

8.1 Thermal Desorption Technology

Thermal desorption is an established and acceptable technology for FMGP residual material (GRI, 1996). Thermal desorption refers to the separation of chemical constituents by volatilization from solid matrices, such as soil. It requires heating the soil to facilitate the diffusion and volatilization of the contaminants in a reasonable time. Desorption temperatures are lower than the temperatures required for thermally induced decomposition reactions (e.g., oxidation pyrolysis) to occur. This, as well as generally lower concentrations of oxygen within the treatment unit, distinguishes thermal desorption from incineration, in which combustion (destruction) of the contaminants is intended.

8.2 Soil Restoration and Recovery (SR-2) Facility

United Cities has chosen the Soil Restoration and Recovery, LLC ("SR2") facility located in Chattanooga, Tennessee as the location to receive the residual material generated during the Tennessee St. FMGP interim action. The SR2 Summit facility is located approximately 220 miles south of Johnson City, Tennessee. SR2, founded in 1995, is located at the Summit Landfill in Chattanooga. The Summit facility was established to harvest methane gas produced within the Summit landfill. The collected landfill gas is utilized to fuel the thermal desorption unit in the remediation of non-hazardous soils. Soil exiting the thermal treatment unit is sterile. In a cooperative effort with the city's Mocassin Bend Water Treatment Plant, SR2 combines municipal bio-solids with the sterile soil to produce an environmentally safe organic soil. The "remanufactured" soil is then sold or used as a useful product such as top soil and land reclamation material.

9.0 SAMPLING AND ANALYSIS STRATEGY

Two types of sampling will be utilized during the removal action: confirmation sampling and residual profile sampling. Confirmation sampling will be collected to obtain data to assess the completeness of the remedial action and for risk assessment purposes. Residual profile sampling will be collected to determine the waste classification of the pretreated residual material.

9.1 Confirmation Sampling and Analysis

Confirmation samples will be collected to confirm the concentration of the constituents of concern remaining (if any) at the limits of the excavation to determine interim action effectiveness in removal of residuals and for risk assessment purposes. Confirmation sampling will consist of collecting grab samples from the four walls above the observed water table elevation of the final dimension of each excavation area with the exception of the AST containment structure [i.e., four (4) samples per excavation area for a total of sixteen (16) samples]. No samples are planned from the bottom of the excavation as it is likely to be bedrock and the sample would be saturated by groundwater.

For consistency with the Phase II Remedial Investigation list of Constituents of Potential Concern – Table 5-9 (Arcadis Geraghty & Miller, Inc. 2000) and future risk assessment activities, pit soil confirmation samples will be submitted for a focused list of analytes. The list will include:

- volatile organic compounds (“VOCs”) including benzene, toluene, ethylbenzene and xylenes (“BTEX”), 1,2,4-tri methylbenzene, and 1,3,5-trimethylbenzene by Method 8260B;
- semi-volatile organic compounds (“SVOCs”) including polycyclic aromatic hydrocarbons (“PAHs”) by Method 8270C;
- total petroleum hydrocarbons-gasoline range organics and extractable petroleum hydrocarbons (“TPH-GRO/EPH”) by Method TDHE; and
- four metals including aluminum, arsenic, iron, and lead by Method 6010B.

Confirmation sampling procedures are described in the Sampling and Analysis Plan (“SAP”) located in Appendix D.

9.2 Pretreated Residual Profile Sampling and Analysis

SR-2 requires a material profile and analytical results prior to acceptance of pretreated residual material from the Site. One (1) composite residual profile sample will be collected and submitted for analysis. The composite sample will be prepared by collecting grab samples from each staging pile associated with each of the four excavation areas.

The pretreated residual profile sample will be analyzed in accordance with USEPA SW-846 methodology for the following parameters:

- VOCs by Method 8260B;
- Toxicity Characteristic Leaching Procedure ("TCLP") for benzene by SW-846 Method;
- PAHs by Method 8270C
- TPH-GRO/EPH by TDHE Method;
- RCRA Metals by Method 6010B; and
- Moisture content and pH.

The pretreated residual profile sample will be submitted to the project laboratory for rush turnaround to expedite the approval process with SR-2. Residual profile sampling procedures are described in the SAP located in Appendix D.

10.0 NONCONFORMING WASTE MANAGEMENT PLAN

During the performance of the interim action, it is likely that materials will be generated that are not suitable for thermal desorption, *i.e.*, nonconforming waste. These materials may include such items as plastic sheeting, metal piping and fittings, concrete, large wood debris, etc.

Nonconforming waste will be segregated from conforming waste and disposed of as non-hazardous special waste at Waste Management's Subtitle C landfill in Emelle, Alabama.

11.0 OXYGEN RELEASE COMPOUND APPLICATION

Following the completion of each excavation, with the exception of the AST containment structure, an Oxygen Release Compound ("ORC") manufactured by Regenesis, Inc. of San Clemente, CA will be applied in a slurry form to the saturated wall and floor areas of each excavation. ORC is a patented formulation of magnesium peroxide that slowly releases oxygen upon hydration for up to six months to one year according to the manufacturer. The appropriate volume of ORC will be estimated based on known site soil chemical concentrations and guidance from Regenesis, Inc. and Arcadis Geraghty & Miller.

12.0 EXCAVATION BACKFILL

All excavations will be backfilled immediately following the removal of residual material and application of ORC. Clean #67 limestone gravel will be utilized. Backfilling will continue until the excavation is filled to the present surface elevation. Backfilled excavations will not be paved over so that oxygenated rainwater may infiltrate the backfill and aid in the natural attenuation processes occurring at the Site.

13.0 EQUIPMENT DECONTAMINATION

Prior to leaving the site, all excavation equipment will be decontaminated using a high-pressure steam spray. Decontamination fluids will be containerized and characterized for disposal. Decontamination procedures are discussed in greater detail in Appendix D.

14.0 PROJECT SCHEDULE

Site work is anticipated to be complete within 25 days of the start date. *Figure 13-1, Project Schedule*, lists each major project task and anticipated time need to complete each task.

REFERENCES

ARCADIS, 2000. *Phase II Remedial Investigation Report, United Cities Gas Company, Tennessee Street FMGP Site, Johnson City, Tennessee*. Prepared by Arcadis Geraghty & Miller, Inc., and submitted to Tennessee Department of Environment and Conservation, Division of Superfund, Johnson City, Tennessee. Dated September 1, 2000.

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1.0 Introduction

ARCADIS has prepared this Post-Interim-Action Groundwater Monitoring Report on behalf of United Cities Gas Company (United Cities) for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Exhibit 1-1). This groundwater monitoring event was conducted in accordance with the Tennessee Department of Environment and Conservation (TDEC) Division of Superfund (DSF) approved recommendations outlined in the Post-Interim-Action Monitoring - January 2002 Report (ARCADIS G&M, Inc. 2002). The purpose of this groundwater monitoring report is to evaluate the effectiveness of interim actions conducted during the summer of 2001 with regard to source removal, constituent of potential concern (COPC) concentration reduction in groundwater, and overall effect on the project closure schedule.

Section 2.0 of this report provides a summary of site characterization and interim-action activities. Groundwater sampling methods are described Section 3.0. Section 4.0 discusses groundwater flow conditions and analytical results from the February 2002 sampling event. Discussions of biogeochemistry, natural attenuation status, and mass reduction are also included in Section 4.0. Report conclusions are presented in Section 5.0. References are provided in Section 6.0. A certification is located in Section 7.0.

2.0 Site Characterization and Remediation History

2.1 Site Investigations

On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order Agreement to manage the Site under the state Voluntary Cleanup Oversight and Assistance Program. A Phase I Site Evaluation Report was approved by TDEC-DSF on July 10, 1997.

A Preliminary Site Investigation (PSI) was conducted during 1997 in accordance with the PSI Work Plan (United Cities Gas Company 1997a). The scope of work for the PSI included collecting and analyzing soil, residual material, surface-water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil-properties borings, and four FMGP residual material borings were installed at the Site using direct-push technology. A groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-02 through GW-05). One permanent, off-site monitor well (GW-01) was installed in 1996 by the City during an unrelated investigation at the Johnson City Continuing Education Site. Well GW-01 is approximately 600 feet (ft) west of the Site. Surface-water and sediment samples were also collected at the Site from three locations along Brush Creek during the PSI. Samples were analyzed for selected volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and inorganic compounds.

A Phase II remedial investigation (RI) was conducted during the fall of 1999 and the spring of 2000. Tasks completed at the Site in 1999 included the installation of ten groundwater monitor wells (nine shallow, residuum wells and one deep, bedrock well) (Exhibit 2-1), the installation of three soil borings, and the installation of a stream staff gauge. Soil samples were collected from the soil and well borings and analyzed for Target Compound List (TCL) organic compounds and Target Analyte List (TAL) metals.

Two additional bedrock groundwater monitor wells (MW-3D and MW-4D) were installed during February 2000 to obtain a better understanding of site conditions (Exhibit 2-1). A 1-inch monitor well (MW-10) was installed across Tennessee Street (northeast of the Site) to further define downgradient conditions in shallow groundwater (Exhibit 2-1). Following the installation and development of those three monitor wells, groundwater samples were collected for field and laboratory analyses from all wells. A focused analyte list was selected for that sampling event based on analytical results from the October 1999 sampling event. The resulting Phase II RI Report was approved by TDEC-DSF in September 2000 (ARCADIS Geraghty & Miller, Inc. 2000). Benzene,

ethylbenzene, toluene, and xylenes (BTEX), PAHs, and select metals were identified as preliminary COPCs in the Phase II RI Report. Additional groundwater baseline monitoring was conducted during February 2001 in preparation for interim-action activities.

2.2 Interim Action

Former source areas were excavated during June 2001 (ARCADIS G&M, Inc. 2001c). These areas included the following: 1) UST Area; 2) Tar-Water Separator Areas; 3) Storage Holder Pad; and (4) Tar Well Area (Figure 2-1). The objectives of the interim action were to

- Remove residual material from identified source areas;
- Pre-treat residual material potentially containing benzene at concentrations exceeding 0.5 milligrams per liter (mg/L) [Toxicity Characteristics Leaching Procedure (TCLP) method] in accordance with the U.S. Environmental Protection Agency (USEPA) Area of Contamination policy;
- Apply Oxygen Release Compound (ORC[®]) and porous backfill material to enhance natural attenuation of groundwater impacts; and
- Transport non-hazardous residual material off site for thermal treatment.

A total of 921.36 tons of coal tar and impacted soil was excavated and removed from the Site; a total of 8,006 gallons of impacted water was removed from the Site; and 660 pounds of ORC[®] was added to the excavation areas during backfilling.

Post-excavation confirmatory subsurface soil samples were collected at the four areas. One new monitor well (MW-3R) was also installed at that time to replace MW-3, which was removed to excavate the former Storage Holder Pad (Exhibit 2-1). A soil sample was collected from the boring for the replacement monitor well. Soil samples were analyzed for a focused list of analytes, including selected VOCs, semivolatile organic compounds (SVOCs), and selected metals. ORC[®] was applied during gravel backfilling of the excavated areas to enhance natural attenuation processes and reduce groundwater concentrations. In addition, from August through September 2001, remaining buildings were demolished to ground level and removed from the Site.

2.3 Post-Interim-Action Monitoring

Post-interim-action groundwater field monitoring was conducted from July 2001 (ARCADIS G&M, Inc. 2001b) through January 2002 (ARCADIS G&M, Inc. 2002).

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Several field biogeochemical parameters were measured in selected wells to assess the effectiveness of the interim actions, particularly source removal and ORC[®] application. Samples were collected from four wells located near the excavated areas (MW-1, MW-3R, MW-5, and MW-7) in July 2001 and analyzed for BTEX. In October 2001, MW-1, MW-3R, MW-5, MW-6, and MW-7 were sampled and analyzed for BTEX and selected PAHs. Field measurements collected in January 2002 indicated that the ORC[®] was no longer releasing significant DO concentrations. Therefore, the post-interim-action groundwater monitoring event was conducted in February 2002.

Executive Summary

The Tennessee Department of Environment and Conservation – Division of Superfund (TDEC-DSF) has requested Atmos Energy Corporation (Atmos) to prepare a focused feasibility study (FFS) to document the development, screening, and detailed analysis of remedial alternatives for the Johnson City Site (Site). The FFS builds on previous investigations and interim actions including the Phase II Remedial Investigation (RI) Report, Interim Action Report, and Supplemental Groundwater Investigation and Risk Assessment Report.

The process used to prepare this FFS included the presentation of site assessment data; summarization of the risk assessment findings; determination of preliminary remediation goals (PRGs), identification of remedial action objectives (RAOs); and the identification and screening of remedial technologies applicable to the Site. Following these steps, site-wide remedial alternatives were developed and evaluated based on several criterion. Finally, a preferred remedial alternative was selected, and an associated conceptual design was developed.

The Site is located on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee. A manufactured gas plant was constructed in 1915 and was operational until 1954, when natural gas became available in Johnson City. During the 1970s, site improvements/modifications included the dismantling and removal of equipment and two buildings associated with the former manufactured gas plant operations. The Site currently occupies approximately 1.8 acres and is inactive and vacant. The Site and surrounding properties support a mix of industrial and commercial land uses. Land in the immediate vicinity is zoned heavy industrial. No private residences exist on parcels adjacent to the Site. No water-supply wells have been identified within a 0.5-mile radius of the Site.

On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order and Agreement to manage the Site under the state Voluntary Cleanup, Oversight, and Assistance Program (VOAP). Several investigations were conducted over the next several years. These investigations indicate that surficial soil and unconsolidated groundwater are impacted on site and that benzene and naphthalene extend off site to the northeast.

Based on temporal biogeochemical evaluations, multiple biodegradational processes are ongoing within the groundwater to sufficiently degrade existing constituents. The results of historical investigations that defined source areas, the interim-action removal of those source areas, the refined hydrogeologic conceptual model, and the current distribution of

groundwater impacts indicate that the existing well network is sufficient to monitor horizontal and vertical constituent concentrations and migration.

Atmos conducted an interim action in June 2001 to supplement requirements in the Consent Order and Agreement within the VOAP. The purpose of the interim action was the removal of identified coal tar mass and surrounding impacted soils to reduce the source term. Coal tar/impacted soil was excavated from four separate areas. A total of 921.36 tons of coal tar/impacted soil was excavated from these areas and transported off site for thermal treatment.

All excavations were backfilled following confirmation sampling and application of Oxygen Release Compound® (ORC®). The addition of ORC® to the former source areas was designed to increase the dissolved oxygen levels within the saturated zone, resulting in enhancement and acceleration of the natural attenuation processes at the Site. In addition, the remaining buildings were demolished to ground and/or foundation level and removed from the Site.

Results of the risk assessment indicate that there are no current complete exposure pathways for the Site, and no future risk from groundwater discharging into Brush Creek. Potential future risks/hazards include the following:

- Incidental ingestion and/or dermal contact with on-site bedrock-zone groundwater;
- Incidental ingestion and/or dermal contact with on-site surface soil;
- Inhalation of vapors migrating from on-site subsurface soil to indoor air; and
- Incidental ingestion and/or dermal contact with off-site bedrock-zone groundwater.

RAOs were designed to focus on the protection of human health and the environment for these potential future risks. Three RAOs have been developed for the Site:

Objective 1: To protect a) potential future off-site groundwater users from unacceptable risk from use of groundwater as a potable and/or industrial water source; b) future on-site industrial workers from potentially unacceptable risk from exposure to groundwater via incidental ingestion and/or dermal contact on site; c) future on-site industrial and excavation workers from potentially unacceptable risk from dermal contact with and incidental ingestion of soils; and d) future on-site industrial workers from potentially unacceptable risk from vapor migration to indoor air from subsurface soils. An excess cancer risk of 10^{-5} is selected as the appropriate risk standard for carcinogenic risks, and a HI of 1 is selected as the appropriate risk standard for non-carcinogenic risks.

Objective 2: To protect human health and the environment by minimizing the potential for expansion of the impacted area beyond its current extent.

Objective 3: To comply with federal and state applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) guidance related to remediation implementation.

Remedial technologies were selected to achieve the RAOs, screened for site-specific applicability including effectiveness, implementability, and cost, and combined to form site-wide remedial alternatives for further evaluation. The four alternatives evaluated in the FFS are:

- Alternative 1: No Action;
- Alternative 2: Land-Use Restrictions, Capping, and Monitored Natural Attenuation;
- Alternative 3: Land-Use Restrictions, Capping, Enhanced Aerobic Bioremediation, and Monitored Natural Attenuation; and
- Alternative 4: Land-Use Restrictions, Capping, Pump-and-Treat with Vacuum Enhanced Recovery, and Monitored Natural Attenuation.

Individual and comparative analyses of these alternatives were conducted to evaluate each option according to the following seven criteria:

- 1) Protection of human health, welfare, and the environment;
- 2) Compliance with ARARs;
- 3) Long-term effectiveness and permanence;
- 4) Reduction of mobility, toxicity, or volume through treatment;
- 5) Short-term effectiveness;
- 6) Implementability; and
- 7) Cost.

Two remaining criteria, state acceptance and community acceptance, will be further evaluated after TDEC-DSF and the community have reviewed the FFS.

Alternative 2 (Land-Use Restrictions, Capping, and Monitored Natural Attenuation) is recommended as the preferred remedy for the Site. Alternative 2 provides a high

degree of overall protectiveness to human health and the environment and will provide the maximum flexibility for potential site redevelopment. Alternative 2 complies with ARARs and will significantly reduce risk posed by potential future exposure pathways. Alternative 2 provides long-term effectiveness and permanence by removing the potential for exposure to COCs, and through natural attenuation processes.

The equipment and controls needed for Alternative 2 are reliable, used commonly in other remedial activities, and require minimal O&M cost. The implementation time for Alternative 2 is estimated to be less than 2 years. The time required to achieve RAOs is estimated to be 30 years. However, 5-year reviews with TDEC-DSF will allow a determination to be made whether RAOs have been met, and whether no further action is appropriate. Alternative 2 is easily implementable, and approval from TDEC-DSF is anticipated based on 1) the degree of future risk reduction provided by the remedial components; 2) flexibility for site redevelopment and/or to implement other remedial actions (if warranted); and 3) cost effectiveness.

The total construction and present worth operation and maintenance (O&M) costs for each alternative is detailed below.

Alternative 2. Land-Use Restrictions, Capping, and Monitored Natural Attenuation		Alternative 3. Land-Use Restrictions, Capping, Enhanced Aerobic Bioremediation, and Monitored Natural Attenuation		Alternative 4. Land-Use Restrictions, Capping, Pump-and-Treat with Vacuum Enhanced Recovery, and Monitored Natural Attenuation	
Capital Cost =	\$547,500	Capital Cost =	\$747,800	Capital Cost =	\$1,109,155
		EAB Injection =	\$257,700		
O&M Present Worth Cost =	\$784,600	O&M Present Worth Cost =	\$652,700	O&M Present Worth Cost =	\$1,536,500
Future Closure Cost =	\$8,700	Future Closure Cost =	\$33,400	Future Closure Cost =	\$29,200
Contingency Cost =	\$201,100	Contingency Cost =	\$253,700	Contingency Cost =	\$401,200
30-Year Est. Cost =	\$1,541,900	15-Year Est. Cost =	\$1,945,300	15-Year Est. Cost =	\$3,076,100

ARCADIS

Focused Feasibility Study

Executive Summary

Atmos and ARCADIS have prepared this FFS in accordance with TDEC-DSF VOAP requirements, and to satisfy requirements outlined in the Consent Order and Agreement. In conjunction with input from TDEC-DSF and the public, the FFS will determine future environmental actions by serving as a foundation for developing the Record of Decision and a Remedial Design.

1.0 Introduction

ARCADIS prepared this Focused Feasibility Study (FFS) on behalf of Atmos Energy Corporation (Atmos), formerly known as United Cities Gas Company (United Cities), for the Tennessee Street Former Manufactured Gas Plant (FMGP) facility (Site), located west of downtown Johnson City, Washington County, Tennessee (Figure 1-1). The FFS was prepared in accordance with requirements of the Tennessee Department of Environment and Conservation (TDEC), Division of Superfund (DSF), Voluntary Cleanup, Oversight, and Assistance Program (VOAP). The FFS process consists of the identification of remedial action objectives (RAOs) including: preliminary remediation goals (PRGs); identification, evaluation, and screening of remedial technologies; development, screening, and detailed analysis of remedial alternatives; selection of a preferred alternative; and conceptual design of the preferred remedial alternative.

This FFS Report describes the formation of remedial alternatives, screening of these alternatives (based on effectiveness, implementability, and cost), and analyses of the alternatives that pass the screening process. This screening process reduces the number of technologies requiring a detailed analysis, while retaining flexibility for choosing technologies during design. This report is based on site analytical data and existing information about currently available technologies. The findings and conclusions presented herein may be revised based on additional information and data that may be collected in the future. However, in conjunction with input from TDEC-DSF and the public, the FFS will determine future environmental actions by serving as a foundation for the Record of Decision (ROD) and a Remedial Design (RD).

This FFS examines the feasibility of various remedial alternatives for control and/or remediation of residual constituents remaining from past site operations and serves as the principal document supporting Atmos' selection of a recommended remedial alternative for the areas of concern. Atmos has previously prepared a *Phase II Remedial Investigation (RI) Report* (ARCADIS Geraghty & Miller, Inc. 2000) and a *Supplemental Groundwater Investigation and Risk Assessment Report* (ARCADIS G&M, Inc. 2003) that describe the Site, the nature and extent of impacted media, and potential risks to human health and the environment.

1.1 Physical Setting

The Site is on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee (Figures 1-1 and 1-2). The Site occupies approximately 1.8 acres and is currently

inactive and vacant. Former operation/office buildings associated with the FMGP were demolished and removed from the Site in August and September 2001. The majority of the Site is paved and fenced, and there are areas of gravel fill from the interim action (Section 2.0). The Site and surrounding terrain are generally flat and are located within the 100-year floodplain of Brush Creek (Figure 1-3).

The Site and surrounding properties remained essentially undeveloped until around 1915. Since that time, they have supported a mix of industrial and commercial activities, including the former Johnson City Foundry, which was located directly south of the Site across State of Franklin Road. Land in the immediate vicinity is zoned heavy industrial (Johnson City Zoning Code I-2) (United Cities Gas Company 1997).

The property south and southwest of the Site, across State of Franklin Road where the foundry once existed, is currently a parking lot on the campus of East Tennessee State University (ETSU) (Figure 1-3). The property west of the Site is also owned by ETSU and is currently used to stockpile coal for the university. A railroad spur operated by Norfolk Southern Railway Company and the former Thomasville Furniture manufacturing facility lie to the north. Tennessee Street and a grassy vacant lot owned by Johnson City lie east of the Site. Southeast of the Site, another grassy vacant lot lies diagonally across the intersection of State of Franklin Road and Tennessee Street (near a McDonald's restaurant). No private residences exist on parcels adjacent to the Site.

Johnson City obtains its municipal water supply from springs and surface water (Watauga River). The springs are located along Indian Creek approximately 10 miles south of the city (United States Geological Survey 1962). During previous investigations, no domestic water-supply wells were identified within a 0.5-mile radius of the Site (United Cities Gas Company 1998).

1.2 Site History

Prior to 1915, the Site was undeveloped land. A manufactured gas plant (MGP) was constructed in 1915 and was operational until 1954, when natural gas became available in Johnson City. Operation of the MGP ceased in 1954, and the Site was utilized as a service center for utility service and construction crews from 1954 to 1996. It has not been used for commercial purposes since 1996, except for equipment and vehicle storage (ARCADIS Geraghty & Miller, Inc. 2000).

During the 1970s, site improvements/modifications included the dismantling and removal of equipment and two buildings associated with FMGP operations. A total of

12 cylindrical, propane-style, aboveground storage tanks (ASTs) used for gas storage were sold and removed from the Site in 1974. In 1976, an oil AST associated with gas production processes was sold and removed from the Site (United Cities Gas Company 1998). A gasoline underground storage tank (UST) associated with the former field service and construction crew support operations was utilized until 1995, when the tank was removed under TDEC-Division of Underground Storage Tank regulations (Figure 1-2).

1.3 Investigation History

Findings from the UST closure activities indicated a potential release had occurred and further investigation was warranted (United Cities Gas Company 1997). On January 23, 1997, United Cities and TDEC-DSF signed a Consent Order and Agreement to manage the Site under the state VOAP. The *Phase I Report* was approved by TDEC-DSF on July 10, 1997 (United Cities Gas Company 1997).

A Preliminary Site Investigation (PSI) was conducted in 1997. The scope of work for the PSI included collecting and analyzing soil, residual, surface water, sediment, and groundwater samples (United Cities Gas Company 1998). A total of nine soil borings, two soil properties borings, and four FMGP residual borings were installed at the Site using direct-push technology (Figure 1-2). Groundwater evaluation was conducted by completing four of the soil borings as temporary monitor wells (GW-02 through GW-05) (Figure 1-2). One permanent, off-site monitor well (GW-01) was installed in 1996 by the City of Johnson City during an unrelated investigation at the Johnson City Continuing Education Site. Well GW-01 is approximately 600 feet (ft) west of the Site. Surface-water and sediment samples were also collected from three locations along Brush Creek to determine current conditions (Figure 1-2). Samples were analyzed for selected volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and inorganic compounds. The PSI Report was submitted to TDEC-DSF in March 1998.

ARCADIS was contracted in January 1999 to assist United Cities in the next phase of work associated with the Site. A Phase II RI was conducted during the fall of 1999 and spring of 2000. Tasks completed at the Site during 1999 included the installation of ten groundwater monitor wells (nine in the unconsolidated zone and one in the bedrock zone), and the installation of three soil borings (Figure 1-2). Soil samples collected during installation of the soil and well borings were analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) metals. Groundwater samples were

analyzed for the same analytes as the soil samples and additional biogeochemical parameters.

During February 2000, two additional bedrock groundwater monitor wells (MW-3D and MW-4D) were installed to obtain a better understanding of site conditions (Figure 1-2). Also, a 1-inch monitor well (MW-10) was installed across Tennessee Street northeast of the Site to further define downgradient off-site conditions in unconsolidated-zone groundwater (Figure 1-2). Following the installation and development of the three new monitor wells, groundwater samples were collected for field and laboratory analyses from the previously existing and new monitor wells. A focused analyte list was selected for this sampling event based on the analytical results from the October 1999 sampling event. The Phase II RI Report was approved by TDEC-DSF in September 2000 (ARCADIS Geraghty & Miller, Inc. 2000). Benzene, ethylbenzene, toluene, and xylenes (BTEX), PAHs, and specific metals were identified as preliminary constituents of potential concern (COPCs) in the Phase II RI Report. Additional groundwater monitoring was conducted during February 2001 in preparation for interim-action activities (Section 2.0).

Subsequently, ARCADIS conducted a supplemental groundwater investigation and risk assessment to further the understanding of groundwater conditions in bedrock at the Site, and to evaluate potential risks to human health and the environment associated with residual impacts from historical operations. Five additional bedrock wells and one lithologic boring were installed on and near the Site between October 28 and November 8, 2002 (Figure 1-2). Groundwater samples were collected from all 18 monitor wells and two piezometers during November 2002. Lithologic and water-level data collected during the supplemental groundwater investigation have been integrated with information obtained during the 1998 PSI and 2000 Phase II RI to formulate a conceptual model of hydrogeologic conditions at the Site.

Based on the interim-action effectiveness, biogeochemical evaluation, and assimilative capacity calculations, groundwater in the unconsolidated zone exhibits fluctuating aerobic/anaerobic conditions upgradient, a mixed aerobic/anaerobic core, and a stable aerobic buffer downgradient. The affected area is stable within the unconsolidated zone. Data suggest that significant and multiple biodegradational processes are ongoing with sufficient assimilative capacity to degrade on-site constituents. The bedrock-zone groundwater exhibits anaerobic conditions and increased bioactivity. The affected area for bedrock-zone groundwater is reduced yet stable, remains localized to the center of the Site, and possesses the natural assimilative capacity to degrade site constituents over time.

The results of historical investigations that defined source areas, the interim-action removal of those source areas, the refined hydrogeologic conceptual model, and the current distribution of groundwater impacts indicate that the existing well network is sufficient to monitor horizontal and vertical constituent concentrations and migration.



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

March 21, 2007

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

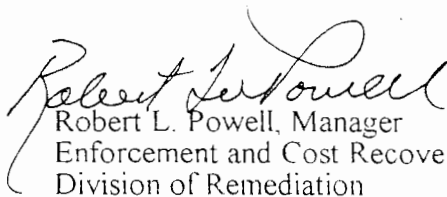
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$93.17 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 855286

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
15-MAR-07	855286	*****93.17

Void After 90 Days

PAY: Ninety-Three Dollars And 17 Cents*****

TO THE ORDER OF TENNESSEE STATE OF
401 CHURCH ST
4TH FLOOR L AND C ANNEX
DIVISION OF REMEDIATION
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈855286⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 855286

DATE: 15-MAR-07

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INVO22707	27-FEB-07	93.17	0.00	93.17
VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM, SITE ID 90-51, UNITED CITIES GAS (A				
VOAP 90-513 United Cities Gas Co. Site				

STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Date March 20, 2007 # 855286 Number 320255

Dept. ENVIRONMENT AND CONSERVATION 3/15/07 Object _____

Office/Division Remediation Sub-object _____

Address _____ Cost Center _____

Received of ATMOS Energy Corp. Cert. of Deposit No. \$93.17

For VOAP 90-513 United Cities Gas Co. Site Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by [Signature] Title ASA3

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

93.17

0.00

93.17

3553154



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Remediation
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1538

February 27, 2007

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Voluntary Oversight and Assistance Program
Site ID 90-513
United Cities Gas
Washington County

Dear Mr. Schulz:

Enclosed is the periodic billing for the above site. A statement of those costs incurred including overhead charges for a total of \$93.17 is attached. This billing includes costs posted since the last periodic billing, which may include costs incurred during prior billing cycles that were not posted until recently and, therefore, not billed previously. Any costs incurred and/or posted after the statement date will appear on subsequent billing statements. Our system has some inherent timing delays, which results in posting delays of approximately three months.

Payment should be received within thirty (30) days of the date of this letter. Payment is to be made to the **State of Tennessee, Division of Remediation at the above address**. Please include the site identification number and the paying party's name and address to insure proper credit.

Should you have any questions, please contact Teresa Lewis (615) 532-0927. Your participation in this program is appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read "Steve Goins", with a long horizontal line extending to the right.

Steve Goins, CPA
Environmental Program Manager
Administrative & Financial Operations

cc: Johnson City Environmental Field Office
Site File
Cost Recovery File
Financial File
Voluntary Section

Statement of Costs

State of Tennessee
Division of Superfund
4th Floor Annex, L & C Building
401 Church Street
Nashville, TN 37243-1538
(615) 532-0900

Site: UNITED CITIES GAS CO.
Site Number: 90513

Beginning Date Of Entries: 8/20/1996

Ending Date Of Entries: 1/30/2007

State and Voluntary

Post Date	Activity Date	Activity	Staff Name & Position	Cost
10/14/1996	8/20/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
10/14/1996	8/23/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
11/4/1996	9/12/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
11/4/1996	9/24/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
11/4/1996	9/25/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
11/4/1996	9/27/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	51.70
12/6/1996	10/1/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
12/6/1996	10/2/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
2/6/1997	10/15/1996	06 Enforcement / Legal Support	Heflin, Floyd Env Pro Sp 4	33.70
12/6/1996	10/15/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
2/6/1997	10/17/1996	06 Enforcement / Legal Support	Heflin, Floyd Env Pro Sp 4	44.93
12/6/1996	10/17/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
12/6/1996	10/18/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
1/6/1997	11/20/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
1/6/1997	11/22/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
1/6/1997	11/25/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	93.06
2/6/1997	11/25/1996	06 Enforcement / Legal Support	Heflin, Floyd Env Pro Sp 4	11.23
1/6/1997	11/26/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	93.06
2/6/1997	11/26/1996	06 Enforcement / Legal Support	Heflin, Floyd Env Pro Sp 4	11.23
1/27/1997	12/5/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	51.70
1/27/1997	12/10/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/27/1997	12/11/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/27/1997	12/12/1996	06 Enforcement / Legal Support	Grubbs, Frank Env Pro Sp 3	7.70
1/27/1997	12/12/1996	08 General Activities (Field/Office)	Hendricks, Phillip Env Pro Sp 3	51.70
1/27/1997	12/17/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
1/27/1997	12/18/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
1/27/1997	12/31/1996	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
4/10/1997	1/6/1997	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
4/10/1997	1/9/1997	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
4/10/1997	1/14/1997	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34

Current Date: 2/20/2007

90513 UNITED CITIES GAS CO.

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
4/10/1997	1/27/1997	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/31/1997	1/28/1997	PA Payment	ADMIN	-134.42
4/10/1997	2/13/1997	06 Enforcement / Legal Support	Hayes, Alan Geologist 3	14.85
4/10/1997	2/20/1997	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
4/10/1997	2/21/1997	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	59.40
4/10/1997	2/21/1997	20 Community Relations	Hendricks, Phillip Env Pro Sp 3	41.36
4/14/1997	3/17/1997	20 Community Relations	Hendricks, Phillip Env Pro Sp 3	10.34
4/14/1997	3/24/1997	04 Information to public	Hayes, Alan Geologist 3	22.27
4/14/1997	3/26/1997	04 Information to public	Hayes, Alan Geologist 3	22.27
7/24/1997	6/4/1997	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	44.55
7/24/1997	6/5/1997	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	14.85
7/24/1997	6/19/1997	03 Administration / Management	Murray, Karin Env Spec 1	17.36
12/10/1997	7/3/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/10/1997	7/3/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.93
12/10/1997	7/7/1997	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
12/10/1997	7/7/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	47.92
12/10/1997	7/8/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/10/1997	7/8/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/10/1997	7/10/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/10/1997	7/14/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/10/1997	7/14/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/10/1997	7/25/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/17/1997	8/12/1997	06 Enforcement / Legal Support	Shivas, Andrew Env Prg Mg 1	27.19
12/17/1997	8/12/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/17/1997	8/13/1997	04 Information to public	Shivas, Andrew Env Prg Mg 1	27.19
12/17/1997	8/13/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	107.65
12/17/1997	8/13/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
12/17/1997	8/13/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
12/17/1997	8/14/1997	14 Remedial Investigation/Feasibility Study	Jessee, Gay Env Spec 3	18.72
12/17/1997	8/15/1997	03 Administration / Management	Shivas, Andrew Env Prg Mg 1	27.19
12/17/1997	8/15/1997	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
12/17/1997	8/18/1997	04 Information to public	Shivas, Andrew Env Prg Mg 1	40.78
12/17/1997	8/20/1997	05 Technical Assistance	Hendricks, Phillip Env Pro Sp 3	20.68
12/17/1997	8/20/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83
12/17/1997	8/20/1997	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mg 1	21.75
12/17/1997	8/20/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/17/1997	8/21/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
9/24/1997	8/22/1997	PA Payment	ADMIN	-625.79
9/24/1997	8/22/1997	PA Payment	ADMIN	-273.89

Current Date: 2/20/2007

90513 UNITED CITIES GAS CO.

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
1/16/1998	9/8/1997	05 Technical Assistance	Hayes, Alan Geologist 3	46.11
1/16/1998	9/8/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.93
1/16/1998	9/9/1997	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/1998	9/9/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	121.11
1/16/1998	9/9/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
1/16/1998	9/10/1997	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
1/16/1998	9/10/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	65.89
1/16/1998	9/10/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83
1/16/1998	9/11/1997	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
1/16/1998	9/11/1997	05 Technical Assistance	Hayes, Alan Geologist 3	46.11
1/16/1998	9/11/1997	14 Remedial Investigation/Feasibility Study	Jessie, Gay Env Spec 3	18.72
1/16/1998	9/11/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	77.87
1/16/1998	9/11/1997	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	2.31
1/16/1998	9/12/1997	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/1998	9/18/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	26.91
1/16/1998	9/19/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	27.55
1/16/1998	9/23/1997	14 Remedial Investigation/Feasibility Study	Jessie, Gay Env Spec 3	9.36
12/22/1997	10/6/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	94.20
12/22/1997	10/6/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
12/22/1997	10/7/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83
12/22/1997	10/7/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	9.58
12/22/1997	10/8/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	107.65
12/22/1997	10/8/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/22/1997	10/9/1997	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mg 1	13.59
12/22/1997	10/9/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/22/1997	10/9/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	201.85
12/22/1997	10/10/1997	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	107.65
12/22/1997	10/13/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/22/1997	10/14/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
11/10/1997	10/30/1997	PA Payment	ADMIN	-76.76
1/16/1998	11/17/1997	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/1998	11/17/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
1/16/1998	11/18/1997	05 Technical Assistance	Hayes, Alan Geologist 3	53.79
1/16/1998	11/18/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	59.90
1/16/1998	11/18/1997	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	3.60
1/16/1998	11/19/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	62.30
1/16/1998	11/19/1997	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	2.69
1/16/1998	11/20/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
3/16/1998	12/16/1997	14 Remedial Investigation/Feasibility Study	Hendricks, Phillip Env Pro Sp 3	20.68

Current Date: 2/20/2007

90513 UNITED CITIES GAS CO.

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3/16/1998	12/22/1997	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
5/5/1998	3/2/1998	10 Cost Recovery	Murray, Karin Env Spec 1	6.11
5/5/1998	3/3/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	51.31
5/5/1998	3/4/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	36.65
5/5/1998	3/4/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.11
5/5/1998	3/5/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	24.43
5/5/1998	3/5/1998	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	96.09
5/5/1998	3/6/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	24.43
6/3/1998	4/13/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	18.33
6/3/1998	4/14/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	36.65
7/1/1998	4/17/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
7/8/1998	5/1/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
7/8/1998	5/4/1998	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/1998	5/5/1998	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/1998	5/5/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
7/8/1998	5/6/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
7/8/1998	5/7/1998	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/1998	5/8/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
7/8/1998	5/11/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	33.16
7/8/1998	5/12/1998	05 Technical Assistance	Hayes, Alan Geologist 3	86.20
7/8/1998	5/12/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
7/8/1998	5/13/1998	05 Technical Assistance	Hayes, Alan Geologist 3	94.04
7/8/1998	5/14/1998	05 Technical Assistance	Hayes, Alan Geologist 3	117.55
7/8/1998	5/14/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
6/3/1998	5/27/1998	PA Payment	ADMIN	-2,300.90
8/6/1998	6/5/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
8/6/1998	6/8/1998	10 Cost Recovery	Murray, Karin Env Spec 1	26.52
8/6/1998	6/8/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	19.89
8/6/1998	6/9/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
8/6/1998	6/10/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.63
8/6/1998	6/10/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	79.57
8/6/1998	6/11/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	19.89
8/6/1998	6/12/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	79.57
8/6/1998	6/15/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
8/6/1998	6/16/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
11/5/1998	7/22/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.11
11/5/1998	7/23/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
11/5/1998	7/24/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	1.33
11/5/1998	8/12/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.30

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11/5/1998	8/13/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.30
1/1/1999	10/23/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.63
1/20/1999	11/2/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	53.05
1/26/1999	11/5/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	33.16
1/26/1999	11/12/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	53.05
1/26/1999	11/13/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	37.13
1/26/1999	11/20/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
1/26/1999	11/20/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
1/26/1999	11/20/1998	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	82.37
1/26/1999	11/20/1998	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	151.01
1/26/1999	11/20/1998	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mg 1	69.33
4/12/1999	11/20/1998	TC Travel Claim	Murray, Karin Env Spec 1	67.35
4/12/1999	11/20/1998	TC Travel Claim	Murray, Karin Env Spec 1	22.50
4/12/1999	11/20/1998	TC Travel Claim	Murray, Karin Env Spec 1	5.50
4/12/1999	11/20/1998	TC Travel Claim	Hale, Darrel Env FO Mgr	67.35
4/12/1999	11/20/1998	TC Travel Claim	Hale, Darrel Env FO Mgr	22.50
4/12/1999	11/20/1998	TC Travel Claim	Hale, Darrel Env FO Mgr	5.50
1/26/1999	11/20/1998	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	47.52
1/26/1999	11/24/1998	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
1/26/1999	11/24/1998	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	151.01
12/21/1998	12/4/1998	PA Payment	ADMIN	-1,328.51
3/10/1999	12/16/1998	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	13.73
8/3/1999	1/22/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/1999	2/8/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/1999	2/10/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/1999	2/10/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	20.29
8/3/1999	2/10/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/1999	2/12/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/1999	2/16/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/1999	2/18/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/1999	2/25/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/1999	3/1/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
8/3/1999	3/2/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	84.01
8/3/1999	3/2/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	53.66
8/3/1999	3/5/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/1999	3/11/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/1999	3/23/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/1999	5/1/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	23.00
8/3/1999	5/12/1999	08 General Activities (Field/Office)	Banner, Chasity Student asst	13.88

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8/3/1999	5/12/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.60
8/3/1999	5/13/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	1.53
8/3/1999	5/17/1999	14 Remedial Investigation/Feasibility Study	Banner, Chasity Student asst	22.09
8/3/1999	5/18/1999	14 Remedial Investigation/Feasibility Study	Banner, Chasity Student asst	47.33
8/3/1999	5/19/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
8/3/1999	5/21/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
6/30/1999	6/1/1999	PA Payment	ADMIN	-1,167.19
8/3/1999	6/4/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	76.65
8/3/1999	6/7/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	53.66
8/3/1999	6/14/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	33.73
8/3/1999	6/15/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	61.32
8/3/1999	6/16/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	45.99
8/3/1999	6/17/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	68.99
8/3/1999	6/18/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	114.98
8/3/1999	6/21/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	76.65
8/3/1999	6/22/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	61.32
8/3/1999	6/23/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	68.99
8/3/1999	6/24/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	91.98
8/3/1999	6/25/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	107.31
8/3/1999	6/28/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	98.02
8/3/1999	6/28/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	93.51
8/3/2000	7/9/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/2000	7/12/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/2000	7/20/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	23.68
8/3/2000	7/21/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.79
8/3/2000	8/5/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.74
8/3/2000	8/12/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/2000	8/17/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	39.47
8/3/2000	8/19/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/2000	8/23/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.79
8/3/2000	8/25/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/2000	8/31/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/2000	9/2/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	26.84
8/2/2000	9/3/1999	05 Technical Assistance	Jobe, Charles Env Spec 4	17.96
8/3/2000	9/3/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	58.42
8/3/2000	9/7/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	86.83
8/2/2000	9/8/1999	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/2/2000	9/9/1999	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/3/2000	9/9/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	59.99

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8/2/2000	9/10/1999	05 Technical Assistance	Jobe, Charles Env Spec 4	44.89
8/3/2000	9/10/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	63.15
8/3/2000	9/13/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	39.47
8/2/2000	9/14/1999	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/3/2000	9/14/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	71.05
11/17/1999	9/14/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	56.01
3/8/2000	10/5/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.74
3/8/2000	10/18/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	210.04
3/8/2000	10/18/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	1.91
3/8/2000	10/19/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	47.36
3/8/2000	10/19/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/2000	10/19/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/2000	10/20/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	20.52
3/8/2000	10/20/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	28.00
3/8/2000	10/20/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/2000	10/21/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/2000	10/21/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/2000	10/22/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	70.01
3/8/2000	10/22/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/2000	10/26/1999	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/2000	10/26/1999	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/2000	10/27/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/2000	11/3/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/2000	11/4/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/2000	11/22/1999	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	30.00
4/6/2000	12/21/1999	08 General Activities (Field/Office)	Nail, Jason Geologist 1	27.87
4/6/2000	1/12/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
4/6/2000	1/20/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
4/6/2000	1/21/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
8/4/2000	2/3/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93
8/4/2000	2/7/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	83.60
8/4/2000	2/7/2000	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/4/2000	2/7/2000	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	2.67
8/4/2000	2/8/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	76.64
8/4/2000	2/8/2000	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/4/2000	2/8/2000	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	4.13
8/4/2000	2/9/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	55.74
8/4/2000	2/9/2000	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	1.70
8/4/2000	2/10/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93

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2/23/2000	2/18/2000	PA Payment	ADMIN	-2,301.52
8/4/2000	3/13/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
8/4/2000	4/25/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	6.97
8/4/2000	4/27/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93
8/4/2000	5/1/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	104.50
8/4/2000	5/3/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	90.57
8/4/2000	5/4/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	98.02
8/4/2000	5/4/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	76.64
8/4/2000	5/5/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	154.03
8/4/2000	5/5/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	62.70
8/4/2000	5/5/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	210.04
8/4/2000	5/8/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
8/4/2000	5/11/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
8/4/2000	5/12/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	55.74
8/4/2000	5/15/2000	08 General Activities (Field/Office)	Nail, Jason Geologist 1	48.77
8/4/2000	5/16/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	62.70
8/4/2000	5/17/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	84.01
8/4/2000	5/17/2000	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	86.83
8/4/2000	5/17/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	69.67
8/4/2000	5/19/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	6.97
8/4/2000	5/22/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	69.67
8/4/2000	5/22/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	13.93
8/4/2000	6/1/2000	06 Enforcement / Legal Support	Lilly, John Env Spec 4	10.39
8/4/2000	6/1/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	6.97
8/4/2000	6/2/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	13.93
8/4/2000	6/5/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	34.83
8/4/2000	6/6/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	27.87
8/4/2000	6/19/2000	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	41.80
5/21/2001	7/24/2000	08 General Activities (Field/Office)	Nail, Jason GEOLOGIST 1	14.42
5/21/2001	7/25/2000	08 General Activities (Field/Office)	Nail, Jason GEOLOGIST 1	14.42
7/9/2001	9/6/2000	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	18.58
7/9/2001	9/8/2000	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/2001	9/11/2000	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/2001	9/12/2000	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/2001	9/12/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO MG	57.96
7/9/2001	9/12/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO MG	57.96
7/9/2001	9/12/2000	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.40
7/9/2001	9/14/2000	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	27.87
7/9/2001	9/14/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO MG	43.47

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7/9/2001	9/14/2000	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	43.47
7/9/2001	9/14/2000	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	0.70
7/9/2001	9/18/2000	17 Remedial Action	MATTRAW, HAROLD GEOLOGIST 3	65.03
11/9/2000	10/20/2000	PA Payment	ADMIN	-2,578.58
8/27/2001	11/20/2000	12 Preliminary Assessment	MATTRAW, HAROLD GEOLOGIST 3	65.03
8/27/2001	11/21/2000	12 Preliminary Assessment	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/15/2001	2/1/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/2001	2/6/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/15/2001	2/7/2001	05 Technical Assistance	Murray, Karin ENV SPRC 3	16.50
10/15/2001	2/7/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/15/2001	2/8/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	55.74
10/15/2001	2/15/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/2001	2/21/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/2001	2/23/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/2001	2/26/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/15/2001	2/26/2001	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	115.93
10/15/2001	2/26/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.87
10/15/2001	2/27/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	102.20
10/15/2001	2/27/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	3.37
8/31/2001	3/29/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/9/2001	4/2/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	65.03
10/9/2001	4/10/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/25/2001	4/16/2001	LB Lab	ADMIN	350.00
10/9/2001	4/18/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/9/2001	4/19/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
8/31/2001	6/4/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.29
8/31/2001	6/4/2001	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	14.49
8/31/2001	6/11/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	102.20
8/31/2001	6/11/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.38
8/31/2001	6/13/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	109.63
8/31/2001	6/13/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.57
8/31/2001	6/14/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	135.64
8/31/2001	6/14/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.55
8/31/2001	6/18/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	118.92
8/31/2001	6/18/2001	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	57.96
8/31/2001	6/18/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.90
8/31/2001	6/19/2001	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	115.93
8/31/2001	6/19/2001	TR Travel Expense(State Vehicle)	Hale, Darrel ENV FO MG	3.11
8/31/2001	6/20/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	128.21

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8/31/2001	6/20/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.76
8/31/2001	6/21/2001	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	43.47
8/31/2001	6/21/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	126.35
8/31/2001	6/21/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.14
8/31/2001	6/22/2001	08 General Activities (Field/Office)	MATTRAW, HAROLD GEOLOGIST 3	74.32
8/31/2001	6/22/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.29
8/31/2001	6/25/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	81.76
8/31/2001	6/25/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.14
8/31/2001	6/26/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	137.50
8/31/2001	6/26/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.43
8/31/2001	6/27/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
8/31/2001	6/27/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.00
8/31/2001	6/28/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
1/28/2002	7/2/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/2002	7/9/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
1/28/2002	7/10/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/2002	7/11/2001	01 Program Development and Planning	MATTRAW, HAROLD GEOLOGIST 3	102.85
1/28/2002	7/11/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.76
1/28/2002	7/18/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
10/15/2001	7/30/2001	LB Lab	ADMIN	616.00
10/15/2001	7/30/2001	LB Lab	ADMIN	674.00
10/15/2001	8/6/2001	LB Lab	ADMIN	700.00
10/15/2001	8/6/2001	LB Lab	ADMIN	175.00
1/28/2002	8/8/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
1/28/2002	8/9/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/2002	8/9/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.95
1/28/2002	8/20/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	26.66
8/14/2002	8/20/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.86
2/4/2002	9/4/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/4/2002	9/5/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	66.66
2/4/2002	9/10/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
2/4/2002	9/11/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
2/4/2002	9/11/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	4.87
2/4/2002	9/12/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
2/4/2002	9/13/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	137.13
2/4/2002	9/18/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
2/4/2002	9/24/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
10/18/2001	10/1/2001	LB Lab	ADMIN	175.00
10/18/2001	10/1/2001	LB Lab	ADMIN	175.00

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2/12/2002	10/9/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/12/2002	10/10/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	47.62
2/12/2002	10/10/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.87
2/12/2002	10/23/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/15/2002	11/8/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
2/15/2002	11/8/2001	14 Remedial Investigation/Feasibility Study	Banner, Chasly ENV SPEC 3	35.64
2/15/2002	11/8/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.21
1/1/19/2001	11/9/2001	LB Lab	ADMIN	175.00
2/15/2002	11/28/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
2/15/2002	11/29/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
3/7/2002	12/4/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	66.66
3/7/2002	12/4/2001	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.40
3/7/2002	12/6/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
3/7/2002	12/18/2001	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
5/7/2002	1/2/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
1/25/2002	1/3/2002	LB Lab	Other	175.00
1/25/2002	1/3/2002	LB Lab	Other	175.00
5/7/2002	1/8/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	76.19
5/7/2002	1/11/2002	08 General Activities (Field/Office)	MATTRAW, HAROLD GEOLOGIST 3	20.95
5/7/2002	1/14/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
5/7/2002	1/17/2002	17 Remedial Action	MATTRAW, HAROLD GEOLOGIST 3	19.05
5/7/2002	1/31/2002	17 Remedial Action	MATTRAW, HAROLD GEOLOGIST 3	30.47
5/21/2002	2/4/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
2/14/2002	2/8/2002	OP Overhead Payment	Other	-2,363.54
2/14/2002	2/8/2002	PA Payment	Other	-5,513.74
5/21/2002	2/11/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	41.90
5/21/2002	2/12/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	95.23
5/21/2002	2/12/2002	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.68
5/21/2002	2/13/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
5/21/2002	2/14/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
5/21/2002	2/19/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
5/23/2002	3/21/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
5/23/2002	3/27/2002	08 General Activities (Field/Office)	MATTRAW, HAROLD GEOLOGIST 3	19.05
8/14/2002	4/4/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.86
8/14/2002	4/5/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.90
8/14/2002	4/17/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.90
8/14/2002	4/29/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.90
8/14/2002	5/8/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.95
5/21/2002	5/16/2002	PA Payment	Other	-1,811.96

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8/15/2002	6/3/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.90
8/15/2002	6/4/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.90
8/15/2002	6/10/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.95
8/15/2002	6/13/2002	22 Risk Assessment	MATTRAW, HAROLD GEOLOGIST 3	49.75
8/15/2002	6/26/2002	17 Remedial Action	RICE, JAMES ENV SPEC 3	35.70
8/15/2002	6/27/2002	17 Remedial Action	RICE, JAMES ENV SPEC 3	142.79
8/15/2002	6/28/2002	17 Remedial Action	RICE, JAMES ENV SPEC 3	133.86
10/30/2002	7/5/2002	17 Remedial Action	RICE, JAMES	62.47
10/30/2002	7/8/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
10/30/2002	7/8/2002	14 Remedial Investigation/Feasibility Study	Hale, Darrel	29.71
10/30/2002	7/8/2002	17 Remedial Action	RICE, JAMES	116.01
10/30/2002	7/8/2002	22 Risk Assessment	Parman, Bradley	60.82
10/30/2002	7/9/2002	22 Risk Assessment	Parman, Bradley	60.82
10/30/2002	7/10/2002	17 Remedial Action	RICE, JAMES	89.24
10/30/2002	7/10/2002	22 Risk Assessment	Parman, Bradley	111.51
10/30/2002	7/11/2002	22 Risk Assessment	Parman, Bradley	152.06
10/30/2002	7/12/2002	22 Risk Assessment	Parman, Bradley	60.82
10/30/2002	7/15/2002	17 Remedial Action	RICE, JAMES	80.32
10/30/2002	7/15/2002	22 Risk Assessment	Parman, Bradley	60.82
10/30/2002	7/16/2002	17 Remedial Action	RICE, JAMES	8.92
10/30/2002	7/16/2002	22 Risk Assessment	Parman, Bradley	81.10
10/30/2002	7/17/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	47.76
7/22/2002	7/17/2002	OP Overhead Payment	Other	-310.74
7/22/2002	7/17/2002	PA Payment	Other	-259.66
10/30/2002	7/18/2002	14 Remedial Investigation/Feasibility Study	Hale, Darrel	89.12
10/30/2002	7/18/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	69.65
10/30/2002	7/18/2002	17 Remedial Action	RICE, JAMES	53.55
10/30/2002	7/22/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
10/30/2002	7/22/2002	14 Remedial Investigation/Feasibility Study	Hale, Darrel	59.41
10/30/2002	7/22/2002	17 Remedial Action	RICE, JAMES	35.70
10/30/2002	7/22/2002	22 Risk Assessment	Parman, Bradley	30.41
10/30/2002	7/23/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	27.86
10/30/2002	7/23/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	39.80
10/30/2002	7/23/2002	17 Remedial Action	RICE, JAMES	26.77
10/30/2002	7/24/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	79.60
10/30/2002	7/24/2002	14 Remedial Investigation/Feasibility Study	Hale, Darrel	118.83
10/30/2002	7/24/2002	17 Remedial Action	RICE, JAMES	151.71
10/30/2002	7/24/2002	22 Risk Assessment	Parman, Bradley	10.14
10/30/2002	7/25/2002	05 Technical Assistance	Hale, Darrel	29.71

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10/30/2002	7/25/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
10/30/2002	7/25/2002	17 Remedial Action	Rice, James	116.01
10/30/2002	7/29/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
10/30/2002	7/29/2002	17 Remedial Action	Rice, James	133.86
10/30/2002	7/30/2002	17 Remedial Action	Rice, James	8.92
10/30/2002	7/31/2002	17 Remedial Action	Rice, James	17.85
8/15/2002	8/5/2002	LB Lab	Other	980.00
10/30/2002	8/12/2002	14 Remedial Investigation/Feasibility Study	Rice, James	8.92
1/10/2003	9/20/2002	08 General Activities (Field/Office)	Rice, James	80.32
1/10/2003	9/25/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
1/10/2003	9/25/2002	14 Remedial Investigation/Feasibility Study	Rice, James	44.62
1/10/2003	9/26/2002	14 Remedial Investigation/Feasibility Study	Rice, James	53.55
1/10/2003	9/30/2002	14 Remedial Investigation/Feasibility Study	Rice, James	62.47
1/10/2003	10/1/2002	14 Remedial Investigation/Feasibility Study	Rice, James	26.77
1/10/2003	10/2/2002	14 Remedial Investigation/Feasibility Study	Rice, James	8.92
1/10/2003	10/28/2002	14 Remedial Investigation/Feasibility Study	Rice, James	8.92
1/10/2003	10/28/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
1/10/2003	10/28/2002	TR Travel Expense(State Vehicle)	Rice, James	1.93
1/10/2003	10/29/2002	14 Remedial Investigation/Feasibility Study	Rice, James	17.85
1/10/2003	10/30/2002	14 Remedial Investigation/Feasibility Study	Rice, James	89.24
1/10/2003	10/31/2002	14 Remedial Investigation/Feasibility Study	Hicks, Mary	44.54
1/10/2003	10/31/2002	14 Remedial Investigation/Feasibility Study	Rice, James	89.24
1/10/2003	10/31/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	105.48
1/10/2003	10/31/2002	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD	1.23
1/10/2003	10/31/2002	TR Travel Expense(State Vehicle)	Hicks, Mary	1.93
4/9/2003	11/1/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	79.60
4/9/2003	11/1/2002	14 Remedial Investigation/Feasibility Study	Hicks, Mary	62.36
4/9/2003	11/1/2002	TR Travel Expense(State Vehicle)	Hicks, Mary	3.30
4/9/2003	11/1/2002	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD	1.54
4/9/2003	11/4/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	39.80
4/9/2003	11/4/2002	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD	2.20
4/9/2003	11/5/2002	14 Remedial Investigation/Feasibility Study	Rice, James	71.39
4/9/2003	11/5/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	59.70
11/12/2002	11/5/2002	OP Overhead Payment	Other	-227.58
11/12/2002	11/5/2002	PA Payment	Other	-1,517.22
4/9/2003	11/6/2002	14 Remedial Investigation/Feasibility Study	Rice, James	71.39
4/9/2003	11/7/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	19.90
4/9/2003	11/7/2002	14 Remedial Investigation/Feasibility Study	Lilly, John	75.97
4/9/2003	11/8/2002	14 Remedial Investigation/Feasibility Study	Lilly, John	218.71

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4/9/2003	11/8/2002	TR Travel Expense(State Vehicle)	Lilly, John	4.18
4/9/2003	11/12/2002	14 Remedial Investigation/Feasibility Study	Rice, James	133.86
4/9/2003	11/13/2002	14 Remedial Investigation/Feasibility Study	Rice, James	17.85
4/9/2003	11/14/2002	14 Remedial Investigation/Feasibility Study	Rice, James	44.62
4/9/2003	11/20/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	167.17
4/9/2003	11/20/2002	14 Remedial Investigation/Feasibility Study	Hale, Darrel	103.97
4/9/2003	11/21/2002	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	39.80
4/9/2003	11/22/2002	14 Remedial Investigation/Feasibility Study	Rice, James	17.85
4/23/2003	12/10/2002	14 Remedial Investigation/Feasibility Study	Rice, James	8.92
7/2/2003	1/6/2003	14 Remedial Investigation/Feasibility Study	Rice, James	150.57
7/2/2003	1/7/2003	14 Remedial Investigation/Feasibility Study	Rice, James	70.27
7/2/2003	1/28/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	21.42
7/2/2003	1/30/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	21.42
7/15/2003	3/4/2003	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
7/15/2003	3/19/2003	14 Remedial Investigation/Feasibility Study	Rice, James	20.08
7/15/2003	3/21/2003	14 Remedial Investigation/Feasibility Study	Hale, Darrel	167.08
7/15/2003	3/24/2003	22 Risk Assessment	Lilly, John	191.65
3/23/2004	3/24/2003	LB Lab	Other	1,422.00
3/26/2003	3/24/2003	OP Overhead Payment	Other	-432.99
3/26/2003	3/24/2003	PA Payment	Other	-2,886.61
7/15/2003	3/25/2003	14 Remedial Investigation/Feasibility Study	Lilly, John	246.04
7/15/2003	3/26/2003	14 Remedial Investigation/Feasibility Study	Lilly, John	258.99
7/15/2003	3/27/2003	14 Remedial Investigation/Feasibility Study	Lilly, John	129.49
10/8/2003	4/1/2003	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
10/8/2003	4/9/2003	14 Remedial Investigation/Feasibility Study	Rice, James	120.46
10/8/2003	4/14/2003	14 Remedial Investigation/Feasibility Study	Rice, James	100.38
10/8/2003	4/15/2003	14 Remedial Investigation/Feasibility Study	Rice, James	91.23
10/8/2003	4/16/2003	22 Risk Assessment	Parman, Bradley	20.08
10/8/2003	4/24/2003	08 General Activities (Field/Office)	Rice, James	45.62
10/8/2003	4/24/2003	22 Risk Assessment	Parman, Bradley	20.08
10/8/2003	4/29/2003	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
10/8/2003	4/30/2003	14 Remedial Investigation/Feasibility Study	Rice, James	45.62
10/14/2003	5/7/2003	22 Risk Assessment	Parman, Bradley	45.62
10/14/2003	5/13/2003	22 Risk Assessment	Parman, Bradley	91.23
10/14/2003	5/14/2003	22 Risk Assessment	Parman, Bradley	68.43
10/14/2003	5/23/2003	22 Risk Assessment	Parman, Bradley	22.81
10/14/2003	5/27/2003	14 Remedial Investigation/Feasibility Study	Rice, James	20.08
10/14/2003	6/3/2003	14 Remedial Investigation/Feasibility Study	Rice, James	10.04

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10/14/2003	6/4/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	21.42
10/14/2003	6/5/2003	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
10/14/2003	6/12/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	21.42
10/14/2003	6/24/2003	14 Remedial Investigation/Feasibility Study	Rice, James	60.23
6/26/2003	6/24/2003	OP Overhead Payment	Other	-186.62
6/26/2003	6/24/2003	PA Payment	Other	-1,244.08
10/14/2003	6/26/2003	14 Remedial Investigation/Feasibility Study	Rice, James	140.54
10/14/2003	6/30/2003	14 Remedial Investigation/Feasibility Study	Rice, James	140.54
10/29/2003	7/2/2003	14 Remedial Investigation/Feasibility Study	Rice, James	20.08
10/29/2003	7/8/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	107.10
10/29/2003	7/8/2003	14 Remedial Investigation/Feasibility Study	Rice, James	120.46
10/29/2003	7/8/2003	14 Remedial Investigation/Feasibility Study	Hale, Darrel	183.78
10/29/2003	7/9/2003	04 Information to public	Rice, James	20.08
10/29/2003	7/9/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	179.92
10/29/2003	7/10/2003	14 Remedial Investigation/Feasibility Study	Rice, James	90.34
10/29/2003	7/10/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	199.20
10/29/2003	7/14/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	94.25
10/29/2003	7/14/2003	14 Remedial Investigation/Feasibility Study	Rice, James	30.11
11/12/2003	8/27/2003	14 Remedial Investigation/Feasibility Study	Rice, James	50.19
11/12/2003	8/28/2003	14 Remedial Investigation/Feasibility Study	Rice, James	90.34
3/3/2004	9/3/2003	22 Risk Assessment	Parman, Bradley	11.40
10/20/2003	10/14/2003	OP Overhead Payment	Other	-33.12
10/20/2003	10/14/2003	PA Payment	Other	-1,287.05
3/3/2004	11/6/2003	14 Remedial Investigation/Feasibility Study	Rice, James	30.11
3/3/2004	11/10/2003	14 Remedial Investigation/Feasibility Study	Rice, James	140.54
3/3/2004	11/12/2003	14 Remedial Investigation/Feasibility Study	Rice, James	120.46
3/3/2004	11/13/2003	14 Remedial Investigation/Feasibility Study	Rice, James	140.54
3/3/2004	11/17/2003	14 Remedial Investigation/Feasibility Study	Rice, James	200.77
3/3/2004	11/18/2003	14 Remedial Investigation/Feasibility Study	Rice, James	40.15
3/3/2004	11/19/2003	14 Remedial Investigation/Feasibility Study	Rice, James	150.57
3/3/2004	11/20/2003	14 Remedial Investigation/Feasibility Study	Rice, James	130.50
3/3/2004	11/24/2003	14 Remedial Investigation/Feasibility Study	Rice, James	150.57
3/3/2004	11/24/2003	14 Remedial Investigation/Feasibility Study	Hale, Darrel	33.42
3/3/2004	11/25/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	74.97
3/3/2004	11/25/2003	14 Remedial Investigation/Feasibility Study	Rice, James	100.38
3/3/2004	11/26/2003	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD	85.68
3/3/2004	11/26/2003	14 Remedial Investigation/Feasibility Study	Rice, James	20.08
4/27/2004	2/10/2004	14 Remedial Investigation/Feasibility Study	Rice, James	70.27
4/27/2004	2/11/2004	14 Remedial Investigation/Feasibility Study	Rice, James	20.08

Current Date: 2/20/2007

90513 UNITED CITIES GAS CO.

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
7/12/2004	3/8/2004	04 Information to public	Rice, James	10.04
7/12/2004	3/31/2004	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
8/6/2004	4/6/2004	14 Remedial Investigation/Feasibility Study	Rice, James	30.11
4/14/2004	4/13/2004	OP Overhead Payment	Other	-721.23
4/14/2004	4/13/2004	PA Payment	Other	-1,935.71
8/6/2004	4/14/2004	14 Remedial Investigation/Feasibility Study	Rice, James	60.23
4/19/2004	4/14/2004	OP Overhead Payment	Other	-721.23
4/19/2004	4/14/2004	PA Payment	Other	-3,741.98
8/6/2004	4/16/2004	14 Remedial Investigation/Feasibility Study	MATTEAW, HAROLD	21.42
8/6/2004	5/20/2004	04 Information to public	Rice, James	60.23
8/6/2004	5/21/2004	14 Remedial Investigation/Feasibility Study	MATTEAW, HAROLD	10.71
8/13/2004	6/1/2004	08 General Activities (Field/Office)	Rice, James	30.11
8/13/2004	6/14/2004	14 Remedial Investigation/Feasibility Study	Rice, James	10.04
12/17/2004	9/7/2004	14 Remedial Investigation/Feasibility Study	Rice, James	134.42
12/17/2004	9/9/2004	14 Remedial Investigation/Feasibility Study	Rice, James	20.68
12/17/2004	9/13/2004	14 Remedial Investigation/Feasibility Study	Rice, James	31.02
12/17/2004	9/13/2004	16 Remedial Design	Hale, Darrel	189.28
12/17/2004	9/17/2004	14 Remedial Investigation/Feasibility Study	Rice, James	41.36
12/17/2004	9/21/2004	14 Remedial Investigation/Feasibility Study	Rice, James	20.68
12/17/2004	9/29/2004	14 Remedial Investigation/Feasibility Study	Rice, James	20.68
12/17/2004	9/30/2004	14 Remedial Investigation/Feasibility Study	Rice, James	31.02
12/21/2004	10/5/2004	14 Remedial Investigation/Feasibility Study	Rice, James	113.74
12/21/2004	10/5/2004	TR Travel Expense(State Vehicle)	Rice, James	4.51
12/21/2004	10/6/2004	14 Remedial Investigation/Feasibility Study	Rice, James	62.04
12/21/2004	10/7/2004	14 Remedial Investigation/Feasibility Study	Rice, James	41.36
12/21/2004	10/11/2004	14 Remedial Investigation/Feasibility Study	Rice, James	196.45
12/21/2004	10/12/2004	14 Remedial Investigation/Feasibility Study	Rice, James	165.44
3/1/2005	11/10/2004	14 Remedial Investigation/Feasibility Study	Rice, James	10.92
3/1/2005	12/6/2004	14 Remedial Investigation/Feasibility Study	Rice, James	10.92
3/1/2005	12/9/2004	14 Remedial Investigation/Feasibility Study	Rice, James	21.85
6/15/2005	2/2/2005	14 Remedial Investigation/Feasibility Study	Rice, James	98.31
6/30/2005	3/29/2005	04 Information to public	Rice, James	87.39
7/19/2005	4/4/2005	04 Information to public	Rice, James	10.92
7/19/2005	4/7/2005	14 Remedial Investigation/Feasibility Study	Rice, James	10.92
7/19/2005	4/11/2005	14 Remedial Investigation/Feasibility Study	Rice, James	32.77
4/18/2005	4/15/2005	PA Payment	Other	-645.46
7/27/2005	5/3/2005	15 Record of Decision	Rice, James	21.85
7/27/2005	5/5/2005	15 Record of Decision	Rice, James	10.92
7/27/2005	5/11/2005	15 Record of Decision	Rice, James	163.85

Current Date: 7/20/2007

90513 UNITED CITIES GAS CO.

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
11/30/2005	7/5/2005	15 Record of Decision	Rice, James	33.75
12/6/2005	8/15/2005	03 Administration / Management	Rice, James	22.50
1/9/2006	9/1/2005	05 Technical Assistance	Rice, James	11.25
2/8/2006	10/5/2005	15 Record of Decision	Rice, James	11.25
2/8/2006	10/10/2005	15 Record of Decision	Rice, James	135.00
2/8/2006	10/11/2005	15 Record of Decision	Rice, James	191.25
2/8/2006	10/12/2005	15 Record of Decision	Rice, James	191.25
2/8/2006	10/13/2005	15 Record of Decision	Rice, James	135.00
2/8/2006	10/17/2005	15 Record of Decision	Rice, James	146.25
2/8/2006	10/19/2005	15 Record of Decision	Rice, James	112.50
2/8/2006	10/20/2005	15 Record of Decision	Rice, James	22.50
2/8/2006	10/20/2005	15 Record of Decision	Hale, Darrel	131.06
2/27/2006	11/9/2005	04 Information to public	Rice, James	33.75
2/27/2006	11/21/2005	04 Information to public	Rice, James	56.25
2/27/2006	11/23/2005	04 Information to public	Rice, James	56.25
2/27/2006	11/28/2005	15 Record of Decision	Randolph, John	83.39
2/27/2006	11/30/2005	15 Record of Decision	Randolph, John	62.54
2/27/2006	12/5/2005	20 Community Relations	Rice, James	22.50
12/19/2005	12/16/2005	PA Payment	Other	-502.47
3/15/2006	1/17/2006	15 Record of Decision	Rice, James	11.25
3/15/2006	1/18/2006	15 Record of Decision	Rice, James	33.75
3/15/2006	1/23/2006	15 Record of Decision	Rice, James	45.00
6/1/2006	3/28/2006	16 Remedial Design	Rice, James	11.25
6/1/2006	3/30/2006	04 Information to public	Rice, James	56.25
4/21/2006	4/18/2006	PA Payment	Other	-1,315.09
10/25/2006	7/7/2006	04 Information to public	Hale, Darrel	40.51
7/31/2006	7/25/2006	OP Overhead Payment	Other	-7.29
7/31/2006	7/25/2006	PA Payment	Other	-458.09
10/25/2006	7/31/2006	10 Cost Recovery	Rice, James	11.85
12/8/2006	8/7/2006	03 Administration / Management	Rice, James	11.85
12/8/2006	8/10/2006	03 Administration / Management	Rice, James	11.85
10/13/2006	10/9/2006	OP Overhead Payment	Other	-10.13
10/13/2006	10/9/2006	PA Payment	Other	-67.50
2/9/2007	10/16/2006	16 Remedial Design	Hale, Darrel	40.51
2/9/2007	10/30/2006	16 Remedial Design	Hale, Darrel	40.51
1/31/2007	1/30/2007	OP Overhead Payment	Other	-11.41
1/31/2007	1/30/2007	PA Payment	Other	-76.06

Site Totals									
Salaries	Travel	Professional	Lab	Misc	Payments & Refunds		OHChg	OHPay	Total Amount Due
28,006.86	332.40	0.00	5,792.00	0.00	-34,050.24		5,038.03	-5,025.88	93.17



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

January 30, 2007

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

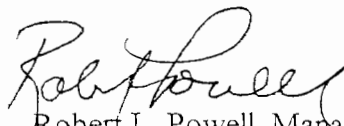
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$87.47 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 843320

DATE: 26-JAN-07

VENDOR NAME: DEPARTMENT OF ENVIR.

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV122006 SITE ID # 90-513--MR. STUART SCHULZ	20-DEC-06	87.47	0.00	87.47
TO: DEPT. OF ENVIR. NOVEMBER 10 2007				
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		87.47	0.00	87.47

3520361

Date Jan. 30 2007 STAT OF TENNESSEE - CASH RECEIPT VOUCHER
 Dept. ENVIRONMENT AND CONSERVATION # 843320 Number 320207
 Office/Division Remediation 1-26-07 Object _____
 Address _____ Sub-object _____
 Received of Atmos Energy Corp. Cost Center _____
Eighty-seven and 47/100 Cert. of Deposit No. _____
 For VOAP 90-513 United Cities Gas \$ 87.47 Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Teresa J. Ellis
 Title APPY

FA-0628

AMARILLO NATIONAL BANK
 Amarillo, TX

Rec.# 320207

NO. 843320

Atmos Energy Corporation
 PO Box 650205
 Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
26-JAN-07	843320	*****87.47

Void After 90 Days

PAY: Eighty-Seven Dollars And 47 Cents*****

TO THE DEPARTMENT OF ENVIRONMENT
 ORDER OF AND CONSERVATION
 DIVISION OF SUPERFUND
 4TH FLOOR L AND C ANNEX
 NASHVILLE, TN 37243 1538
 United States

John P. Reddy
 AUTHORIZED SIGNATURE

⑈843320⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 843320

DATE: 26-JAN-07

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV122006 SITE ID # 90-513--MR.STUART SCHULZ	20-DEC-06	87.47	0.00	87.47
10 10 11 DE NOV 2007 DIVISION OF REMEDIATION				

VENDOR NO: 229841

VENDOR NAME: DEPARTMENT OF ENVIRONMENT

DATE: 26-JAN-07

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV122006 SITE ID # 90-513--MR. STUART SCHULZ	20-DEC-06	87.47	0.00	87.47
2007 JAN 20 PM 10:01 DISCOUNT AMOUNT				
				87.47

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

3520361



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

October 10, 2006

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

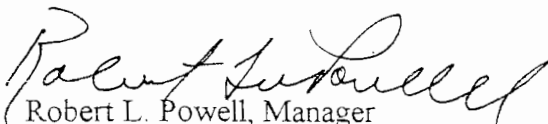
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$77.63 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 815232

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
03-OCT-06	815232	*****77.63

Void After 90 Days

PAY: Seventy-Seven Dollars And 63 Cents*****

TO THE ORDER OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND
401 CHURCH STREET
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈815232⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 815232

DATE: 03-OCT-06

VENDOR NAME: TENNESSEE DEPARTMENT

VENDOR NO: 223238

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV092006 OVERHEAD CHARGES	20-SEP-06	77.63	0.00	77.63

42
Voap 90-513
United Cities Gas Site

Date Oct. 9, 2006 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
Dept. ENVIRONMENT AND CONSERVATION # 815232 Number 316651
Office/Division Remediation 10/3/06
Address _____
Received of ATMOS Energy Corporation \$ 77.63
Seventy seven and 63/100 Dollars
For Voap 90-513, United Cities Gas Co. Site

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by John M. Bateman

Title ASA?



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

July 25, 2006

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$465.38 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert L. Powell".

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 796985

DATE: 20-JUL-06

VENDOR NAME: TENNESSEE DEPARTMENT

VENDOR NO: 223238

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV060906 SITE ID 90-513	09-JUN-06	465.38	0.00	465.38
		465.38	0.00	465.38

2006 JUL 25 AM 9:08
DIVISION OF REMEDIATION

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

3400277

Date July 25, 2006 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
 Dept. ENVIRONMENT AND CONSERVATION # 796985 Number 316627
 Office/Division Remediation 7-20-06 Object _____
 Address _____ Sub-object _____
 Received of Atmos Energy Corp. Cost Center _____
Four hundred sixty-five and 38/100 Cert. of Deposit No. _____
 For WPP 90-513 United Cities Gas \$ 465.38 Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Teresa V. Lewis

Title ASAC

FA-0628

AMARILLO NATIONAL BANK
 Amarillo, TX

NO. 796985

Atmos Energy Corporation
 PO Box 650205
 Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
20-JUL-06	796985	*****465.38

Void After 90 Days

PAY: Four Hundred Sixty-Five Dollars And 38 Cents *****

TO THE ORDER OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DIV OF SUPERFUND
 4TH FLOOR L AND C ANNEX
 401 CHURCH STREET
 NASHVILLE, TN 37243-1538
 United States

John P. Reddy
 AUTHORIZED SIGNATURE

⑈796985⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 796985

DATE: 20-JUL-06

VENDOR NAME: TENNESSEE DEPARTMENT

VENDOR NO: 223238

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INVO60906 SITE ID 90-513	09-JUN-06	465.38	0.00	465.38



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

April 18, 2006

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$1,315.09 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 773130

DATE: 12-APR-06

VENDOR NAME: DEPARTMENT OF ENVIR

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV030306 SH: EIB//VOLUNTARY OVERSIGHT	03-MAR-06	1,315.09	0.00	1,315.09
AND ASSISTANCE PROGRAM, SITE ID 90-513				
DIVISION OF REMEDIATION 2006 APR 18 AM 9:11				
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		1,315.09	0.00	1,315.09

3345211

Date April 18, 2006 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
 Dept. ENVIRONMENT AND CONSERVATION # 773130 Number 314609
 Office/Division Remediation 4-12-06 Object _____
 Address _____ Sub-object _____
 Received of Atmos Energy Corp. Cost Center _____
One thousand three hundred fifteen and 09/100 Cert. of Deposit No. _____
 For VOAP 90-513 United Cities Gas \$ 1,315.09 Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

FA-0628

Received by Theresa N. Jenkins
 Title ASAY

AMARILLO NATIONAL BANK
 Amarillo, TX

cc.# 314609

NO. 773130

Atmos Energy Corporation
 PO Box 650205
 Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
12-APR-06	773130	*****1,315.09

Void After 90 Days

PAY: One Thousand Three Hundred Fifteen Dollars And 09 Cents *****

TO THE ORDER OF DEPARTMENT OF ENVIRONMENT
 AND CONSERVATION
 DIVISION OF SUPERFUND
 4TH FLOOR LAND C ANNEX
 NASHVILLE, TN 37243-1538
 United States

John P. Reddy
 AUTHORIZED SIGNATURE

⑈773130⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 773130

DATE: 12-APR-06		VENDOR NAME: DEPARTMENT OF ENVIRO		VENDOR NO: 229841	
INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT	
DESCRIPTION					
INV030306 SH: EIB//VOLUNTARY OVERSIGHT	03-MAR-06	1,315.09	0.00	1,315.09	
AND ASSISTANCE PROGRAM, SITE ID 90-513					



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

December 13, 2005

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Cresent Centre Drive, Suite 600
Franklin, TN 37067-6226

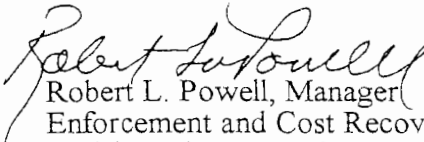
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$502.47 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 741206

DATE: 08-DEC-05

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV090105 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM SITE ID #90-513	01-SEP-05	502.47	0.00	502.47
DIVISION OF REMEDIATION 2005 DEC 13 AM 9:37				
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		502.47	0.00	502.47

3218006

AMARILLO NATIONAL BANK
Amarillo, TX

Rec# 311334

NO. 741206

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
08-DEC-05	741206	*****502.47

Void After 90 Days

PAY: Five Hundred Two Dollars And 47 Cents*****

TO THE ORDER OF DEPARTMENT OF ENVIRONMENT
AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243 1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈741206⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 741206

DATE: 08-DEC-05

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
DESCRIPTION				
INV090105 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM SITE ID #90-513	01-SEP-05	502.47	0.00	502.47

STATE OF TENNESSEE - CASH RECEIPT VOUCHER
Date Dec. 13, 2005 Number 311334
Dept. ENVIRONMENT AND CONSERVATION # 741206
Office/Division Remediation 12-8-05
Address Atmos Energy Corp.
Received of Five hundred two and 47/100 Dollars
For VOAP 90-513 United Cities Gas Cert. of Deposit No. \$ 502.47

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Teresa D. Lewis

Title ASAC

FA-0628



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

April 15, 2005

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$645.46 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert L. Powell".

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Remediation

enclosure

cc: Johnson City Env. Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 681848

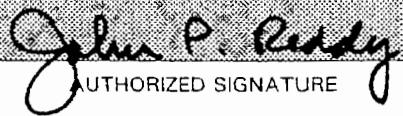
Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
12-APR-05	681848	*****645.46

Void After 90 Days

PAY: Six Hundred Forty-Five Dollars And 46 Cents*****

TO THE DEPARTMENT OF ENVIRONMENT
ORDER OF AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243 1538
United States


AUTHORIZED SIGNATURE

⑈681848⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 681848

DATE: 12-APR-05

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV031805 SITE ID #90-513	18-MAR-05	645.46	0.00	645.46
DIVISION OF REMEDIATION 2005 APR 15 AM 10:31		VOID 90-513		
		645.46	0.00	645.46

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

3091364



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

April 14, 2004

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$4,463.21 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 618850

DATE: 12-APR-04

VENDOR NAME: DEPARTMENT OF ENVIR

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV031904 BILLING FOR OVERHEAD CHARGES	19-MAR-04	4,463.21	0.00	4,463.21
		90-513		
				DIVISION OF SUPERFUND 2004 APR 14 PM 1:27
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		4,463.21	0.00	4,463.21

2932548

AMARILLO NATIONAL BANK
Amarillo, TX

Rec # 303076

NO 618850

Atmos Energy Corporation
PO Box 650205
Dallas TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
12-APR-04	618850	4,463.21

VOID AFTER 90 DAYS

PAY: Four Thousand Four Hundred Sixty-Three Dollars And 21 Cents *****

TO THE ORDER OF DEPARTMENT OF ENVIRONMENT
AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR LAND C ANNEX
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈618850⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 618850

DATE: 12-APR-04

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV031904 BILLING FOR OVERHEAD CHARGES	19-MAR-04	4,463.21	0.00	4,463.21

Date April 14, 2004 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
Dept. ENVIRONMENT AND CONSERVATION # 618850 Number 303076
Office/Division Superfund 4-12-04 Object _____
Address _____ Sub-object _____
Received of Atmos Energy Corp. Cost Center _____
Four thousand four hundred sixty-three and 21/100 Dollars Cert. of Deposit No. _____
For VOAP 90-513 United Cities Gas

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Teresa J Lewis
Title ASA3

FA-0628

SUPERFUND
PM 1:27

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

4,463.21

0.00

4,463.21

2932548



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

April 13, 2004

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$2,656.94 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 618523

DATE: 08-APR-04

VENDOR NAME: DEPARTMENT OF ENVIR

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV112603 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM	26-NOV-03 90-513	2,656.94	0.00	2,656.94
DIVISION OF SUPERFUND 2004 APR 13 PM 1:52				
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		2,656.94	0.00	2,656.94

2932202

AMARILLO NATIONAL BANK
Amarillo, TX

Rec # 303074

NO 618523

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
08-APR-04	618523	2,656.94

VOID AFTER 90 DAYS

PAY: Two Thousand Six Hundred Fifty-Six Dollars And 94 Cents *****

TO THE ORDER OF: DEPARTMENT OF ENVIRONMENT
AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR LAND C ANNEX
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈618523⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 618523

DATE: 08-APR-04

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV112603 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM	26-NOV-03	2,656.94	0.00	2,656.94
90-513				

Date April 13, 2004 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Dept. ENVIRONMENT AND CONSERVATION

618523

Number 303074

Office/Division Superfund

4-8-04

Object _____

Address _____

Sub-object _____

Received of Atmos Energy Corp.

Cost Center _____

Cert. of Deposit No. _____

Two thousand six hundred fifty-six and 94/100 \$ 2,656.94
Dollars

For VOAP United Cities Gas 90-513

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Theresa J. Lewis

Title ABA3



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

October 14, 2003

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

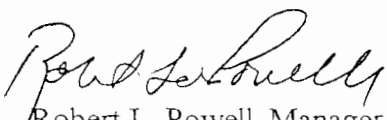
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$1,320.17 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 586384

DATE: 09-OCT-03

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 21791

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV073003	30-JUL-03	1,320.17	0.00	1,320.17
VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM				

90-513

2003 OCT 14 AM 9:

DIVISION OF SUPERF

AMARILLO NATIONAL BANK
Amarillo, TX

KCC # 298444

NO. 586384

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
09 OCT 03	586384	*****1320.17

VOID AFTER 90 DAYS

PAY: One Thousand Three Hundred Twenty Dollars And 17 Cents *****

TO THE ORDER OF TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX E AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈586384⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 586384

DATE: 09-OCT-03

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV073003	30-JUL-03	1,320.17	0.00	1,320.17
VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM				

Date Oct. 14, 2003 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Dept. ENVIRONMENT AND CONSERVATION 586384 Number 298444
Office/Division Superfund 10-9-03 Object _____
Address _____ Sub-object _____
Cert. of Deposit No. _____

Received of Atmos Energy Corp. \$ 1,320.17
One thousand three hundred twenty 17/100 Dollars
For VOPP 90-513 United Cities Gas

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

FA-0628

Received by Teresa N. Lewis
Title ASA3

DIVISION OF SUPERFUND
2003 OCT 14 AM 9:45

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

1,320.17

0.00

1,320.17

2862682



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

June 24, 2003

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$1,430.70 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

A handwritten signature in cursive script, reading "Robert L. Powell".

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 564246

DATE: 18-JUN-03

VENDOR NAME: TENNESSEE DEPARTMEN.

VENDOR NO: 223238

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV043003 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM 90-513 VOAP	30-APR-03	1,430.70	0.00	1,430.70
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		1,430.70	0.00	1,430.70

2003 JUN 23 PM 1:44
DIVISION OF SUPERFUND

2790455

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 564246

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
18-JUN-03	564246	1,430.70

VOID AFTER 90 DAYS

PAY: One Thousand Four Hundred Thirty Dollars And 70 Cents

TO THE ORDER OF
TENNESSEE DEPARTMENT OF ENVIRONMENT AND
CONSERVATION DIV OF SUPERFUND
4TH FLOOR L AND C ANNEX
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈564246⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 564246

DATE: 18-JUN-03		VENDOR NAME: TENNESSEE DEPARTMENT		VENDOR NO: 223238	
INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT	
INV043003 VOLUNTARY OVERSIGHT AND ASSISTANCE PROGRAM	30-APR-03	1,430.70	0.00	1,430.70	
90-513					

Date June 23, 2003 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Dept. ENVIRONMENT AND CONSERVATION # 564246 Number 298370

Office/Division Superfund 6-18-03 Object _____

Address _____ Sub-object _____

Received of Atmos Energy Corp. Cost Center _____

One thousand four hundred thirty and 70/100 \$ 1,430.70 Dollars

For 90-513 VOAP Cert. of Deposit No. _____

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Theresa L. Lewis
Title ASA3

FA-0628

		2003 JUN 23 PM 1:44	
		DIVISION OF SUPERFUND	
		1.430.70	

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

March 24, 2003

Mr. Stuart Schulz, RPG, CHMM
Atmos Energy Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

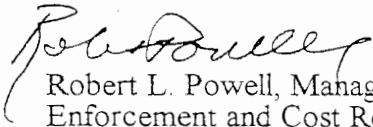
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$3,319.60 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

AMARILLO NATIONAL BANK
Amarillo, TX

W# 298318

NO. 547476

Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
21-MAR-03	547476	3,319.60

Valid After 90 Days

PAY: Three Thousand Three Hundred Nineteen Dollars And 60 Cents*****

TO THE ORDER OF DEPARTMENT OF ENVIRONMENT
AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243 1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈547476⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 547476

DATE: 21-MAR-03

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV013003 SITE ID 90-513	30-JAN-03	3,319.60	0.00	3,319.60

Date March 24, 2003 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Dept. ENVIRONMENT AND CONSERVATION # 547476 Number 298318
Office/Division Superfund 3-21-03 Object _____
Address _____ Sub-object _____
Cert. of Deposit No. _____

Received of Atmos Energy Corp. \$ 3,319.60
Three thousand three hundred nineteen & 60/100 Dollars

For DOAP 90-513 United Cities Gas

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Theresa V. Lewis
Title ASA3

FA-0628



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

November 5, 2002

Mr. Stuart Schulz, RPG, CHMM
Project Geologist
United Cities Gas Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Mr. Schulz:

Enclosed is a receipt acknowledging payment in the amount of \$1,744.80 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 522582

DATE: 01-NOV-02

VENDOR NAME: DEPARTMENT OF ENVIR

VENDOR NO: -229841

[illegible]

2 688713

Date Nov. 5, 2002 STATE OF TENNESSEE - CASH RECEIPT VOUCHER 291956
 Dept. ENVIRONMENT AND CONSERVATION # 522582 Number _____
 Office/Division Superfund 11-1-02 Sub-object _____
 Address _____ Cost Center _____
 Received of Atmos Energy Corp. Cert. of Deposit No. 1744.80
One thousand seven hundred forty-four and 80/100 Dollars
 For VARP 90-513 United Cities Gas

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Bread V. Spunk
 Title AS43

FA 0628

AMARILLO NATIONAL BANK
 Amarillo, TX
 NO. 522582
 CHECK DATE: 01 NOV 02 CHECK NUMBER: 522582 CHECK AMOUNT: 1744.80
 PAY TO THE ORDER OF: ENVIRONMENT AND CONSERVATION
 DIVISION OF SUPERFUND
 4TH FLOOR LAND GANNEX
 NASHVILLE, TN 37243-1538
 United States
 AUTHORIZED SIGNATURE: John P. Ruddy

11 522582 11 113242191 1100 053 11

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 522582

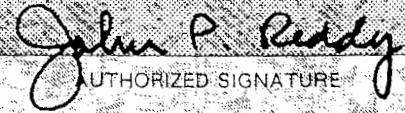
Atmos Energy Corporation
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
01 NOV-02	522582	*****1,744.80

Void After 90 Days

PAY: One Thousand Seven Hundred Forty-Four Dollars And 80 Cents*****

TO THE ORDER OF DEPARTMENT OF ENVIRONMENT
AND CONSERVATION
DIVISION OF SUPERFUND
4TH FLOOR LAND C ANNEX
NASHVILLE, TN 37243 1538
United States


AUTHORIZED SIGNATURE

⑈522582⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 522582

DATE: 01-NOV-02

VENDOR NAME: DEPARTMENT OF ENVIRO

VENDOR NO: 229841

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
INV090402	04-SEP-02	1,744.80	0.00	1,744.80
90-513				

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT

1,744.80

0.00

1,744.80



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Superfund
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1538

June 3, 2002

Mr. Stuart Shulz
United Cities Gas Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

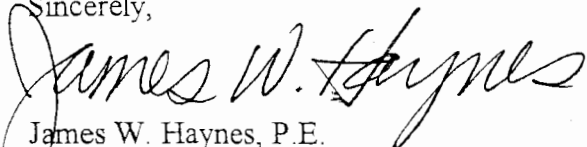
RE: Voluntary Oversight and Assistance Program
Site ID 90-513
United Cities Gas
Washington County

Dear Mr. Shulz:

Enclosed is the periodic billing for the above site. An invoice of those costs incurred including overhead charges for a total of \$570.40 is attached. Payment should be received within thirty (30) days of the date of this letter. Payment is to be made to the State of Tennessee, Division of Superfund. Please include the site identification number, the invoice number and the paying party's name and address to insure proper credit.

Should you have any questions, please contact Teresa Lewis (615) 532-0927. Your participation in this program is appreciated.

Sincerely,


James W. Haynes, P.E.
Director

cc: Johnson City Environmental Assistance Center
Site File
Cost Recovery File
Financial File
Voluntary Section

Statement of Costs

State of Tennessee
Division of Superfund
4th Floor Annex, L & C Building
401 Church Street
Nashville, TN 37243-1538
(615) 532-0900

Site: UNITED CITIES GAS CO.
Site Number: 90513

Beginning Date Of Entries: 8/20/96

Ending Date Of Entries: 5/16/02

State and Voluntary

Post Date	Activity Date	Activity	Staff Name & Position	Cost
10/14/96	8/20/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
10/14/96	8/23/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
11/4/96	9/12/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
11/4/96	9/24/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
11/4/96	9/25/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
11/4/96	9/27/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	51.70
12/6/96	10/1/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
12/6/96	10/2/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
2/6/97	10/15/96	06 Enforcement / Legal Support	Hellin, Floyd Env Pro Sp 4	33.70
12/6/96	10/15/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
12/6/96	10/17/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
2/6/97	10/17/96	06 Enforcement / Legal Support	Hellin, Floyd Env Pro Sp 4	44.93
12/6/96	10/18/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
1/6/97	11/20/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
1/6/97	11/22/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
2/6/97	11/25/96	06 Enforcement / Legal Support	Hellin, Floyd Env Pro Sp 4	11.23
1/6/97	11/25/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	93.06
1/6/97	11/26/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	93.06
2/6/97	11/26/96	06 Enforcement / Legal Support	Hellin, Floyd Env Pro Sp 4	11.23
1/27/97	12/5/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	51.70
1/27/97	12/10/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/27/97	12/11/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/27/97	12/12/96	06 Enforcement / Legal Support	Grubbs, Frank Env Prg Mg 3	7.70
1/27/97	12/12/96	08 General Activities (Field/Office)	Hendricks, Phillip Env Pro Sp 3	51.70
1/27/97	12/17/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
1/27/97	12/18/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	31.02
1/27/97	12/31/96	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
4/10/97	1/6/97	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
4/10/97	1/9/97	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34

Current Date: 5/23/02

90513 UNITED CITIES GAS CO.

Group Page 1 of 12

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
4/10/97	1/14/97	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	10.34
4/10/97	1/27/97	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
1/31/97	1/28/97	PA Payment	ADMIN	-134.42
4/10/97	2/13/97	06 Enforcement / Legal Support	Hayes, Alan Geologist 3	14.85
4/10/97	2/20/97	06 Enforcement / Legal Support	Hendricks, Phillip Env Pro Sp 3	20.68
4/10/97	2/21/97	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	59.40
4/10/97	2/21/97	20 Community Relations	Hendricks, Phillip Env Pro Sp 3	41.36
4/14/97	3/17/97	20 Community Relations	Hendricks, Phillip Env Pro Sp 3	10.34
4/14/97	3/24/97	04 Information to public	Hayes, Alan Geologist 3	22.27
4/14/97	3/26/97	04 Information to public	Hayes, Alan Geologist 3	22.27
7/24/97	6/4/97	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	44.55
7/24/97	6/5/97	14 Remedial Investigation/Feasibility Study	Hayes, Alan Geologist 3	14.85
7/24/97	6/19/97	03 Administration / Management	Murray, Karin Env Spec 1	17.36
12/10/97	7/3/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.93
12/10/97	7/3/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/10/97	7/7/97	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
12/10/97	7/7/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	47.92
12/10/97	7/7/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/10/97	7/8/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/10/97	7/8/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/10/97	7/10/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/10/97	7/14/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/10/97	7/25/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/17/97	8/12/97	06 Enforcement / Legal Support	Shivas, Andrew Env Prg Mg 1	27.19
12/17/97	8/12/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/17/97	8/13/97	04 Information to public	Shivas, Andrew Env Prg Mg 1	27.19
12/17/97	8/13/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
12/17/97	8/13/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
12/17/97	8/13/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	107.65
12/17/97	8/14/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	18.72
12/17/97	8/15/97	03 Administration / Management	Shivas, Andrew Env Prg Mg 1	27.19
12/17/97	8/15/97	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
12/17/97	8/18/97	04 Information to public	Shivas, Andrew Env Prg Mg 1	40.78
12/17/97	8/20/97	05 Technical Assistance	Hendricks, Phillip Env Pro Sp 3	20.68
12/17/97	8/20/97	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mg 1	21.75
12/17/97	8/20/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/17/97	8/20/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
12/17/97	8/21/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
9/24/97	8/22/97	PA Payment	ADMIN	-625.79
9/24/97	8/22/97	PA Payment	ADMIN	-273.89
1/16/98	9/8/97	05 Technical Assistance	Hayes, Alan Geologist 3	46.11
1/16/98	9/8/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.93
1/16/98	9/9/97	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/98	9/9/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	121.11
1/16/98	9/9/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	23.96
1/16/98	9/10/97	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
1/16/98	9/10/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	65.89
1/16/98	9/10/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83
1/16/98	9/11/97	05 Technical Assistance	Hayes, Alan Geologist 3	15.37
1/16/98	9/11/97	05 Technical Assistance	Hayes, Alan Geologist 3	46.11
1/16/98	9/11/97	14 Remedial Investigation/Feasibility Study	Jessee, Gay Env Spec 3	18.72
1/16/98	9/11/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	77.87
1/16/98	9/11/97	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	2.31
1/16/98	9/12/97	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/98	9/18/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	26.91
1/16/98	9/19/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	27.55
1/16/98	9/23/97	14 Remedial Investigation/Feasibility Study	Jessee, Gay Env Spec 3	9.36
12/22/97	10/6/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	94.20
12/22/97	10/6/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
12/22/97	10/7/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	53.83
12/22/97	10/7/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	9.58
12/22/97	10/8/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	35.94
12/22/97	10/8/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	107.65
12/22/97	10/9/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	201.85
12/22/97	10/9/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	11.98
12/22/97	10/9/97	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mgr	13.59
12/22/97	10/10/97	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	107.65
12/22/97	10/13/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
12/22/97	10/14/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
11/10/97	10/30/97	PA Payment	ADMIN	-76.76
1/16/98	11/17/97	05 Technical Assistance	Hayes, Alan Geologist 3	30.74
1/16/98	11/17/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
1/16/98	11/18/97	05 Technical Assistance	Hayes, Alan Geologist 3	53.79
1/16/98	11/18/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	59.90

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
1/16/98	11/18/97	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	3.60
1/16/98	11/19/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	62.30
1/16/98	11/19/97	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	2.69
1/16/98	11/20/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.99
3/16/98	12/16/97	14 Remedial Investigation/Feasibility Study	Hendricks, Phillip Env Pro Sp 3	20.68
3/16/98	12/22/97	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	17.97
5/5/98	3/2/98	10 Cost Recovery	Murray, Karin Env Spec 1	6.11
5/5/98	3/3/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	51.31
5/5/98	3/4/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.11
5/5/98	3/4/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	36.65
5/5/98	3/5/98	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	96.09
5/5/98	3/5/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	24.43
5/5/98	3/6/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	24.43
6/3/98	4/13/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	18.33
6/3/98	4/14/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	36.65
7/1/98	4/17/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
7/8/98	5/1/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
7/8/98	5/4/98	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/98	5/5/98	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/98	5/5/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
7/8/98	5/6/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
7/8/98	5/7/98	05 Technical Assistance	Hayes, Alan Geologist 3	31.35
7/8/98	5/8/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
7/8/98	5/11/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	33.16
7/8/98	5/12/98	05 Technical Assistance	Hayes, Alan Geologist 3	86.20
7/8/98	5/12/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
7/8/98	5/13/98	05 Technical Assistance	Hayes, Alan Geologist 3	94.04
7/8/98	5/14/98	05 Technical Assistance	Hayes, Alan Geologist 3	117.55
7/8/98	5/14/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
6/3/98	5/27/98	PA Payment	ADMIN	-2,300.90
8/6/98	6/5/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	26.52
8/6/98	6/8/98	10 Cost Recovery	Murray, Karin Env Spec 1	26.52
8/6/98	6/8/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	19.89
8/6/98	6/9/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
8/6/98	6/10/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.63
8/6/98	6/10/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	79.57
8/6/98	6/11/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	19.89

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
8/6/98	6/12/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	79.57
8/6/98	6/15/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	46.42
8/6/98	6/16/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.26
11/5/98	7/22/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	41.11
11/5/98	7/23/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
11/5/98	7/24/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	1.33
11/5/98	8/12/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.30
11/5/98	8/13/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	5.30
11/11/99	10/23/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.63
11/26/99	11/2/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	53.05
11/26/99	11/5/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	33.16
11/26/99	11/12/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	53.05
11/26/99	11/13/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	37.13
11/26/99	11/20/98	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	151.01
11/26/99	11/20/98	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	82.37
11/26/99	11/20/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	39.79
11/26/99	11/20/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
11/26/99	11/20/98	14 Remedial Investigation/Feasibility Study	Shivas, Andrew Env Prg Mgr 1	69.33
4/12/99	11/20/98	TC Travel Claim	Murray, Karin Env Spec 1	22.50
4/12/99	11/20/98	TC Travel Claim	Hale, Darrel Env FO Mgr	5.50
4/12/99	11/20/98	TC Travel Claim	Hale, Darrel Env FO Mgr	22.50
4/12/99	11/20/98	TC Travel Claim	Murray, Karin Env Spec 1	5.50
4/12/99	11/20/98	TC Travel Claim	Hale, Darrel Env FO Mgr	67.35
4/12/99	11/20/98	TC Travel Claim	Murray, Karin Env Spec 1	67.35
11/26/99	11/20/98	TR Travel Expense(State Vehicle)	Murray, Karin Env Spec 1	47.52
11/26/99	11/24/98	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	72.94
11/26/99	11/24/98	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	151.01
11/26/99	11/24/98	PA Payment	ADMIN	-1,328.51
3/10/99	12/16/98	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	13.73
8/3/99	11/22/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/99	2/8/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/99	2/10/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/99	2/10/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	20.29
8/3/99	2/10/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/99	2/12/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53
8/3/99	2/16/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/99	2/18/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	13.53

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
8/3/99	2/25/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 1	6.76
8/3/99	3/1/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
8/3/99	3/2/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	84.01
8/3/99	3/2/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	53.66
8/3/99	3/5/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/99	3/11/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/99	3/23/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.67
8/3/99	5/11/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	23.00
8/3/99	5/12/99	08 General Activities (Field/Office)	Banner, Chasity Student asst	13.88
8/3/99	5/12/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.60
8/3/99	5/13/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	1.53
8/3/99	5/17/99	14 Remedial Investigation/Feasibility Study	Banner, Chasity Student asst	22.09
8/3/99	5/18/99	14 Remedial Investigation/Feasibility Study	Banner, Chasity Student asst	47.33
8/3/99	5/19/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
8/3/99	5/21/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.33
6/30/99	6/1/99	PA Payment	ADMIN	-1,167.19
8/3/99	6/4/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	76.65
8/3/99	6/7/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	53.66
8/3/99	6/14/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	33.73
8/3/99	6/15/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	61.32
8/3/99	6/16/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	45.99
8/3/99	6/17/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	68.99
8/3/99	6/18/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	114.98
8/3/99	6/21/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	76.65
8/3/99	6/22/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	61.32
8/3/99	6/23/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	68.99
8/3/99	6/24/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	91.98
8/3/99	6/25/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	107.31
8/3/99	6/28/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	93.51
8/3/99	6/28/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	98.02
8/3/00	7/9/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/00	7/12/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/00	7/20/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	23.68
8/3/00	7/21/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.79
8/3/00	8/5/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.74
8/3/00	8/12/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
8/3/00	8/17/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	39.47

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
8/3/00	8/19/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/00	8/23/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	15.79
8/3/00	8/25/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/00	8/31/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/3/00	9/2/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	26.84
8/2/00	9/3/99	05 Technical Assistance	Jobe, Charles Env Spec 4	17.96
8/3/00	9/3/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	58.42
8/3/00	9/7/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	86.83
8/2/00	9/8/99	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/2/00	9/9/99	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/3/00	9/9/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	59.99
8/2/00	9/10/99	05 Technical Assistance	Jobe, Charles Env Spec 4	44.89
8/3/00	9/10/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	63.15
8/3/00	9/13/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	39.47
8/2/00	9/14/99	05 Technical Assistance	Jobe, Charles Env Spec 4	35.91
8/3/00	9/14/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	71.05
11/17/99	9/14/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	56.01
3/8/00	10/5/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	4.74
3/8/00	10/18/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	210.04
3/8/00	10/18/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	1.91
3/8/00	10/19/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	47.36
3/8/00	10/19/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/00	10/19/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/00	10/20/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	28.00
3/8/00	10/20/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	20.52
3/8/00	10/20/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/00	10/21/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/00	10/21/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/00	10/22/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	70.01
3/8/00	10/22/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/00	10/26/99	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	42.01
3/8/00	10/26/99	TR Travel Expense(State Vehicle)	Hale, Darrel Env FO Mgr	2.20
3/8/00	10/27/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/00	11/3/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/00	11/4/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	7.89
3/8/00	11/22/99	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	30.00
4/6/00	12/21/99	08 General Activities (Field/Office)	Nail, Jason Geologist 1	27.87

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
4/6/00	1/12/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
4/6/00	1/20/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
4/6/00	1/21/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
8/4/00	2/3/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93
8/4/00	2/7/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	83.60
8/4/00	2/7/00	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/4/00	2/7/00	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	2.67
8/4/00	2/8/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	76.64
8/4/00	2/8/00	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	31.58
8/4/00	2/8/00	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	4.13
8/4/00	2/9/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	55.74
8/4/00	2/9/00	TR Travel Expense(State Vehicle)	Nail, Jason Geologist 1	1.70
8/4/00	2/10/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93
2/23/00	2/18/00	PA Payment	ADMIN	-2,301.52
8/4/00	3/13/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	20.90
8/4/00	4/25/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	6.97
8/4/00	4/27/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	13.93
8/4/00	5/1/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	104.50
8/4/00	5/3/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	90.57
8/4/00	5/3/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	98.02
8/4/00	5/4/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	76.64
8/4/00	5/4/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	154.03
8/4/00	5/5/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	62.70
8/4/00	5/5/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	210.04
8/4/00	5/8/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
8/4/00	5/11/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	41.80
8/4/00	5/12/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	55.74
8/4/00	5/15/00	08 General Activities (Field/Office)	Nail, Jason Geologist 1	48.77
8/4/00	5/16/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	62.70
8/4/00	5/17/00	14 Remedial Investigation/Feasibility Study	Murray, Karin Env Spec 3	86.83
8/4/00	5/17/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel Env FO Mgr	84.01
8/4/00	5/17/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	69.67
8/4/00	5/19/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	6.97
8/4/00	5/22/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	13.93
8/4/00	5/22/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	69.67
8/4/00	6/1/00	06 Enforcement / Legal Support	Lilly, John Env Spec 4	10.39
8/4/00	6/1/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	6.97

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
8/4/00	6/2/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	13.93
8/4/00	6/5/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	34.83
8/4/00	6/6/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	27.87
8/4/00	6/19/00	14 Remedial Investigation/Feasibility Study	Nail, Jason Geologist 1	41.80
5/21/01	7/24/00	08 General Activities (Field/Office)	Nail, Jason GEOLOGIST 1	14.42
5/21/01	7/25/00	08 General Activities (Field/Office)	Nail, Jason GEOLOGIST 1	14.42
7/9/01	9/6/00	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	18.58
7/9/01	9/8/00	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/01	9/11/00	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/01	9/12/00	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	37.16
7/9/01	9/12/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	57.96
7/9/01	9/12/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	57.96
7/9/01	9/12/00	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.40
7/9/01	9/14/00	03 Administration / Management	MATTRAW, HAROLD GEOLOGIST 3	27.87
7/9/01	9/14/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	43.47
7/9/01	9/14/00	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	43.47
7/9/01	9/14/00	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	0.70
7/9/01	9/18/00	17 Remedial Action	MATTRAW, HAROLD GEOLOGIST 3	65.03
11/9/00	10/20/00	PA Payment	ADMIN	-2,578.58
8/27/01	11/20/00	12 Preliminary Assessment	MATTRAW, HAROLD GEOLOGIST 3	65.03
8/27/01	11/21/00	12 Preliminary Assessment	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/15/01	2/1/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/01	2/6/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/15/01	2/7/01	05 Technical Assistance	Murray, Karin ENV SPROC 3	16.50
10/15/01	2/7/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/15/01	2/8/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	55.74
10/15/01	2/15/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/01	2/21/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/01	2/23/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
10/15/01	2/26/01	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	115.93
10/15/01	2/26/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/15/01	2/26/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.87
10/15/01	2/27/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	102.20
10/15/01	2/27/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	3.37
8/31/01	3/29/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
10/9/01	4/2/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	65.03
10/9/01	4/10/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
10/25/01	4/16/01	LB Lab	ADMIN	350.00
10/9/01	4/18/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	83.61
10/9/01	4/19/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
8/31/01	6/4/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.29
8/31/01	6/4/01	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	14.49
8/31/01	6/11/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	102.20
8/31/01	6/11/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.38
8/31/01	6/13/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	109.63
8/31/01	6/13/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.57
8/31/01	6/14/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	136.64
8/31/01	6/14/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.55
8/31/01	6/18/01	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	57.96
8/31/01	6/18/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	118.92
8/31/01	6/18/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.90
8/31/01	6/19/01	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	115.93
8/31/01	6/19/01	TR Travel Expense(State Vehicle)	Hale, Darrel ENV FO MG	3.11
8/31/01	6/20/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	128.21
8/31/01	6/20/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.76
8/31/01	6/21/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	126.35
8/31/01	6/21/01	14 Remedial Investigation/Feasibility Study	Hale, Darrel ENV FO MG	43.47
8/31/01	6/21/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.14
8/31/01	6/22/01	08 General Activities (Field/Office)	MATTRAW, HAROLD GEOLOGIST 3	74.32
8/31/01	6/22/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.29
8/31/01	6/25/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	81.76
8/31/01	6/25/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.14
8/31/01	6/26/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	137.50
8/31/01	6/26/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.43
8/31/01	6/27/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	27.87
8/31/01	6/27/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.00
8/31/01	6/28/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	18.58
1/28/02	7/2/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/02	7/9/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
1/28/02	7/10/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/02	7/11/01	01 Program Development and Planning	MATTRAW, HAROLD GEOLOGIST 3	102.85
1/28/02	7/11/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.76
1/28/02	7/18/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
10/15/01	7/30/01	LB Lab	ADMIN	674.00

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>	<i>Cost</i>
10/15/01	7/30/01	LB Lab	ADMIN	616.00
10/15/01	8/6/01	LB Lab	ADMIN	700.00
10/15/01	8/6/01	LB Lab	ADMIN	175.00
1/28/02	8/8/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
1/28/02	8/9/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
1/28/02	8/9/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.95
1/28/02	8/20/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	26.66
2/4/02	9/4/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/4/02	9/5/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	66.66
2/4/02	9/10/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	57.14
2/4/02	9/11/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
2/4/02	9/11/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	4.87
2/4/02	9/12/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
2/4/02	9/13/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	137.13
2/4/02	9/18/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
2/4/02	9/24/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	28.57
10/18/01	10/1/01	LB Lab	ADMIN	175.00
10/18/01	10/1/01	LB Lab	ADMIN	175.00
2/12/02	10/9/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/12/02	10/10/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	47.62
2/12/02	10/10/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	1.87
2/12/02	10/23/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
2/15/02	11/8/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
2/15/02	11/8/01	14 Remedial Investigation/Feasibility Study	Banner, Chasity ENV SPEC 3	35.64
2/15/02	11/8/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.21
11/19/01	11/9/01	LB Lab	ADMIN	175.00
2/15/02	11/28/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
2/15/02	11/29/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	9.52
3/7/02	12/4/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	66.66
3/7/02	12/4/01	TR Travel Expense(State Vehicle)	MATTRAW, HAROLD GEOLOGIST 3	2.40
3/7/02	12/6/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	19.05
3/7/02	12/18/01	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
5/7/02	1/2/02	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	38.09
1/25/02	1/3/02	LB Lab	Other	175.00
1/25/02	1/3/02	LB Lab	Other	175.00
5/7/02	1/8/02	14 Remedial Investigation/Feasibility Study	MATTRAW, HAROLD GEOLOGIST 3	76.19
5/7/02	1/11/02	08 General Activities (Field/Office)	MATTRAW, HAROLD GEOLOGIST 3	20.95

<i>Post Date</i>	<i>Activity Date</i>	<i>Activity</i>	<i>Staff Name & Position</i>				<i>Cost</i>
5/7/02	1/14/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/7/02	1/17/02	17 Remedial Action	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/7/02	1/31/02	17 Remedial Action	MATRAW, HAROLD	GEOLOGIST 3			30.47
5/21/02	2/4/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			19.05
2/14/02	2/8/02	OP Overhead Payment	Other				-2,363.54
2/14/02	2/8/02	PA Payment	Other				-5,513.74
5/21/02	2/11/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			41.90
5/21/02	2/12/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			95.23
5/21/02	2/12/02	TR Travel Expense(State Vehicle)	MATRAW, HAROLD	GEOLOGIST 3			2.68
5/21/02	2/13/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/21/02	2/14/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/21/02	2/19/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			57.14
5/23/02	3/21/02	14 Remedial Investigation/Feasibility Study	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/23/02	3/27/02	08 General Activities (Field/Office)	MATRAW, HAROLD	GEOLOGIST 3			19.05
5/21/02	5/16/02	PA Payment	Other				-1,811.96

<i>Site Totals</i>						
<i>Salaries</i>	<i>Travel</i>	<i>Professional</i>	<i>Lab</i>	<i>Misc</i>	<i>Payments & Refunds</i>	
14,671.34	311.58	0.00	3,390.00	0.00	-18,113.26	2,674.28
					<i>OHCg</i>	<i>OHPay</i>
						<i>Total Amount Due</i>
						570.40



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

May 16, 2002

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole:

Enclosed is a receipt acknowledging payment in the amount of \$1,811.96 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 495625

DATE: 13-MAY-02

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
CHE-042202 UNITED CITIES GAS COOL SPRING Site # 90-513	22-APR-02	1,811.96	0.00	1,811.96
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.		1,811.96	0.00	1,811.96

2612223

Dept. ENVIRONMENT AND CONSERVATION Number 289890
 Office/Division Superfund Sub-object
 Address 5-13-02 Cost Center
 Received of United Cities Gas Co. Cert. of Deposit No.

One thousand eight hundred eleven and 96/100 \$ 1,811.96 Dollars
 For VAMP 90-513 UCGAS

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Arthur V. Lewis
 Title ABA3

AMARILLO NATIONAL BANK
 Amarillo, TX

REC # 289890 NO. 495625

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
13 MAY 02	495625	1811.96

Valid After 90 Days

PAY: One Thousand Eight Hundred Eleven Dollars And 96 Cents *****

TO THE TENNESSEE STATE OF
 ORDER OF DIVISION OF SUPERFUND
 4TH FLOOR ANNEX L AND C BUILDING
 401 CHURCH STREET
 NASHVILLE, TN 37243-1538
 United States

Authorized Signature: John P. Ruddy

11495625 11113242191 1100 053 11

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 495625

United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
13 MAY 02	495625	1,811.96

VOID AFTER 90 DAYS

PAY: One Thousand Eight Hundred Eleven Dollars And 96 Cents*****

TO THE ORDER OF TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX L AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈495625⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 495625

DATE: 13-MAY-02

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
CHE-042202 UNITED CITIES GAS COOL SPRING	22-APR-02	1,811.96	0.00	1,811.96
Site # 90-513				
		1,811.96	0.00	1,811.96

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

2610002



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

February 11, 2002

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

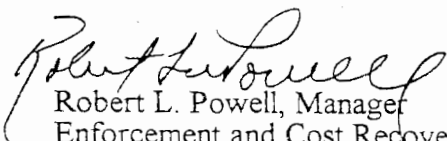
RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole:

Enclosed is a receipt acknowledging payment in the amount of \$7,877.28 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,


Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 479478

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
04-FEB-02	479478	*****7877.28

Valid After 90 Days

PAY: Seven Thousand Eight Hundred Seventy Seven Dollars And 28 Cents ***

TO THE
ORDER OF
TENNESSEE DEPARTMENT OF ENVIRONMENT AND
401 CHURCH STREET
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243-1538
United States

John P. Bredy
AUTHORIZED SIGNATURE

⑈479478⑈ ⑆111324219⑆ ⑈00 053 ⑈

STATE OF TENNESSEE - CASH RECEIPT VOUCHER

289804

479478

Dept. ENVIRONMENT AND CONSERVATION

Office/Division Superfund

Address

Received of

United Cities Gas Company
Seven thousand eight hundred seventy-seven and 28/100

For C.R. Site # 90-513

Number

Object

Sub-object

Cost Center

Cert. of Deposit No.

\$ 7877.28

Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by

Title

NO. 479478

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
04 FEB 02	479478	7,877.28

VOID AFTER 90 DAYS

PAY: Seven Thousand Eight Hundred Seventy-Seven Dollars And 28 Cents

TO THE TENNESSEE DEPARTMENT OF ENVIRONMENT AND
ORDER OF 401 CHURCH STREET
4TH FLOOR L AND C ANNEX
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

11 4 7 9 4 7 8 11 1: 1 1 1 3 2 4 2 1 9 1: 11 00 0 5 3 1 11

NO. 479478

VENDOR NO: 223238

[illegible]

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

October 19, 2000

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067-6226

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$2,578.58 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 393073

DATE: 12-OCT-00

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	DESCRIPTION	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
0090513	13-SEP-00	SITE ID 90-513	2,578.58	0.00	2,578.58
DIRECTOR OF SUPERVISOR 200 OCT 19 AM 10:47					
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.			2,578.58	0.00	2,578.58

PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.

RECEIPT VOUCHER

276723

Dept. ENVIRONMENT AND CONSERVATION # 393073
Office/Division Superfund
Address P.O. Box 650205, Dallas TX 75265-
Received of United Cities Gas Company 0205
Two thousand five hundred seventy-eight and 58/100 Dollars
For VOAP 90-513 United Cities Gas

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Wanda J. Jones
Title ASA3

FA 0028

AMARILLO NATIONAL BANK
Amarillo, TX
Rec. # 276723
NO. 393073

United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
12-OCT-00	393073	*****2,578.58

Valid After 90 Days

PAY: Two Thousand Five Hundred Seventy-Eight Dollars And 58 Cents*****

TO THE
ORDER OF
TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX L AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

⑈393073⑈ ⑈111324219⑈ ⑈00 053 ⑈

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 393073

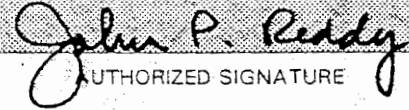
United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
12-OCT-00	393073	*****2,578.58

Void After 90 Days

PAY: Two Thousand Five Hundred Seventy-Eight Dollars And 58 Cents*****

TO THE ORDER OF TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX L AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States


AUTHORIZED SIGNATURE

⑈393073⑈ ⑆111324219⑆ ⑈00 053 1⑈

NO. 393073

DATE: 12-OCT-00

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	DESCRIPTION	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
0090513	13-SEP-00	SITE ID 90-513	2,578.58	0.00	2,578.58
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.					
			2,578.58	0.00	2,578.58

466206



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

February 18, 2000

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$2,301.52 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager *RP*
Enforcement and Cost Recovery
Division of Superfund

enclosure

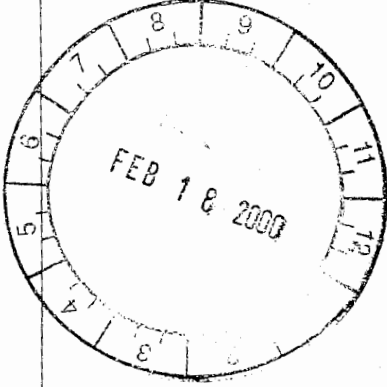
cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

NO. 349428

DATE: 14-FEB-00

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	DESCRIPTION	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
9990513	07-DEC-99		2,301.52	0.00	2,301.52
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.			2,301.52	0.00	2,301.52

526564

Date 2-18-2000 STATE OF TENNESSEE - CASH RECEIPT VOUCHER 265358

Dept. ENVIRONMENT AND CONSERVATION # 349428 Number 265358

Office/Division Superfund 2-14-2000 Sub-object 2-14-2000

Address PO Box 650205 Dallas, TX 75265-0205 Cost Center 2-14-2000

Received of United Cities Gas Company Cert. of Deposit No. 2,301.52 Dollars

For VOAP 90-513 United Cities Gas Co.

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by Edward H. Davis Title ASB

United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 349428

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
14 FEB-00	349428	*****2,301.52

Void After 90 Days

PAY: Two Thousand Three Hundred One Dollars And 52 Cents *****

TO THE
ORDER OF
TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX L AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

Authorized Signature
John P. Reddy
AUTHORIZED SIGNATURE

11 349428 11 1113242191 1100 052 311

AMARILLO NATIONAL BANK
Amarillo, TX

NO. 349428

United Cities Gas Company
PO Box 650205
Dallas, TX 75265-0205

CHECK DATE	CHECK NUMBER	CHECK AMOUNT
14 FEB 00	349428	*****2,301.52

VOID AFTER 90 DAYS

PAY: Two Thousand Three Hundred One Dollars And 52 Cents*****

TO THE ORDER OF TENNESSEE STATE OF
DIVISION OF SUPERFUND
4TH FLOOR ANNEX L AND C BUILDING
401 CHURCH STREET
NASHVILLE, TN 37243-1538
United States

John P. Reddy
AUTHORIZED SIGNATURE

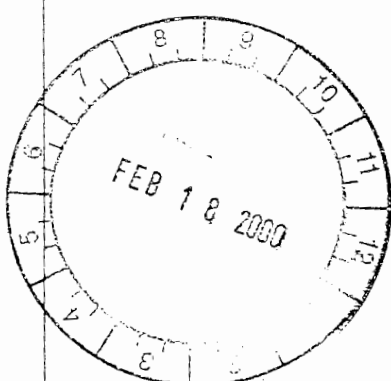
⑈349428⑈ ⑆111324219⑆ ⑈00 052 3⑈

NO. 349428

DATE: 14-FEB-00

VENDOR NAME: TENNESSEE STATE OF

VENDOR NO: 217981

INVOICE NO.	INVOICE DATE	DESCRIPTION	AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
9990513	07-DEC-99		2,301.52	0.00	2,301.52
PLEASE DETACH AND RETAIN THIS STATEMENT AS YOUR RECORD OF PAYMENT.			2,301.52	0.00	2,301.52

526564



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Superfund
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1538

CERTIFIED MAIL NO. P116068181
RETURN RECEIPT REQUESTED

December 10, 1999

Mr. Karol Sole, CHMM
Principal Engineer-Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

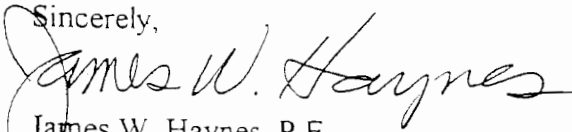
RE: Voluntary Oversight and Assistance Program
Site ID 90-513, United Cities Gas Company
Washington County

Dear Mr. Sole:

Enclosed is the periodic billing for the above referenced site. An invoice of those costs incurred and recorded through September 14, 1999 in the amount of \$2,301.52 is attached. The Division of Superfund staff is currently addressing an upgrade of the accounting program. Overhead charges are not included in this invoice. Overhead will be calculated and charged at the completion of the site project or when the upgrade of the accounting program is complete. Payment in the amount of \$2,301.52 should be received within thirty (30) days of the date of this letter. Please include the site identification number referenced above and the paying party's name and address with the payment to insure proper credit.

Should you have any questions, please contact Judy Bateman (615) 532-0923. Your participation in this program is appreciated.

Sincerely,


James W. Haynes, P.E.
Director

cc: Johnson City Env. Assistance Ctr.
Site File
Cost Recovery File
Financial File
Voluntary Section

State of Tennessee
 Division of Superfund
 4th Floor Annex, L & C Building
 601 Church Street
 Nashville, TN 37243-1538
 (615) 532-0900

Superfund Site Costs
 Page 1

INVOICE # 99- 90513 Beginning Date of Entries 07/01/1984
 Invoice Date 12/07/1999 Ending Date of Entries 12/07/1999

UNITED CITIES GAS CO 90-513 State & Voluntary

Date	Activity	Staff name and position	Cost
7/01/1984	-- Beginning balance --		0.00
8/20/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
8/23/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
9/12/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
9/24/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
9/25/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
9/27/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	51.70
10/01/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
10/02/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
10/15/1996	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	33.70
10/15/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
10/17/1996	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	44.93
10/17/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
10/18/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
11/20/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
11/22/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
11/25/1996	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	11.23
11/25/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	93.06
11/26/1996	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	11.23
11/26/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	93.06
12/05/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	51.70
12/10/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
12/11/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
12/12/1996	Enforcement / Legal Support	Grubbs, Frank - Env Prg Mg 3	7.70
12/12/1996	General Activities (Field/Office)	Hendricks, Phillip - Env Pro Sp 3	51.70
12/17/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
12/18/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
12/31/1996	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
1/06/1997	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
1/09/1997	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
1/14/1997	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
1/27/1997	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
1/28/1997	Payment		-134.42
1/13/1997	Enforcement / Legal Support	Hayes, Alan - Geologist 3	14.85
1/20/1997	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
1/21/1997	Community Relations	Hendricks, Phillip - Env Pro Sp 3	41.36
1/21/1997	Remedial Investigation/Feasibility Study	Hayes, Alan - Geologist 3	59.40
1/17/1997	Community Relations	Hendricks, Phillip - Env Pro Sp 3	10.34
1/24/1997	Information to public	Hayes, Alan - Geologist 3	22.27
1/26/1997	Information to public	Hayes, Alan - Geologist 3	22.27
1/04/1997	Remedial Investigation/Feasibility Study	Hayes, Alan - Geologist 3	44.55

State of Tennessee
 Division of Superfund
 4th Floor Annex, L & C Building
 401 Church Street
 Nashville, TN 37243-1538
 (615) 532-0900

Superfund Site Costs INVOICE # 99- -90513 Beginning Date of Entries 07/01/1984
 Page 3 Invoice Date 12/07/1999 Ending Date of Entries 12/07/1999

UNITED CITIES GAS CO 90-513 State & Voluntary

Date	Activity	Staff name and position	Cost
09/11/1997	Technical Assistance	Hayes, Alan - Geologist 3	46.11
09/11/1997	Technical Assistance	Hayes, Alan - Geologist 3	15.37
09/12/1997	Technical Assistance	Hayes, Alan - Geologist 3	30.74
09/18/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	26.91
09/19/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	27.55
09/23/1997	Remedial Investigation/Feasibility Study	Jessee, Gay - Env Spec 3	9.36
10/06/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	94.20
10/06/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.99
10/07/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	53.83
10/07/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	9.58
10/08/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	107.65
10/08/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	35.94
10/09/1997	Remedial Investigation/Feasibility Study	Shivas, Andrew - Env Prg Mg 1	13.59
10/09/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	201.85
10/09/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	11.98
10/10/1997	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	107.65
10/13/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	17.97
10/14/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.99
10/30/1997	Payment		-76.76
11/17/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.99
11/17/1997	Technical Assistance	Hayes, Alan - Geologist 3	30.74
11/18/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	59.90
11/18/1997	Travel expenses	Burnette, Karin - Env Spec 1	3.60
11/18/1997	Technical Assistance	Hayes, Alan - Geologist 3	53.79
11/19/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	62.30
11/19/1997	Travel expenses	Burnette, Karin - Env Spec 1	2.69
11/20/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.99
12/16/1997	Remedial Investigation/Feasibility Study	Hendricks, Phillip - Env Pro Sp 3	20.68
12/22/1997	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	17.97
03/02/1998	Cost Recovery	Burnette, Karin - Env Spec 1	6.11
03/03/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	51.31
03/04/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.11
03/04/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	36.65
03/05/1998	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	96.09
03/05/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	24.43
03/06/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	24.43
04/13/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	18.33
04/14/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	36.65
04/17/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	26.52
05/01/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.26

Superfund Site Costs
Page 4

Beginning Date of Entries 07/01/1984
Ending Date of Entries 12/07/1999

Date	Activity	Staff name and position	Cost
5/04/1998	Technical Assistance	Hayes, Alan - Geologist 3	31.35
5/05/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	72.94
5/05/1998	Technical Assistance	Hayes, Alan - Geologist 3	31.35
5/06/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	39.79
5/07/1998	Technical Assistance	Hayes, Alan - Geologist 3	31.35
5/08/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	46.42
5/11/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	33.16
5/12/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	26.52
5/12/1998	Technical Assistance	Hayes, Alan - Geologist 3	86.20
5/13/1998	Technical Assistance	Hayes, Alan - Geologist 3	94.04
5/14/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.25
5/14/1998	Technical Assistance	Hayes, Alan - Geologist 3	117.55
5/27/1998	Payment		-2,300.90
6/05/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	26.52
6/08/1998	Cost Recovery	Burnette, Karin - Env Spec 1	26.52
6/08/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	19.89
6/09/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	46.42
6/10/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.63
6/10/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	79.57
6/11/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	19.89
6/12/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	79.57
6/15/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	46.42
6/16/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.26
7/22/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	41.11
7/23/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	39.79
7/24/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	1.33
8/12/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.30
8/13/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	5.30
10/23/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.63
11/02/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	53.05
11/05/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	33.16
11/12/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	53.05
11/13/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	37.13
11/20/1998	Remedial Investigation/Feasibility Study	Shivas, Andrew - Env Prg Mg 1	69.33
11/20/1998	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	82.37
11/20/1998	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	151.01
11/20/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	39.79
11/20/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	72.94
11/20/1998	Travel expenses	Burnette, Karin - Env Spec 1	47.52
11/20/1998	Travel Claims (excludes State Vehicles)	Burnette, Karin - Env Spec 1	67.33

tate of Tennessee
 ivision of Superfund
 th Floor Annex, L & C Building
 01 Church Street
 ashville, TN 37243-1538
 615) 532-0900

Superfund Site Costs
 Page 5

INVOICE # 99- -90513
 Invoice Date 12/07/1999

Beginning Date of Entries 07/01/1984
 Ending Date of Entries 12/07/1999

UNITED CITIES GAS CO

90-513

State & Voluntary

Date	Activity	Staff name and position	Cost
11/20/1998	Travel Claims (excludes State Vehicles)	Burnette, Karin - Env Spec 1	22.50
11/20/1998	Travel Claims (excludes State Vehicles)	Burnette, Karin - Env Spec 1	5.50
11/20/1998	Travel Claims (excludes State Vehicles)	Hale, Darrell - Env FO Mgr	67.35
11/20/1998	Travel Claims (excludes State Vehicles)	Hale, Darrell - Env FO Mgr	22.50
11/20/1998	Travel Claims (excludes State Vehicles)	Hale, Darrell - Env FO Mgr	5.50
11/24/1998	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	151.01
11/24/1998	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	72.94
12/04/1998	Payment		-1,328.51
12/16/1998	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	13.73
01/22/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.76
02/08/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.53
02/10/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	20.29
02/10/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.76
02/10/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.53
02/12/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.53
02/16/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.76
02/18/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	13.53
02/25/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 1	6.76
03/01/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	15.33
03/02/1999	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	84.01
03/02/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	53.66
03/05/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
03/11/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
03/23/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
05/11/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	23.00
05/12/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	4.60
05/12/1999	General Activities (Field/Office)	Banner, Chasity - Student asst	13.88
05/13/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	1.53
05/17/1999	Remedial Investigation/Feasibility Study	Banner, Chasity - Student asst	22.09
05/18/1999	Remedial Investigation/Feasibility Study	Banner, Chasity - Student asst	47.33
05/19/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	15.33
05/21/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	15.33
06/01/1999	Payment		-1,167.19
05/04/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	76.65
06/07/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	53.66
06/14/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	33.73
06/15/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	61.32
06/16/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	45.99
06/17/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	68.99
06/18/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	114.98

State of Tennessee
 Division of Superfund
 4th Floor Annex, L & C Building
 201 Church Street
 Nashville, TN 37243-1538
 (615) 532-0900

Superfund Site Costs INVOICE # 99- 90513 Beginning Date of Entries 07/01/1984
 Page 6 Invoice Date 12/07/1999 Ending Date of Entries 12/07/1999

UNITED CITIES GAS CO 90-513 State & Voluntary

Date	Activity	Staff name and position	Cost
06/21/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	76.65
06/22/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	61.32
06/23/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	68.99
06/24/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	91.98
06/25/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	107.31
06/28/1999	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	98.02
06/28/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	93.51
07/09/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
07/12/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
07/20/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	23.00
07/21/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	15.33
08/05/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	4.60
08/12/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	7.67
08/17/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	38.33
08/19/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	30.66
08/23/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	15.33
08/25/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	30.66
08/31/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	30.66
09/02/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	26.06
09/03/1999	Technical Assistance	Jobe, Charles - Env Spec 4	17.50
09/03/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	56.72
09/07/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	84.32
09/08/1999	Technical Assistance	Jobe, Charles - Env Spec 4	35.01
09/09/1999	Technical Assistance	Jobe, Charles - Env Spec 4	35.01
09/09/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	58.25
09/10/1999	Technical Assistance	Jobe, Charles - Env Spec 4	43.76
09/10/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	61.32
09/13/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	38.33
09/14/1999	Technical Assistance	Jobe, Charles - Env Spec 4	35.01
09/14/1999	Remedial Investigation/Feasibility Study	Hale, Darrell - Env FO Mgr	56.01
09/14/1999	Remedial Investigation/Feasibility Study	Burnette, Karin - Env Spec 3	68.99
Subtotal due			2,301.52

Costs by Category for the current billing:

Salaries	Travel	Professional	Laboratory	Miscellaneous	Payments & refunds	Total
7,962.16	246.82	0.00	0.00	0.00	-5,907.46	2,301.52



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

June 10, 1999

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$1,167.19 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75265-0205

DATE
05/24/99
E003

CHECK NO.
205383
50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
04/29/99	9990513		05/22/99 4035	116719	00	116719
	SITE ID 90-513, UNITED CITIES GAS COMPANY					
	VOAP					
THE ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE TOTAL >				116719	000	116719

1 473786

Date 6-8-99 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
 Dept. ENVIRONMENT AND CONSERVATION Number 261552
 Office/Division DSF CK# 205383 5-24-99 Object _____
 Address P.O. Box 650205, Dallas, TX 75265-0205 Sub-object _____
 Received of United Cities Gas Co. Cost Center _____
Eleven Hundred sixty-seven & 19/100 Cert. of Deposit No. _____
 \$ 1,167.19
 Dollars
 For VOAP 90-513

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

FA-0628

Received by J. Dean
 Title ASAC

UNITED CITIES GAS COMPANY
 P.O. BOX 650205
 DALLAS, TX 75265-0205

AMARILLO NATIONAL BANK
 AMARILLO, TEXAS

CHECK NO.
 205383

261552

PAY
 ONE THOUSAND ONE HUNDRED SIXTY-SEVEN DOLLARS NINETEEN CENTS
 TO THE ORDER OF:

DATE: 05/24/99
 VOID AFTER 90 DAYS

DEPARTMENT OF ENVIRONMENT/CONS
 DIV SUPERFUND/4TH FL, L&C ANNEX
 401 CHURCH STREET
 NASHVILLE TN 37243-1538

*****1,167.19
 UNITED CITIES GAS COMPANY

John P. Reddy
 TREASURER

BY: (IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: AUTHORIZED REPRESENTATIVE

205383 1111300958 00 052 3

UNITED CITIES GAS COM NY

P.O. BOX 850205

DALLAS, TX

75285-0205

AMARILLO NATIONAL BANK

AMARILLO, TEXAS

CHECK NO.
205383

PAY

ONE THOUSAND ONE HUNDRED SIXTY-SEVEN DOLLARS NINETEEN CENTS

TO THE ORDER OF:

DEPARTMENT OF ENVIRONMENT/CONS
DIV SUPERFUND/4TH FL, L&C ANNEX
401 CHURCH STREET
NASHVILLE TN 37243-1538

DATE 05/24/99

VOID AFTER 90 DAYS

*****1,167.19

UNITED CITIES GAS COMPANY

John P. Reddy

BY: (IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED) TREASURER

BY: AUTHORIZED REPRESENTATIVE

⑈205383⑈ ⑆111300958⑆ ⑈00 052 3⑈

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75265-0205

DATE
05/24/99
E003

CHECK NO.
205383
50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
042999	9990513		05/22/99 4035	116719	00	116719
	SITE ID 90-513,		UNITED CITIES GAS COMPANY			
	VOAP					
ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE TOTAL >				116719	000	116719

L 473786



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

December 7, 1998

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$1,328.51 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75265-0205

DATE
11/30/98
E003

CHECK NO.
166999
50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
100798	INV 1007		11/30/98 4050	132851	00	132851
	SITE ID 90-513		UNITED CITIES GAS COMPANY			
	<u>VOAR</u>					
THE ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE TOTAL >				132851	000	132851

1 432029

UNITED CITIES GAS COMPANY
P.O. BOX 850205
DALLAS, TX 75285-0205

AMARILLO NATIONAL BANK
AMARILLO, TEXAS

CHECK NO.
166999

257674

PAY

DATE: 11/30/98

VOID AFTER 90 DAYS

ONE THOUSAND THREE HUNDRED TWENTY-EIGHT DOLLARS FIFTY-ONE CENTS

TO THE ORDER OF:

*****1,328.51

UNITED CITIES GAS COMPANY

DEPARTMENT OF ENVIRONMENT/CONS
DIV SUPERFUND/4TH FL, L&C ANNEX
401 CHURCH STREET
NASHVILLE TN 37243-1538

BY: *[Signature]* TREASURER
(IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: _____ AUTHORIZED REPRESENTATIVE

⑈166999⑈ ⑆1111300958⑆ ⑈00 052 3⑈

Date 12-4-98 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
Dept. ENVIRONMENT AND CONSERVATION Number 257674
Office/Division DSF CR# 166999 11-30-98 Object _____
Address P.O. Box 650205, Dallas, TX 75265 Sub-object _____
Received of United Cities Gas Co. Cost Center _____
Thirteen hundred twenty-eight + 51/100 Cert. of Deposit No. _____
For VOAP 90-513 \$ 1,328.51 Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

Received by J. Dean

Title ASAI

UNITED CITIES GAS COMPANY

P.O. BOX 850205

DALLAS, TX

75265-0205

AMARILLO NATIONAL BANK
AMARILLO, TEXAS

CHECK NO.
166999

PAY

DATE: 11/30/98

VOID AFTER 90 DAYS

ONE THOUSAND THREE HUNDRED TWENTY-EIGHT DOLLARS FIFTY-ONE CENTS

TO THE ORDER OF:

*****1,328.51

UNITED CITIES GAS COMPANY

DEPARTMENT OF ENVIRONMENT/CONS
DIV SUPERFUND/4TH FL,L&C ANNEX
401 CHURCH STREET
NASHVILLE TN 37243-1538

BY:  TREASURER
(IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: AUTHORIZED REPRESENTATIVE

⑈166999⑈ ⑆1111300958⑆ ⑈00 052 3⑈

UNITED CITIES GAS COMPANY

P.O. BOX 650205

DALLAS, TX

75265-0205

DATE

11/30/98

E003

CHECK NO.

166999

50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
100798	INV 1007		11/30/98 4050	132851	00	132851
	SITE ID 90-513,		UNITED CITIES GAS COMPANY			
TOTAL >				132851	000	132851



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

May 28, 1998

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$2,300.90 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Env. Assistance Center
Financial Files
Cost Recovery
Site File
Voluntary Section

UNITED CITIES GAS COMPANY
P.O. BOX 650205
ATLANTA, TX 75265-0205

DATE 05/21/98
E003
CHECK NO. 122257
50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
12098	9890513		05/21/98 4042	230090	00	230090
VOAP						
ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE TOTAL >				230090	000	230090

DIVISION OF
SUPERFUND
1998 MAY 27 AM 10:22
TENNESSEE DEPARTMENT
OF ENVIRONMENT AND
CONSERVATION

1 385324

LD

Date 5-27-98 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

225337

Dept. ENVIRONMENT AND CONSERVATION

Number 225337

Office/Division DSF CR# 122251 5-21-98

Object

Address PO Box 650205, Dallas, TX 75265-0205

Sub-object

Received of United Cities Gas Co.

Cost Center

Cert. of Deposit No.

Two thousand three hundred & 90/100

\$ 2,300.90

For VOAP 90-513

Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

FA-0628

Received by Julean

Title ASAT

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75285-0205

AMARILLO NATIONAL BANK
AMARILLO, TEXAS

CHECK NO.
122251

225337

PAY

TWO THOUSAND THREE HUNDRED DOLLARS NINETY CENTS

TO THE ORDER OF:

DEPARTMENT OF ENVIRONMENT/CONS
DIV SUPERFUND/4TH FL, L&C ANNEX
401 CHURCH STREET
NASHVILLE TN 37243-1538

DATE: 05/21/98
VOID AFTER 90 DAYS

*****2,300.90

UNITED CITIES GAS COMPANY

Shirley L. Burman

BY: Shirley L. Burman TREASURER
(IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: AUTHORIZED REPRESENTATIVE

⑈122251⑈ ⑆111300958⑆ ⑈00 052 3⑈

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75265-0205

AMARILLO NATIONAL BANK
AMARILLO, TEXAS

CHECK NO.
122251

PAY

TWO THOUSAND THREE HUNDRED DOLLARS NINETY CENTS

TO THE ORDER OF:

DEPARTMENT OF ENVIRONMENT/CONS
DIV SUPERFUND/4TH FL, L&C ANNEX
401 CHURCH STREET
NASHVILLE TN 37243-1538

DATE: 05/21/98
VOID AFTER 90 DAYS

*****2,300.90
UNITED CITIES GAS COMPANY

BY: *[Signature]* TREASURER
(IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: AUTHORIZED REPRESENTATIVE

⑈ 122251 ⑈ ⑆ 111300958⑆ ⑈00 052 3⑈

UNITED CITIES GAS COMPANY
P.O. BOX 650205
DALLAS, TX 75265-0205

DATE
05/21/98
E003

CHECK NO.
122251
50970

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
042098	9890513		05/21/98 4042	230090	00	230090
TOTAL >				230090	000	230090

1998 MAY 27 AM 10:22
DIVISION OF
SUPERFUND
TENNESSEE DEPARTMENT
OF ENVIRONMENT
& CONSERVATION



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

October 30, 1997

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$76.76 for the above referenced site.

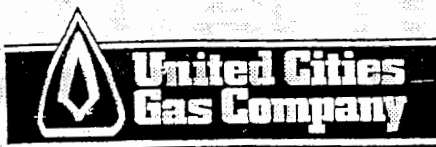
Thank you for your cooperation and participation in this program. If there are any questions, please contact Teresa Lewis at (615)532-0927.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section



5300 MARYLAND WAY
BRENTWOOD, TN. 37027

87-695
0843

CHECK NO.
300159



SEVENTY SIX DOLLARS AND 76 CENTS

PAY TO THE ORDER OF

DATE

CHECK AMOUNT

10/28/97

*****\$76.76

STATE OF TENNESSEE
DEPT OF ENVIRONMENT/CONSERV
DIVISION OF SUPERFUND
NASHVILLE TN 37243-1538

UNITED CITIES GAS COMPANY

BY: *[Signature]* TREASURER
(IF OVER \$20,000, A CO-SIGNATURE IS REQUIRED)

BY: _____ AUTHORIZED REPRESENTATIVE

FIRST AMERICAN NATIONAL BANK, PARIS, TN.

VOID OVER \$76.76

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK - HOLD AT AN ANGLE TO VIEW

300159

084306953

9080000157



5300 MARYLAND WAY BRENTWOOD, TN. 37027

DATE
10/28/97
APTR

CHECK NO.
300159
391466

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
00997	97- -90513 VOAP SITE ID 90-513	1746553		7676	00	7676
TOTAL				7676	000	7676

THE ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE.

date 10-30-97 STATE OF TENNESSEE - CASH RECEIPT VOUCHER
dept. ENVIRONMENT AND CONSERVATION Number 218147
Office/Division ASF-300159 10-25-97 Object _____
Address 5300 Maryland Way Brentwood TN 37027 Sub-object _____
Received of United Cities Gas Co Cost Center _____
Seventy Six Dollars + 76/100 Cert. of Deposit No. _____
\$ 76.76
for VOAP-90513 Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check
Amt. Paid	Money Order
Balance Due	Cashier's Check

4-0628

Received by

Title



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Superfund
4th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1538

CERTIFIED MAIL NO. Z018751163
RETURN RECEIPT REQUESTED

October 15, 1997

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Voluntary Oversight and Assistance Program
Site ID 90-513 (7)
United Cities Gas
Washington County

Dear Ms. Sole:

Enclosed is the periodic billing for the above referenced site. An invoice of those costs incurred and recorded through May 19, 1997, in the amount of \$76.76 is attached. The Division of Superfund staff is currently addressing an upgrade of the accounting program. Overhead charges are not included in this invoice. Overhead will be calculated and charged at the completion of the site project or when the upgrade of the accounting program is complete. Payment in the amount of \$76.76 should be received within thirty (30) days of the date of this letter. Please include the site identification number referenced above and the paying party's name and address with the payment to insure proper credit.

Should you have any questions, please contact Teresa Lewis (615)532-0927. Your participation in this program is appreciated.

Sincerely,

James W. Haynes, PE
Director

cc: Johnson City Field Office
Site File
Cost Recovery File
Financial File
Voluntary Section

State of Tennessee
 Division of Superfund
 4th Floor Annex, L & C Building
 401 Church Street
 Nashville, TN 37243-1538
 (615) 532-0900

Superfund Site Costs
 Page 1

INVOICE # 97- -90513
 Invoice Date 10/09/97

Beginning Date of Entries 07/01/84
 Ending Date of Entries 10/09/97

UNITED CITIES GAS CO

90-513

State & Voluntary

Date	Activity	Staff name and position	Cost
07/01/84	-- Beginning balance --		0.00
08/20/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
08/23/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
09/12/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
09/24/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
09/25/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
09/27/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	51.70
10/01/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
10/02/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
10/15/96	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	33.70
10/15/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
10/17/96	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	44.93
10/17/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
10/18/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
11/20/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
11/22/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
11/25/96	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	11.23
11/25/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	93.06
11/26/96	Enforcement / Legal Support	Heflin, Floyd - Env Pro Sp 4	11.23
11/26/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	93.06
12/05/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	51.70
12/10/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
12/11/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
12/12/96	Enforcement / Legal Support	Grubbs, Frank - Env Prg Mg 3	7.70
12/12/96	General Activities (Field/Office)	Hendricks, Phillip - Env Pro Sp 3	51.70
12/17/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
12/18/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	31.02
12/31/96	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
01/06/97	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
01/09/97	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
01/14/97	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	10.34
01/27/97	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
01/28/97	Payment		-134.42
02/13/97	Enforcement / Legal Support	Hayes, Alan - Geologist 3	14.85
02/20/97	Enforcement / Legal Support	Hendricks, Phillip - Env Pro Sp 3	20.68
02/21/97	Community Relations	Hendricks, Phillip - Env Pro Sp 3	41.36
02/21/97	Remedial Investigation/Feasibility Study	Hayes, Alan - Geologist 3	59.40
03/17/97	Community Relations	Hendricks, Phillip - Env Pro Sp 3	10.34
03/24/97	Information to public	Hayes, Alan - Geologist 3	22.27
03/26/97	Information to public	Hayes, Alan - Geologist 3	22.27
06/04/97	Remedial Investigation/Feasibility Study	Hayes, Alan - Geologist 3	44.85

State of Tennessee
Division of Superfund
4th Floor Annex, L & C Building
401 Church Street
Nashville, TN 37243-1538
(615) 532-0900

Superfund Site Costs
Page 2

INVOICE # 97- -90513
Invoice Date 10/09/97

Beginning Date of Entries 07/01/84
Ending Date of Entries 10/09/97

UNITED CITIES GAS CO

90-513

State & Voluntary

Date	Activity	Staff name and position	Cost
06/05/97	Remedial Investigation/Feasibility Study	Hayes, Alan - Geologist 3	14.85
06/19/97	Administration / Management	Burnette, Karin - Env Spec 1	17.36
08/22/97	Payment		-625.79
08/22/97	Payment		-273.89
		Subtotal due	76.76

Costs by Category for the current billing:

Salaries	Travel	Professional	Laboratory	Miscellaneous	Payments & refunds	Total
1,110.86	0.00	0.00	0.00	0.00	-1,034.10	76.76



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF SUPERFUND
401 Church Street
4th Floor, L & C Annex
Nashville, Tennessee 37243-1538

August 21, 1997

Ms. Karol Sole, CHMM
Principal Engineer - Environmental
United Cities Gas Company
5300 Maryland Way
Brentwood, TN 37027

RE: Receipt of Payment-VOAP
United Cities Gas
Site ID 90-513
Washington County

Dear Ms. Sole :

Enclosed is a receipt acknowledging payment in the amount of \$899.68 for the above referenced site.

Thank you for your cooperation and participation in this program. If there are any questions, please contact Judy Bateman at (615)532-0923.

Sincerely,

Robert L. Powell, Manager
Enforcement and Cost Recovery
Division of Superfund

enclosure

cc: Johnson City Field Office
Financial Files
Cost Recovery
Site File
Voluntary Section



5300 MARYLAND W. BRENTWOOD, TN. 37027

DATE
08/19/97
APTR

CHECK NO.
292878
248518

DATE	INVOICE/CREDIT MEMO	TYPE	DESCRIPTION	GROSS	DISCOUNT	NET
1897	97-90513 VOAP SITE ID# 90-513	1734779	97 AUG 21 AID : 20 <i>Superfund</i>	89968	SUPERFUND 00	89968
THE ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE.				TOTAL	89968	000
						89968

Date 8-21-97 STATE OF TENNESSEE - CASH RECEIPT VOUCHER

Dept. ENVIRONMENT AND CONSERVATION

Office/Division DSF CK# 292878 819-97

Address 5300 Maryland Way, Brentwood, TN

Received of United Cities Gas Co.

Eight hundred ninety-nine & 68/100

For VOAP 90-513

Number 217851

Object _____

Sub-object _____

Cost Center _____

Cert. of Deposit No. _____

\$ 899.68

Dollars

Account	How Paid
Account Code	Cash
Amt. of Account	Check ☒
Amt. Paid	Money Order
Balance Due	Cashier's Check

FA-0628

Received by L Dean

Title Ac Ck

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5300 MARYLAND WAY
BRENTWOOD, TN. 37027

87-695
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CHECK NO.
292878

217851

PAY ONLY **899.68** NINE NINE EIGHT CT SCTS

EIGHT HUNDRED NINETY NINE DOLLARS AND 68 CENTS

PAY TO THE ORDER OF

DATE

08/19/97

CHECK AMOUNT

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UNITED CITIES GAS COMPANY

James L. White
ASST. TREASURER

James B. Ford
SVP & TREASURER

FIRST AMERICAN NATIONAL BANK, PARIS, TN.

VOID OVER \$899.68

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1.0 INTRODUCTION

1.1 Background

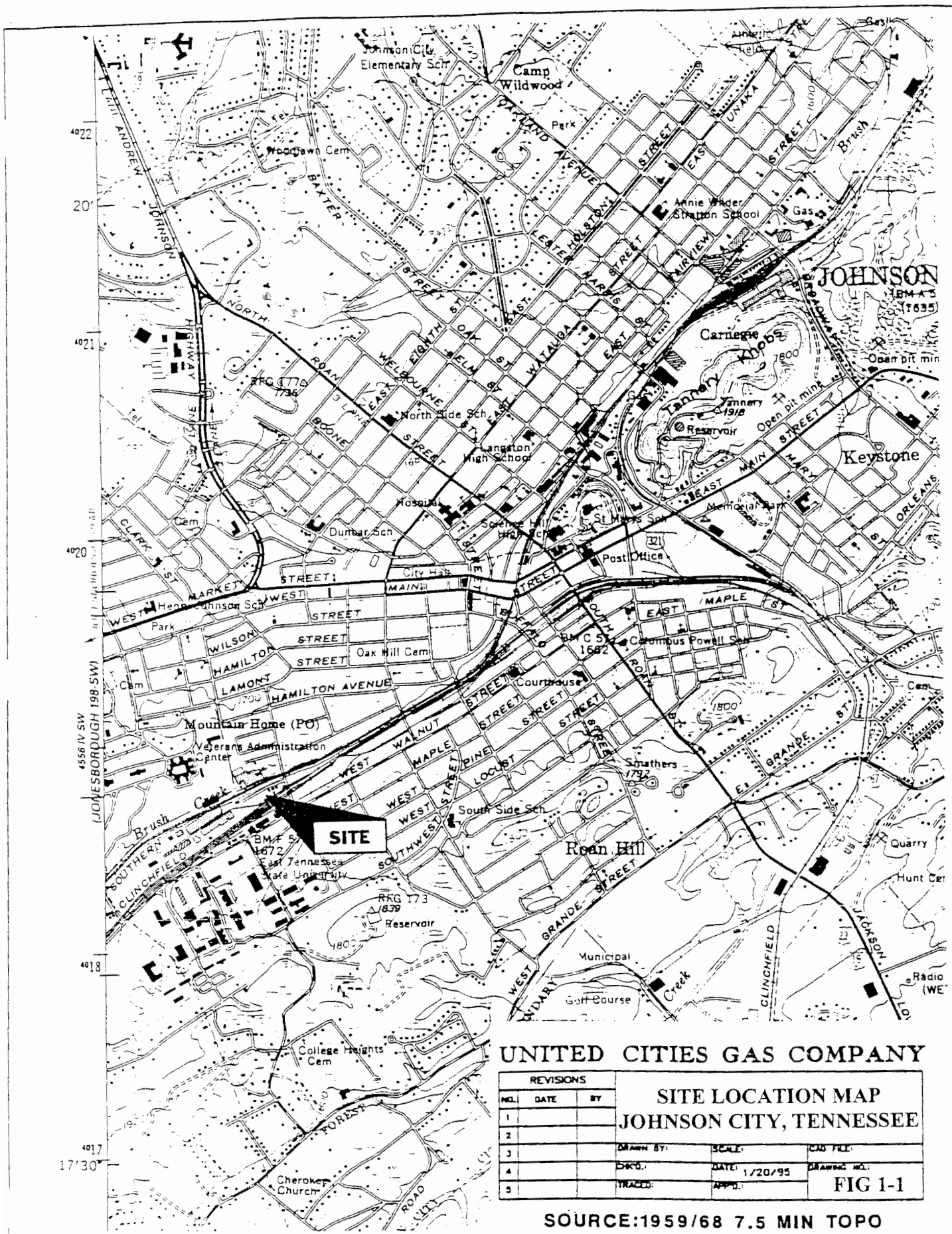
This report provides the results of the Preliminary Site Investigation conducted from November 18 to 20, 1997, at the Tennessee Street Former Manufactured Gas Plant ("FMGP") located at Tennessee Street and Security Lane in Johnson City, Tennessee ("the Site"). Figure 1-1, *Site Location Map*, shows the location of the Site in relation to area landmarks. United Cities Gas Company ("United Cities") as current owner of the Site conducted the investigation with support from three contractors. Hitch Environmental provided the geoprobe services, Specialized Assays provided the environmental laboratory services, and Beaver Engineering provided the geotechnical laboratory services.

A manufactured gas plant was operated at the Site from 1915 until 1946, and a gas making plant from 1946 until 1954 when natural gas became available in Johnson City. Beginning in 1954, the Site was used as a service center for utility service and construction crews. The Site has not been used for commercial purposes except equipment and vehicle storage since 1996.

In October 1995, a gasoline underground storage tank ("UST") was removed from the northwest corner of the Site. During the UST removal, soil and groundwater contamination was identified. Notification of a release was given to the Tennessee Department of Environment and Conservation, Division of Underground Storage Tanks ("DUST") in accordance with Rule 1200-1-15-05(1). Between October 1995 and January 1997, negotiations occurred between United Cities, DUST and the Division of Superfund ("DSF") concerning the appropriate regulatory oversight for the management of the Site. On January 23, 1997, United Cities entered into a Consent Order and Agreement ("Consent Order") with the DSF to manage the Site under the Voluntary Cleanup, Oversight, and Assistance Program ("VOAP"). The VOAP was established within the DSF by the Hazardous Waste Management Act of 1983 as amended May 9, 1994. The VOAP allows willing and able parties to conduct an investigation and, if necessary, a cleanup of inactive hazardous substance site.

On May 22, 1997, in satisfaction of paragraph X-B-1 of the Consent Order and in accordance with Section 3.3 of the VOAP Program Guidance, dated May 20, 1996 ("Guidance"), United Cities submitted a Phase I Site Evaluation Report ("Phase I Report") to the DSF summarizing the site history and identifying the need for further investigation to confirm the presence of FMGP residuals on-site and to determine if a release to the environment had occurred. The Phase I Report was approved by the DSF on July 10, 1997. On September 5, 1997, United Cities submitted a work plan for a Preliminary Site Investigation ("PSI") at the Site. The DSF accepted a modified version of the PSI on October 13, 1997.

United Cities began Site work on November 18, 1997 and concluded Site work on November 20, 1997. The Site work was performed in accordance with the procedures contained in Section 3.4 of the VOAP Guidance and the modified PSI Work Plan.



1.2 Investigation Objectives

The primary objectives of the PSI were:

- to determine if FMGP residuals remain on-site,
- to determine if a release to the environment has occurred, and
- gather site specific hydrogeological data to aid in scoping future site activities.

1.3 Report Organization

Section 2.0 provides a description of the Site, a summary of historical land use, a summary of previous investigations, and a summary of the regional geology and hydrogeology. The Site investigation field activities and the laboratory analyses are described in Section 3.0. Site geology and hydrogeology are described in Section 4.0. Section 5.0 provides the results of soil and groundwater sampling and analysis. The nature and extent of impacts to soil and groundwater are discussed in Section 6.0. Section 7.0 presents a preliminary risk assessment which discusses an exposure assessment completed at the Site. Conclusions are provided in Section 8.0. Section 9.0 provides a list of the references cited in this report.

2.0 SITE BACKGROUND AND DESCRIPTION

2.1 Site Description

The Tennessee St. FMGP is located at the southwest corner of the intersection of Tennessee Street and Security Lane in Washington County, Tennessee. The geographic coordinates of the site are 36°18'59" North latitude and 82°21'57" West longitude (North 713,600 and East 3,071,300 Tennessee Carter Coordinates) at an approximate elevation of 1,640 feet above mean sea level based on the 1969 Johnson City, Tennessee 7.5 Minute Topographic map.

The Tennessee St. FMGP is on property owned by United Cities Gas Company, and is located near downtown Johnson City in a mixed industrial and commercial area. The site is bounded on the north by Norfolk Southern railroad tracks and Gordon's Furniture manufacturing facility, on the south by State of Franklin Road, on the east by Tennessee St. and vacant property owned by the City of Johnson City, and on the west by a coal storage pile owned by the State of Tennessee, East Tennessee State University. The site is approximately 1.8 acres in area, fenced, largely open and paved.

The Site is currently vacant. Several buildings remain on-site from when the FMGP was in operation. The site and surrounding terrain are generally flat and are located within the 100 year flood zone of Brush Creek. Surface water run-off from the site drains to the east and west with the center of the site acting as a divide. Several stormwater catch basins are located on-site and drain into Brush Creek located along the north edge of the site. *Figure 2-1, Current Site Conditions*, depicts the current Site layout.

2.2 Site History

2.2.1 Information Sources

An extensive review of historical documents was completed and reported in the Phase I Report (United Cities, 1996). A summary of that information is presented in this Section.

The Site was used as a manufactured gas plant ("MGP") from 1915 until 1946, and as a gas making plant from 1946 until 1954 when natural gas became available in Johnson City. Prior to 1915 the site was undeveloped land. Gas was manufactured by heating coal in the absence of oxygen. Water and oil were then sprayed onto the incandescent coal and the resulting gas created by the interaction was collected, purified, and stored until delivered into the gas distribution piping network of the city. After the gas manufacturing process was discontinued, gas was made with propane and later with petroleum distillate. Over time several different gas manufacturing processes were developed based on the raw materials available and BTU value required by the customers.



Several different gas processes were used at the site. These processes included:

1915-1946	<u>Gas manufacturing</u> : Coal gas and carburetted water gas, where coal was used as feedstock and coke and oil were used for BTU enrichment, respectively;
1946-1951	<u>Gas making</u> : Propane-air, where propane and air were mixed to produce a suitable gas. Water gas process was used to cover peak loads, and;
1951-1954	<u>Gas making</u> : Hasche Process, where H-Fuel (a petroleum distillate similar to natural gasoline) was mixed with air and sprayed onto hot ceramic tiles to produce a suitable gas. Water gas process was used to cover peak loads.

Only the operation of the gas manufacturing process produced MGP residuals at the Site.

Since 1954 the site has primarily been used as a service center for utility construction and service crews. The site has been vacant since 1996. *Table 2-1, Brown's Directory*, provides a summary of information compiled from Brown's Directories for the Site. Appendix A of this report provides the Sanborn Maps for the Site. *Figure 2-2, Historical Site Layout*, depicts the current Site conditions in relation to historical site plans. *Table 2-2, Historical Milestones*, summarizes the historical milestones for the Site.

2.3 Previous Investigations

With the exception of the UST closure investigation, no other investigations have been conducted at the Site. During the October 1995 UST investigation the following activities were conducted:

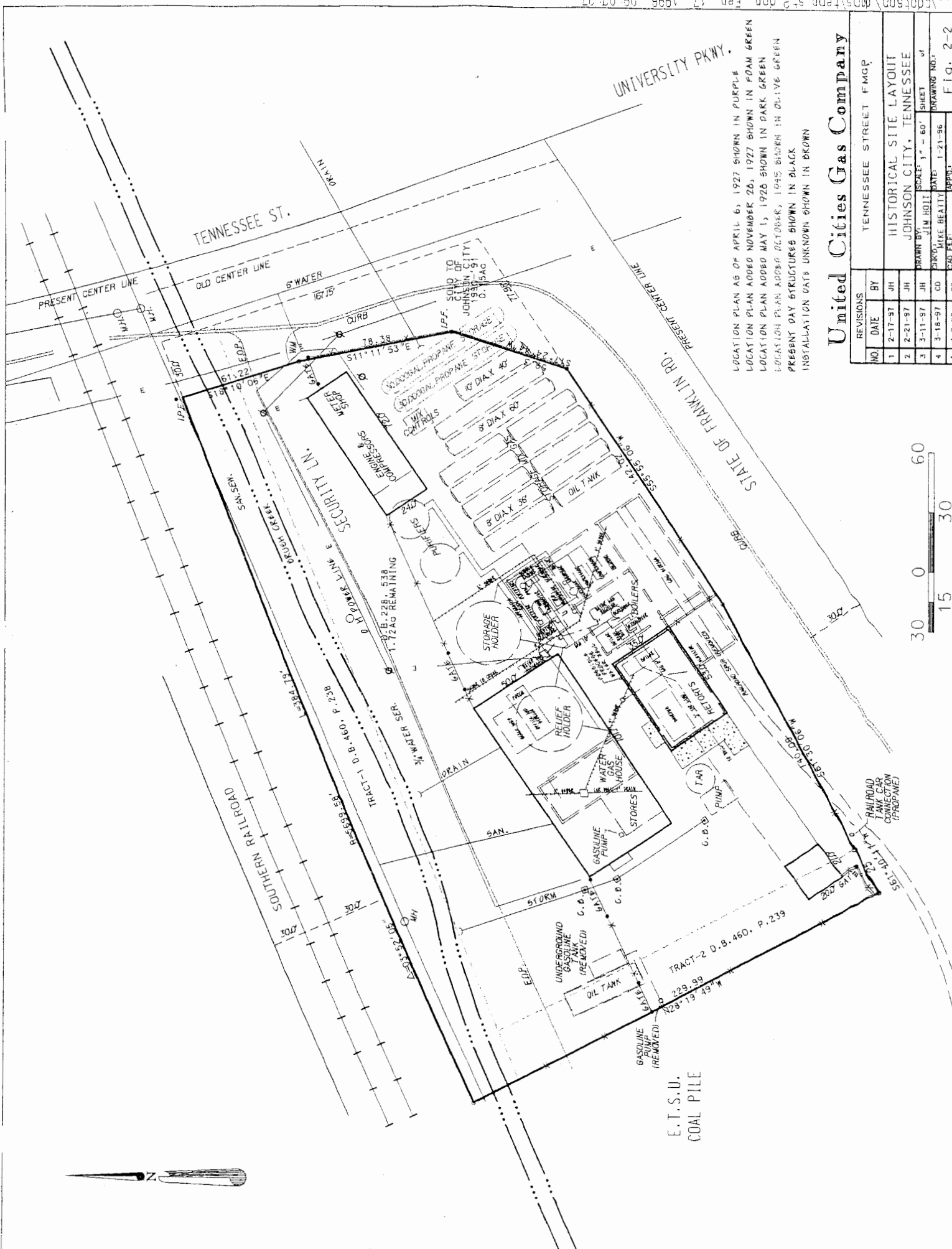
- Four (4) soil samples were collected from an approximate depth of 8 feet;
- One (1) groundwater sample was collected from the tank pit excavation;
- Four (4) samples were collected from stockpiled soil from the tank pit;
- Approximately 580 gallons of groundwater were pumped from the UST pit and disposed of as non-hazardous wastewater by the UST removal contractor;
- Soil and groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylene ("*BTEX*") by EPA Method 8020; total petroleum hydrocarbons ("*TPH*") diesel and gasoline range organics by EPA Methods 3550 and 5030, respectively; and polycyclic aromatic hydrocarbons ("*PAH's*") by EPA Method 8100. PAH's were added to the analysis suite to test for MGP residuals;
- Stockpile soil samples were analyzed for BTEX, TPH-DRO and -GRO, and toxic characteristic leaching potential ("*TCLP*") for lead for waste disposal profiling.

TABLE 2-1

Year	Company Name	Process Type/Name	Annual Production (cubic feet)	Gas Holder Capacity (cubic feet)	Gas Unaccounted For	Tar Produced (gals)	Tar Sold (gals)	Coke Produced (tons)	Coke Sold (tons)	Coke Used (tons)	Ammonia Produced (lbs)	Ammonia Sold (lbs)	Coal Carbonized (tons)	Gas Off Used (gals)	Notes
1914-15	Washington County Gas Co.	coal & kerosene	12,600,000 c.f.	100,000	10.00%	(15)									1.2
1917	Washington County Gas Co.	coal & kerosene	1,400,000 w.f.	100,000	10.00%										1.2
1918	Washington County Gas Co.	coal & kerosene	19,000,000 c.f.	100,000	10.00%										1.2
1919	Washington County Gas Co.	coal & kerosene	21,500,000 c.f.	100,000	10.00%	15,777	15,777	823	609						1.2
1920	Washington County Gas Co.	coal gas & water gas	14,700,000 c.f.	80,000	8.47%	23,900	20,000	1,212	1,050						1.2
1921	Washington County Gas Co.	coal gas & water gas	5,000,000 w.f.	80,000	8.00%	23,900	20,000	797	50						1.2
1922	Washington County Gas Co.	coal gas & water gas	20,500,000 c.f.	80,000	11.00%	14,870	15,000	1,287	50						1.2
1923	Washington County Gas Co.	coal gas & water gas	12,000,000 c.f.	80,000	11.00%	23,379	23,000	1,287	648						1.2
1924	Washington County Gas Co.	coal gas & water gas	21,200,000 c.f.	80,000	11.00%	23,379	23,000	1,287	648						1.2
1925	Washington County Gas Co.	coal gas & water gas	17,120,000 w.f.	100,000	8.71%	32,810		1,738					2,845	13,728	1.2
1926	Washington County Gas Co.	coal gas & water gas	31,300,000	100,000	4.44%	34,000		1,800					3,100	34,000	1.2
1927	Washington County Gas Co.	coal gas & water gas	31,500,000	100,000	4.44%	34,000		1,800					3,100	34,000	1.2
1928	Washington County Gas Co.	coal gas & water gas	31,500,000	100,000	4.44%	34,000		1,800					3,100	34,000	1.2
1929	Washington County Gas Co.	coal gas & water gas	34,900,000 c.f.	130,000	10.00%	34,000		1,800					2,800	34,000	1.2
1930	Washington County Gas Co.	coal gas & water gas	2,860,000 w.f.	20,000	19.40%	60,950		3,311	1,844				5,316	982	1.2
1931	Washington County Gas Co.	coal gas & water gas	48,702,000 c.f.	20,000	18.00%	62,229		3,370	1,844				5,443	3,009	1.2
1932	Washington County Gas Co.	coal gas	29,230,000 w.f.	20,000	11.50%	52,132		3,121	1,829				4,707	4,336	1.2
1933	Washington County Gas Co.	coal gas & water gas	81,003,000	260,000	11.80%	52,132		2,626	1,697				3,994	4,7	1.2
1934	Washington County Gas Co.	coal gas & water gas	33,510,000	180,000	11.20%	58,194		2,148	2,094				3,797	4,7	1.2
1935	Washington County Gas Co.	coal gas	57,755,000	180,000	12.30%	57,278		2,735	2,681				4,204	4,7	1.2
1936	Washington County Gas Co.	coal gas	44,439,000	160,000	14.40%	45,639		3,669	1,600				4,707	4,7	1.2
1937	Washington County Gas Co.	coal gas	74,112,000	180,000	14.40%	45,639		3,144	2,283				5,360	4,7	1.2
1938	Washington County Gas Co.	coal & water gas	98,270,000 c.f.	180,000	14.40%	83,113		4,117	2,695				4,198	4,7	1.2
1939	Washington County Gas Co.	coal & water gas	48,183,000	180,000	11.20%	60,716	11,620	4,035	2,094				4,198	4,7	1.2
1940	Washington County Gas Co.	coal & water gas	95,982,000	180,000	7.80%	84,127	81,716	4,137	2,131				4,198	4,7	1.2
1941	Washington County Gas Co.	coal & water gas	81,111,000	180,000	11.50%	93,069	93,069	4,319	2,597				4,252	4,7	1.2
1942	Washington County Gas Co.	coal & water gas	92,360,000	180,000	9.80%	97,534	97,534	4,449	3,798				4,222	4,7	1.2
1943-44	Washington County Gas Co.	coal & water gas	104,541,000 c.f.	180,000	7.71%	102,748	102,748	4,171	3,368				7,569	4,7	1.2
1944-45	Washington County Gas Co.	coal & water gas	172,000 w.f.	180,000	7.71%	99,978	102,748	4,171	3,368				7,569	4,7	1.2
1945-46	Washington County Gas Co.	coal & water gas	104,540,000 c.f.	180,000	6.40%	111,830	111,830	3,394	3,061				7,748	4,7	1.2
1946-47	Wallaula Valley Gas Co.	propane	20,356,000 w.f.	180,000	8.40%										4.11
1947-48	Wallaula Valley Gas Co.	propane	13,717,000	180,000	8.40%										4.11
1948-49	Wallaula Valley Gas Co.	propane	34,811,000	180,000	13.50%										4.10
1949-50	Wallaula Valley Gas Co.	propane	113,140,000	180,000	19.70%										4.10
1950-51	Wallaula Valley Gas Co.	propane	113,087,000	180,000	14.10%										4.10
1951-52	Wallaula Valley Gas Co.	propane	113,034,000	180,000	14.10%										4.10
1952-53	Wallaula Valley Gas Co.	propane	113,984,000	180,000	14.10%										4.10
1953-54	Wallaula Valley Gas Co.	LP gas	117,021,000	180,000	9.20%										4.12
1954-55	Volunteer Natural Gas Co.	natural	120,415,000	180,000	9.20%										4.12
1955-56	Volunteer Natural Gas Co.	natural	483,551,000	180,000	5.30%										4.9
1956-57	Volunteer Natural Gas Co.	natural	860,094,000	180,000	3.57%										4.9
1958	Volunteer Natural Gas Co.	natural	1,155,946,000	180,000	3.57%										4.9
1959	Volunteer Natural Gas Co.	natural													4.9
1960-61	Volunteer Natural Gas Co.	natural	1,495,758,000	180,000	2.97%										4.9
1962	Volunteer Natural Gas Co.	natural	1,435,443,000	180,000	28.40%										4.9
1963	Volunteer Natural Gas Co.	natural	1,776,823,000	180,000	3.17%										4.9
1964	Volunteer Natural Gas Co.	natural	1,747,495,000	180,000	1.41%										4.9
1965	Volunteer Natural Gas Co.	natural													2.9
1966	Volunteer Natural Gas Co.	natural	2,283,315,000		2.55%										2.9

• **Wiederholung:**

1. Supplies Johnson City.
2. Controlled by Appleby-Wagner Co., Saginaw, Michigan.
3. Subsidiary of Federated Utilities Inc., Chicago, Illinois.
4. Supplies Johnson City and Elizabethton, Tennessee.
5. Subsidiary of Southern Cities Public Service Co., Chicago, Illinois.
6. Managed by Central Public Service Corp., Chicago, Illinois.
7. Subsidiary of Consolidated Electric and Gas Co., Chicago, Illinois.
8. Superintended by Stone & Webster Corp., New York, New York.
9. Gas purchased from East Tennessee Natural Gas Co.
10. Company operates a water gas plant.
11. Affiliated with Rutledge Gas Co., Charlotte, North Carolina.
12. Company converted to natural gas January 27, 1951.
13. Blank cell indicates data were not provided.



E.T.S.U.
COAL PILE

UNIVERSITY PKWY.

TENNESSEE ST.

STATE OF FRANKLIN RD.

SOUTHERN RAILROAD

LOCATION PLAN AS OF APRIL 6, 1927 SHOWN IN PURPLE
LOCATION PLAN ADDED NOVEMBER 26, 1927 SHOWN IN FOAM GREEN
LOCATION PLAN ADDED MAY 1, 1928 SHOWN IN DARK GREEN
LOCATION PLAN ADDED OCTOBER, 1945 SHOWN IN OLIVE GREEN
PRESENT DAY STRUCTURES SHOWN IN BLACK
INSTALLATION DATS UNKNOWN SHOWN IN BROWN

United Cities Gas Company

REVISIONS		TENNESSEE STREET FMOP			
NO.	DATE	BY	DATE	BY	DATE
1	2-17-97	JH			
2	2-21-97	JH			
3	3-11-97	JH			
4	3-18-97	CD			
5	4-7-97	CD			

NO.	DATE	BY	DATE	BY	DATE
1	2-17-97	JH			
2	2-21-97	JH			
3	3-11-97	JH			
4	3-18-97	CD			
5	4-7-97	CD			

SCALE: 1" = 60'
DRAWN BY: JIM HOIT
CHECKED BY: MIKE BEATTY
APPROVED BY: [Signature]
SHEET NO. 1-21-96
DRAWING NO. 2-2



TABLE 2-2
HISTORICAL MILESTONES
TENNESSEE ST. MGP

April 6, 1915	Charter to manufacture and distribute manufactured gas granted by Johnson City, Tennessee, to Washington County Gas Co. ("WCGC"). WCGC owned by Appleby-Wagner Co. of Saginaw, Michigan.
May 21, 1915	Tennessee Street property purchased by WCGC.
Summer 1915	WCGC began distributing manufactured gas in Johnson City. Plant consisted of two small retorts and had a daily production of 66,000 cubic feet of gas, enough to serve 800 homes.
1922	Gas lines were extended to Elizabethton, Tennessee, and the gas plant was enlarged.
1927	Appleby-Wagner Co. sells interest in WCGC to Federated Utilities, Inc. of Battle Creek, Michigan.
November 27, 1927	Plans for enlarging the gas plant are drawn-up. A new water gas building was planned along with additional storage capacity. The "new" gas plant had a daily production capacity of 42,000,000 cubic feet.
March, 1928	Federated Utilities sold interest in WCGC to Central Public Service Corp. of Chicago, Illinois.
1930	WCGC becomes a subsidiary of Southern Cities Public Service Co. of Chicago, Illinois.
1931	Stone & Webster retained to operate gas plant.
1932	WCGC becomes a subsidiary of Consolidated Electric and Gas Co. of Chicago, Illinois.
1933 to 1937	Coal gas was the only gas manufactured at the plant.
1943	U.S. Congress amended Public Utility Holding Act of 1935 requiring large holding companies to divest themselves of multiple holdings.
June 4, 1943	WCGC sold to James Pierce of Hartford, Connecticut.
October 30, 1943	James Pierce sold WCGC to Carl H. Schwyn of Cignet, Ohio.
July 8, 1944	Granted new Tennessee Charter under new name of Carl H. Schwyn Utilities, Inc.
August 31, 1944	Name changed to Watauga Valley Gas Co.
1944	Plant reached peak production of 124,725,000 cubic feet.
August 11, 1945	Rulane Corp. of Charlotte, NC purchases company and makes plans to convert MGP to propane-air.
September, 1945	Tennessee Railroad and Public Utility Commission grants request to construct a propane-air plant at the Site.

**TABLE 2-2, CONTINUED
HISTORICAL MILESTONES
TENNESSEE ST. MGP**

1946	Propane-air plant construction was completed and conversion from manufactured coal and water gas to propane-air gas was completed.
1950	Water gas equipment re-activated for use during peak load events.
November, 1951	Gas manufacturing process converted from propane-air to Hasche process. Water gas set still used to cover peak-loads.
August 22, 1953	Charter amended and name changed from Watauga Valley Gas Co. to Volunteer Natural Gas Co.
January 27, 1954	Natural gas became available to Johnson City. Water gas process no longer used as emergency peak-load supply.
July, 1972	Manufactured gas plant equipment (boiler and Hasche Reforming equipment) are removed to make room for improvements to the Site.
July, 1973	Remaining gas plant equipment (holders, purifiers, etc.) are removed to make room for improvements to the Site.
October, 1973	Boiler-compressor building and exhaust room are dismantled to make room for improvements to the Site.
February, 1974	Cylindrical gas storage tanks (9-8' x 30'; 2-8' x 60'; and 1-10' x 40') are sold and removed from the Site.
April, 1976	Petroleum storage tank (8' x 30') is sold and removed from the Site.
December 5, 1980	Name changed to Tennessee Virginia Energy Company
1986	United Cities Gas Co. merges with Tennessee Virginia Energy Co.

Results of the 1995 UST closure investigation are summarized as follows:

- Benzene and TPH concentrations in one soil sample (northeast corner of pit) exceeded the most stringent DUST action levels;
- BTEX and TPH concentrations in groundwater exceeded the most stringent DUST action level; and
- Although gasoline was the only fuel known to have been stored in the UST, diesel range organics were the primary chemicals detected in soil and groundwater samples.

2.4 Physical Setting

The site is located in the city of Johnson City, on the eastern edge of Washington County, Tennessee. Washington County is located in the northeastern corner of the state and situated in the Valley and Ridge physiographic province. Johnson City is located in the Great Valley of the Valley and Ridge physiographic province. The Great Valley is characterized by numerous parallel low ridges and valleys that lie in a general northeast-southwest direction. The higher ridges are composed of resistant sandstone and the lower ridges of cherty limestone and dolomite.

2.4.1 Topography and Drainage

Topography of the Great Valley is rolling to hilly, though it ranges from nearly level to steep. The difference in elevation from stream bottoms and adjacent ridge crests range from 50 to 300 feet. The maximum difference between the highest and lowest point in the county is 1,900 feet (USDA, 1948).

Surface drainage is well formed in most of the area. Sinkholes are prevalent, and karst relief is characteristic of some areas underlain by limestone. The Watauga River and a tributary, the Doe River, are the major streams in the area. The flow of the Watauga River is controlled by the Watauga Dam located east of Johnson City (USDA, 1948).

2.4.2 Regional Geology

Consolidated rocks that underlie the area are mostly sedimentary and range from Precambrian (570 million years ago ("mya")) to Ordovician (425 mya) age. Unconsolidated deposits of late Tertiary (165 mya) and Recent age (<10,000 years) are present along the stream valleys beneath and on terraces along these valleys. The structure of the area is complex. The predominant structural feature is the Shady Valley thrust sheet which has been folded into the Stony Creek syncline (USGS, 1962).

The stratigraphic sequence from oldest to youngest rocks includes the Precambrian Complex, Chilhowee Group, Shady Dolomite, Rome Formation, Honaker Dolomite, Upper

Conasaga Group, Knox Group, Sevier Shale, and alluvium and terrace deposits. The Knox Group underlies a larger area of east Tennessee than any other stratigraphic unit (USGS, 1962). *Figure 2-3, Generalized Stratigraphic Column*, presents the stratigraphic column of the Johnson City area of the Valley and Ridge Physiographic Province.

2.4.3 Regional Hydrogeology

Johnson City obtains its water supply from springs and surface water (Watauga River). The springs that supply Johnson City are located along Indian Creek approximately 10 miles south of the City (USGS, 1962). A water use survey was conducted for a 0.5 mile radius of the Site and did not identify any groundwater users. In the Johnson City area groundwater occurs in openings along fractures and bedding planes in the consolidated rocks underlying the area, and in the pore spaces between the particles that make up the residuum, alluvium, and terrace deposits. Wells having the largest yields are generally located near streams.

The Shady and Honaker formations and the Knox group are the principal water-bearing rocks of the area. Wells drilled into these formations yield an average of about 10 gallons per minute in most places. The Honaker dolomite is the most productive aquifer. Perched water is common in the alluvium and terrace deposits. Recharge is principally from precipitation. Areas next to streams are recharged by surface water during high stages, but this water returns to the streams rather quickly when the stream water level falls (USGS, 1962).

FIGURE 2-3
GENERALIZED STRATIGRAPHIC COLUMN
JOHNSON CITY, TN

Age	Symb.	Formation		Character	Thickness (in feet)
Lower Ordovician	Os	Athens shale*		Gray to black shale, calcareous below, sandy above	1000-5000
	COhk	Knox dolomite		Gray to blue-gray limestone and dolomite, in part cherty. Argillaceous seams in lower part	1,000
Nolichucky shale		Green calcareous and dolomitic shale, and shaly dolomite.	100		
Honaker dolomite		Gray to blue-gray dolomite and limestone, with many silty and shaly laminae.	2,000		
Middle Cambrian	Cr	Rome formation		Red shale and siltstone, some green shale, and some dolomite; residual clay contains many manganese deposits.	1200-1800
Lower Cambrian	Cs	Shady dolomite		Blue-gray dolomite, white dolomite, ribboned dolomite and limestone; residual clay contains many manganese deposits.	900-1200
	Cbc	Basalt clastic group	Erwin formation	White vitreous quartzite, in part containing Scolithus, greenish sandy shale and siltstone, some beds of purple ferruginous quartzite.	1200-1500
			Hampton formation	Dark greenish argillaceous shale, sandy shale and siltstone; some beds of arkosic quartzite, in parts containing Scolithus.	1200-1300
			Unicoi formation	Coarse-grained arkosic quartzite, conglomerate, arkosic sandy shale and siltstone; some beds of amygdaloidal basalt.	200-5000
			Unconformity		
Pre- Cambrian	pC	Volcanic rocks		Rhyolitic lava and tuff; present only in northeast part of area.	0-1000
		Unconformity			
		Granitic rocks		Granite and granite gneiss, some schist inclusions, pegmatite and quartz veins.	

Adapted from Table 1 (King, 1944)

* Not present at the Site.

EXECUTIVE SUMMARY

The purpose of this site evaluation is to assemble relevant information about the Tennessee Street Former Manufactured Gas Plant (*"the Site"*) into a cohesive package facilitating proper site management decisions concerning the need for additional site action.

The site is located at the intersection of Tennessee Street and Security Lane in Johnson City, Washington County, Tennessee (Zip Code 37604). Following the removal of an underground storage tank (*"UST"*) in October, 1995, petroleum hydrocarbon impacted soil and groundwater were discovered. The UST closure assessment work suggested that the petroleum contamination discovered may be the result of petroleum releases originating from historical use of the site as a former manufactured gas plant (*"FMGP"*).

From 1915 until 1954, the site was used to manufacture gas. Four gas manufacturing processes were used: coal gas, water gas, propane-air, and the Hasche process. As a result of regular and ordinary operations of the FMGP, there is a potential for the presence of MGP-related process feed stocks and residual constituents in the soil and groundwater at the site.

Based on the information collected and reviewed while preparing the Phase I Site Evaluation, and in conformance with the consent order, United Cities recommends an assessment conference be scheduled to discuss the need for additional site investigation (Phase II) activities.

1.0 PURPOSE OF INVESTIGATION

The purpose of this site evaluation was to assemble relevant information about the Tennessee Street Former Manufactured Gas Plant ("*the Site*") into a cohesive package facilitating proper site management decisions concerning the need for additional site action.

1.1 Scope and Content of Report

The information presented in this Phase I Site Evaluation Report ("*Phase I SE*") is consistent with the objectives and guidelines presented in Section 3 of the Tennessee Department of Environment and Conservation ("*TDEC*"), Division of Superfund, Voluntary Cleanup, Oversight and Assistance Program ("*VOAP*") Guidance document dated May 20, 1996, and with the requirements established by the American Society of Testing and Materials ("*ASTM*") standard E 1527-94 for conducting Phase I Environmental Site Assessments.

1.2 Objectives

The objectives of the Phase I SE are:

- to establish an appropriate level of inquiry based on current and historical information;
- to determine whether the property has been the site of a release or threatened release of a hazardous substance, pollutant, or contaminant; and
- to determine the need for additional inquiry or investigation.

1.3 Background to Investigation

Following the removal of an underground storage tank ("*UST*") in October, 1995, petroleum hydrocarbon impacted soil and groundwater at concentrations greater than those allowable by the Tennessee Division of Underground Storage Tank ("*DUST*") program were discovered. Field conditions, analytical results, and a review of site history indicated that the soil and groundwater impacts encountered during the UST removal may be due to sources other than the UST.

In June, 1996, United Cities approached the VOAP about moving the regulatory lead for the site from DUST to VOAP to better address the overall potential environmental condition of the site. In July, 1996, the regulatory lead was switched from DUST to VOAP and consent order negotiations were initiated.

In January, 1997, consent order negotiations were complete and the order was executed. At this time, United Cities has published public notice and initiated the Phase I SE.

2.0 LOCATION OF PROPERTY AND SURROUNDING SITE USE

The site is located at the intersection of Tennessee Street and Security Lane in Johnson City, Washington County, Tennessee (Zip Code 37604) and being more precisely described as:

Beginning at the intersection of the southwesterly right-of-way line of Tennessee Street with the southwesterly right-of-way line of the Norfolk-Southern Railway, and running thence in a southeasterly direction along said Tennessee Street right-of-way S $18^{\circ}10'06''$ E a distance of 61.22 feet, S $11^{\circ}11'53''$ E a distance of 78.38 feet and S $17^{\circ}24'44''$ W a distance of 59.3 feet to the intersection with a point in the northern right-of-way line of State of Franklin Road (S.R. 381); thence with said State of Franklin Road right-of-way line the following two (2) calls; S $55^{\circ}55'06''$ W a distance of 142.02 feet and S $61^{\circ}30'06''$ W a distance of 140.09 feet to the corner with State of Tennessee N $28^{\circ}19'49''$ W a distance of 229.99 feet to a point on the Norfolk-Southern southern right-of-way line; thence with said right-of-way line with a curve having a length of 384.79 feet, a radius of 5,699.58 feet, and a delta angle of $03^{\circ}52'05''$ to the point of beginning, containing 1.8756 acres, more or less according to United Cities Gas Company Tennessee Street property map, which reflects property sold to City for Tennessee Street street improvements.

The geographic coordinates of the site are $36^{\circ}18'59''$ North latitude and $82^{\circ}21'57''$ West longitude (North 713,600 and East 3,071,300 Tennessee Carter Coordinates) at an elevation of 1,640 feet above mean sea level. *Figure 2-1, Site Location Map*, is a copy of the United States Geological Survey ("USGS") 7.5 minute topographical quadrangle depicting the location of the site in relation to area landmarks. *Figure 2-2, Site Layout Map*, depicts current site structures and property boundaries as described above. All figures are located in Appendix A.

2.1 Directions From County Seat

To reach the Site from Jonesboro, the county seat, take U.S. 11E/411 "Andrew Johnson Highway" east toward Johnson City approximately 3.75 miles. Exit 11E/411 at State of Franklin Road (S.R. 381) South and continue east for approximately 1.5 miles. Turn left (north) onto Tennessee Street. The site is on your left. Take next left into the private alley way (Security Lane). Entrance to the site is approximately 30 yards on left.

2.2 Property Use

The site is currently not in use, but as recent as 1996, the site was used by United Cities service and construction crews. The site is regularly visited and inspected by United Cities personnel. The site is located in a mixed commercial, industrial, residential area of Johnson City and is zoned for heavy industrial (I-2) use [Zoning Map, Southeast Quadrant]. *Figure 2-3, Zoning Use Map*, depicts the site and surrounding property zoning designations.

The site is rectangular in shape, measuring approximately 385 feet long by 230 feet wide, or about 1.8 acres. *Figure 2-4, Tax Map*, depicts the site property boundaries and surrounding property boundaries and ownership.

2.3 Surrounding Property Use

The site is bounded on the north by railroad tracks and right-of-way owned by Norfolk-Southern Railroad. Gordon's Furniture Manufacturing Company is located north of the railroad right-of-way. The site is bounded by State of Franklin Road to the south; to the east by Tennessee Street and then vacant property owned by Johnson City; and to the west by a coal storage pile owned by the State of Tennessee, East Tennessee State University ("*ETSU*").

2.4 Records Review

A review of reasonably ascertainable records was conducted to help identify recognized environmental conditions in connection with the site. Environmental Data Resources, Inc. ("*EDR*") was contracted to conduct a search of environmental records. The search met the specific requirements of ASTM Standard E 1527-94. A copy of EDR's Radius Map Report is included in Appendix B.

Results of EDR's search revealed two leaking underground storage tank ("*LUST*") sites within 1/8 mile of the site. Further review of LUST files at the TDEC Johnson City Field Office ("*Field Office*") revealed the two facilities were the same facility but listed under two different names. The LUST site is the present location of the BP station located at 901 W. Walnut St., southeast (upgradient) of the Tennessee St. FMGP. It does not appear to be impacting the site. Remediation of soil and groundwater is scheduled at the LUST site.

Three additional underground storage tank ("*UST*") sites were identified within 1/4 miles of the site. One small quantity hazardous waste generator ("*SQG*") was identified within 1/8 mile of the site. Further review at the field office identified the SQG as Gordon's Furniture. Gordon's generates <1000 kg of hazardous waste per month and appears to be in compliance with SQG requirements. A review of site inspection records dating back to February 1985 indicated that Gordon's has maintained compliance with one exception in May, 1996, when a notice of violation was issued for exceeding the seven day inspection requirement for the hazardous waste accumulation area. This violation was non-correctable and did not require a follow-up inspection.

Nine sites were identified by database but not by location due to poor or inadequate address information. Further review indicated that none of these sites were within 1/4 mile of the site.

One impacted property, which did not appear on EDR's database search, was the future Continuing Education Center located 1,000 feet west and upgradient of the site. Currently, the property is undergoing remediation for barium contaminated soil and groundwater. Historical records indicate the property was used as a barium reduction facility from 1915 through 1924. From 1924 through 1984, the property was used to manufacture wood flooring. Several phases of investigation have been completed and a risk-based corrective action is currently being implemented under the regulatory authority of the Tennessee Department of Health and Environment, Division of Hazardous Waste Management, State Remediation Section [Personal Communication with Ronnie Bowers].

3.0 SITE HISTORY

The site history spans 82 years (1915-1997). Over this time span, several different owners, operators, and managements have existed. The chain of ownership is summarized on *Table 3-1, Tennessee Street FMGP Ownership History*, which was taken from Attachment B to the Consent Order.

Washington County Gas Company. On April 6, 1915, the Washington County Gas Company, controlled by Appleby-Wagner Company of Saginaw, Michigan, obtained a Charter from Johnson City to manufacture and distribute gas. On May 21, 1915, the Washington County Gas Company purchased the property at Tennessee Street and Security Lane and began construction of the gas plant. The Washington County Gas Company began distributing gas in June, 1915.

Appleby-Wagner Company owned the gas company from April 6, 1915 until 1927 when controlling interest was sold to Federated Utilities, Inc. Federated sold its interest to Central Public Service Corporation of Chicago, Illinois in March, 1928. In 1930, Washington County Gas Company became a subsidiary of Southern Cities Public Service Company, Chicago, Illinois.

From 1931 to 1932 the Washington County Gas Company was owned by the Central Public Service Corporation and operated by Stone and Webster. In 1932, Washington County Gas Company became a subsidiary of Consolidated Electric and Gas Company of Chicago, Illinois. Stone and Webster remained the operator. The company operated in this manner until October 4, 1943.

In 1943 the United States Congress amended the Public Utility Holding Act of 1935 which required the Central Public Service Corporation and other large holding companies to divest themselves of multiple holdings. On June 4, 1943, the Washington County Gas Company was sold to James Pierce of Hartford, Connecticut. Twenty-six days later, on October 30, 1943, James Pierce sold the company to Carl H. Schwyn of Cignet, Ohio. Stone and Webster remained as operator.

Carl H. Schwyn Utilities, Inc. On July 8, 1944 the company was granted a new Tennessee Charter under the name Carl H. Schwyn Utilities, Inc. Shortly thereafter, on August 31, 1944, the name was changed to Watauga Valley Gas Company. Stone and Webster remained as operator.

Watauga Valley Gas Company. Watauga Valley Gas Company was in existence from August 31, 1944 until August 22, 1953. On August 11, 1945, Carl Schwyn sold the company to the Rulane Corporation of Charlotte, North Carolina. Stone and Webster remained operator of the gas plant until MGP operations ceased and the plant was converted to propane-air in early 1946. On November 17, 1947, the company was sold to a group of businessmen from Johnson City and Chattanooga, Tennessee.

Volunteer Natural Gas Company. On August 22, 1953 the charter was amended and the name of the company was changed to Volunteer Natural Gas Company. In February, 1954 Volunteer Natural Gas Company began distributing natural gas.

Tennessee Virginia Energy Company. The company name was changed again on December 5, 1980 to Tennessee Virginia Energy Company.

United Cities Gas Company. In 1986, United Cities Gas Company acquired Tennessee Virginia Energy Company by merger. United Cities Gas Company corporate office is located at 5300 Maryland Way in Brentwood, Tennessee 37027. The telephone number is (615) 373-0104.

TABLE 3-1
Tennessee St. FMGP Ownership History

Date	Name	Owner	Operator	Additional Info.
May 21, 1915	Washington County Gas	Controlled by Appleby-Wagner Company, Saginaw, Michigan		Property purchase date
1927	Washington County Gas	Federated Utilities, Inc. Battle Creek, Michigan		Federated buys controlling interest. Still listed in Brown's Directory as controlled by Appleby-Wagner
March 1928	Washington County Gas	Central Public Service Corporation, Chicago, IL		Federated sells to Central Public Service. Still listed in Brown's Directory as controlled by Appleby-Wagner
1930	Washington County Gas	Central Public Service Corporation, Chicago, IL		Subsidiary Southern Cities Public Service, Chicago
1931-32	Washington County Gas	Central Public Service Corporation, Chicago, IL	Stone & Webster	Managed by Central Public Service, Chicago, Illinois
1932	Washington County Gas	Central Public Service Corporation, Chicago, IL	Stone & Webster	Subsidiary Consolidated Electric & Gas Co., Chicago, IL
Oct. 4, 1943	Washington County Gas	James Pierce Hartford, Conn.	Stone & Webster	Entire Company Sold
Oct. 30, 1943	Washington County Gas	Carl H. Schwyn Cygnet, OH	Stone & Webster	Entire Company Sold
July 8, 1944	Carl H. Schwyn Utilities, Inc.		Stone & Webster	Granted New Tennessee Charter
Aug. 31, 1944	Watauga Valley Gas Company		Stone & Webster	Name Change
Aug. 11, 1945	Watauga Valley Gas Company	Rulane Corporation Charlotte, NC	Stone & Webster	Entire Company Sold MGP operations ceased early 1946
Nov. 17, 1947	Watauga Valley Gas Company	Johnson City and Chattanooga businessmen		Entire Company Sold
Aug. 22, 1953	Volunteer Natural Gas Company			Charter amended and name changed
Dec. 5, 1980	Tennessee Virginia Energy Company			Name change
1986	United Cities Gas Company			Merger with Tennessee Virginia Energy Company

4.0 OPERATIONAL HISTORY

The Washington County Gas Company purchased the property at Tennessee Street and Security Lane on May 21, 1915, and began distributing gas in the summer of 1915. [Stahl, 1982, p.7; Brown's Directory, 1916]. The plant manufactured both coal gas ("CG") and carburetted water gas ("CWG"). CWG was more expensive to produce than CG and was used only during the peak winter months to supplement the existing supplies of CG. From 1915 until 1922 the plant consisted of two small retorts and had a daily production of 66,000 cubic feet of gas, enough to serve 800 homes. [Stahl, 1982, p.6].

In 1922 gas lines were extended to Elizabethton and the gas plant was enlarged. In 1928 the gas plant was further enlarged, more than doubling gas production. Gas production had increased to 42,000,000 cubic feet by 1927 [Brown's Directory, 1928]. Through 1945 Brown's Directory listed the process as CG and CWG except from 1933 to 1937 when just CG was listed. In 1944 the plant reached it's peak annual production at 124,725,000 cubic feet. In 1946 the gas manufacturing process was changed to propane-air [Stahl, 1982, p. 12; Brown's Directory, 1947-48]. The total gas production of CG and CWG from 1915 to 1945 was 1.7 billion cubic feet.

At the close of World War II, a shortage in the coal supply had occurred. Propane was more plentiful at that time and the owner (Rulane Corp.) was a dealer in propane and propane gas producing equipment. In September, 1945, permission was granted by the Railroad and Public Utility Commission of Tennessee to install a propane-air plant. Construction of the automated propane-air system was completed in early 1946. The propane-air process was used to manufacture gas from 1946 until 1951.

In November, 1951, the Watauga Valley Gas Company adopted the Hasche process for manufacturing gas. The Hasche process had several advantages over the propane-air process. ~~Most important of these was increased production capacity of a higher heating value gas.~~ The Hasche process was utilized until natural gas became available in January, 1954. The CWG plant remained in use from 1950 to 1954 as a standby process to meet gas production needs during peak periods.

Following the switch to natural gas, the property was used as a service center and office for gas company construction and service crews until 1996. The site is currently vacant except for continued use for vehicle and equipment storage. *Table 4-1, Operational History Summary*, lists the site history in chronological order. Information included on Table 4-1 and Section 4.0 was taken primarily from Brown's Directories and Stahl's company history listed in the References.

Gas Holder Capacity (cubic feet)	Gas Unaccounted For	Tar Produced (gals)	Tar Sold (gals)	Coke Produced (tons)	Coke Sold (tons)	Coke Used (tons)	Ammonia Produced (lbs)	Ammonia Sold (lbs)	Coal Carbonized (tons)	Gas Oil Used (gals)	Notes
100,000	10.00%	(13)									1,2
100,000	10.00%										1,2
100,000	10.00%										1,2
80,000	8.42%	15,727	15,727	823	699						1,2
80,000	8.00%	23,900	20,000	1,242	1,050						1,2
80,000	12.00%	14,870	15,000	797	50						1,2
80,000	14.00%	23,579	23,000	1,287	648						1,2
100,000	8.71%	32,810		1,738					2,846	13,749	1,2
100,000	4.48%	34,000		1,800					3,100	36,000	1
100,000	4.48%	34,000		1,800					3,100	36,000	1
100,000	4.48%	34,000		1,800					3,100	36,000	1,3
120,000	10.00%	34,000		1,800					3,100	20,000	3,4
120,000	15.00%	48,700		2,660					4,365	7,320	3,4
20,000	19.40%	60,950		3,241	1,846	1,847			5,316	982	4,5,6
20,000	18.00%	62,229		3,470	1,846	1,847			5,462	3,839	4,5,6
	11.50%			3,121	1,829	319			4,747		4,5,6
260,000	11.80%	52,132		2,606	1,497	365			3,994		4,7
180,000	14.20%	55,494		2,468	2,094	546			3,797		4,7
180,000	12.30%	57,278		2,735	1,855	594			4,208		4,7,8
180,000	14.40%	65,629		3,059	1,800	455			4,707		4,7,8
180,000	14.40%	65,509		3,484	2,283	739			5,360		4,7,8
180,000	14.40%	83,143		4,117	2,695	512			6,196		4,7,8
180,000	14.20%	80,746	81,860	4,025	2,289	609			6,191		4,7,8
180,000	7.90%	86,127	91,349	4,157	2,346	1,615			6,375		4,7,8
180,000	11.50%	93,089	93,089	4,519	2,297	1,750			6,957		4,7,8
180,000	9.80%	97,538	97,775	4,869	3,790	1,340			6,822		4,7,8
180,000	7.71%	99,978	102,748	5,171	3,300	2,261			7,569		4,7,8
180,000	7.71%	99,978	102,748	5,171	3,300	2,261			7,569		4,7,8
180,000	6.40%	111,830	111,025	5,394	3,061	2,987			7,768		4,7,8
186,000	8.40%										4,11
186,000	13.50%										4,11
186,000	19.70%										4
186,000	14.10%										4,10
186,000	14.10%										4,10
186,000	14.10%										4,10
186,000	9.20%										4
186,000	9.20%										4,12
186,000	5.30%										4,9
186,000	3.52%										4,9
136,000	3.52%										4,9
136,000	2.97%										4,9
136,000	29.40%										4,9
136,000	2.17%										4,9
	1.61%										4,9
	2.55%										2,9

Table 4-1
Operational History Summary
Tennessee St. FMGP

4.1 Manufacturing Processes

Several gas manufacturing processes were utilized over the 39 year gas manufacturing life of the site. These included coal gas, carburetted water gas, propane-air, and the Hasche process. *Figure 4-1, Generic Coal/Water Gas Process and Environmental Flowsheet*, depicts the fundamental gas manufacturing process and associated residuals. Figure 4-1 is located in Appendix A.

4.1.1 Coal and Water Gas

The gas manufacturing processes used at the site from 1915 until 1946 included both coal and water gas processes. Coal gas was manufactured by high temperature (2,000°F) destructive distillation of coal in a retort. As the coal was heated and turned into coke, coal gas was released. The gas was immediately quenched with water to cool it and condense the coal tar by-product. Following this, the gas went through further purification steps before entering the gas holders. The remnants of the coal were removed from the retort as coke. Coke was a by-product used in iron and steel making, in foundries as smokeless fuel, for home heating, and as feedstock in the carburetted water gas process.

Water gas was manufactured by reacting steam with hot coal (or coke) in a generator chamber, resulting in the formation of water gas (mixture of hydrogen and carbon monoxide). Water gas alone did not have sufficient heating or illuminating capacity to be generally distributed. To increase its heating and illuminating capacity, the gas was enriched in a second vessel known as the carburettor by adding a spray of petroleum hydrocarbon oil which vaporized and was finally converted to gas in a third vessel known as the superheater. As with coal carbonization, the gas was immediately quenched with water to cool it and condense the tar. Quenching the gas occurred in a vessel known as the wash box. Following the wash box, the gas was purified to specification before entering the distribution system.

4.1.2 Propane-Air Process

In 1946 the gas manufacturing process changed from coal and water gas to propane-air. The propane-air process generated gas by vaporizing propane and mixing it with air to achieve a gas mixture of suitable characteristics to distribute. By itself, propane is too high in Btu content to be distributed. The propane-air process did not generate any ancillary products or residuals. The propane-air process continued in use through 1951 [Stahl, 1982, p. 14; Brown's Directory, 1951-52].

4.1.3 Hasche Process

In late 1951, the Hasche process replaced the propane-air process and continued in use until 1954 when natural gas became available [Stahl, 1982, pp. 14-15; Brown's Directory, 1953-54, 1954-55 and 1955-56]. The Hasche process manufactured gas by "cracking" light hydrocarbons into high

Btu gas. At this facility the Hasche process reformed a variety of fuels including "H" Fuel, propane, and butane. The Hasche process generated minimal ancillary products or residuals. The water gas plant was brought back into use from 1950 to 1954 as a standby process to meet peak gas load demands on the Hasche process [Brown's Directory, 1950-51, 1951-52 and 1953-54].

4.2 Standard Industrial Codes

The Standard Industrial Codes ("SIC") applicable to the various site uses include:

- 4925 Mixed, Manufacture, or Liquefied Petroleum Gas Production and/or Distribution
- 4924 Natural Gas Distribution

4.3 Raw Products Used

Raw products used consisted of feedstock for gas manufacturing. The operational history of the site includes four gas manufacturing processes: coal gas, water gas, propane-air, and the Hasche process. Coal was used as the feedstock to manufacture coal gas. Coal or coke and petroleum hydrocarbon oil were used to manufacture water gas. Propane and air were used to produce the correct propane-air mixture for distribution. A variety of fuels were used as the feedstock for the Hasche process. These fuels included propane, butane, and H-Fuel. H-Fuel had characteristics similar to natural gasoline [Sun Oil Co., 1962, p.90].

During the time the site was used as a construction/service center for natural gas distribution two products were used that are classified as hazardous under CERCLA. These products were gasoline (leaded and unleaded) and mercury. A gasoline underground storage tank was formerly located on the site for fueling company vehicles. Mercury filled manometers were repaired at this site.

4.4 Residuals

Three primary residuals were produced from the gas manufacturing process. These included solids, hydrocarbon liquids, and aqueous residuals. Residuals were produced during both the gas production and gas cleanup processes. *Table 4-2, Summary of Process Residuals*, lists the gas manufacturing processes utilized at the site and the related residuals. Typical uses of the byproducts and residuals are described in Section 4.5.

4.4.1 Solid Residuals and Ancillary Products

Coke was the primary solid residual from the coal carbonization process. Coke was either sold or used as feedstock for the water gas process. For the period from 1929 to 1945 Brown's Directory indicates that coke from the plant was used for water gas production. During this time, the quantities of coke sold and coke used were approximately equal to the quantity of coke

produced. Table 4-1, *Operational History Summary*, lists the production and residual data over the history of gas production for the site.

Ash was a residual of both the coal and water gas process. Clinkers (conglomerated ash) were also formed. Ash and clinkers were typically managed as a waste. At the Tennessee St. FMGP, some amounts of ash and clinkers were spread across the site to fill in low areas and maintain roads.

Table 4-2
Summary of Process Residuals
Generated During Gas Production and Heat Recovery

Process	Solids	Hydrocarbons	Aqueous
Coal Gas	Coal Coke Clinker Ash	Coal tar Tar decanter sludge	Quench condensate
Water Gas	Ash	Coal tar Oil tar Tar/Oil/Water emulsion	Quench condensate
Propane-Air	None	None	None
Hasche	None	Oil tar Tar/Oil/Water emulsion	Quench condensate

The cleanup of gas often involved the reaction and/or absorption of gas constituents with solids which produced inorganic solid residual and/or product. The most common of these materials produced were spent lime, spent oxide, and ammonium sulfate. These materials were typically managed as a waste by the gas industry. Brown's Directory does not list production or sales data for ammonia from the site.

4.4.2 Hydrocarbon Liquid Residuals

Hydrocarbon liquids in the form of tars and oils were produced from the coal gas and water gas processes, and to a much lesser extent, from the Hasche process. Brown's Directory indicates that the quantity of tar sold between 1919 and 1945 met or exceeded production except between 1920 and 1922 when tar production exceeded sales. From the period 1923 to 1937 Brown's Directory does not report any tar sold. During this time, 30,000 to 80,000 gallons of tar were produced annually.

In addition to tar and oils, but to a lesser extent, emulsions of tar, oil and water were produced by the carburetted water gas process. Standard industry practice at that time was to use these

emulsions for dust control on roads or manage it as a waste. No information on how this material was managed at the Tennessee Street FMGP is known at this time.

4.4.3 Tar Decanter Sludge

During the coal gas process some very heavy hydrocarbons were produced which combined with the fine coal or coke solids to form a solid/semi-solid, black pitchy sludge which settled in the tar/oil/water separator. Standard industry practice at that time was to periodically purge the sludge from the separator and use it for dust control on roads or manage it as a waste. No information on how this material was managed at the Tennessee Street FMGP is known at this time.

4.4.4 Aqueous Residuals

The aqueous stream which condensed from the raw manufactured gas contained nearly all of the hydrocarbons with which it came into contact. The organic composition of the residuals typically consisted of volatile organics and polyaromatic hydrocarbons.

The aqueous residuals produced during the gas cleanup process consisted largely of an ammonia liquor and liquid blowdowns from aqueous sulfur removal systems.

Standard industry practice at that time was to combine the aqueous residuals with other process waters for discharge into either surface waters or to the local municipal plant sewer.

4.5 Residual Usage and Disposal Methods

No information about actual disposal methods used at the site are available. Most historical records have been lost or discarded over time. It appears from accounts of company history and Brown's Directory that several of the process residuals from the gas manufacturing process had a marketable value to other industries.

Coke was marketed as a clean and smokeless fuel for heating stoves and fireplaces. It was called "Jay-Cee" (J.C. for Johnson City) Coke. During the depression period of the 1930's, this coke sold for \$4.50 a ton. Customers in Elizabethton and Johnson City claimed it was the cleanest and hottest fuel they had ever used [Stahl p.7].

A hydrocarbon liquid substance referred to as "Bug Juice" by employees sold for approximately fifteen cents a gallon. Bug Juice is reported to have had the consistency and odor of creosote. It was highly volatile and could be used as a fuel for automobiles and trucks in place of gasoline except the odor from the motors exhaust was too offensive to make it a practical fuel. It was marketed to railroads as a preservative for wooden railroad ties and weed killer for railroad right-of-ways [Stahl p.7].

Coal tar was typically sold. Tar was an important raw material for the tar distillation industry. A great number of chemicals were manufactured from coal tar including benzene, naphthalene, tar acids, and tar bases. Refined tar was used as a paint, road tar, and wood preserver [AGA, 1965, p. 3/20].

Ammonia was recovered by passing the gas stream through an acid bath containing sulfuric acid wherein the ammonia was converted to a salt (ammonia sulfate) that was recovered and sold. The primary use of this salt was as a fertilizer. Ammonia liquors were typically sold to soda ash plants [ERT and Koppers, 1984, p. 3-57]. Ammonia production and sales figures are not available for the site.

The ash and clinkers which were removed from the retorts consisted mostly of oxides of silica, calcium, aluminum, etc. Because of the inert, non-combustible nature of the material there was little market for its resale and was typically disposed of by landfilling [ERT and Koppers, 1984, p.3-58].

4.6 Hazardous Waste Streams

The majority of waste generated at the site occurred between 1915 and 1954. In 1976 the Resource Conservation and Recovery Act ("*RCRA*") was enacted to regulate, among other things, the disposal of hazardous waste. Thus MGP waste streams that were disposed of long ago were not subject to RCRA waste management regulations.

Waste streams generated at this facility since 1976 have not exhibited the characteristics of a hazardous waste with one exception. In March, 1995, approximately 25 gallons of gasoline was pumped from an underground storage tank in preparation for closure of the tank. The waste gasoline met the characteristics of ignitability (D001) and toxicity for benzene (D018) and was disposed of as a hazardous waste (See Section 5.4).

5.0 REGULATORY HISTORY

5.1 EPA Hazardous Waste Identification Numbers

No EPA hazardous waste identification numbers exist for the site. The site qualified as a Conditionally Exempt Small Quantity Generator ("*CESQG*") for a shipment of hazardous waste (1 drum of waste gasoline) in 1995.

5.2 Notification of Potential Hazardous Substance Site (EPA Form 8900-1)

An EPA Form 8900-1 has not been filed for the site.

5.3 Sara Title III Information

United Cities Gas Company submitted Tier II Forms for reporting years 1992 and 1993 for the underground storage of unleaded gasoline at the site. In 1994, less than 10,000 pounds of unleaded gasoline was present on-site and a Tier II report was not required. In 1995 the UST was removed. Activities at the site have never required a Form R submittal.

5.4 Hazardous Waste Manifests

The only hazardous waste shipped from the site occurred on March 23, 1995. Approximately 25 gallons of unleaded gasoline was removed from an underground storage tank and shipped as a hazardous waste (D001 and D018) via Laidlaw Environmental Services under manifest document number 50802. A copy of the manifest is included in Appendix C.

5.5 Notice of Violations and Enforcement Actions

United Cities has never received a notice of violation ("*NOV*") from any regulatory body concerning the site. United Cities did receive an enforcement action letter from the Department of Environment and Conservation, Division of Underground Storage Tanks ("*DUST*") ordering site investigation actions in response to petroleum impacted soil and groundwater discovered following the closure of an underground storage tank in October, 1996.

5.5.1 History of Enforcement Action

During the closure of a 2,000 gallon underground storage tank ("*UST*"), United Cities discovered petroleum impacted soil in excess of the action levels established by DUST. On November 30, 1995 United Cities submitted a Closure Report to the Johnson City Field Office requesting that the UST be considered closed and provided information suggesting that the petroleum impacted soil may be the result of past site use and not from the UST.

On December 14, DUST responded to the closure report and concluded that the petroleum release had occurred from the UST and not from past site use and established response due dates. On December 19, 1995, United Cities requested an extension to address the matters raised in DUST's letter. On January 2, 1996, DUST granted a 30 day extension for the submittal of the Initial Abatement Report ("*IAR*") or a workplan to determine the source of the petroleum release.

On February 9, 1996, United Cities submitted a Supplemental Site Investigation Work Plan ("*Work Plan*") detailing work designed to determine the source of the petroleum impacted soil and groundwater. A copy of the Supplemental Site Investigation Workplan is included in Appendix D. On February 27, 1996, DUST approved the workplan with some modifications. On May 24, 1996, United Cities requested a 30 day extension to consider options related to management of the UST site. On May 30, 1996, DUST denied the request for extension.

On June 4, 1996, United Cities requested DUST reconsider the previous extension request denial citing an upcoming meeting with the Division of Superfund to discuss the Voluntary Cleanup, Oversight and Assistance Program ("*VOAP*"). On June 12, 1996, DUST granted a 30 day extension.

On June 18, 1996, United Cities requested that the regulatory lead for the site be switched from DUST to the Division of Superfund, Voluntary Cleanup, Oversight and Assistance Program ("*VOAP*"). On July 9, 1996, United Cities received confirmation from DUST that the regulatory lead for the site would be the VOAP.

On August 7, 1996, United Cities notified the VOAP of its plans to submit a draft consent order. On August 19, 1996, United Cities submitted the first draft of a Consent Order and Agreement to the VOAP. Negotiations between United Cities and the VOAP continued until December 1996.

On January 23, 1997, United Cities signed the Consent Order and Agreement.

5.6 Historical Information Sources

The following historical information sources were researched:

- Brown's Directory;
- Sanborn Fire Insurance Maps;
- RCRA Hazardous Waste Generator Lists;
- Tennessee Department of Environment and Conservation ("*TDEC*"), Division of Water Pollution Control, Surface Water Quality Data and NPDES Information;
- TDEC Division of Water Supply Well Log Index;
- Historic and current USGS topographic maps, geologic, and hydrologic reports;
- Superfund Amendments and Re-authorization Act ("*SARA*") Title III Reports;
- Federal Railroad Administration or Department of Transportation Spill Records;
- Trade Journal and newspaper accounts regarding openings, closings and expansions of businesses;
- TDEC Regional Field Offices;
- Local Libraries;
- Aerial photographs; and
- Local Utilities.

6.0 PROPERTY FEATURES

Property features were determined from a literature search, review of historical maps and photographs, and a site reconnaissance on March 6, 1997 by Mr. Stuart Schulz, RPG, Project Geologist with United Cities. *Figure 2-2, Site Layout Map*, located in Appendix A, depicts the present site features. A discussion of historical site features is presented in Section 8.0, Maps and Photographs.

6.1 Geologic Setting

The site is located in the Valley and Ridge province. Most of the ridges in the Valley and Ridge province are north-eastward striking monoclines. The higher ridges are composed of resistant sandstone and the lower ones of cherty limestone and dolomite. Chert and clay weathered from the limestone and dolomite form a residual cover. Surface drainage is well formed in most of the area and all streams eventually flow into the Watauga River, which in turn flows north-westward and joins the Holston River near Kingsport, Tennessee.

The site is underlain by rocks of the Knox group of Late Cambrian and Early Ordovician age. Bedrock is believed to be approximately 7 to 10 feet below ground based on observations during the UST closure and rock outcrops in Brush Creek. The strike of the rocks is generally northeast and the dip is southwest [USGS, 1962, p. 396-402].

Native soil at the site is composed of the Lindsides silt loam. The Lindsides silt loam is a light-brown imperfectly drained soil occurring in stream bottoms in limestone valleys. It mainly consists of alluvium washed from uplands underlain by limestone. The Lindsides silt loam has a high water-holding capacity [USDA, 1958, p. 37].

The site is located within the 100-year flood zone and is subject to flooding during periods of heavy rain. *Figure 6-2, Flood Hazard Map*, depicts the location of the site and surrounding areas inundated by the 100-year flood.

6.2 Hydrogeology

In the Johnson City area groundwater occurs in openings along fractures and bedding planes in the consolidated rocks underlying the area, and in the pore spaces between the particles that make up the residuum, alluvium, and terrace deposits. Wells having the largest yields are generally located near streams [USGS, 1962, p. 404]. Johnson City obtains its water supply from springs and surface water. The springs that supply Johnson City are located along Indian Creek approximately 10 miles south of the City [USGS, 1962, p. 396].

A perched water table was encountered at the site during the UST closure in 1995 at approximately 6 feet below ground surface. Similar perched water conditions were encountered approximately 1,000 feet west of the site by TriAd Environmental Consultants during site

investigation activities in 1996 at the former Clinchfield Products barium processing facility. Pump and slug testing conducted by TriAd revealed that the perched water table has a relatively low yield (0.5 gpm) and low hydraulic conductivity (9.8×10^{-5} ft/min) [TriAd, 1996, p. 11].

The perched water table is believed to be recharged by direct infiltration of precipitation, and seepage from Brush Creek at high stages. During low stages, the perched water table discharges into Brush Creek [USGS, 1962, p. 406]. The average depth of bedrock wells drilled in the Elizabethton-Johnson City area is 135 feet. The average depth to water in these wells is 30 feet with wells at the same approximate topographical elevation as the site having water at 17 feet depth. These wells were typically open hole completions (no well screen installed) and were open from approximately 20 feet to total well depth [USGS, 1962, Table 2].

6.3 Surface and Structural Features

The site is surrounded by a seven foot high chain-link fence with two gates located on the northern fence line along Security Lane. An asphalt paved surface covers the entire site with the exception of the northern edge of the site extending from Brush Creek north to the property line. This area is grass covered. A gravel patch is present northwest of the office building where the UST was removed in October, 1995. Three catch basins are present west of the office building. These basins collect surface water runoff and drain into Brush Creek. Two additional drains into Brush Creek were observed emanating from the office building. These drains carry rain water from the roof of the office building.

Tar residue was observed on the asphalt surface cover west of the retort building in the area where the tar tank was indicated on the 1948 Sanborn Map. Orange leachate was observed seeping onto the southwest corner of the site from a concrete block wall on the west boundary of the site. The leachate was observed to drain from the block wall and extend northeast to one of the catch basins described above. The East Tennessee State University coal storage pile is located adjacent west to the site and is believed to be the source of the leachate.

Most aboveground operational structures related to the FMGP have been removed from the site. A total of five structures are present on site with only three structures remaining from the MGP era. The structures present include:

- (1) a vacant 5085 square foot brick office building (includes former water gas house);
- (2) a 1855 square foot brick warehouse (former retort building) with loading dock attached;
- (3) an 80 foot long steel three sided shed;
- (4) a 420 square foot concrete block building formerly used as a paint booth for gas meters;
- (5) and a 1728 square foot concrete block building (former meter shop and propane-air control room).

Due to the age of these structures, i.e., prior to 1981, United Cities previously commissioned an asbestos inspection of the structures on site. According to an October 21, 1994, inspection

report, asbestos containing material ("ACM") was identified in 12 inch floor tile in the office building, roof panels in the warehouse, ceiling and floor tile from the meter shop, and insulation on two vaporizers located adjacent to the meter shop. All ACM remains on site with the exception of the vaporizers which were abated in March, 1997 [Pinnacle, 1994, p.2].

6.4 Aboveground and Underground Storage Tanks

Presently there are no known aboveground or underground storage tanks on site. On October 18, 1995, a 2,000 gallon steel underground storage tank used to store gasoline was excavated and closed in accordance with TDEC-DUST closure guidelines. At the same time, a 500 gallon steel AST used to store diesel fuel was sold to Four Seasons Environmental Contractors and removed from the site.

Analysis of 1920 and 1927 Sanborn maps identified nine AST's located on the east end of the site. Eight of these tanks are identified on the 1920 map as "steel gas tanks" with a total capacity of 88,000 cubic feet. The ninth tank is identified as an "oil tank" and appears to be the same size as the other tanks.

Also present on the 1920 Sanborn map is an aboveground 10,000 cubic foot gas holder and three aboveground purifier tanks located on the north portion of the property. The 1927 Sanborn map does not indicate the purifier tanks.

Several additional AST's had been added to the site by 1948. Analysis of a 1948 Sanborn map identified four additional steel gas storage tanks located east of the existing nine storage tanks and one new tank north of the original nine tanks. An additional 10,000 cubic foot gas holder was installed south of the existing holder. According to data from Brown's Directory the second gas holder was probably added in 1929. Two new purifier tanks are located east of the gas holders. The three original purifier tanks are not depicted on the map, however an extension to the former purifier building has been added and is labeled "compressor". A small tar tank is located west of the retort house and two cylindrical aboveground oil tanks are present on the northeast corner of the site.

Analysis of a 1958 aerial photograph indicates site conditions were unchanged from the 1948 Sanborn map except the tar tank and engine room are not visible. Analysis of a 1963 Sanborn map shows the tar tank and engine room marked over possibly indicating that these features had been removed.

6.5 Storage Containers

During the March 6, 1997, site visit the following storage containers greater than 10 gallons were observed:

- 1) 1-30 gal. drum labeled "Used Oil"
- 2) 1-55 gal. drum labeled "Used Oil"
- 3) 1-55 gal. drum "EMPTY" formerly contained Ethylene Glycol
- 4) 1-55 gal. drum "EMPTY" former contents unknown
- 5) 1-55 gal. drum Cam2 Full Strength Antifreeze (1/4 full)
- 6) 2-55 gal. drums "EMPTY" formerly contained glycol/water solution
- 7) 2-55 gal. drums containing glycol/water solution

All containers were observed to be in good condition and were stored under cover except for items 6 and 7 which were stored outside.

Analysis of historical maps and photographs did not reveal any storage containers. A coal pile measuring approximately 65 ft. by 90 ft. is identified on the 1920 Sanborn map, but is not depicted on the 1927 or subsequent Sanborn maps or aerial photographs.

6.6 Dumps

No dumps or dumping areas were identified on site. A review of licensed and unlicensed dumps within a 1 mile radius of the site did not reveal any dumps.

6.7 Septic Systems

In approximately 1910, a sanitary sewer line was installed by the city of Johnson City along the northern edge of the site parallel with Brush Creek. No record of connection of the site to the sanitary sewer line was found, however, it is assumed that the site was connected to the sanitary sewer in 1915 at the time of plant construction. No record of a septic system or drainage field was found.

6.8 Utilities

Currently the site is served by the following utilities:

Electricity - Johnson City Power Board
Water - Johnson City Utilities
Gas - United Cities Gas Company
Sewer - Johnson City Utilities

Historical utilities were determined by reviewing Sanborn Maps and historical site drawings. The 1920 Sanborn map identifies the utilities as steam heat and power, gas lights, and City water and lengths of small hose. A 6 inch water line is depicted beneath the center of Tennessee Street. A 1927 Sanborn map lists power as steam and lighting by gas. No reference is made about water. A 1948 Sanborn map lists power by electricity and heat by steam.

6.9 Wells, Sumps, Lagoons, Catch Basins and Retention Ponds

No wells were identified within a one mile radius of the site. According to the recollection of a former employee a process water well was located on site adjacent north to the boiler room. No surficial evidence of the well was observed during the site visit.

No sumps, lagoons, or retention ponds are located on site. The site is at an approximate elevation of 1,640 feet above mean sea level. Surface water drainage across the site is in two primary directions. The eastern half of the site drains toward the southeast and off site through a concrete culvert located at the approximate midpoint of the eastern boundary of the site. The culvert passes under Tennessee Street and converges with a second concrete culvert which passes under the intersection of State of Franklin Road and Tennessee Street. The origination of the second culvert is not known. The combined culverts continue approximately 40 feet northeast where they enter Brush Creek.

The western half of the site drains toward the center of the site where two catch basins are located. Water collected in these catch basins drain into Brush Creek north of the site.

7.0 ENVIRONMENTAL RECORDS ON PROPERTY DEED

Records of fee ownership, leases, land contracts, easements, liens, and other encumbrances on or of the property recorded in the property assessors office, Johnson City Tennessee Court House, were reviewed. No reference to any charge, security, or encumbrance upon the title to secure the payment of cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of hazardous substances was found.

8.0 MAPS AND PHOTOGRAPHS

8.1 Property Maps

Four property maps were located in company files and researched during the site evaluation. These maps include facility plans from April 6, 1927; November 28, 1927; May 1, 1928; and October, 1945. Due to the fragile condition of the facility plans the maps were not copied, but instead each map was digitized and a composite map produced. *Figure 8-1, Composite Site Plan*, depicts the site and facility layout through time. For convenience, two copies of Figure 8-1 are presented in Appendix A. The first is an 11" x 17" copy for quick reference, and the second is a full size (D size) copy for more detailed analysis. Each site plan is discussed in this section.

8.1.1 April 6, 1927 Facility Plan

In 1927 the Washington County Gas Company began improvements to the gas plant to allow increased gas production to meet the growing needs of Johnson City and Elizabethton, Tennessee. The basic plant layout included a coal shed supplied by a railroad spur; coal retorts; water gas machine; various boilers and compressors; two aboveground purifier tanks; a 10,000 cubic foot storage holder; an aboveground oil tank; and four high pressure gas storage tanks (total capacity 88,000 cubic feet); a tar well was located west of the retort building (not shown but piping indicated on the plan); and a water gas tar/water separator was located adjacent southwest of the storage holder.

8.1.2 November 28, 1927 Facility Plan

The major changes noted on the November 28 plan include a second 10,000 cubic foot relief gas holder located adjacent west to the previous storage holder, movement of equipment and piping associated with the purification process, construction of a north extension to the boiler room to house the new exhausters, scrubber, and bubble washer, and an additional boiler.

8.1.3 May 1, 1928 Facility Plan

The May 1, 1928 facility plan depicts several modifications and additions to the gas plant primarily to the purification and water gas facilities.

Two new and larger purifier tanks were added north of the cylindrical gas storage tanks. A new water gas house and storage building were constructed north of the existing retort building.

Several site features which are not present on the historical site plans, but are visible on historical photographs and Sanborn maps and are presented on Figure 8-1 for completeness. These features include: two aboveground cylindrical gas storage tanks, each eight feet in diameter and sixty feet long, and one aboveground cylindrical tank ten feet diameter by forty feet long, located east of the existing storage tanks. An additional storage tank storage tank within a concrete vault, measuring

eight feet in diameter and forty feet long was located on the northeast corner of the site. This storage tank was used for feedstock (H-Fuel) for the Hasche process.

8.1.4 October, 1945 Facility Plan

In 1946 the gas manufacturing process changed from coal and water gas to propane-air. The October, 1945 facility plan depicts the future location of two aboveground thirty thousand gallon propane storage tanks on the southeast corner of the site.

8.2 Sanborn Maps

A thorough search of available Sanborn Maps was conducted from maps located at the Library of Congress, Washington D.C., and those owned by EDR Sanborn, Inc., Southport, Connecticut. Sanborn Maps were identified for the following years:

<u>Year</u>	<u>Source</u>
1920	- Library of Congress and EDR Sanborn;
1927	- Library of Congress and EDR Sanborn;
1948	- Library of Congress;
1950	- EDR Sanborn; and
1963	- EDR Sanborn.

8.3 Aerial Photographs

A comprehensive search for aerial photographs depicting historical site conditions was conducted by United Cities and National Aerial Resources, Inc. ("NAR") of Troy, New York. The search conducted by NAR identified six potential sources of aerial photographs ranging in date from 1926 to 1994. United Cities requested flight dates of 1926, 1937, 1939, and 1951 through 1954. Further review by NAR determined that none of the photographs included coverage of the site.

United Cities' search identified aerial photographs from 1953 and 1958. The 1953 photograph was used as the base map for the 1958 edition of the Washington County Soil Survey. The scale of this photograph (1:15,840) was too large to identify site features in detail. The 1958 photograph was from the Johnson City Planner's Office. The scale of this photograph (1:1,000) was small enough to identify site features in sufficient detail to be of use.

Specific site features from this aerial photograph are discussed in Section 6.3, Surface and Structural Features.

8.4 Other Photographs

A review of company records identified two photographs of the site. A third photograph was located at the Archives of Appalachia, The Sherrod Library, East Tennessee State University. The exact dates of the United Cities' photographs are not identified, however, discussions with current employees and a former employee place the photographs at approximately mid-1960's and 1975. The exact date of the Sherrod Library photograph is not known, but is placed sometime prior to 1928 based on a comparison of photograph site features with the 1928 site plan.

8.4.1 1928 Photograph

This early photograph taken from Tennessee Street looking west, shows the single 10,000 cubic foot storage holder, the cylindrical mix gas storage tanks, and the roof outlines of the boiler house and retort house. The two tall stacks are part of the Johnson City Foundry and Machine Works, Inc. The water tank (visible on the right edge of the photo) is part of the Clinchfield Product Company (up to 1916), Rollins Chemical Company (1916-1923), or Barium Reduction Company (1923-1924) depending on the date of the photo. The photo also shows that the site was not paved.

8.4.2 1960's Photograph

Site features identifiable in the mid-1960's include (from left to right) the meter shop and engine and compressor building; 2- purifiers; 2- gas holders; water gas building; stores shed with gasoline pump at corner; gas company vehicles (foreground); and H-Fuel pump cover (tin roof at lower right corner of photo). The roof and west face of the retort building is visible in the background on the right edge of the photo.

8.4.3 1975 Photograph

The 1975 photograph was possibly taken from the top of Gordon's Furniture water storage tank located to the northeast of the site. Site features identifiable in the 1975 photograph include (from foreground to background): the meter shop and engine and compressor room; 2-30,000 gallon propane tanks; propane dispensing equipment (next to wall along southern edge of site); former retort building (used as warehouse in photo); railroad spur; office building (converted water gas building); storage shed (along west edge of site); ETSU coal storage pile; railroad tracks (future State of Franklin Road location); and portion of Johnson City Foundry (upper left corner of photograph).

9.0 POTENTIAL ENVIRONMENTAL CONCERNS

One of the objectives of this Phase I SE was to determine whether the site has been the location of a release or a threatened release of a hazardous substance, pollutant, or contaminant. This section presents a summary of potential environmental concerns identified during this assessment.

9.1 Potential Source Areas

Potential source areas are locations where relatively concentrated residuals may be found, posing a risk of impact to soil, water, or air. Potential source areas may include areas where process feedstock and or residuals may have been located at or near the ground surface; areas surrounding the former aboveground gas holders and tanks; areas where spills or leaks from MGP process may have occurred; and underground structures, if any, including piping.

The Tennessee Street FMGP operated for 39 years, a relatively short operating life for this type of operation. It was a relatively "modern" facility and probably had most MGP structures (holders and purifiers) above ground, reduces the potential for subsurface impacts.

9.2 Potential Impacts to Groundwater

A shallow perched water table is anticipated at the site at a depth of 6 to 7 feet depth. Analysis of groundwater at the time of the UST closure in October, 1995 indicated petroleum hydrocarbons (benzene, toluene, ethylbenzene, and xylene "*BTEX*") and total petroleum hydrocarbons ("*TPH*"), primarily diesel range organics, at concentrations greater than allowable DUST limit. Several polynuclear aromatic hydrocarbons ("*PAH's*") were identified as well. These results indicate that the shallow groundwater at the area of the former UST has been impacted by the former UST and/or FMGP operations.

There are no groundwater users within a 1 mile radius of the site. A water use survey was completed and did not identify any wells or springs within a 1 mile radius of the site.

9.3 Potential Impacts to Surface Water

The nearest surface water is Brush Creek located along the northern boundary of the site. During the site reconnaissance, no obvious impacts were observed in the creek. However, several stormwater discharge pipes are present along the creek bank. Shallow groundwater is believed to discharge to Brush Creek during periods of low base stream flow. Discharge into Brush Creek during these periods would be limited due to the anticipated low hydraulic conductivity of the site soils. Thus, potential impacts to surface water are very unlikely.

9.4 Potential Impacts to Air

Outdoor air is unlikely to be impacted from the FMGP. The site is almost completely paved by asphalt or covered by site structures.

9.5 Potential Impacts to Soil

Analysis of soil at the time of the UST closure in October, 1995 indicated petroleum hydrocarbons (benzene, toluene, ethylbenzene, and xylene "*BTEX*") and total petroleum hydrocarbons ("*TPH*"), primarily diesel range organics, at concentrations greater than allowable DUST limit. Several polynuclear aromatic hydrocarbons ("*PAH's*") were also identified.

These results indicate that subsurface soil in the area of the former UST have been impacted. Analysis of aerial photographs indicated former aboveground storage tanks used for H-fuel storage were located in this area as well. Additional impacts to subsurface soil may exist in former process areas, in residual transfer areas, and in areas where aboveground and underground structures existed.

9.6 Potential Safety Hazards

The site is owned and maintained by United Cities Gas Company. A seven foot high chain link fence surrounds the site and gates to the site are locked. Access by the general public is restricted. United Cities employees enter the site regularly for inspections, and occasionally and briefly to pickup or drop-off vehicles and equipment. No safety hazards or eminent threats to the public or employees were noted during the site reconnaissance.

9.7 Potential Off-Site Impacts

No off-site impacts are known at this time as a result of this site evaluation. Potential off-site impacts are unlikely.

9.8 Summary of Environmental Concerns

Based on a review of historical information and site conditions observed during the site reconnaissance, impacts to subsurface soil and groundwater have occurred in the vicinity of the former UST. It is possible that there are impacts from FMGP operations to subsurface soils and shallow groundwater.

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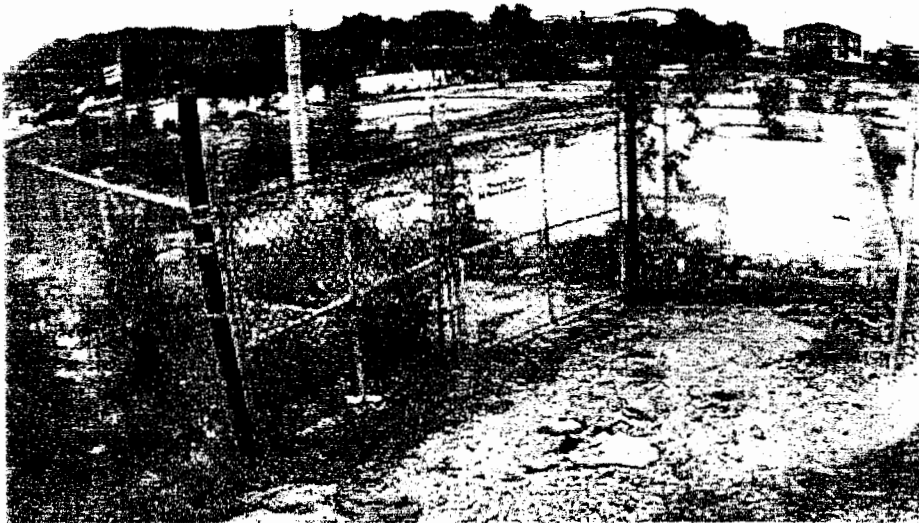
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Johnson City Press

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Deed restriction may be put on property due to groundwater pollution



Atmos Energy's property on the corner of State of Franklin Road and Tennessee Street is cause for concern. (Tony Duncan / Johnson City Press)

By John Thompson
Press Staff Writer
jthompson@johnsoncitypress.com

Residue from a former coal gasification plant that was started in the early 1900s is still causing some concerns in the 21st century.

The property is on the corner of West State of Franklin Road and Tennessee Street. That property is now owned by Atmos Energy, but some of the benzene and toluene compounds have migrated through the groundwater to adjoining property owned by the city of Johnson City.

The city could be asked to place a deed restriction on its strip of land along Brush Creek that would warn future owners not to use the groundwater.

"A big part of what the Superfund does is evaluate risks at the current time and in the future," said Mark Braswell, manager of the Tennessee Department of Environment and Conservation's Environmental Assistance Center in Johnson City.

Braswell said the property is safe under normal circumstances, but there are still risks in water that has seeped through cracks in the limestone bedrock that underlies the property.

A deed restriction would deny a property owner the right to dig a water well or use the groundwater.

DIVISION OF SUPERFUND
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The problem stems from a factory that turned coal into coal gas. The manufacturing process created coal tar as a byproduct. Since the tar had little commercial value, it was stored in concrete containers on the site, called tar wells.

The operation began in 1915 and continued until 1946, according to Stewart Schultz, an environmental specialist with Atmos. He said the property went through several owners, including Watauga Valley Gas, Washington County Gas, Volunteer Natural Gas, United Cities Gas and now Atmos.

Schultz said the property had been used as a service center. When the center was moved in 1996, the problem was discovered during cleanup operations; a large concrete tank containing the tar was found.

Braswell said the company volunteered to clean up the site under the Voluntary Oversight Program. Schultz said the tar was incinerated in a thermal treatment unit in Virginia.

Further investigations uncovered more concrete containers of tar.

As the sites were cleaned up, Schultz said oxygen compounds were added to the sites to speed up the natural cleaning of the ground.

The biggest concern was the groundwater contamination. Schultz said the limestone bedrock lies just 5 to 15 feet below the surface, and water has migrated through the cracks in the rock to the adjoining city property.

"We have asked the city to put a restriction on the deed," Schultz said. He said there were no unacceptable risk levels on the property that could not prevent it from being commercially developed.

"This land is right next to the university, and we are hopeful that it can be made useful," Schultz said. "We have spent a lot of time and effort on it."

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File 90-513
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DIVISION OF SUPERFUND MEETING REPORT

Date of Report: 7/25/02

SITE/FACILITY: United Cities Gas – Johnson City

SITE NUMBER: 90-513

COUNTY: Washington City: Johnson City Date of Meeting: 7/24/02 AF

PURPOSE OF VISIT: To discuss the status of the site and the plan for future investigation.

INDIVIDUALS CONTACTED: Stuart Shulz (UCG), Greg Page and Berny Ilgner (Arcadis G&M)

DSF PERSONNEL PRESENT: Darrell Hale, Harold Mattraw and J. Kevin Rice

Director
AD (Tech)
AD (Admin) 8-13-02
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Tech.
VOAP
DCERP
Fed. Prog.
Prog. Ops.
DSF

COMMENTS AND DISCUSSION:

At approximately 1000 hours, the meeting began with Arcadis distributing an information packet with a Chronological Project Summary, an Interim Action Summary, a Mass Reduction Summary Table from the Interim Action Groundwater Monitoring Report, a Risk Assessment Summary and a copy of the DSF comments on the Interim Action Groundwater Monitoring Report.

One of the main discussion topics was the status of the Risk Assessment. Arcadis admitted that mistakes had been made in the report, but they felt that the risks would be within "acceptable levels". DSF indicated to UCG and Arcadis that the Risk Assessment was very important to future site activities. The risk levels will determine if additional investigative or remedial activities are necessary and the potential future uses of the site.

The revised Risk Assessment will be submitted as Revision 01. A Focused Feasibility Study will be submitted after DSF acceptance of the Risk Assessment. UCG planned to meet with the City of Johnson City later in the day to discuss transferring the property to the City of Johnson City. UCG asked about the possibility of the City entering into the Brownfields Program if the property was transferred. DSF indicated that it might be a possibility, but would require some investigation into the mechanisms of shifting the site from the VOAP to the Brownfields Program. The possibility exists of the City being able to enter into an "Innocent Landowner Agreement" with the DSF.

In the Risk Assessment, the groundwater pathway was discounted due to not having a complete route of exposure. The basis of the incomplete pathway was the lack of domestic water-supply wells identified during a Well Survey of the area within 0.5 miles of the site and a Johnson City ordinance restricting the installation of wells within the city limits. The DSF indicated that institutional controls such as ordinances could be used to

eliminate exposure pathways. DSF also indicated that institutional controls and a long-term monitoring plan for contaminants of concern (COC) with 5-year Reviews would be very likely to be required for disposition of the site (based on the results of the Risk Assessment and FFS). The DSF indicated that it would have to agree to the language of any deed restrictions/institutional controls implemented for the site. Measures such as filling the property to above the flood stage (Arcadis roughly estimated that about 2 feet of fill would be required) or installation of a vapor barrier to protect site workers were mentioned. Also, the DSF indicated that the point of compliance for a site is generally set at the property boundary.

The results of the Interim Action (IA) were discussed. DSF indicated that the Oxygen Release Compound (ORC) did not seem to have had much of an effect outside of the immediate area around the application points. Arcadis clarified that the ORC is not an oxidizer (like hydrogen peroxide) and that the intended purpose was to enhance the aerobic conditions in the excavated areas only in order to facilitate biodegradation. The site COC degrade, in large part, by biological activity. The quantity of ORC applied was not intended to significantly effect the aerobic content of the entire area of shallow groundwater at the site. The ORC appears to have been utilized quickly and did not leave much of a long-term residual. Arcadis said that the area around the site is largely anaerobic at last partially due to the extensive asphalt areas that do not allow for groundwater infiltration that would be expected to enhance aerobic conditions within the aquifer.

The overall data trends identified at the site were also discussed. The reports claim that significant decreases in COC show that the IA was effective in removing source areas and the site is cleaning itself up. Trends for some COC were exhibited as support for this conclusion. However, the data shows that several COC are increasing and are present at levels above the identified site PRG. DSF told Arcadis that the Division wants to see degradation trend charts for all COC. Arcadis told DSF that the increasing trends for some COC could be a result of the IA excavation stirring up the area, and the site is beginning to go back to equilibrium. Additional data collection will be required to support this hypothesis.

The delineation of the deeper groundwater contaminant concentrations and flow direction does not appear to be complete. Based on the IA Report data, no deep wells are ideally located so as to be downgradient of the source areas. UCG/Arcadis agreed that deeper groundwater is not completely delineated. However, they questioned the need for additional delineation based on the future use of the site and the exposure pathways. DSF agreed that additional deeper delineation might not be required based on the exposure pathways listed in the Risk Assessment and the City ordinance (this will depend on the results of the updated Risk Assessment and review of the applicability of the ordinance). The ordinance is key in potentially eliminating the groundwater exposure pathway. The deeper wells are screened at different depths in relation to fractured areas found in the bedrock. Arcadis feels that the deeper groundwater is actually migrating toward and with Brush Creek (would be difficult to prove conclusively).

The DSF raised the question of the reporting limits of the laboratory used by Arcadis being higher than the contaminant-specific PRG. Arcadis indicated that finding a laboratory to report to the lower limits was very difficult. The significance of this will have to be reviewed based on the results of the new Risk Assessment.

Prepared By:

A handwritten signature in black ink, appearing to read 'J. Kevin Rice', with a stylized, cursive script.

J. Kevin Rice
Environmental Specialist
Jackson Environmental Assistance Center

Chronological Project Summary

United Cities Gas Company
Former Tennessee Street MGP Site
Johnson City, Tennessee

October 1995	UST removal
July 1996	Superfund Division takes lead on project
January 1997	Consent Order executed
Feb-May 1997	Public Notice for Entry into VOAP and Phase I SE completed
March 1998	Preliminary Site Investigation (PSI) complete
March 1999	Phase II RI Work Plan Assessment Conference with TDEC-DSF
September 1999	Phase II RI Work Plan submitted to TDEC-DSF
October 1999	Phase II RI fieldwork completed; data gaps identified
February 2000	Additional Phase II RI fieldwork
May 2000	Phase II RI Findings Assessment Conference w/ TDEC-DSF
July 2000	TDEC-DSF approves Phase II RI Report
September 2000	Final Phase II RI Report submitted to TDEC-DSF
September 2000	Interim Action Proposal submitted to TDEC-DSF
February 2001	Interim Action Work Plan submitted to TDEC-DSF
February 2001	Interim Action Work Plan approved by TDEC-DSF
April 2001	IA Baseline GW Monitoring Report submitted to TDEC-DSF
June-July 2001	Interim Actions performed
September 2001	Interim Action Report submitted to TDEC-DSF
September 2001	Interim Action Report approved by TDEC-DSF
July 2001 to Jan 2002	Post IA groundwater monitoring performed
February 2002	Full round of groundwater monitoring performed
May 2002	Post IA Groundwater Monitoring Report submitted to TDEC-DSF
May 2002	Risk Assessment Report submitted to TDEC-DSF
July 2002	Assessment Conference to discuss Interim Action, Post IA monitoring, and Risk Assessment

Interim Action Summary

United Cities Gas Company
Former Tennessee Street MGP Site
Johnson City, Tennessee

- Jun 01
- Former source areas excavated
 - 922 tons of coal tar and impacted soils excavated/off-site disposal
 - 8000 gal of impacted groundwater disposed
 - 660 pounds of ORC applied in four separate areas
 - Excavations backfilled with gravel for infiltration/DO addition
 - Replacement well MW-3R installed
 - Remaining aboveground structures removed (Aug-Sept)
- Jun 01 to Jan 02
- Field parameter monitoring at all monitor wells
 - Monitoring DO to detect when ORC "spent"
 - Analyze 1, 3R, 5, and 7 in July 01 (BTEX)
 - Analyze 1, 3R, 5, 6, and 7 in Oct 01 (BTEX and PAHs)
 - TDEC spilt samples in July, Sept (TDEC only), and Oct
 - Two piezometers installed in former gas holder area and tar well area (Nov 01)
- February 02
- Full round of monitoring at all wells and piezometers
 - Focused analysis of GRO, EPH, BTEX, PAHs, metals, cyanide, and biogeochemical analytes

Post-IA Monitoring Results Summary

- Shallow Groundwater
 - Max BTEX at MW-3R (9.875 ppm) driven by benzene
 - GRO and EPH max at MW-3R (16 ppm respectively)
 - Max PAHs at P-1 (4.14 ppm)
 - Benzene decreasing in Wells 1, 5, 6, and 7
 - Napthalene decreasing in Wells 3R and 6
- Deep Groundwater
 - Max BTEX at MW-3D (6.87 ppm) driven by benzene
 - GRO and EPH max at MW-3D (11 ppm respectively)
 - Max PAHs at MW-3D (9.551 ppm)
 - Benzene decreasing in Well 1D
 - Napthalene decreasing in Wells 3D and 4D
- Assimilative Capacity Calcs

~~Shallow groundwater~~

- BTEX = 12.97 ppm (max detected is 9.875 ppm in MW-3R)
- Napthalene = 12.80 ppm (max detected is 3.2 ppm in MW-3R)

7/22/2002

- Assimilative Capacity Calcs (con't)
 - Bedrock groundwater
 - BTEX = 13.36 ppm (max detected is 6.87 ppm in MW-3D)
 - Napthalene = 10.67 ppm (max detected is 9.44 ppm in MW-3D)
- Mass Reduction Attributable to Interim Actions (Feb 01 to Feb 02)
 - See Exhibit 4-11

Exhibit 4: In. Mass Reduction Summary

United Cities Gas Company Former Tennessee Street MGP Johnson City, Tennessee

Analyte	Site PRG *	MW-1		Percent Reduction	MW-1D		Percent Reduction	MW-2		Percent Reduction
		Feb-01	Feb-02		Feb-01	Feb-02		Feb-01	Feb-02	
Volatile Organic Compounds										
Gasoline Range Organics	1.0	0.41	0.535	-30.5%	2.80	2.34	16.4%	-	-	-
Extractable Petroleum Hydrocarbons	1.0	3.61	1.62	55.1%	9.69	35.1	-262.2%	0.61	0.566	7.2%
Benzene	0.71	0.0193	0.0232	-20.2%	0.5700	0.2650	53.5%	-	-	-
Xylenes	0.14	0.0166	0.02550	-51.8%	0.456	0.3165	30.6%	-	-	-
Polycyclic Aromatic Hydrocarbons										
Benzofluoranthene	0.00049	0.0025	0.0025	0.0%	0.05	0.025	50.0%	-	-	-
Benzopyrene	0.00062	0.0025	0.0025	0.0%	0.0025	0.025	-900.0%	-	-	-
Naphthalene	NL	0.405	0.4601	-13.6%	4.05	2.951	27.2%	-	-	-
Phenanthrene	NL	0.056	0.016	71.4%	0.070	0.13	-85.7%	-	-	-
Total PAHs	NL	0.6130	0.5610	8.5%	4.3910	3.4600	21.2%	-	-	-
Metals										
Arsenic	0.190	0.007	0.0025	64.3%	0.0025	0.0090	-260.0%	0.0025	0.0070	-180.0%
Barium	0.26	0.272	0.176	35.3%	0.150	0.135	10.0%	0.612	0.345	43.6%
Cadmium	1.1	11.070	5.85	47.2%	3.250	0.603	81.4%	13.35	4.99	62.6%
Lead	0.0013	0.0015	0.0015	0.0%	0.0015	0.0015	0.0%	0.0015	0.0030	-100.0%
Manganese	0.088	1.7800	1.45	18.5%	0.3000	0.361	-20.3%	1.200	0.0480	96.0%
Other Analytes										
Cyanide (free)	0.073	0.005	0.005	0.0%	0.005	0.005	0.0%	0.005	0.008	-60.0%

Notes: if component was not detected above the laboratory reporting limit, one-half of the reporting limit was assumed

All units are reported in milligrams per liter (mg/L)

* - Please see Remedial Investigation Report (ARCADIS Geraghty & Miller, Inc. 2000)

Bold - Exceeds the PRG

UJ - analyte was analyzed for, but not detected; value is estimated

J - estimated

R - not detected

PAHs - polycyclic aromatic hydrocarbons

PRGs - Preliminary Remediation Goals

NL - not listed

ARCADIS

Exhibit A 1. Mass Reduction Summary United Cities Gas Company Former Tennessee Street MGP Johnson City, Tennessee

Analyte	Phase II PRG	MW-3R			MW-3D			MW-4		
		Oct-01	Feb-02	Percent Reduction	Feb-01	Feb-02	Percent Reduction	Feb-01	Feb-02	Percent Reduction
Volatile Organic Compounds										
Gasoline Range Organics	1.0	-	16.1	-	13.1	11.3	13.7%	0.05	0.05	0.0%
Extraction Solvent Hydrocarbons	1.0	-	16.9	-	8.08	11.6	-43.6%	0.358	0.763	-113.1%
Benzene	0.71	0.1560	4.430	-2739.7%	3.4	3.58	-5.3%	0.001	0.0005	50.0%
Xylenes	0.14	0.0680	2.165	-3083.8%	1.95	1.965	-0.8%	0.001	0.0005	50.0%
Polycyclic Aromatic Hydrocarbons										
Benzofluoranthene	0.00049	0.05	0.0025	95.0%	0.05	0.0278	44.4%	0.005	0.0025	50.0%
Benzopyrene	0.00049	0.0139	0.0025	82.0%	0.0281	0.0278	1.1%	0.0025	0.0025	0.0%
Naphthalene	0.00062	10.3	3.20 J	68.9%	9.55	9.44	1.2%	0.0025	0.0025	0.0%
Phenanthrene	NL	0.056	0.022	60.4%	0.0281	0.0278	1.1%	0.0025	0.0025	0.0%
Total PAHs	NL	10.6396	3.370	68.3%	9.662	9.551	1.1%	0.006	0.0025	58.3%
Metals										
Arsenic	0.190	-	0.008	-	0.006	0.0060	0.0%	0.0025	0.009	-260.0%
Barium	0.26	-	0.26	-	0.144	0.134	6.9%	0.298	0.37	-24.2%
Iron	1.1	-	4.72	-	10.01	11.3	-12.9%	4.67	5.73	-22.7%
Lead	0.0013	-	0.0015	-	0.0015	0.0015	0.0%	0.0015	0.004	-166.7%
Manganese	0.088	-	1.45	-	1.28	1.31	-2.3%	0.029	0.034	-17.2%
Other Analyte										
Cyanide (free)	0.073	-	0.047	-	0.005	0.066	-1220.0%	0.005	0.023	-360.0%

Note: If constituent was not detected above the laboratory reporting limit, one-half of the reporting limit was assumed.

UJ - analyte was analyzed for, but not detected; value is estimated

J - estimated

R - not detected

PAHs - polycyclic aromatic hydrocarbons

PRGs - Preliminary Remediation Goals

NL - not listed

Exhibit 4-1
Mass Reduction Summary
United Cities Gas Company Former Tennessee Street MGP Johnson City, Tennessee

Analyte	Phase II PRG	MW-4D		Percent Reduction	MW-5		Percent Reduction	MW-6		Percent Reduction
		Feb-01	Feb-02		Feb-01	Feb-02		Feb-01	Feb-02	
Volatile Organic Compounds										
Gasoline Range Organics	1.0	3.75	0.749	80.0%	0.288	0.05	82.6%	0.05	0.05	0.0%
Extractable Petroleum Hydrocarbons	1.0	2.43	2.24	7.8%	1.30	1.02	21.5%	2.00	2.00	-18.3%
Benzene	0.71	0.9750	0.2340	76.0%	0.1310	0.0303	76.9%	0.0035	0.0035	74.6%
Xylenes	0.14	0.6075	0.01760	97.1%	0.0093	0.00420	54.8%	0.001	0.0025	-150.0%
Polycyclic Aromatic Hydrocarbons										
Benzofluoranthene	0.00049	0.05	0.0025	95.0%	0.0025	0.0025	0.0%	0.0025	0.00284	-13.6%
Benzofluorene	0.00049	0.0025	0.0025	0.0%	0.0025	0.0025	0.0%	0.0025	0.00284	-13.6%
Benzo[a]pyrene	0.00062	0.09	0.0240 J	73.3%	0.020	0.0025 UJ	87.5%	0.0025	0.00284 UJ	-13.6%
Phenanthrene	NL	0.007	0.0670	-857.1%	0.0025	0.0025	0.0%	0.032	0.00682	78.7%
Total PAHs	NL	0.1700	0.3110	-82.9%	0.0200	0.0025	87.5%	0.1170	0.0511	56.3%
Metals										
Arsenic	0.190	0.011	0.0060	45.5%	0.0025	0.0025	0.0%	0.0025	0.0025	0.0%
Barium	0.26	0.488	0.333	31.8%	0.113	0.201	-77.9%	0.182	0.188	-3.3%
Cadmium	1.1	3.43	3.67	-7.0%	0.766	1.26	-64.5%	9.190	10.1	-9.9%
Lead	0.0015	0.0015	0.0015	0.0%	0.0015	0.0015	0.0%	0.0015	0.0015	0.0%
Manganese	0.088	0.8430	1.96	-132.5%	0.9050	0.438	51.6%	1.9700	3.20	-62.4%
Other Analytes										
Cyanide (free)	0.073	0.005	0.022	-340.0%	0.005	0.142	-2740.0%	0.005	0.055	-1000.0%

Note: 1. Constituent was not detected above the laboratory reporting limit.

2. One-half of the reporting limit was assumed.

3. All units reported in milligrams per liter (mg/L)

4. Phase II Remedial Investigation Report (ARCADIS Garaghy & Miller, Inc. 2003)

Bold - exceeds site PRG

UJ - analyte was analyzed for, but not detected; value is estimated

J - estimated

N - not detected

PAHs - polycyclic aromatic hydrocarbons

PRGs - Preliminary Remediation Goals

NL - not listed

Exhibit 4-1
Mass Reduction Summary
United Cities Gas Company Former Tennessee Street MGP Johnson City, Tennessee

Analyte	Phase II PRG	MW-7		MW-8		MW-9					
		Feb-01	Feb-02	Percent Reduction	Feb-01	Feb-02	Percent Reduction	Feb-01	Feb-02	Percent Reduction	
Volatile Organic Compounds											
Gasoline Range Organics	1.0	0.05	0.05	0.0%	-	-	-	-	-	-	
Extractable Petroleum Hydrocarbons	1.0	0.77	0.737	4.3%	-	-	-	-	-	-	
Benzene	0.71	0.001	0.0005	50.0%	-	-	-	-	-	-	
Xylenes	0.14	0.001	0.0005	50.0%	-	-	-	-	-	-	
Polycyclic Aromatic Hydrocarbons											
Benzofluoranthene	0.00049	0.00278 R	0.00278	0.0%	-	-	-	-	-	-	
Benzo[a]pyrene	0.00049	0.0025	0.00278	-11.2%	-	-	-	-	-	-	
Naphthalene	0.00062	0.0025	0.00278 UJ	-11.2%	-	-	-	-	-	-	
Phenanthrene	NL	0.00278 R	0.00278	0.0%	-	-	-	-	-	-	
Total PAHs	NL	0.0122	0.00278	77.2%	-	-	-	-	-	-	
Metals											
Arsenic	0.190	0.0025	0.0025	0.0%	0.0025	0.0025	0.0025	0.0025	0.0025	0.0%	
Barium	0.26	1.450	1.51	-4.1%	0.255	0.418	0.177	0.150	0.150	15.3%	
Iron	1.1	9.510	5.01	47.3%	1.5	0.967	7.550	0.468	0.468	93.8%	
Lead	0.0013	0.0015	0.0015	0.0%	0.0015	0.0015	0.0050	0.0015	0.0015	70.0%	
Manganese	0.088	1.0600	1.08	-1.9%	0.307	0.617	2.8800	1.72	1.72	40.3%	
Other Analytes											
Cyanide (free)	0.073	0.005	0.007	-40.0%	-	-	-	-	-	-	

Note: If constituent was not detected above the laboratory reporting limit, one-half of the reporting limit was assumed.

All units reported in milligrams per liter (mg/L)

Phase II Remedial Investigation Report (ARCADIS Geraghty & Miller, Inc. 2000).

Bold - Exceeds the PRG

UJ - analyte was analyzed for, but not detected; value is estimated

J - estimated

R - not detected

PAHs - polycyclic aromatic hydrocarbons

PRGs - Preliminary Remediation Goals

NL - not listed

Exhibit 4-11. Mass Reduction Summary
United Cities Gas Company Former Tennessee Street MGP Johnson City, Tennessee

Analyte	Phase II PRG	MW-10			Site Average			Location
		Feb-01	Feb-02	Percent Reduction	Feb-01	Feb-02	Percent Reduction	
Volatile Organic Compounds								
Gasoline Range Organics	1.0	0.05	0.05	0.0%	4.07	2.99	26.5%	MW-1, MW-1D, MW-3D, MW-4D, MW-5
Extractable Petroleum Hydrocarbons	1.0	IR	0.889	-	3.17	6.18	-95.0%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7
Benzene	0.71	0.601	0.0005	50.0%	0.752	1.22	-62.2%	MW-1, MW-1D, MW-3R, MW-3D, MW-4D, MW-5, MW-6
Arenes	0.14	0.001	0.0005	50.0%	0.532	0.75	-41.0%	MW-1, MW-1D, MW-3R, MW-3D, MW-4D, MW-5
Polycyclic Aromatic Hydrocarbons								
Benzobifluoranthene	0.00049	0.0025	0.00278	-11.2%	0.026	0.015	42.3%	MW-3D, MW-6
Benzo[a]pyrene	0.00049	0.0025	0.00278	-11.2%	0.021	0.015	28.6%	MW-3R, MW-3D
Naphthalene	0.00062	0.0025	0.00278	-11.2%	4.069	2.679	34.2%	MW-1, MW-1D, MW-3R, MW-3D, MW-4D, MW-5
Phenanthrene	NL	0.0025	0.00278	-11.2%	0.042	0.045	-7.1%	MW-1, MW-1D, MW-3R, MW-3D, MW-4D, MW-6
Total PAHs	NL	0.0025	0.00278	-11.2%	2.848	1.924	32.4%	MW-1, MW-1D, MW-3R, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7
Metals								
Arsenic	0.150	IR	0.0025	-	0.005	0.007	-40.0%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D
Barium	0.26	IR	0.245	-	0.376	0.360	4.4%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7, MW-8, MW-9
Iron	1.1	IR	1.76	-	6.754	4.541	32.8%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7, MW-8, MW-9
Lead	0.0013	IR	0.0080	-	0.002	0.002	-2.5%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7, MW-8, MW-9
Manganese	0.088	IR	5.30	-	1.141	1.111	2.7%	MW-1, MW-1D, MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7, MW-8, MW-9
Other Analytes								
Cyanide (free)	0.073	IR	IR	-	0.005	0.046	-822.9%	MW-2, MW-3D, MW-4, MW-4D, MW-5, MW-6, MW-7

Note: If constituent was not detected above the laboratory reporting limit, one-half of the reporting limit was assumed.

All units reported in milligrams per liter (mg/L)

* - Phase II Remedial Investigation Report (ARCADIS Garaghty & Miller, Inc. 2000).

Bold - exceeds Site PRG

UJ - analyte was analyzed for, but not detected; value is estimated

J - estimated

R - not detected

PAHs - polycyclic aromatic hydrocarbons

PRGs - Preliminary Remediation Goals

NL - not listed

IR - insufficient recovery

RISK ASSESSMENT SUMMARY

United Cities Gas Company, Tennessee Street FMGP, Johnson City, Tennessee

GENERAL

- RA focuses on HH because site in industrial area w/o significant ecological habitat
- potential risks aquatic receptors Brush Cr addressed by comparing predicted concs to TDEC & Region IV

WATER USE

- JC municipal supply from Watauga River & springs on Indian Creek (10 mi S)
- no domestic wells within 0.5 miles
- shallow GW not suitable for general use (poor quality & low yield)
- JC ordinance & water department policy restricts installation of water wells

GEOLOGY

- DTB 5 to 8 ft: 3 ft fill (coal, cinders, clinkers); 2 to 5 ft of silty sand, silt, clay
- bedrock: fractured limestone; Knox Group; SE dip

GROUNDWATER

- shallow: 1 to 12 ft bls; average -3.5 ft; flows NNE toward Brush Creek
- deep: flows SSE
- downward gradient from shallow to deep

COPCs

- Phase II RI (1999-2000)
- BTEX, PAHs, and metals

RA Conclusions

Current (on & off site)

- acceptable; no complete exposure pathways for potential receptors

Future (on site)

acceptable for

- industrial worker: constituents migrating from soil or GW to indoor air
- industrial/excavation worker & trespasser: soil
- excavation worker: potential carcinogens in shallow GW; total HI slightly exceeds noncancer target, but no individual HI exceeds target
- deep GW: no complete exposure pathways for potential receptors
- surface water and sediment

Future (off site)

- acceptable; soil, shallow GW, deep GW (no pathways), surface water, sediment

Summary of Conclusions

- Current risk is acceptable
- Future risk could be unacceptable (indoor air, soil, shallow GW) if pavement breached or deteriorated
- IA success reduced GW concs & potential future off-site risk

COCs

soil: PAHs (6) & arsenic

- GW: PAHs (5)

RBCs

- calculated for COCs & exposure scenarios with potential risk (all soil & excavation for shallow GW)
- see attachment for shallow groundwater RBC comparison to Feb 02 data



ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Greg B. Page
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

July 22, 2002

RE: **Post Interim Action Groundwater Monitoring Report**, dated May 2002.
United Cities Gas Site ID# 90-513

Dear Mr. Page:

The DSF received the document entitled, **Post Interim Action Groundwater Monitoring Report**, dated May 2002. After reviewing the document, the DSF has the following comments:

Comments

1. Sample data indicate that some contaminant levels are decreasing, and some contaminant levels are increasing. The text discusses the decreases, but the increases and their causes are not discussed in depth. Do the decreases/increases correlate with expected degradation products from the site-related contaminants? Some contaminant concentrations in the source areas appear to have increased. This appears to indicate that the ORC was not effective in remediating the sources. Or does this indicate the presence of unknown or more laterally extended sources from which contaminants are migrating into the treated areas?
2. Regression plots showing the trend in concentrations over time for all contaminants of concern should be provided. Only plots of some contaminants were provided.
3. The delineation of contaminant concentrations in the deep aquifer does not appear to be complete. The groundwater elevations listed on Exhibit 4-2 for the deep wells indicate that the deeper groundwater is moving in approximately the opposite direction as shallow groundwater. No deep monitoring wells are ideally located so as to detect contaminants migrating from the source areas.

If you have questions or comments, contact me at (423) 854-5468.

Sincerely,

J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
David Randolph, TDEC/DSF, NCO
EAC-JC DSF File # 90-513

100-DSF 90-513

Tennessee Department of Environment and Conservation

Media Contact Work Sheet

TDEC staff person: Harold Matraw JC-EAC Superfund

Title: Geologist

Phone: 423 854-5466

DATE: 6/11/01

Issue or question involved in contact:

United Cities Gas site in Johnson City is having hazardous waste remove from an old (1915-1945) coal gasification plant. Questions included: (1) what is occurring here? (2) what is the hazardous waste (3) How did the Division of Superfund get involved? (4) What is the role of Superfund? (5) Does this site pose an environmental or health risk?

Name of Reporter: Josh Smith

Name of Media: WJHL TV, Channel 11

Phone number of media: 423 434-4502

Fax: 423 926-9080

Address of Media: 338 E. Main Street, Johnson City

Town or county: Johnson City Tennessee (Washington County)

Type of Media: TV

Newspaper
Magazine

Radio
Newsletter

☒ TV
Other

Expected Publish Date: June 11-12, 2001

Other material requested by reporter: None

Notes or comments: Good interviewer

Please return to Kim Olson, Director of Public Information, Phone: 532-0288; Fax: 532-0740; 20th Floor, L & C Tower, 401 Church St., Nashville, TN 37243.

Director
AD (Tech)
AD (Admin) 3-6-6
Enf.
Tech.
VOAP
DCERP
Fed. Prog.
Prog. Ops.
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AF

Hazardous waste site being

By Kristen Hebestreet
Press Staff Writer

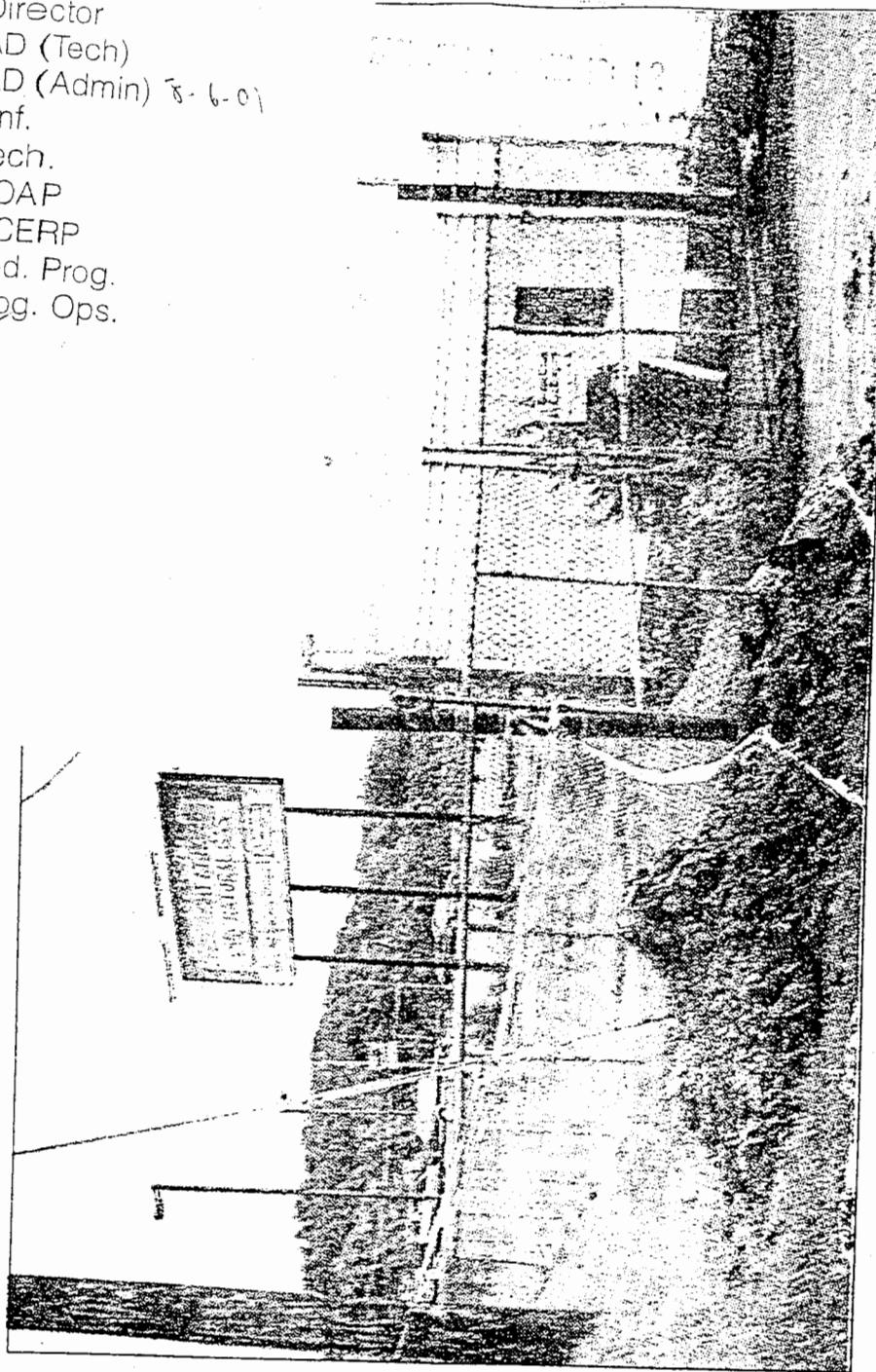
A smell like roofing tar may soon waft from the United Cities Gas Co. property in Johnson City due to a hazardous waste cleanup there, a company manager said Wednesday.

United Cities started preparing Wednesday to remove old coal tar from the site at the corner of Tennessee Street and Security Lane, Environmental Services Manager Karol A. Sole said. The cleanup will begin Monday.

"The two most noticeable things will be the road (behind the gas plant) will be closed and the smell," she said.

The smell will come from the cleanup of an old hazardous waste site left by a former gas manufacturing plant in Johnson City that operated there from 1915 to 1954. The manufacturing byproduct — coal tar — is

Director
AD (Tech)
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AF



Staff Photo by Scott Talbert
Please see WASTE, Page 6 United Cities Gas Co. plans to begin the coal tar removal project next week at this city site

JOHN CITY PRESS, Thursday, June 7, 2001

NCO File # 90-513

Waste

Continued from Page 1

part of what will be removed from the site.

The black, gooey material that will be unearthed is similar to roofing tar or asphalt.

An estimated 1,500 tons of material will be removed and about 520 tons of that material is classified as hazardous, she said. The hazardous material consists of polynuclear aromatic hydrocarbons, volatile aromatics, phenolics, inorganic nitrogen that includes cyanide compounds, inorganic sulfur and trace metals.

The material was found in 1995, when United Cities removed an old 2,000-gallon underground gasoline storage tank and discovered other materials associated with making gas from coal.

The Department of Environment and Conservation's Division of Superfund issued a consent order in 1997 requiring that United Cities remove the hazardous material, but the company requested a delay.

The consent order says "petroleum-impacted soil and groundwater were detected."

United Cities contracted with Four Seasons Environmental Inc., based in Greensboro, N.C., to conduct the removal project.

The company expects to remove an old tar well, a tar/water separator, and the soil from an area immediately around what used to be a 50-foot diameter gas holder that was on a concrete foundation, Sole said.

The excavated material will be blended with clay and lime, which will then allow it to be reclassified as nonhazardous waste before it is shipped off site.

At the end of the project, the material will be transported to Saltville, Va., where it will be treated at the Three Seasons thermal desorption facility.

The consent order said the site had been variously owned by Washington County Gas Co., Appleby-Wagner Co., Central Public Service Co. and Stone & Webster; but has always been used for gas manufacturing since 1915.

Cleanup costs are expected to be about \$325,000, Sole said.

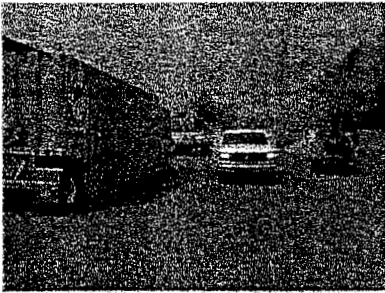
"While coal tar contains chemicals which are a potential health risk if people are exposed to them over a long period of time, our studies have concluded there is little risk from this site," she said.

A fact sheet issued by United Cities says the buildings there will be demolished during the summer and the property will be available for new uses.

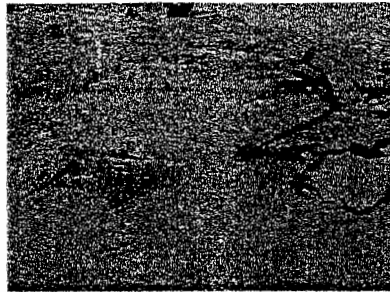
NCO File # 90-513

Photo Images from the United Cities Gas Excavation DSF 90-513

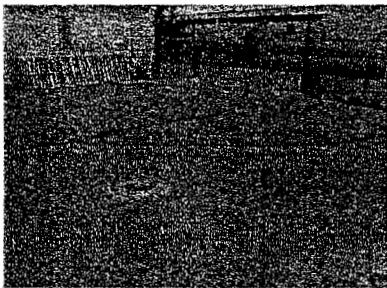
Compiled 6/22/01 by Harold Matraw



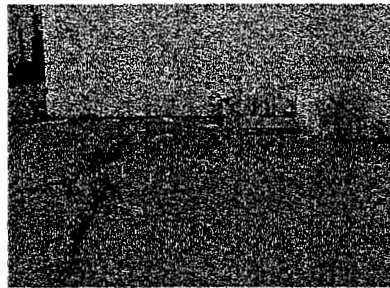
View toward UST Excavation Area Pre-excavation 6/13/01



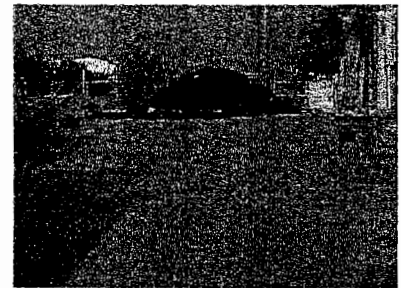
Above ground storage tank cell



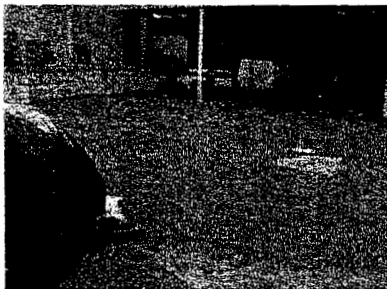
Storage Holder Excavation Area



Tar Water Separator Area



Soil stock pile from AST area



Tar Well Excavation Area



Storage Holder Cell 6/18/01



Sludge in Storage Holder Cell

See another set of images taken by Darrell Hale on 6/19/01 of Storage Holder sampling



Side wall of Tar Well 6/20/01



Tar Well

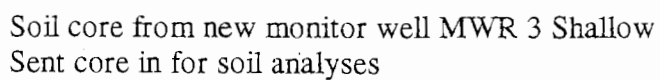
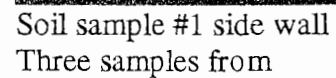
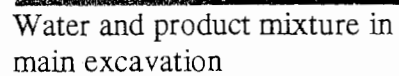
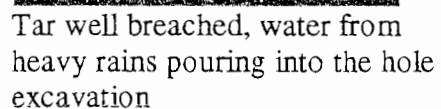
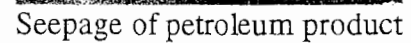
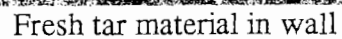
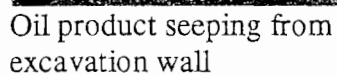
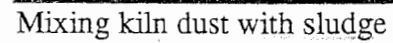
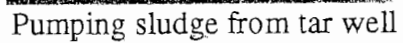
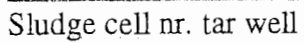
D 7-24-01

VOAP —

SF —

13 03 01 03 21

The Roof canopy had to be removed to permit excavation of the Tar Well



100

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
ENVIRONMENTAL ASSISTANCE CENTER – JOHNSON CITY

90-513
TECH

DIVISION OF REMEDIATION

OFFICE CORRESPONDENCE

DATE: May 9, 2007

TO: JCFO DOR File #90-513, ✓ NCO DOR File #90-513

FROM: Julie Desai

SUBJECT: May 2, 2007 – Meeting to Discuss Current Status of Site Remediation
Efforts / Activities, DOR Site #90-513

7/9/2016 11:09:52
JULIE DESAI

DOR (Darrell Hale and Julie Desai) met with Atmos (Mike Ellis and Stuart Schulz) and Arcadis (Paul Preston and Berny Ilgner) at 1:00pm on May 2, 2007 at the JC-EAC, small conference room.

Mike Ellis (ME) gave an update on the current negotiations with the City of Johnson City regarding the site. ME indicated that including the City during development of the site might complicate or delay remediation of the site. Arcadis personnel presented the latest designs for the selected alternative from the 2003 Focused Feasibility Study. They indicated that the designs are at a stopping point because it would be more appropriate to wait for the selected developer to review and establish the proposed structure(s) for the site before proceeding further.

DOR reaffirmed its commitment to cooperate with Atmos Energy in order to generate the best available option to mitigate the risks identified for this site but stated that we needed to see progress. We further stated that we would like to see efforts made in moving forward such as actively marketing this site as a brownfield to developers that specialize in and are committed to completing this type of project in a timely manner.

Action items from the meeting included discussions:

- 1) that Atmos Energy Corporation would prepare a sequence / schedule of events for the Remedial Design and other activities involved with remediation of the site,
- 2) to commence groundwater monitoring for the already established wells around the site,
- 3) for active marketing of this site as a brownfield to developers that specialize and are committed to complete this type of project in a timely manner, and that
- 4) DOR would send a letter documenting action items / next steps.



DIVISION OF REMEDIATION

2007 MAY 14 11 09:52

90-513
TECH.

ENVIRONMENTAL FIELD OFFICE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

May 7, 2007

Michael Ellis
Atmos Energy Corporation
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067

Re: United Cities Gas – Johnson City, DOR Site #90-513

Dear Mr. Ellis,

It was a pleasure to meet with you and your colleague, Mr. Shulz, and the consultants from Arcadis working on the impacted United Cities Gas site located at the northwest corner of State of Franklin Road and Tennessee Streets in Johnson City, TN.

The purpose of this letter is to document our understanding from the meeting that Atmos Energy Corporation will prepare a sequence/schedule of events for the Remedial Design and other activities involved with remediation of the site. The Remedial Design for the alternative identified in a 2003 Focused Feasibility Study has not been submitted. It was last scheduled for submittal in September 2006.

In addition to the above-mentioned sequence/schedule of events, we agreed that groundwater monitoring should commence for the already established wells around the site. The DOR would like to request that you conduct semiannual monitoring, typically a fall and spring event is recommended.

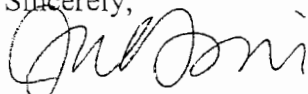
The Division of Remediation (DOR) is committed to cooperate with you in generating the best available option to mitigate the risks identified for this site. We support the idea to develop this property under the Brownfield program and agree with you to wait for an interested developer before proceeding further with completing the design. We believe that this would result in the most appropriate design that would assure an adequate level of protection in the future for the public from the risks identified.

Michael Ellis
May 7, 2007
Page 2

However, as I mentioned above the selected alternative for this site was identified in 2003, thus we need to move forward in active remediation of this site. In order to continue consideration of this site under the Brownfield's program, the DOR needs to see efforts made in moving forward such as actively marketing this site as a brownfield to developers that specialize and are committed to complete this type of project in a timely manner.

I look forward to receiving the sequence / schedule of events, the commencement of groundwater monitoring events, and hearing about development interests for the site. Please feel free to contact me in the Johnson City Environmental Field Office at (423) 854-5468 or Darrell Hale at (423) 854-5463.

Sincerely,



Julie Desai
Project Manager

JD/14047127

cc: Stuart Shulz, Atmos Energy Corporation
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067

Mr. Paul Preston, Arcadis
114 Lovell Road, Suite 202
Knoxville, TN 37934

Berny Ilgner, Arcadis
114 Lovell Road, Suite 202
Knoxville, TN 37934

DOR/EFO-JC File #90-513

~~DOR~~/NCO File #90-513



ENVIRONMENTAL FIELD OFFICE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

April 5, 2007

Stuart Shulz
Atmos Energy Corporation
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067

Re: New Project Manager
United Cities Gas – Johnson City, TDOR Site #90-513

Dear Mr. Shulz,

The purpose of this letter is to inform you that a change in Division of Remediation's (DOR) project management has occurred. The new Division contact for the site will be Ms. Julie Desai. The mailing address will not change. Other contact information is as follows:

Phone: (423) 854-5468
Email: Julie.Desai@state.tn.us

In addition, according to our most recent file review, the Remedial Design that was last scheduled for submittal in September 2006 has not been submitted. Please contact Julie Desai as soon as possible to give us a current status of pending issues and an updated schedule for submittal of the Remedial Design and other required items.

Sincerely,

Darrell Hale
Program Manager

cc: Mr. Paul Preston, Arcadis
DOR/NCO File #90-513
DOR/EFO-JC File #90-513

90-513
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DIVISION OF REMEDIATION
APR 5 2007 11 51 AM



✓ 90-513
DIVISION OF REMEDIATION
2006 AUG -1 PM 2:04

July 28, 2006

Ms. Teresa Lewis
Division of Remediation
2305 Silverdale Road
Johnson City, Tennessee 37601

**RE: 2006 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035**

Dear Ms. Lewis:

This letter serves as the 2006 Waste Removal Report for the above referenced site. The following information is for the previous Tennessee Department of Environment and Conservation ("TDEC") fiscal year (July 1, 2005 to June 30, 2006) and project cumulative.

During the previous TDEC fiscal year Atmos Energy accomplished the following task:

- Received Record of Decision from TDEC

Atmos Energy spent \$9,052.75 in TDEC fiscal year 2006 on the above listed task.

During TDEC fiscal year 2006, Atmos Energy reimbursed the Division of Remediation ("DOR") \$1,817.56 for administrative and oversight costs associated with the Order. Reimbursement costs prior to TDEC fiscal year 2006 totaled \$41,628.06. The cumulative DOR administration and oversight costs to date are \$43,445.62.

The project cumulative total cost as a result of the Order is \$796,715.60. A table summarizing the costs associated with the Order is attached to this letter. The costs reported include invoices received through June 30, 2006.

Page 2

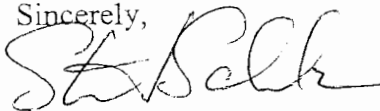
Ms. Teresa Lewis

July 28, 2006

This report is believed to be accurate and complete, however it may or may not represent the final project accounting as recorded by Atmos Energy.

If you have any questions concerning this report please contact me at (615) 771-8405 or by e-mail at stuart.schulz@atmosenergy.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Stuart Schulz", written over the word "Sincerely,".

Stuart Schulz, PG, CHMM
Environmental Specialist

cc: Rad Cook, ATMOS
Dan Lindsey, ATMOS
Doug Walther, ATMOS
Kevin Rice, DSF, JCFO
Robert Powell, DSF, NCO
David Randolph, DSF, NCO

Attachment: Tennessee St. FMGP VOAP Cost Summary Table

Tennessee St. FMGP
VOAP Cost Summary

Fiscal Year	<i>Investigation</i> Cost	<i>Treatment</i> Cost	<i>Disposal</i> Cost	<i>Analytical</i> Cost	<i>DSF Oversight</i> Cost	Total Cost
1997	\$0.00	\$0.00	\$0.00	\$0.00	\$6,110.86	\$6,110.86
1998	\$4,163.18	\$0.00	\$0.00	\$15,571.00	\$3,629.41	\$23,363.59
1999	\$21,997.27	\$0.00	\$0.00	\$0.00	\$1,167.19	\$23,164.46
2000	\$139,639.19	\$0.00	\$0.00	\$0.00	\$2,301.52	\$141,940.71
2001	\$154,307.15	\$64,480.20	\$11,041.20	\$33,793.87	\$2,578.58	\$266,201.00
2002	\$66,542.00	\$0.00	\$35,083.95	\$8,230.00	\$9,689.22	\$119,545.17
2003	\$119,583.00	\$0.00	\$5,697.00	\$9,319.00	\$7,065.50	\$141,664.50
2004	\$52,855.60	\$0.00	\$0.00	\$0.00	\$8,440.32	\$61,295.92
2005	\$3,731.18	\$0.00	\$0.00	\$0.00	\$645.46	\$4,376.64
2006	\$7,235.19	\$0.00	\$0.00	\$0.00	\$1,817.56	\$9,052.75
	\$570,053.76	\$64,480.20	\$51,822.15	\$66,913.87	\$43,445.62	\$796,715.60

Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97

File 90-513
NCO CBY

DIVISION OF REMEDIATION

2006 AUG 14 PM 3: 25



90-513
TECH

ENVIRONMENTAL FIELD OFFICE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

August 7, 2006

Stuart Shulz
Atmos Energy Corporation
810 Crescent Centre Drive, Suite 600
Franklin, TN 37067

Re: New Project Manager
United Cities Gas – Johnson City, TDOR Site #90-513

Dear Mr. Shulz,

The purpose of this letter is to inform you that a change in Division of Remediation project management will occur. After August 15, 2006, the Division contact for the site will be Mr. Darrell Hale. The mailing address will not change. Other contact information is as follows:

Phone: (423) 854-5463
Email: Darrell.Hale@state.tn.us

If you have any questions concerning this correspondence, feel free to contact me at 423-854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,

J. Kevin Rice
Project Manager

cc: Mr. Paul Preston, Arcadis
DOR/NCO File #90-513
DOR/EFO-JC File #90-513



DIVISION OF REMEDIATION

2006 AUG -1 PM 4:05

90-513
TECH

July 28, 2006

Ms. Teresa Lewis
Division of Remediation
2305 Silverdale Road
Johnson City, Tennessee 37601

**RE: 2006 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035**

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Page 2

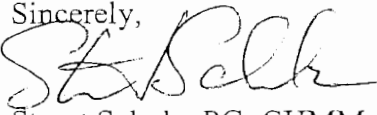
Ms. Teresa Lewis

July 28, 2006

This report is believed to be accurate and complete, however it may or may not represent the final project accounting as recorded by Atmos Energy.

If you have any questions concerning this report please contact me at (615) 771-8405 or by e-mail at stuart.schulz@atmosenergy.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Stuart Schulz", written over the word "Sincerely,".

Stuart Schulz, PG, CHMM
Environmental Specialist

cc: Rad Cook, ATMOS
Dan Lindsey, ATMOS
Doug Walther, ATMOS
Kevin Rice, DSF, JCFO
Robert Powell, DSF, NCO
David Randolph, DSF, NCO

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Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97

Atmos Johnson City: Remedial Design Status

Kevin Rice - Atmos Johnson City: Remedial Design Status

File 90-513
NCO GPR

DIVISION OF REMEDIATION

90-513
TECH.

2006 JUN -5 AM 9:41

From: "Preston, Paul" <PPreston@arcadis-us.com>
To: <kevin.rice@state.tn.us>
Date: 5/30/2006 4:13 PM
Subject: Atmos Johnson City: Remedial Design Status
CC: "Schulz, Stuart P" <Stuart.Schulz@atmosenergy.com>, "Ilgner, Berny" <BIlgner@arcadis-us.com>

Kevin - As per our call on May 24 wanted to follow-up with a summary email of project progression and how it will relate to the remedial design report. Currently Atmos is evaluating alternatives for site redevelopment that could include the co-development of an adjacent parcel. This opportunity comes at a very good time and will allow the design to complement Site development while fulfilling the remedial action objectives. Issues specifically relating to land use and the redevelopment plan will be critical to the final remedial design.

Currently meetings are taking place with adjacent parcel owners and potential redevelopers. In order to allow time to explore redevelopment options we would like to tentatively target the September 2006 timeframe for the remedial design submittal. Please call if you have questions or comments.

Thanks,

Paul Preston, PE
Project Engineer

ARCADIS

114 Lovell Road, Suite 202

Knoxville, TN 37934

Office: 865.675.6700 ext. 3110

Fax: 865.675.6712

Cell: 865.621.2408

File 90-513

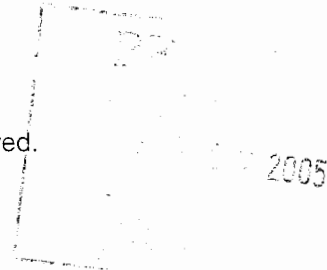
From: Kevin Rice
To: Schulz, Stuart P
Date: 9/1/05 2:01:02 PM
Subject: Re: Tenn St Property

Stuart,

The temporary staging of equipment and materials at the site is approved.

Sincerely,

J. Kevin Rice
Division of Remediation
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, TN 37601-2162
(423) 854-5468
Kevin.Rice@state.tn.us



>>> "Schulz, Stuart P" <Stuart.Schulz@atmosenergy.com> 9/1/05 1:55:14 PM >>>
Kevin:

As per our telephone conversation today, Atmos Energy plans to temporarily use the Tennessee Street property as a staging area for contractor equipment and supplies (such as gravel) while we undergo a major project to improve our gas system in the Johnson City area.

I appreciate your approval of this request.

Regards,

Stuart

Stuart Schulz, RPG, CHMM
Environmental Specialist
Atmos Energy Corporation
810 Crescent Centre Dr., Suite 600
Franklin, TN 37067
(615) 771-8405
(615) 771-8302 Fax

CC: Hale, Darrell

File 90-513

DIVISION OF REMEDIATION

From: Kevin Rice
To: Preston, Paul
Date: 2/22/05 3:45:14 PM
Subject: Re: Atmos Johnson City: Public Notice Review

2005 MAR -2 AM 9:31

Paul, the notice looks good overall. Need to change some items:

- 1) We are now the Division of Remediation, not Superfund. Need to change all references from Division of Superfund, TDSF or DSF to Division of Remediation, TDOR or DOR.
- 2) And we are no longer the Johnson City Environmental Assistance Center; we are now back to being the Johnson City Environmental Field Office.
- 3) The contact person for sending clippings or comments should be me. Use the following address:
Mr. Kevin Rice
Division of Remediation
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, TN 37601-2162
- 4) Make sure that the "no later than" date for comments is at least 30 days after the date that the public notice will appear in the newspaper.

After these changes are made, the public notice can be placed in the newspaper. If you have any questions, give me a call.

J. Kevin Rice
Division of Remediation
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, TN 37601-2162
(423) 854-5468

>>> "Preston, Paul" <PPreston@arcadis-us.com> 2/18/05 3:35:46 PM >>>
<<050216-TN507-LTR-030.pdf>>
Kevin - Attached is the revised public notice for your review.

Thanks,

Paul Preston, EIT
Project Engineer
ARCADIS
114 Lovell Road, Suite 200
Knoxville, TN 37922
Office: 865.675.6700 ext. 3110
Fax: 865.675.6712
Cell: 865.621.2408

CC: Schulz, Stuart

Johnson City Press
ATTN.: Advertising Department
204 W Main Street
Johnson City, Tennessee 37604

Subject:
Posting of Public Notice
Atmos Energy Corporation Facility
TDSF Site No. 90-513

Dear Advertising Editor:

Please insert the enclosed copy to form a display advertisement that is two columns wide and framed with a border in the Local News/Metro Section of the *Johnson City Press* (Sunday Edition). This ad must be published in the February 27, 2005 edition and is requested *not* to be in the classified section.

Following publication, please send clippings to the following recipients.

Ms. Suzanne Wilkes (3 copies)
Division of Superfund
4th Floor L&C Annex
401 Church Street
Nashville, Tennessee 37243-1538

Mr. Stuart Schulz (1 copy)
Atmos Energy Corporation
810 Crescent Center Drive Suite 600
Franklin, Tennessee 37067

Mr. Berny Ilgner (1 copy)
ARCADIS
114 Lovell Road, Suite 202
Knoxville, Tennessee 37922

Invoicing should be directed to Stuart Schulz at the address listed above.

Thank you for your attention in this matter.

Sincerely,
Atmos Energy Corporation

Stuart Schulz

SS/dr
Attachment

Copy:
Mr. Kevin Rice, TDEC-DSF Johnson City

State of Tennessee
Department of Environment and Conservation
Division of Superfund
PUBLIC NOTICE
FEASIBILITY STUDY FOR FORMER
ATMOS ENERGY CORPORATION FACILITY
JOHNSON CITY, TENNESSEE

The Division of Superfund (DSF) previously accepted the former Atmos Energy Corporation facility (Site) located in Johnson City, Tennessee into the Voluntary Cleanup, Oversight and Assistance Program (VOAP). This program allows willing and able parties to investigate and cleanup hazardous substances with oversight from DSF staff. The Feasibility Study, which describes the plan to remediate the Site, is now available for public review and comment.

The Site is located on the northwest corner of the intersection of State of Franklin Road and Tennessee Street, in the industrial district west of downtown Johnson City, Tennessee. The property consists of 1.8 acres and is currently inactive and vacant. The property was developed for industrial use in 1915. Industrial operations occupied the entire property where gas was manufactured from coal until natural gas was available in 1954. Operations include office buildings, storage areas for gas and equipment, and manufacturing facilities. The majority of the site is paved and fenced, with some areas of gravel.

Several interim actions have been conducted to improve site conditions including 1) underground storage tank (UST) removal, 2) building demolition, and 3) source soil excavation. Two USTs were removed in 1995. Former operation/office buildings associated with the former manufactured gas plant (FMGP) were demolished and removed from the site in 2001. Soils were excavated in 2001 from source areas to reduce contaminant mass. Volatile organic compounds and polycyclic aromatic hydrocarbons are the primary contaminants in on-site soils, and in groundwater on- and off-site.

As described in the Focused Feasibility Study, four alternatives were formulated from nine applicable technologies. Based on this analysis, Alternative 2 was selected because it provides a high degree of overall protectiveness to human health and the environment. The recommended alternative includes the following combination of actions: implementation of land-use restrictions on site; design and construction of a cap; and groundwater monitored natural attenuation.

The Focused Feasibility Study is available for public review at the Johnson City Public Library Reference Section, 100 West Millard Street, Johnson City, Tennessee. The public is encouraged to contact Kevin Rice at the Johnson City Environmental Assistance Center, 2305 Silverdale Road, Johnson City, Tennessee 37601 (423 854-5468) for more information concerning the study.

The DSF is accepting written public comments on the Focused Feasibility Study until March 29, 2005. If there is sufficient public interest for information, a public meeting can be requested, or interested parties can be placed on a mailing list for future information.

Comments should be mailed to Suzanne Wilkes, VOAP Community Relations Coordinator, Division of Superfund, 4th Floor, L&C Annex, 401 Church Street, Nashville, Tennessee 37243-1538 no later than March 29, 2005.



DIVISION OF SUPERFUND

2005 FEB -8 AM 9:17

FIELD OFFICE

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF REMEDIATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Berny Ilgner, P.G.
ARCADIS Geraghty & Miller, Inc.
114 Lovell Road
Knoxville, TN 37922

February 02, 2005

RE: Approval of the Focused Feasibility Study - Revised, dated February 2004 and the Feasibility Study Addendum, dated January 24, 2005.
United Cities Gas Site ID# 90-513

Dear Mr. Ilgner:

The Division of Remediation (DOR) received the documents listed above. After review, the DSF concurs with the choice of Alternative 2: Land-Use Restrictions, Capping and Monitored Natural Attenuation as the method for continuing the progress of the Remedial Action. Based on the information obtained in the site ownership history search, the DOR also concurs with the approach for implementing periodic inspections of the downgradient right-of-way to insure that the remedy remains protective over time.

If you have questions or comments, please contact me at (423) 854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,

J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
Mr. Paul Preston, Arcadis
~~Mr. David Randolph, TDEC/DOR, NCO~~
Mr. Andy Shivas, TDEC/DOR, NCO
JCFO DOR File # 90-513



Infrastructure, buildings, environment, communications

DIVISION OF SUPERFUND

2005 JAN 28 AM 10:11

Mr. Kevin Rice
Department of Environment and Conservation
Johnson City Field Office
Division of Superfund
2305 Silverdale Road Drive
Johnson City, Tennessee 37601

Subject:

Feasibility Study Addendum
Atmos Energy Corporation
Tennessee Street FMGP Site
TDSF # 90-513
Johnson City, Tennessee

Dear Mr. Rice:

As we discussed, described herein is additional information requested by the Tennessee Department of Environment and Conservation - Division of Superfund (TDSF) for the referenced Atmos Energy Corporation (Atmos) site, to supplement the previously submitted feasibility study. This additional information supports the institutional controls aspect of the proposed remedy, and more specifically targets the off-site groundwater impact.

Following on-site source removal, a feasibility study was prepared which evaluated various technologies, and formulated four alternatives for remediation of the site. The proposed remedy consists of capping the on-site soil impact and monitored natural attenuation for groundwater on and off site, in conjunction with institutional controls. These institutional controls include prohibitions against certain land uses and use of groundwater as a drinking water source. While most impacted groundwater is situated on site, a narrow plume extends off site.

Significant efforts have been made to determine the ownership of the off-site parcels where groundwater impact is present. This effort has involved working with the City of Johnson City (City), the Tennessee Department of Transportation, and Atmos. It was determined that this off-site impact is beneath a right-of-way, owned by the City, situated between the State of Franklin Road and Brush Creek.

The subject land is not likely to be developed due to its narrow shape, ownership by the City, and location within this right-of-way. That is, neither aboveground structures nor groundwater wells are likely to be constructed in the right-of-way, and the foreseeable future land use is likely to remain a right-of-way. However, to ensure that the proposed remedy remains protective in the future, routine inspections (propose annual) of the right-of-way are proposed as part of the ongoing

ARCADIS G&M, Inc.
114 Lovell Road
Knoxville
Tennessee 37922
Tel 865 675 6700
Fax 865 675 6712
www.arcadis-us.com

ENVIRONMENT

Date:
24 January 2005

Contact:
Berny Ilgner

Phone:
865.675.6700, ext. 3112

Email:
bilgner@arcadis-us.com

Our ref:
TN000507.0000

ARCADIS

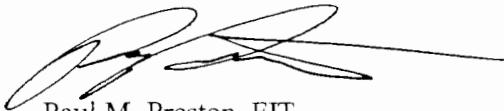
Mr. Kevin Rice
January 24, 2005

implementation of the remedy, to ensure these existing conditions (no structures or wells) do not change. Should conditions change, then Atmos will work with TDSF to evaluate appropriate amendments to the remedy to ensure it remains protective.

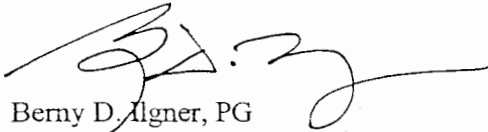
We believe this information satisfies the additional information requested by TDSF and therefore, look forward to your approval of the feasibility study for the site. Upon your approval, we will finalize the public notice and submit it for your review. As always, feel free to contact Mr. Stuart Schulz of Atmos, or either of the undersigned if you have any questions, comments, or need additional information.

Sincerely,

ARCADIS G&M, Inc.



Paul M. Preston, EIT
Project Engineer



Berny D. Ilgner, PG
Associate/Vice President

BDI/bf
Attachment

Copies:

Stuart Schulz, Atmos Energy
Andy Shivas, TDEC DSF Nashville



90-513 RLP-8/14
THL
DIVISION OF SUPERFUND
2004 AUG 11 PM 12:43

August 9, 2004

Mr. Kevin Rice
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

**RE: 2004 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035**

Dear Mr. Rice:

This letter serves as the 2004 Waste Removal Report for the above referenced site. The following information is for the previous Tennessee Department of Environment and Conservation ("TDEC") fiscal year (July 1, 2003 to June 30, 2004) and project cumulative.

During the previous TDEC fiscal year Atmos Energy accomplished the following task:

- Completed Focused Feasibility Study

Atmos Energy spent \$52,855.60 in TDEC fiscal year 2004 on the above listed task.

During TDEC fiscal year 2004, Atmos Energy reimbursed the Division of Superfund ("DSF") \$8,440.32 for administrative and oversight costs associated with the Order. Reimbursement costs prior to TDEC fiscal year 2004 totaled \$32,542.28. The cumulative DSF administration and oversight costs to date are \$40,982.60.

The project cumulative total cost as a result of the Order is \$783,286.21. A table summarizing the costs associated with the Order is attached to this letter. The costs reported include invoices received through June 30, 2004.

Tennessee St. FMGP
VOAP Cost Summary

Fiscal Year	<i>Investigation Cost</i>	<i>Treatment Cost</i>	<i>Disposal Cost</i>	<i>Analytical Cost</i>	<i>DSF Oversight Cost</i>	Total Cost
1997	\$0.00	\$0.00	\$0.00	\$0.00	\$6,110.86	\$6,110.86
1998	\$4,163.18	\$0.00	\$0.00	\$15,571.00	\$3,629.41	\$23,363.59
1999	\$21,997.27	\$0.00	\$0.00	\$0.00	\$1,167.19	\$23,164.46
2000	\$139,639.19	\$0.00	\$0.00	\$0.00	\$2,301.52	\$141,940.71
2001	\$154,307.15	\$64,480.20	\$11,041.20	\$33,793.87	\$2,578.58	\$266,201.00
2002	\$66,542.00	\$0.00	\$35,083.95	\$8,230.00	\$9,689.22	\$119,545.17
2003	\$119,583.00	\$0.00	\$5,697.00	\$9,319.00	\$7,065.50	\$141,664.50
2004	\$52,855.60	\$0.00	\$0.00	\$0.00	\$8,440.32	\$61,295.92
	\$559,087.39	\$64,480.20	\$51,822.15	\$66,913.87	\$40,982.60	\$783,286.21

Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97



File
90-513
DIVISION OF SUPERFUND
2004 AUG 13 PM 3:03

August 9, 2004

Mr. Kevin Rice
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

**RE: 2004 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035**

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The project cumulative total cost as a result of the Order is \$783,286.21. A table summarizing the costs associated with the Order is attached to this letter. The costs reported include invoices received through June 30, 2004.

Page 2

Mr. Kevin Rice

August 9, 2004

This report is believed to be accurate and complete, however it may or may not represent the final project accounting as recorded by Atmos Energy.

If you have any questions concerning this report please contact me at (615) 771-8405 or by e-mail at stuart.schulz@atmosenergy.com.

Sincerely,

A handwritten signature in dark ink, appearing to read "Stuart Schulz", written over a horizontal line.

Stuart Schulz, PG, CHMM
Environmental Specialist

cc: Dan Lindsey
Doug Walther, ATMOS
Robert Powell, DSF, NCO
David Randolph, DSF, NCO

Attachment: Tennessee St. FMGP VOAP Cost Summary Table

Tennessee St. FMGP
VOAP Cost Summary

Fiscal Year	<i>Investigation Cost</i>	<i>Treatment Cost</i>	<i>Disposal Cost</i>	<i>Analytical Cost</i>	<i>DSF Oversight Cost</i>	<i>Total Cost</i>
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2001	\$154,307.15	\$64,480.20	\$11,041.20	\$33,793.87	\$2,578.58	\$266,201.00
2002	\$66,542.00	\$0.00	\$35,083.95	\$8,230.00	\$9,689.22	\$119,545.17
2003	\$119,583.00	\$0.00	\$5,697.00	\$9,319.00	\$7,065.50	\$141,664.50
2004	\$52,855.60	\$0.00	\$0.00	\$0.00	\$8,440.32	\$61,295.92
	\$559,087.39	\$64,480.20	\$51,822.15	\$66,913.87	\$40,982.60	\$783,286.21

Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97

NCO Copy

File 90-513

From: Kevin Rice
To: Jim, Culbert,
Date: 4/14/04 5:16:55 PM
Subject: Re: Atmos Site, State of Franklin and Tennessee Street

Jim,

The Focused Feasibility Study was conditionally approved by the DSF. The selected alternative includes Land Use Restrictions of both on-site and off-site properties as a component of the alternative. The restrictions will help insure that no one comes in contact with the contaminants at unacceptable levels. The conditional approval recognized that Atmos Energy must receive permission from Johnson City to implement the restrictions on the property owned by the City. Without an agreement between the City and Atmos Energy, another alternative must be selected as the final selected alternative. This would require additional evaluation so as to select a remedy that is protective and also physically and economically viable.

The property that the Land Use Restrictions would effect is located roughly between Brush Creek, Tennessee Street and State of Franklin. An outline of this area was presented in the April 1, 2004 letter from Atmos Energy. These deed restrictions would need to be recorded with the Registrar of Deeds so that future landowners are aware of the restrictions.

The Land Use Restrictions should encompass a restriction on installing ground water wells for the purpose of obtaining potable, irrigation or industrial process water. The types of buildings and businesses allowed on the site should be restricted to commercial or light industrial uses. Also, day care facilities or other facilities for the purpose of teaching or caring for children should be prohibited. The construction techniques used for any buildings should be primarily restricted to slab-on-grade construction or to some similar non-intrusive technique. Other types of building foundations could be used if the design provides for a proper vapor barrier. Residential development should not be allowed. These restrictions should not pose a major constraint to development, since the City-owned property is relatively small and at least a portion of the property is located within the 100-year floodplain for Brush Creek. Any type of structure built within this area will likely require that the property be built-up out of the floodplain.

If you have any other questions, please do not hesitate to contact me.

>>> "Culbert, Jim" <jculbert@johnsoncitytn.org> 4/14/04 9:49:51 AM >>>

Good morning,

City staff met yesterday regarding a letter of request from Atmos to the City dated April 1, 2004. This letter detailed proposed remediation activities, which were possibly discussed with your office and could have even been approved for Atmos to initiate a work plan. In particular land-use-restrictions were noted in this request.

In order that the City can completely understand the role that we would be requested to play, if this option is to be successfully carried out by Atmos please e-mail me the exact needs for the City, being land owner of the northeasterly tract bordering the railroad and State of Franklin Road, and understood to have been identified to have contamination in the groundwater beneath the site.

I look forward to a detailed and careful explanation of what our role would be in such a case, so that we might better respond to Atmos' request.

Thanks again,
Jim

DIVISION OF SUPERFUND
2004 APR 19 AM 9:59

Kevin Rice
Department of Environment and Conservation
Division of Superfund
Johnson City Environmental Assistance Center
(423) 854-5468

CC: Hale, Darrell



DIVISION OF SUPERFUND
2004 FEB 18 AM 10:45

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Berny Ilgner, P.G.
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

February 11, 2004

RE: **Focused Feasibility Study - Revised**, dated February 2004
United Cities Gas Site ID# 90-513

Dear Mr. Ilgner:

The Division of Superfund (DSF) received the document entitled **Focused Feasibility Study - Revised**, dated February 2004. After review, the DSF concurs with the choice of Alternative 2: Land-Use Restrictions, Capping and Monitored Natural Attenuation as the method for continuing the progress of the Remedial Action. As stated in the report, successful implementation of the Land-Use Restrictions will require the cooperation of the adjacent property owners. Before the Record of Decision can be finalized, a cooperative agreement between the interested parties must be in place.

If you have questions or comments, please contact me at (423) 854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,

J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
~~Mr. David Randolph, TDEC/DSF, NCO~~
Mr. Andy Shivas, TDEC/DSF, NCO
EAC-JC DSF File # 90-513



DEPARTMENT OF ENVIRONMENT

2003 DEC -2 AM 9:50

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Berny Ilgner, P.G.
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

November 25, 2003

RE: **Focused Feasibility Study**, dated October 2003
United Cities Gas Site ID# 90-513

Dear Mr. Ilgner:

The Division of Superfund (DSF) received the document entitled **Focused Feasibility Study**, dated October 2003. After review, the DSF has the following comments:

Comments

1. Page ES-4, Table 6-1 and Table 6-3 – Remediation Time Frame.

Alternative 3 specifies a time period of 15-years on page ES-4. However, Table 6-1 specifies 10-years and Table 6-3 discusses 15-years for the same alternative. What is the correct time frame?

2. Location in Flood Plain.

The text states on page 1-2 that the site is in the flood plain and that cap construction will account for the flood plain. However, the ARARs table (Table 4-1) states that the site is not in the flood plain. As we discussed during our telephone conversation on November 24, the FEMA flood maps indicate that the site is located in the flood plain. This should be verified and the alternatives reviewed to determine if the flood plain was addressed.

3. Site Specific Impaired Ground Water Classification.

Rule 1200-4-3-.08(4)(d) states that "Site Specific Impaired Criteria shall only apply to ground water that has been certified through the" classification application process. Therefore, the Site Specific Impaired Ground Water classification should not be listed as an ARAR unless the application process has been completed, and the Commissioner has certified the ground water classification. Also, Rule 1200-4-3-.10(2) states that "all areas with ground water classified as Site Specific Impaired must be owned or controlled by the person(s) subject to ground water cleanup or permitting obligations and/or subject to appropriate deed restrictions or other institutional controls. All locations outside the point

of classification change must not exceed the applicable ground water criteria beyond the point of classification change." The most downgradient extent of the plume is not controlled by Atmos Energy.

4. Institutional Controls.

The selected remedial alternative should include institutional controls on the downgradient property affected by the contaminant plume.

5. Page 3-3, Section 3.1.3 Exposure Assessment.

Insert a sentence in this section stating that future residential use of the site is not appropriate or likely and briefly explain why.

6. Page 9-1 References.

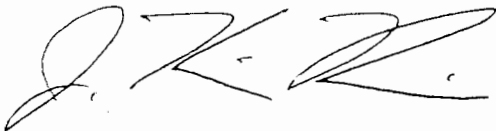
The 6th reference is jumbled. Appears that two references were combined.

7. Long-Term Ground Water Monitoring Sampling Frequency.

After construction of the cap, ground water should be sampled semi-annually for one year to establish a baseline for the post-capping ground water conditions. Ground water should be sampled annually afterwards. The monitoring requirements will be re-evaluated in the first Five-Year Review report.

If you have questions or comments, please contact me at (423) 854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,



J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
Mr. David Randolph, TDEC/DSF, NCO
✓ Mr. Andy Shivas, TDEC/DSF, NCO
EAC-JC DSF File # 90-513



DIVISION OF SUPERFUND
2003 DEC -2 AM 9:51

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Berny Ilgner, P.G.
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

November 25, 2003

RE: **Focused Feasibility Study**, dated October 2003
United Cities Gas Site ID# 90-513

Dear Mr. Ilgner:

The Division of Superfund (DSF) received the document entitled **Focused Feasibility Study**, dated October 2003. After review, the DSF has the following comments:

Comments

1. Page ES-4, Table 6-1 and Table 6-3 – Remediation Time Frame.

Alternative 3 specifies a time period of 15-years on page ES-4. However, Table 6-1 specifies 10-years and Table 6-3 discusses 15-years for the same alternative. What is the correct time frame?

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4. Institutional Controls.

The selected remedial alternative should include institutional controls on the downgradient property affected by the contaminant plume.

5. Page 3-3, Section 3.1.3 Exposure Assessment.

Insert a sentence in this section stating that future residential use of the site is not appropriate or likely and briefly explain why.

6. Page 9-1 References.

The 6th reference is jumbled. Appears that two references were combined.

7. Long-Term Ground Water Monitoring Sampling Frequency.

After construction of the cap, ground water should be sampled semi-annually for one year to establish a baseline for the post-capping ground water conditions. Ground water should be sampled annually afterwards. The monitoring requirements will be re-evaluated in the first Five-Year Review report.

If you have questions or comments, please contact me at (423) 854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,



J. Kevin Rice
Project Manager

cc: ~~Mr. Stuart Shulz~~, United Cities Gas Company
Mr. David Randolph, TDEC/DSF, NCO
Mr. Andy Shivas, TDEC/DSF, NCO
EAC-JC DSF File # 90-513



90-513
DIVISION OF SUPERFUND TECH

2003 SEP -2 AM 9:31

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Greg B. Page
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

August 28, 2003

RE: Response to Comments and Document Revisions for the Supplemental Groundwater Investigation and Risk Assessment Report, dated August 8, 2003.
United Cities Gas Site ID# 90-513

Dear Mr. Page:

The Division of Superfund (DSF) reviewed and approves the Response to Comments and Document Revisions for the Supplemental Groundwater Investigation and Risk Assessment Report, dated August 8, 2003.

The next step in the regulatory process is to develop a Feasibility Study to evaluate the alternatives for managing the risks posed by the site. The Feasibility Study Report should be submitted to the DSF by October 31, 2003.

If you have questions or comments, please contact me at (423) 854-5468 or at Kevin.Rice@state.tn.us.

Sincerely,

J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
Mr. David Randolph, TDEC/DSF, NCO
~~Mr. Andy Shivas, TDEC/DSF, NCO~~
EAC-JC DSF File # 90-513



Infrastructure, buildings, environment, communications

DIVISION OF SUPERFUND

2003 AUG 19 AM 9:17

90-513
TECH

Mr. Kevin Rice
Tennessee Department of Environment and Conservation
Johnson City Environmental Assistance Center
2305 Silverdale Road
Johnson City, Tennessee 37601-2161

ARCADIS G&M, Inc.
97 Midway Lane
Oak Ridge
Tennessee 37830
Tel 865.481.3000
Fax 865.482.5075

Subject:

Response to Comments on the Supplemental Groundwater
Investigation and Risk Assessment Report
Tennessee Street FMGP Site
Johnson City, Tennessee
TDSF Site No. 90-513

ENVIRONMENT

Dear Mr. Rice:

Date:
8 August 2003

In response to your comment letter dated June 30, 2003 concerning the previously submitted *Supplemental Groundwater Investigation and Risk Assessment Report*, ARCADIS, on behalf of Atmos Energy, has prepared the following responses. These responses address each comment and provide the requested information to assist the Tennessee Department of Environment and Conservation - Division of Superfund (TDEC-DSF) in completing their evaluation of the above-referenced report.

Contact:
Denise Miller
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Our Ref.:
TN0005070006

Comment 1: Page 4-16, Section 4.4.2.4, Relative Absorption Factors (RAF): The use of RAF in risk assessments is an emerging science. The Division of Superfund is not able to review new or novel toxicity determinations based solely upon journal articles. While the peer-reviewed journal article may be correct in its assessment of arsenic absorption, it is up to the EPA or ATSDR to come up with the means to incorporate this new information into risk assessments. At this time, the DSF has not been able to determine if using the RAF values from other non-related studies as default values is acceptable to EPA, Region 4. Numerous physical, chemical and biological processes influence contaminant bioavailability. A limited literature review of the use of RAF in risk assessments indicates that the Relative Absorption Factors have only been calculated after extensive, site-specific exposure studies were completed. Please recalculate arsenic-related risk using the standard techniques and toxicity values or provide an approval letter or other such documentation from EPA, Region 4 that states that the use of a default RAF for arsenic is approved.

Response: The RAF for arsenic that was incorporated in the risk assessment calculations will be removed and the affected tables will be revised. Text referring to the RAF will also be removed from the document. Affected text will be revised.

ARCADIS

Mr. Stuart Schulz
8 August 2003

Comment 2: **Page 4-26, Section 4.7, Risk Assessment Summary:** The text states that some potential future use exposure pathways pose an unacceptable risk to on-site and off-site industrial workers, but "all of these exposure scenarios are considered unlikely...". The DSF does not agree that all of the potential future use scenarios are unlikely. Since the site is located within a high-traffic area of Johnson City and the surrounding area is developing relatively rapidly, the DSF believes that the potential for a future owner to construct a building on the site is high. Therefore, some of the exposure pathways have a good possibility of being completed, especially the vapor migration to indoor air pathway for an on-site worker. The last sentence in the section should be revised to reflect this possibility, unless Atmos Energy intends to propose that institutional controls be implemented that provide for the site to be perpetually covered with an asphalt cap (or similar device) without the presence of an on-site structure for human use.

Response: The last sentence of Section 4.7 has been removed from the document.

In an effort to facilitate the approval of this document, we are providing for your review only the section and tables that are affected by these comments rather than reissuing the document in its entirety. The enclosed replacement pages should be inserted in the original document. The document, pending your approval, will then be considered as complete/final.

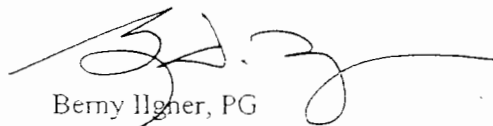
We believe the information provided above satisfies TDEC-DSF comments regarding the above-referenced report. Should you have questions or require further information, please call.

Sincerely,

ARCADIS G&M, Inc.



P. Denise Miller, PG
Project Scientist



Berny Ilgner, PG
Vice President

PDM/bf
Enclosures (22)

Copies:
Jim O'Brien, Baker & McKenzie
Brad Parman, TDSF, Nashville Central Office
David Randolph, TDSF, Nashville
Stuart Schulz, Atmos Energy Corporation
Doug Walther, Atmos Energy Corporation



Infrastructure, buildings, environment, communications

DIVISION OF SUPERFUND

2003 AUG 19 AM 9:17

Mr. Kevin Rice
Tennessee Department of Environment and Conservation
Johnson City Environmental Assistance Center
2305 Silverdale Road
Johnson City, Tennessee 37601-2161

Subject:

Response to Comments on the Supplemental Groundwater
Investigation and Risk Assessment Report
Tennessee Street FMGP Site
Johnson City, Tennessee
TDSF Site No. 90-513

Dear Mr. Rice:

In response to your comment letter dated June 30, 2003 concerning the previously submitted *Supplemental Groundwater Investigation and Risk Assessment Report*, ARCADIS, on behalf of Atmos Energy, has prepared the following responses. These responses address each comment and provide the requested information to assist the Tennessee Department of Environment and Conservation - Division of Superfund (TDEC-DSF) in completing their evaluation of the above-referenced report.

Comment 1: Page 4-16, Section 4.4.2.4, Relative Absorption Factors (RAF): The use of RAF in risk assessments is an emerging science. The Division of Superfund is not able to review new or novel toxicity determinations based solely upon journal articles. While the peer-reviewed journal article may be correct in its assessment of arsenic absorption, it is up to the EPA or ATSDR to come up with the means to incorporate this new information into risk assessments. At this time, the DSF has not been able to determine if using the RAF values from other non-related studies as default values is acceptable to EPA, Region 4. Numerous physical, chemical and biological processes influence contaminant bioavailability. A limited literature review of the use of RAF in risk assessments indicates that the Relative Absorption Factors have only been calculated after extensive, site-specific exposure studies were completed. Please recalculate arsenic-related risk using the standard techniques and toxicity values or provide an approval letter or other such documentation from EPA, Region 4 that states that the use of a default RAF for arsenic is approved.

Response: The RAF for arsenic that was incorporated in the risk assessment calculations will be removed and the affected tables will be revised. Text referring to the RAF will also be removed from the document. Affected text will be revised.

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ENVIRONMENT

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Our Ref.:
TN0005070006

Part of a bigger picture

ARCADIS

Mr. Stuart Schulz
8 August 2003

Comment 2: Page 4-26, Section 4.7, Risk Assessment Summary: The text states that some potential future use exposure pathways pose an unacceptable risk to on-site and off-site industrial workers, but "all of these exposure scenarios are considered unlikely...". The DSF does not agree that all of the potential future use scenarios are unlikely. Since the site is located within a high-traffic area of Johnson City and the surrounding area is developing relatively rapidly, the DSF believes that the potential for a future owner to construct a building on the site is high. Therefore, some of the exposure pathways have a good possibility of being completed, especially the vapor migration to indoor air pathway for an on-site worker. The last sentence in the section should be revised to reflect this possibility, unless Atmos Energy intends to propose that institutional controls be implemented that provide for the site to be perpetually covered with an asphalt cap (or similar device) without the presence of an on-site structure for human use.

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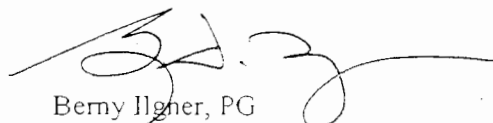
In an effort to facilitate the approval of this document, we are providing for your review only the section and tables that are affected by these comments rather than reissuing the document in its entirety. The enclosed replacement pages should be inserted in the original document. The document, pending your approval, will then be considered as complete/final.

We believe the information provided above satisfies TDEC-DSF comments regarding the above-referenced report. Should you have questions or require further information, please call.

Sincerely,

ARCADIS G&M, Inc.


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surface. Additionally, many inorganic constituents are not considered to be readily absorbed. Dermal exposure is not evaluated for those constituents without an ABS_d .

Toxicity values for dermal exposures have not yet been developed by USEPA. Therefore, the oral toxicity values and the oral absorption efficiency (ABS_o) were used to derive toxicity values adjusted to an absorbed dose for use in assessing dermal exposure (U.S. Environmental Protection Agency 1999):

$$RfD_a = RfD_o \times ABS_o$$

$$CSF_a = CSF_o / ABS_o$$

The adjusted toxicity values represent the theoretical toxicity of the orally absorbed dose of the constituent. Oral absorption efficiencies and adjusted values are shown in Tables 4-11 and 4-13.

It is to be noted that the USEPA recommends that the oral toxicity values for PAHs not be adjusted when evaluating dermal exposure to constituents detected in soil (U.S. Environmental Protection Agency 2001c). The recommendation assumes a 100-percent gastrointestinal (GI) absorption value ($ABS_{GI}=1$), indicating that these constituents are generally well absorbed (>50 percent) across the GI tract.

4.5 Risk Characterization

Risk characterization is the integration of the results of the data evaluation, exposure assessment, and toxicity assessment to yield a quantitative measure of cancer risk and non-cancer hazard. Risk characterization evaluates potential cancer risks and non-cancer hazards for all completed exposure pathways. The resulting estimates of cancer risk and non-cancer hazards reflect cumulative values associated with exposure to all COPCs at each exposure point. The results of the risk characterization are a list of constituents of concern (COCs) for each medium and exposure scenario that are determined to pose a risk or hazard within or above the target risk range (10^{-4} to 10^{-6}) or above the hazard threshold of 1.

Potential cancer risks are estimated as the incremental increased probability of an individual developing cancer over a lifetime as a result of pathway-specific exposure to carcinogenic chemicals (ELCR). To calculate the ELCR, the estimated daily intake of a chemical carcinogen averaged over a lifetime is multiplied by a constituent-specific slope factor. Consideration is given to exposure to multiple constituents, as well as multiple exposure pathways, when calculating the risk of an individual developing

cancer. This is accomplished by summing ELCRs for each constituent within a given pathway and across pathways within a scenario. When evaluating potential individual cancer risks, USEPA has established an acceptable risk range of 1 in 1,000,000 (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (U.S. Environmental Protection Agency 1990). In establishing this range, USEPA accepted the policy that a risk range, rather than a single risk value, adequately protects public health (U.S. Environmental Protection Agency 1990). The *de minimus* risk value of 1×10^{-6} ($1 \times 1,000,000$) is used as a “point of departure” for discussing predicted cancer risks. In this risk assessment, pathways of concern relative to carcinogenic risk are those with a total ELCR of greater than 1×10^{-6} . Within the pathways that have a total risk of greater than 10^{-6} , the carcinogenic COCs are defined as those constituents whose excess cancer risk is equal to or greater than 1×10^{-6} .

The potential for non-carcinogenic effects is evaluated by comparing the average exposure dose (intake) over a specified time period (exposure duration) with an RfD derived for similar exposure periods for each constituent. This ratio is called the hazard quotient (HQ). The HQs for each exposure route (ingestion, inhalation, dermal) for each COPC are summed to obtain a HI for the individual COPC. The HI for each COPC is then summed to obtain a total HI for the medium. The HIs for all pathway media and routes to which the receptor is exposed per scenario are summed. For this risk assessment, pathways of concern relative to non-carcinogenic risk are those that have a total HI >1. Within the pathways that have a HI >1, the non-carcinogenic COCs are defined as those whose HIs are >0.1.

Results of the cancer risk estimates can be compared to the target risk range of 10^{-6} to 10^{-4} or 1 in 1,000,000 to 1 in 10,000 (U.S. Environmental Protection Agency 1989). ELCRs below 10^{-6} are acceptable; ELCRs above 10^{-4} are unacceptable; and ELCRs within the range are subject to a risk management decision. An HI greater than 1 for a medium has been defined as the level of concern for potential, adverse, non-carcinogenic health effects (U.S. Environmental Protection Agency 1989).

The equations used in the risk calculations are shown in Tables 4-11 through 4-14 for soil and groundwater direct-contact exposure scenarios. The primary inputs to the risk calculations are the EPCs, exposure parameters, toxicity values, and dermal and oral absorption factors described in Sections 4.3 and 4.4. The calculation of volatilization and particulate emission factors for the evaluation of soil exposure are presented in Table 4-15. Indoor air concentrations due to vapor migration from soil and groundwater were calculated using the Johnson and Ettinger model described in USEPA (2000a) and calculated as shown in Tables 4-16 and 4-17. Air concentrations for the excavation worker were calculated using liquid- and gas-phase mass transfer coefficients to

determine volatilization rates from exposed groundwater (U.S. Environmental Protection Agency 1985) and a simple box model for mixing groundwater emissions with ambient air. Tables 4-18 through 4-21 present calculated parameters used in assessing the inhalation pathway for on-site unconsolidated-zone and bedrock-zone groundwater and surface and subsurface soil. The calculated parameters used in assessing the inhalation pathway for off-site bedrock-zone groundwater are presented in Table 4-22.

The following sections discuss the results of the risk calculations for each of the exposure pathways evaluated. Note that the ELCRs and HIs reported in the text are rounded to one significant figure.

4.5.1 Current Use (On Site and Off Site)

There are currently no complete exposure pathways for site COPCs (Figure 4-1 and Section 4.3.1.1). Consequently, current risks and hazards from exposure to constituents at the Site are acceptable.

4.5.2 Future Use (On Site)

4.5.2.1 Unconsolidated-Zone Groundwater

Potential future risks from unconsolidated-zone groundwater were evaluated for industrial workers exposed to COPCs migrating through the unsaturated zone and into indoor air and excavation workers exposed to unconsolidated-zone groundwater during excavation/site development activities.

Industrial Worker – The total ELCR for industrial worker exposure to indoor air is 2×10^{-6} (Table 4-29), at the low end of USEPA's target risk range of 10^{-6} to 10^{-4} and attributable solely to benzene. The total HI is 0.9, below the target level, of which benzene and naphthalene are the primary contributors.

Excavation Worker – The total ELCR for excavation worker exposure to unconsolidated-zone groundwater is 1×10^{-7} (Table 4-30), which is below the target risk range. Benzene is the primary contributor to the total ELCR. The total HI is 0.7, which is below the target level and attributable mainly to naphthalene.

4.5.2.2 Bedrock-Zone Groundwater

Potential future risks from exposure to COPCs detected in bedrock-zone groundwater were evaluated for industrial workers exposed either via inhalation of COPCs transported to indoor air and/or via direct contact (ingestion and dermal).

Industrial Worker – The total ELCR for industrial worker exposure to indoor air is 1×10^{-7} (Table 4-31), which is below USEPA's target risk range of 10^{-6} to 10^{-4} and is attributable solely to benzene. The total HI is 0.02, below the target level, of which benzene and naphthalene are the primary contributors.

The total ELCR for industrial worker exposure to COPCs in bedrock-zone groundwater via ingestion and dermal contact is 6×10^{-4} (Table 4-32), above the USEPA's target risk range of 10^{-6} to 10^{-4} . The carcinogenic COCs (Section 4.5) identified for this receptor and these pathways are benzene, benzo(a)anthracene, benzo(k)fluoranthene, and benzo(a)pyrene. It is highly unlikely that this sort of exposure would occur, given the availability of a public water supply.

The total HI is 17, above the target level (Table 4-32). Thus, the following constituents were identified as COCs for this receptor and these pathways: benzene, naphthalene, arsenic, iron, and manganese.

4.5.2.3 Surface Soil

Potential future risks from surface soil were evaluated for industrial workers exposed to COPCs transported to indoor air and for industrial workers, excavation workers, and trespassers directly exposed to COPCs in soil.

Industrial Worker – The total ELCR for industrial worker exposure to COPCs migrating to indoor air from surface soil is 2×10^{-8} (Table 4-33), which is below the USEPA's acceptable risk range of 10^{-6} to 10^{-4} . The total HI is 0.5, below the target level of 1. With the exception of naphthalene, PAHs are generally not volatile at typical soil temperatures and do not present inhalation risks from soil when considering the vapor migration pathways (U.S. Environmental Protection Agency 1996).

The total ELCR for direct exposure of industrial workers to surface soil is 1×10^{-4} (Table 4-34), which is equal to the high end of the USEPA's acceptable target risk range. The COCs identified for this receptor are benzo(a)anthracene,

benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and arsenic. The total HI for this receptor is 0.1, below the target level of 1.

Excavation Worker – The total ELCR for excavation worker exposure to surface soil is 2×10^{-6} (Table 4-35), which is at the low end of the target risk range. Benzo(a)pyrene contributes 75 percent of the ELCR and is the only carcinogenic COC identified for this receptor and this pathway. The total HI is 0.06, which is below the target level.

Trespassers – The total ELCR for direct exposure of trespassers to surface soil is 1×10^{-5} (Table 4-36), which is within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} . The carcinogenic COCs identified for this receptor and these pathways are benzo(a)pyrene and arsenic. The total HI is 0.05, which is below the target level of 1.

4.5.2.4 Subsurface Soil

Potential future risks from subsurface soil were evaluated for industrial workers exposed to COPCs transported via vapor migration to indoor air and for excavation workers directly exposed to COPCs in soil.

Industrial Worker – The total ELCR for industrial worker exposure to COPCs migrating to indoor air from subsurface soil is 1×10^{-5} (Table 4-37), which is within the USEPA's target risk range of 10^{-6} to 10^{-4} . Benzene is the sole contributor to the ELCR and the only carcinogenic COC identified for this receptor and this pathway.

The total HI is 9, above the target level of 1. The non-carcinogenic COCs identified for this receptor and this pathway are benzene and naphthalene. With the exception of naphthalene, PAHs are generally not volatile at typical soil temperatures and do not present inhalation risks from soil when considering the vapor migration pathways (U.S. Environmental Protection Agency 1996).

Excavation Worker – The total ELCR for excavation worker exposure to subsurface soil is 1×10^{-6} (Table 4-38), at the low end of the target risk range. Benzo(a)pyrene contributes 70 percent of the ELCR and is the only carcinogenic constituent identified as a COC. The total HI is 0.1, below the target level of 1.

4.5.2.5 Surface Water

Evaluation of potential, future risks to human and ecological receptors from groundwater discharge to Brush Creek were evaluated by the mass-flux calculation

method used to assess current risk in the Phase II RI Report (ARCADIS Geraghty & Miller, Inc. 2000). The calculations estimate constituent mass flux into Brush Creek from unconsolidated-zone groundwater and the concentrations in the creek after mixing with groundwater discharge. Information used to complete these calculations is based on hydrogeological data from ARCADIS (2000 and 2001a), the November 2002 event, and the EPCs used in the risk assessment (Table 4-1). All input data and calculations are shown in Table 4-39. Examination of water table and concentration contours presented in this report indicates that most of the discharge of constituents to the creek can be expected to take place approximately between MW-5 and MW-6 (Figures 3-5 through 3-8). The distance over which discharge occurs and the average saturated thickness shown in Table 4-40 are based on this observation.

Calculations were performed for those unconsolidated-zone groundwater COPCs that were the primary contributors to human health risk [benzene, naphthalene, and benzo(a)pyrene] and a representative inorganic constituent (arsenic). These constituents also provide a representative suite for evaluating possible ecological risk. The calculations assume that maximum detected concentrations of COPCs discharge to the creek and that no attenuation processes (e.g., volatilization, adsorption, dispersion) occur either in groundwater or in the creek. These are highly conservative assumptions, and the potential creek concentrations calculated should be considered worst-case results.

Predicted creek concentrations were compared to screening values for human and ecological receptors (Table 4-41). The screening values for human health were Tennessee surface-water WQC for ingestion of water and organisms (Tennessee Department of Environment and Conservation 1999) and USEPA Region 9 PRGs when a WQC was not available. Comparison to these very conservative criteria indicates that predicted worst-case concentrations of the constituents in Brush Creek are about an order of magnitude below levels of concern for human receptors.

Tennessee fresh water WQC and USEPA Region 4 fresh water screening values for aquatic organisms were used for the ecological screening values. Predicted concentrations in Brush Creek are nearly two or more orders of magnitude below these criteria (Table 4-41), indicating that risk to ecological receptors is not a concern for Brush Creek.

4.5.3 Future Use (Off Site)

The results discussed previously for soil and surface water indicate that it is unlikely that these media would present unacceptable risk off site in the future. For soil,

transport of particulates is the only pathway that could lead to off-site exposure to soil. Calculations indicate that risk due to inhalation of particulates is negligible even on site. The calculations of predicted worst-case concentrations in Brush Creek indicate that future risks in the creek should be acceptable both on and off site.

Risk from exposure to constituents known to have migrated off site was evaluated for bedrock-zone groundwater. Migration of vapors from groundwater through the unsaturated zone and into buildings above the plume were evaluated quantitatively in the risk assessment. Potential future risks from exposure to COPCs detected in bedrock-zone groundwater were evaluated for industrial workers exposed via direct contact (ingestion and dermal) and via inhalation of COPCs transported to indoor air.

Industrial Worker – The total ELCR for industrial worker exposure to indoor air is 2×10^{-7} (Table 4-42), below USEPA's target risk range of 10^{-6} to 10^{-4} . The total HI is 0.06, which is below the target level.

The total ELCR for industrial worker exposure to COPCs in bedrock-zone groundwater via ingestion and dermal contact is 1×10^{-4} (Table 4-43), at the high end of the USEPA's target risk range of 10^{-6} to 10^{-4} and is attributable to benzene and arsenic. The total HI is 3, above the target level, of which benzene, naphthalene, arsenic, and manganese are the primary contributors. The non-carcinogenic COCs identified for this pathway are benzene, naphthalene, arsenic, and manganese.

4.6 Uncertainty Analysis

There are uncertainties associated with any risk assessment. These could include:

- sampling data adequacy;
- selection of COPCs;
- exposure scenarios and assessment variables; and
- toxicity values.

Because of these uncertainties, conservatism is built into the process to ensure risks are not underestimated. The methodologies used and assumptions made at each step in the risk assessment were conservative. This results in a conservative estimation of potential risk and may overestimate the risk predictions presented herein. The risk assessment methods and procedures employed herein are consistent with existing regulatory

guidance and accepted scientific methods. Each of these uncertainty categories is discussed in the following sections.

4.6.1 Data

Limitations in data relative to locations and substances sampled and to analytical considerations (*e.g.*, laboratory procedures) may affect the constituents identified for a site. The uncertainty associated with the site sampling data is considered relatively low because the data set provides adequate spatial coverage and the data were collected, analyzed, and validated using standard, recognized procedures established by USEPA (ARCADIS Geraghty & Miller, Inc. 1999).

4.6.2 Constituents of Potential Concern

Uncertainty is inherent in the selection of COPCs for the risk assessment. Eliminating constituents in the COPC screening process can lead to lower estimates of potential health effects than inclusion of all analytes. The screening concentrations used for the human health screening were accepted standards and very conservative values. Because of the conservative way in which screening was done, the probability of overlooking a significant constituent is considered minimal.

4.6.3 Exposure Assessment

Factors that can contribute to uncertainty in the exposure assessment include choice of receptors and exposure pathways, derivation of EPCs, and assumptions for exposure parameters. Receptors were chosen based on current and anticipated future land use for the Site and its vicinity. Exposure pathways considered accounted for all land and water uses near the Site.

The major uncertainty related to groundwater EPCs is the assumption of maximum concentrations in the calculations. Doing so clearly overestimates risk to potential future receptors. The maximum concentrations are only representative of the most seriously impacted areas. An additional uncertainty that applies to this site is that an interim action has recently been completed, and November 2002 data show evidence of reducing groundwater concentrations. Consequently, risks for groundwater calculated based on current concentrations are likely to overestimate actual risks subsequent to the interim action. Use of 95% UCLs as EPCs for soil may overestimate or underestimate concentrations at any given location on the Site.

Values assumed for exposure parameters (e.g., body weight and exposure frequency) used in calculations for intakes were based primarily on USEPA and Region 4 guidance or derived from data in USEPA (1997a). These assumed values might result in underestimating or overestimating the intakes calculated for specific receptors, depending on the accuracy of the assumptions relative to actual site conditions and uses. Some parameters were based on professional judgment about reasonable activities for specific receptors.

4.6.4 Toxicity Assessment

Uncertainty is also inherent in the toxicity values used in characterizing the carcinogenic and non-carcinogenic risks. Such uncertainty is chemical-specific and is incorporated into the toxicity value during its development. For example, an uncertainty factor may be applied for interspecies variability, for extrapolation from sub-chronic to chronic duration of exposure, or for epidemiological data limitations.

Additional uncertainty is introduced when some COPCs do not have valid toxicity factors for use in quantitative estimates. The only COPC for which toxicity data could not be obtained or derived or some appropriate regulatory or other screening value assigned is p-isopropyltoluene. Exclusion of this compound from the quantitative risk assessment is unlikely to significantly affect total site risks (since these are clearly driven by other COPCs) and will not affect risk management decisions for the Site.

Toxicity values specific to the dermal absorption route are not available and, as discussed previously, dermal absorption is evaluated using oral toxicity values that have been adjusted for oral absorption. The use of these adjusted values is a source of uncertainty in the risk assessment and generally leads to overestimation of risk via the dermal route.

The RfDs and CSFs used in this human health risk assessment typically are based on controlled laboratory experiments in which animal test species are exposed in some manner to the constituent under study. For example, oral toxicity estimates are typically based on studies in which a soluble salt of the metal was dissolved in water or mixed in food and ingested by an animal or human. A given dose of a metal in soil may be absorbed less completely (or in some cases, more completely) than the same dose of the metal administered in the toxicity studies used to derive the associated toxicity factors. In other words, a metal in soil may be present in an insoluble or particulate form that might not be as readily available (also referred to as bioavailable) for absorption when ingested. Without using a measure of relative bioavailability or a

relative absorption factor (RAF) for metals in soil, the risk assessment may over estimate potential exposures for this medium.

4.7 Risk Assessment Summary

There are currently no complete exposure pathways for the Site. The Site is inactive, so there are no workers on site on a regular basis. Site visitors or trespassers would not come into contact with COPCs in soil because remaining impacted areas are paved. For the same reason, off-site receptors would not be exposed to airborne particulates. There are currently no construction activities that would lead to exposure of excavation workers to soil or groundwater. There are no identified water-supply wells at or near the Site. Previous analyses performed during the Phase II RI and updated in this report indicate that there are no COPCs in Brush Creek.

The risk assessment indicates that the potential ELCR to a future on-site industrial worker from exposure to bedrock-zone groundwater and surface soil via incidental ingestion and dermal contact (Table 4-44) is above or equal to the high end of the target risk range, respectively. The non-carcinogenic HI resulting from exposure to bedrock-zone groundwater via incidental ingestion and dermal contact is greater than 1. Additionally, the potential non-carcinogenic hazard to an on-site industrial worker from exposure to subsurface soil via migration of vapors to indoor air is greater than 1.

The evaluation of these pathways assumes that the industrial/commercial development of the Site includes removal of the existing asphalt cover, installation of a process bedrock-zone groundwater well, and construction of a building. Although the installation of a bedrock-zone groundwater well is considered an unlikely scenario, based on the existing City ordinance restricting the installation of such wells and the availability of another water supply, exposure to bedrock groundwater was evaluated quantitatively to support the selection of potential remedies for the Site. The calculated risk/hazard for potential future on-site excavation workers and trespassers is acceptable for all pathways evaluated (Table 4-44).

The risk assessment quantitatively evaluated the potential future risk/hazard to an off-site industrial worker from exposure to bedrock-zone groundwater. The risk assessment conservatively assumes that the off-site undeveloped parcel of land located near MW-10/MW-10D would be developed for industrial/commercial use. The exposure parameters and characteristics for this receptor were identical to the on-site industrial worker. Incidental ingestion, dermal contact, and inhalation of vapors migrating from bedrock-zone groundwater were evaluated. The calculated ECLR for this receptor via

incidental ingestion and dermal contact with bedrock-zone groundwater was equal to the high end of the target risk range, and the non-carcinogenic HI was greater than 1 (Table 4-44). The installation of a bedrock-zone groundwater well is considered an unlikely scenario, as explained previously. The potential risk resulting from exposure to vapors migrating from bedrock-zone groundwater to indoor air was below the carcinogenic target risk range and the non-carcinogenic threshold of 1.

In conclusion, there are no current complete exposure pathways for the Site. Potential future risks/hazards include the following:

- incidental ingestion and/or dermal contact with on-site bedrock-zone groundwater;
- incidental ingestion and/or dermal contact with on-site surface soil;
- inhalation of vapors migrating from on-site subsurface soil to indoor air; and
- incidental ingestion and/or dermal contact with off-site bedrock-zone groundwater.

Table 4-12. Risk Equations for Industrial Worker and Excavation Worker Exposure to Soil
 Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

ROUTE-SPECIFIC RISKS:

Oral:
$$\text{ELCR}_o \text{ or } \text{HQ}_o = \frac{\text{EPCs} \times \text{FI} \times \text{IRs} \times \text{EF} \times \text{ED}}{(10^6 \text{ mg/kg}) \times \text{BW} \times (\text{AT}_c \text{ or } \text{AT}_{\text{NC}}) \times ([1/\text{CSF}_o] \text{ or } \text{RfD}_o)}$$

Dermal:
$$\text{ELCR}_d \text{ or } \text{HQ}_d = \frac{\text{DAevent} \times \text{SSA} \times \text{EV} \times \text{EF} \times \text{ED}}{\text{BW} \times (\text{AT}_c \text{ or } \text{AT}_{\text{NC}}) \times ([1/\text{CSF}_d] \text{ or } \text{RfD}_d)}$$

$$\text{DAevent} = \text{EPCs} \times (10^{-6} \text{ kg/mg}) \times \text{SAR} \times \text{ABSd}$$

Inhalation: See Table 4-17

TOTAL CANCER RISK:
$$\text{ELCR} = \text{ELCR}_o + \text{ELCR}_d + \text{ELCR}_i$$

TOTAL NONCANCER RISK:
$$\text{HI} = \text{HQ}_o + \text{HQ}_d + \text{HQ}_i$$

Variable Definitions:

θ_{as}	Air-filled porosity of the soil (unitless).
θ_t	Total soil porosity (unitless).
θ_{ws}	Water-filled porosity of the soil (unitless).
ρ_b	Dry soil bulk density (g/cm ³).
ABSd	Dermal absorption efficiency (unitless) (Table 4-27).
AT_c	Averaging time for cancer effects (days) (Table 4-10).
AT_{NC}	Averaging time for noncancer effects (days) (Table 4-10).
BRs	Breathing rate for soil exposure (m ³ /day) (Table 4-10).
BW	Body weight (kg) (Table 4-10).
CSF	Cancer slope factor for oral (CSF _o), dermal (adjusted to an absorbed dose, CSF _d), or inhalation (CSF _i) exposure (kg-day/mg [inverse mg/kg/day]) (Tables 4-25 and 4-26).
D_a	Apparent diffusivity in soil (cm ² /sec).
D_{air}	Constituent diffusivity in air (cm ² /sec) (Table 4-9).
D_{wat}	Constituent diffusivity in water (cm ² /sec) (Table 4-9).
ED	Exposure duration (years) (Table 4-10).
EF	Exposure frequency (days/year) (Table 4-10).
ELCR	Excess lifetime cancer risk (unitless).
EPCs	Exposure point concentration in soil (mg/kg) (Table 4-8).
FI	Fraction ingested from area of concern (unitless) (Table 4-10).
Foc	Fraction organic carbon in the soil (unitless).
Fx	Function of U_t/U_m (unitless); $Fx = 0.18 \times (8x^2 + 12x) \times \exp[-(x^2)]$, where $x = 0.886 \times (U_t/U_m)$.
H	Henry's Law Constant (atm-m ³ /mol) (Table 4-9).
HI	Hazard index for noncancer risk (unitless); sum of the HQs.
H_o	Dimensionless Henry's Law constant (unitless); calculated as $H_o = H / RT$.
HQ	Hazard quotient for noncancer risk (unitless).
IRs	Ingestion rate of soil (mg/day) (Table 4-10).
K _{oc}	Organic carbon partition coefficient (cm ³ /g = mL/g = L/kg) (Table 4-9).
PEF	Particulate emission factor (m ³ /kg).
Q/C	Emission flux per unit concentration [(g/m ² /sec)/(kg/m ³)].

Table 4-12. Risk Equations for Industrial Worker and Excavation Worker Exposure to Soil
Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

RfD	Reference dose for oral (RfD _o), dermal (adjusted to an absorbed dose, RfD _a), or inhalation (RfD _i) exposure (mg/kg/day) (Tables 4-23 and 4-24).
RPF	Respirable particle fraction (0.036 g/m ³ /hr).
RT	Product of the universal gas constant ($R = 8.206 \times 10^{-5}$ atm-m ³ /mol/K) and the relevant Kelvin temperature ($T = 298.15$ K); $RT = 0.02447$ atm-m ³ /mol.
SAR	Soil-to-skin adherence rate (mg/cm ² /day) (Table 4-10).
SSAs	Exposed skin surface area for soil contact (cm ²) (Table 4-10).
t	Exposure interval (sec).
Um	Mean annual wind speed (m/sec).
Ut	Equivalent threshold value of windspeed at 7 meters (11.32 m/sec).
V	Fraction of vegetative cover (unitless).
VF	Volatilization factor (m ³ /kg).
x	Intermediate value in the calculation of PEF; $x = 0.886 \times (Ut/Um)$.

atm-m³/mol - Atmosphere times cubic meter per mole

cm/hour - Centimeter per hour

cm² - Square centimeter

cm²/sec - Square centimeter per second

cm³/g - Cubic centimeter per gram

cm³/L - Cubic centimeter per liter

g/cm³ - Gram per cubic centimeter

g/m²/sec - Gram per square meter per second

g/m²/hr - Gram per square meter per hour

g/mol - Gram per mole

K - Kelvin

kg - kilogram

kg-day/mg - Inverse of milligram per kilogram per day

kg/m³ - Kilogram per cubic meter

L/day - Liter per day

L/kg - Liter per kilogram

L/m³ - Liter per cubic meter

m - Meter

m² - Square meter

m³/day - Cubic meter per day

m³/kg - Cubic meter per kilogram

mg/cm²/day - Milligram per square centimeter per day

mg/day - Milligram per day

m/sec - Meter per second

mg/kg - Milligram per kilogram

mg/kg/day - Milligram per kilogram per day

mL/g - Milliliter per gram

MW - Molecular weight

sec - Second

Table 4-14. Risk Equations for Excavation Worker and Trespasser Exposure to Soil
 Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

ROUTE-SPECIFIC RISKS:

Oral:

$$\text{ELCR}_o \text{ or } \text{HQ}_o = \frac{\text{EPCs} \times \text{FI} \times \text{IRs} \times \text{EF} \times \text{ED}}{(10^6 \text{ mg/kg}) \times \text{BW} \times (\text{AT}_c \text{ or } \text{AT}_{\text{NC}}) \times ([1/\text{CSF}_o] \text{ or } \text{RfD}_o)}$$

Dermal:

$$\text{ELCR}_d \text{ or } \text{HQ}_d = \frac{\text{DAevent} \times \text{SSA} \times \text{EV} \times \text{EF} \times \text{ED}}{\text{BW} \times (\text{AT}_c \text{ or } \text{AT}_{\text{NC}}) \times ([1/\text{CSF}_d] \text{ or } \text{RfD}_d)}$$

$$\text{DAevent} = \text{EPCs} \times (10^{-6} \text{ kg/mg}) \times \text{SAR} \times \text{ABSd}$$

Inhalation:

$$\text{ELCR}_i \text{ or } \text{HQ}_i = \frac{\text{EPCs} \times \text{BRs} \times \text{EF} \times \text{ED}}{\text{Min}(\text{VF}, \text{PEF}) \times \text{BW} \times (\text{AT}_c \text{ or } \text{AT}_{\text{NC}}) \times ([1/\text{CSF}_i] \text{ or } \text{RfD}_i)}$$

$$\text{VF} = \frac{\text{Q/C} \times [3.14 \times D_A \times t]^{1/2}}{2 \times \rho_b \times D_A \times (10,000 \text{ cm}^2/\text{m}^2)}$$

$$\text{PEF} = \frac{\text{Q/C} \times (3,600 \text{ sec/hr})}{\text{RPF} \times (1-\text{V}) \times (\text{Um/U}t)^3 \times \text{Fx}}$$

$$D_A = \frac{[(\theta_{as}^{10/3} \times D_{air} \times H_o) + (\theta_{ws}^{10/3} \times D_{wat})] / \theta_t^2}{(\rho_b \times \text{Koc} \times \text{Foc}) + \theta_{ws} + (\theta_{as} \times H_o)}$$

TOTAL CANCER RISK: $\text{ELCR} = \text{ELCR}_o + \text{ELCR}_d + \text{ELCR}_i$

TOTAL NONCANCER RISK: $\text{HI} = \text{HQ}_o + \text{HQ}_d + \text{HQ}_i$

Variable Definitions:

θ_{as}	Air-filled porosity of the soil (unitless).
θ_t	Total soil porosity (unitless).
θ_{ws}	Water-filled porosity of the soil (unitless).
ρ_b	Dry soil bulk density (g/cm ³).
ABSd	Dermal absorption efficiency (unitless) (Table 4-27).
AT_c	Averaging time for cancer effects (days) (Table 4-10).
AT_{NC}	Averaging time for noncancer effects (days) (Table 4-10).
BRs	Breathing rate for soil exposure (m ³ /day) (Table 4-10).
BW	Body weight (kg) (Table 4-10).
CSF	Cancer slope factor for oral (CSF _o), dermal (adjusted to an absorbed dose, CSF _d), or inhalation (CSF _i) exposure (kg-day/mg {inverse mg/kg/day}) (Tables 4-25 and 4-26).
D_A	Apparent diffusivity in soil (cm ² /sec).
D_{air}	Constituent diffusivity in air (cm ² /sec) (Table 4-9).
D_{wat}	Constituent diffusivity in water (cm ² /sec) (Table 4-9).
ED	Exposure duration (years) (Table 4-10).
EF	Exposure frequency (days/year) (Table 4-10).
ELCR	Excess lifetime cancer risk (unitless).
EPCs	Exposure point concentration in soil (mg/kg) (Table 4-8).
EV	Event frequency (events/day) (Table 4-10).
FI	Fraction ingested from area of concern (unitless) (Table 4-10).

Table 4-14. Risk Equations for Excavation Worker and Trespasser Exposure to Soil
Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

F _{oc}	Fraction organic carbon in the soil (unitless).
F _x	Function of U _t /U _m (unitless); $F_x = 0.18 \times (8x^3 + 12x) \times \exp[-(x^2)]$, where $x = 0.886 \times (U_t/U_m)$.
H	Henry's Law Constant (atm-m ³ /mol) (Table 4-9).
H _i	Hazard index for noncancer risk (unitless); sum of the HQs.
H _o	Dimensionless Henry's Law constant (unitless); calculated as $H_o = H / RT$.
HQ	Hazard quotient for noncancer risk (unitless).
IR _s	Ingestion rate of soil (mg/day) (Table 4-10).
K _{oc}	Organic carbon partition coefficient (cm ³ /g = mL/g = L/kg) (Table 4-9).
PEF	Particulate emission factor (m ³ /kg).
Q/C	Emission flux per unit concentration [(g/m ² /sec)/(kg/m ³)].
RfD	Reference dose for oral (RfD _o), dermal (adjusted to an absorbed dose, RfD _d), or inhalation (RfD _i) exposure (mg/kg/day) (Tables 4-23 and 4-24).
RPF	Respirable particle fraction (0.036 g/m ³ /hr).
RT	Product of the universal gas constant ($R = 8.206 \times 10^{-5}$ atm-m ³ /mol/K) and the relevant Kelvin temperature ($T = 298.15$ K); $RT = 0.02447$ atm-m ³ /mol.
SAR	Soil-to-skin adherence rate (mg/cm ² /event) (Table 4-10).
SSAs	Exposed skin surface area for soil contact (cm ²) (Table 4-10).
t	Exposure interval (sec).
U _m	Mean annual wind speed (m/sec).
U _t	Equivalent threshold value of windspeed at 7 meters (11.32 m/sec).
V	Fraction of vegetative cover (unitless).
VF	Volatilization factor (m ³ /kg).
x	Intermediate value in the calculation of PEF; $x = 0.886 \times (U_t/U_m)$.

atm-m³/mol - Atmosphere times cubic meter per mole

cm/hour - Centimeter per hour

cm² - Square centimeter

cm²/sec - Square centimeter per second

cm³/g - Cubic centimeter per gram

cm³/L - Cubic centimeter per liter

g/cm³ - Gram per cubic centimeter

g/m²/sec - Gram per square meter per second

g/m²/hr - Gram per square meter per hour

g/mol - Gram per mole

K - Kelvin

kg - kilogram

kg-day/mg - Inverse of milligram per kilogram per day

kg/m³ - Kilogram per cubic meter

L/day - Liter per day

L/kg - Liter per kilogram

L/m³ - Liter per cubic meter

m - Meter

m² - Square meter

m³/day - Cubic meter per day

m³/kg - Cubic meter per kilogram

mg/cm²/day - Milligram per square centimeter per day

mg/day - Milligram per day

m/sec - Meter per second

mg/kg - Milligram per kilogram

mg/kg/day - Milligram per kilogram per day

mL/g - Milliliter per gram

MW - Molecular weight

sec - Second

Table 4-34. Risk Calculations for an On-Site Industrial Worker Exposure to Surface Soil
Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

Johnson City, Tennessee												
Tennessee Street Paving												
Constituent	EPC ₃ (mg/kg)	VF or PEF [a] (m³/kg) (Table 4-15)	CANCER RISK					NON-CANCER RISK				Percent Total HI
			Route-Specific Risks			Calculated Risk ELCR	Route-Specific Risks			Calculated Risk HI		
			Oral ELCR	Dermal ELCR	Inhalation ELCR		Oral HQ	Dermal HQ	Inhalation HQ			
										Total ELCR	Percent	
Polycyclic Aromatic Hydrocarbons												
Benzo(a)anthracene	18	8.78E+06	V	2.3E-06	3.9E-06	4.4E-08	6.3E-06	2.9E-05	5.0E-05	NA	8.0E-05	0%
Benzo(b)fluoranthene	20	1.38E+07	V	2.6E-06	4.4E-06	1.7E-08	6.9E-06	2.4E-04	4.2E-04	NA	6.6E-04	0%
Benzo(k)fluoranthene	27	2.00E+07	V	3.4E-07	5.9E-07	6.5E-10	9.4E-07	3.3E-04	5.7E-04	NA	9.0E-04	1%
Benzo(a)pyrene	28	1.42E+07	V	3.6E-05	6.1E-05	1.5E-07	9.7E-05	4.6E-04	7.8E-04	NA	1.2E-03	1%
Dibenz(a,h)anthracene	0.38	3.63E+07	V	4.8E-07	8.3E-07	2.3E-09	1.3E-06	6.2E-07	1.1E-06	NA	1.7E-06	0%
Indeno(1,2,3-cd)pyrene	11	3.30E+07	V	1.4E-06	2.4E-06	3.0E-10	3.8E-06	1.8E-04	3.1E-04	NA	4.9E-04	0%
Naphthalene	30	2.16E+05	V	NA	NA	NA	NA	7.3E-04	1.3E-03	3.2E-02	3.4E-02	25%
Metals												
Arsenic	41	2.44E+11	P	1.1E-05	4.3E-06	1.8E-10	1.5E-05	6.7E-02	2.6E-02	NA	9.3E-02	70%
Manganese	300	2.44E+11	P	NC	NC	NC	NC	3.2E-03	0.0E+00	1.7E-05	3.2E-03	2%
Total ELCR						1E-04		Total HI		0.1		100%

[a] Minimum of the volatilization factor (identified with "V") and the particulate emission factor (PEF) (identified with "P"), both derived on Table 4-15.

* EPC₃ exceeds the soil saturation limit (C_{sat}) (Table 4-15); therefore, volatilization is based on the C_{sat} concentration instead of EPC₃.

-- Not applicable.

C_{sat} - Soil saturation limit.

ELCR - Excess lifetime cancer risk.

EPC₃ - Exposure point concentration in soil (mg/kg).

HI - Hazard index (sum of the HQs).

HQ - Hazard quotient.

m³/kg - Cubic meters per kilogram.

mg/kg - Milligrams per kilogram.

NA - Not available.

NC - Not evaluated as a carcinogen.

PEF - Particulate emission factor.

VF - Volatilization factor.

Table 4-35. Risk Calculations for an On-Site Excavation Worker Exposure to Surface Soil

Atmos Energy Corporation		Tennessee Street FMGP		Johnson City, Tennessee									
Constituent	EPC _s (mg/kg)	VF or PEF [a] (m³/kg) (Table 4-15)	CANCER RISK					NON-CANCER RISK					Percent Total HI
			Route-Specific Risks			Calculated Risk ELCR	Percent Total ELCR	Route-Specific Risks			Calculated Risk HI		
			Oral ELCR	Dermal ELCR	Inhalation ELCR			Oral HQ	Dermal HQ	Inhalation HQ			
Polycyclic Aromatic Hydrocarbons													
Benzo(a)anthracene	18	8.78E+06	V	7.3E-08	1.9E-08	2.1E-10	9.2E-08	2.3E-05	6.0E-06	NA	2.9E-05	0%	
Benzo(b)fluoranthene	20	1.38E+07	V	8.1E-08	2.1E-08	8.3E-11	1.0E-07	1.9E-04	5.0E-05	NA	2.4E-04	0%	
Benzo(k)fluoranthene	27	2.00E+07	V	1.1E-08	2.8E-09	3.1E-12	1.4E-08	2.6E-04	6.8E-05	NA	3.3E-04	1%	
Benzo(a)pyrene	28	1.42E+07	V	1.1E-06	2.9E-07	7.3E-10	1.4E-06	3.6E-04	9.4E-05	NA	4.6E-04	1%	
Dibenz(a,h)anthracene	0.38	3.63E+07	V	1.5E-08	4.0E-09	1.1E-11	1.9E-08	4.9E-07	1.3E-07	NA	6.2E-07	0%	
Indeno(1,2,3-cd)pyrene	11	3.30E+07	V	4.4E-08	1.2E-08	1.4E-12	5.6E-08	1.4E-04	3.7E-05	NA	1.8E-04	0%	
Naphthalene	30	2.16E+05	V	NA	NA	NA	NA	5.8E-04	1.5E-04	3.8E-03	4.5E-03	7%	
Metals													
Arsenic	41	2.44E+11	P	3.4E-07	2.0E-08	8.5E-13	3.6E-07	5.3E-02	3.2E-03	NA	5.6E-02	87%	
Manganese	300	2.44E+11	P	NC	NC	NC	NC	2.5E-03	0.0E+00	2.1E-06	2.5E-03	4%	
Total ELCR							2E-06	Total HI			0.06	100%	

[a] Minimum of the volatilization factor (identified with "V") and the particulate emission factor (PEF) (identified with "P"), both derived on Table 4-15.

* EPC_s exceeds the soil saturation limit (C_{sat}) (Table 4-15); therefore, volatilization is based on the C_{sat} concentration instead of EPC_s.

- - Not applicable

ELCR - Excess lifetime cancer risk.

EPC_s - Exposure point concentration in soil (mg/kg).

HI - Hazard index (sum of the HQs).

HQ - Hazard quotient.

mg/kg - Milligrams per kilogram.

NA - Not available.

NC - Not evaluated as a carcinogen.

PEF - Particulate emission factor.

VF - Volatilization factor.

Table 4-36. Risk Calculations for an On-Site Trespasser Exposure to Surface Soil
Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

Constituent	EPC _s (mg/kg)	VF or PEF [a] (m³/kg) (Table 4-15)	CANCER RISK				NON-CANCER RISK						
			Route-Specific Risks			Calculated Percent ELCR	Route-Specific Risks			Calculated Risk HI			
			Oral ELCR	Dermal ELCR	Inhalation ELCR		Oral HQ	Dermal HQ	Inhalation HQ				
Polycyclic Aromatic Hydrocarbons													
Benzo(a)anthracene	18	8.78E+06	V	5.9E-07	4.3E-08	1.9E-09	6.4E-07	1.9E-05	1.4E-06	NA	2.0E-05	0%	
Benzo(b)fluoranthene	20	1.38E+07	V	6.6E-07	4.8E-08	7.3E-10	*	7.1E-07	1.6E-04	1.2E-05	NA	1.7E-04	0%
Benzo(k)fluoranthene	27	2.00E+07	V	8.9E-08	6.5E-09	2.7E-11	*	9.6E-08	2.1E-04	1.6E-05	NA	2.3E-04	0%
Benzo(a)pyrene	28	1.42E+07	V	9.2E-06	6.7E-07	6.4E-09	*	9.9E-06	3.0E-04	2.2E-05	NA	3.2E-04	1%
Dibenz(a,h)anthracene	0.38	3.63E+07	V	1.3E-07	9.1E-09	9.5E-11	*	1.3E-07	4.0E-07	2.9E-08	NA	4.3E-07	0%
Indeno(1,2,3-cd)pyrene	11	3.30E+07	V	3.6E-07	2.6E-08	1.3E-11	*	3.9E-07	1.2E-04	8.5E-06	NA	1.2E-04	0%
Naphthalene	30	2.16E+05	V	NA	NA	NA		NA	4.7E-04	3.5E-05	3.3E-03	3.8E-03	8%
Metals													
Arsenic	41	2.44E+11	P	2.8E-06	4.7E-08	7.4E-12		2.8E-06	4.3E-02	7.3E-04	NA	4.4E-02	87%
Manganese	300	2.44E+11	P	NC	NC	NC		NC	2.1E-03	0.0E+00	1.8E-06	2.1E-03	4%
			Total ELCR			1E-05		Total HI			0.05		100%

[a] Minimum of the volatilization factor (identified with "V") and the particulate emission factor (PEF) (identified with "P"), both derived on Table 4-15.

* EPC_s exceeds the soil saturation limit (Csat) (Table 4-15); therefore, volatilization is based on the Csat concentration instead of EPC_s.

-- Not applicable

ELCR - Excess lifetime cancer risk.

EPC_s - Exposure point concentration in soil (mg/kg).

HI - Hazard index (sum of the HQs).

HQ - Hazard quotient.

m³/kg - Cubic meters per kilogram

mg/kg - Milligrams per kilogram

NA - Not available.

NC - Not evaluated as a carcinogen.

PEF - Particulate emission factor.

VF - Volatilization factor.

Table 4-38. Risk Calculations for an On-Site Excavation Worker Exposure to Subsurface Soil

Atmos Energy Corporation		Tennessee Street FMGP		Johnson City, Tennessee												
Constituent	EPCs (mg/kg)	VF or PEF [a] (m³/kg) (Table 4-15)	CANCER RISK					NON-CANCER RISK								
			Route-Specific Risks			Calculated Risk ELCR	Percent Total ELCR	Route-Specific Risks			Calculated Risk HI	Percent Total HI				
			Oral ELCR	Dermal ELCR	Inhalation ELCR			Oral HQ	Dermal HQ	Inhalation HQ						
Volatile Organic Compounds																
Benzene	0.4	1.18E+04	V	7.7E-11	0.0E+00	2.0E-10	2.7E-10	0%	5.2E-05	0.0E+00	4.7E-04	5.2E-04	1%			
Polycyclic Aromatic Hydrocarbons																
Benzo(a)anthracene	30	8.78E+06	V	1.2E-07	3.2E-08	2.7E-10	*	1.5E-07	10%	3.9E-05	1.0E-05	NA	*	4.9E-05	0%	
Benzo(b)fluoranthene	20	1.38E+07	V	8.1E-08	2.1E-08	8.3E-11	*	1.0E-07	7%	1.9E-04	5.0E-05	NA	*	2.4E-04	0%	
Benzo(k)fluoranthene	13	2.00E+07	V	5.3E-09	1.4E-09	3.1E-12	*	6.6E-09	0%	1.3E-04	3.3E-05	NA	*	1.6E-04	0%	
Benzo(a)pyrene	20	1.42E+07	V	8.1E-07	2.1E-07	7.3E-10	*	1.0E-06	66%	2.6E-04	6.7E-05	NA	*	3.3E-04	0%	
Dibenz(a,h)anthracene	12	3.63E+07	V	4.8E-08	1.3E-08	3.4E-11		6.1E-08	4%	1.5E-06	4.0E-07	NA		2.0E-06	0%	
Indeno(1,2,3-cd)pyrene	6	3.30E+07	V	2.4E-08	6.3E-09	1.4E-12	*	3.1E-08	2%	7.7E-05	2.0E-05	NA	*	9.8E-05	0%	
Naphthalene	480	2.16E+05	V	NA	NA	NA	*	NA	-	9.3E-03	2.4E-03	4.8E-02	*	6.0E-02	67%	
Metals																
Arsenic	19	2.44E+11	P	1.6E-07	9.5E-09	3.9E-13		1.7E-07	11%	2.5E-02	1.5E-03	NA		2.6E-02	29%	
Manganese	250	2.44E+11	P	NC	NC	NC		NC	-	2.1E-03	0.0E+00	1.7E-06		2.1E-03	2%	
				Total ELCR			2E-06			Total HI			0.1			100%

[a] Minimum of the volatilization factor (identified with "V") and the particulate emission factor (PEF) (identified with "P"), both equations are presented on Table 4-15.

• EPCs exceeds the soil saturation limit (Csat) (Table 4-15), therefore, volatilization is based on the Csat concentration instead of EPCs.

-- - Not applicable.

CNS - Central nervous system.

ELCR - Excess lifetime cancer risk.

EPCs - Exposure point concentration in soil (mg/kg).

HI - Hazard index (sum of the HQs)

HQ - Hazard quotient.

m³/kg - Cubic meters per kilogram.

mg/kg - Milligrams per kilogram.

NA - Not available.

NC - Not evaluated as a carcinogen.

PEF - Particulate emission factor.

VF - Volatilization factor.

Table 4-44. Risk Characterization Summary

Atmos Energy Corporation		Tennessee Street FMGP		Johnson City, Tennessee			
Medium		Exposure Pathway		Total Excess Lifetime Cancer Risk (ELCR)	Total Non-Cancer Hazard Index (HI)	Does Medium Pose An Unacceptable Risk/Hazard? (YES/NO)	Rationale
On-Site Industrial Worker							
Unconsolidated-Zone Groundwater		Vapor Migration to Indoor Air		2E-06	0.9	NO	ECLR is at the low end of the target risk range and HI is less than 1.
Bedrock-Zone Groundwater		Vapor Migration to Indoor Air		1E-07	0.02	NO	ECLR is below the target risk range and HI is less than 1.
Bedrock-Zone Groundwater		Incidental Ingestion/Dermal Contact		6E-04	17	YES	ECLR is above the target risk range and HI is greater than 1.
Surface Soil		Vapor Migration to Indoor Air		2E-08	0.5	NO	ECLR is below the target risk range and HI is less than 1.
Surface Soil		Incidental Ingestion/Dermal Contact/Inhalation		1E-04	0.1	YES	ECLR is equal to the high end of the target risk range although HI is less than 1.
Subsurface Soil		Vapor Migration to Indoor Air		1E-05	9	YES	ECLR is within the target risk range and HI is greater than 1.
On-Site Excavation Worker							
Unconsolidated-Zone Groundwater		Incidental Ingestion/Dermal Contact/Inhalation		1E-07	0.7	NO	ECLR is below the target risk range and HI is less than 1.
Surface Soil		Incidental Ingestion/Dermal Contact/Inhalation		2E-06	0.06	NO	ECLR is at the low end of the target risk range and HI is less than 1.
Subsurface Soil		Incidental Ingestion/Dermal Contact/Inhalation		1E-06	0.1	NO	ECLR is equal to the low end of the target risk range and HI is less than 1.
On-Site Trespasser							
Surface Soil		Incidental Ingestion/Dermal Contact/Inhalation		1E-05	0.05	NO	ECLR is within the target risk range and HI is less than 1.
Off-Site Industrial Worker							
Bedrock-Zone Groundwater		Vapor Migration to Indoor Air		2E-07	0.06	NO	ECLR is below the target risk range and HI is less than 1.
Bedrock-Zone Groundwater		Incidental Ingestion/Dermal Contact		1E-04	3	YES	ECLR is equal to the high end of the target risk range and HI is greater than 1.

Table 5-2. Risk-Based Concentration Goals for Soil

Atmos Energy Corporation Tennessee Street FMGP Johnson City, Tennessee

Constituent of Concern	RBG _C (mg/kg)			RBG _{NC} (mg/kg)		
	Based on Cancer Effects			Based on Noncancer Effects		
	1E-06	1E-05	1E-04	0.1	1	3
Industrial Worker						
Volatile Organic Compounds						
Benzene	9	92	920	10	100	300
Polycyclic Aromatic Hydrocarbons						
Benzo(a)anthracene	2.9	29	290	23,000	230,000	680,000
Benzo(b)fluoranthene	2.9	29	290	3,000	30,000	90,000
Benzo(a)pyrene	0.29	2.9	29	2,300	23,000	68,000
Dibenz(a,h)anthracene	0.29	2.9	29	23,000	230,000	680,000
Indeno(1,2,3-cd)pyrene	2.9	29	290	2,300	23,000	68,000
Naphthalene	NA	NA	NA	89	890	2,700
Metals						
Arsenic	2.7	27	270	44	440	1,300
Excavation Worker						
Volatile Organic Compounds						
Benzene	1,500	15,000	150,000	77	770	2300
Polycyclic Aromatic Hydrocarbons						
Benzo(a)anthracene	200	2,000	20,000	61,000	610,000	1,800,000
Benzo(b)fluoranthene	200	2,000	20,000	8,200	82,000	250,000
Benzo(a)pyrene	20	200	2,000	6,100	61,000	180,000
Dibenz(a,h)anthracene	20	200	2,000	61,000	610,000	1,800,000
Indeno(1,2,3-cd)pyrene	200	2,000	20,000	6,100	61,000	180,000
Naphthalene	NA	NA	NA	660	6,600	20,000
Metals						
Arsenic	110	1,100	11,000	73	730	2,200
Trespasser^(a)						
Polycyclic Aromatic Hydrocarbons						
Benzo(a)anthracene	28	280	2,800	88,000	880,000	2,600,000
Benzo(b)fluoranthene	28	280	2,800	12,000	120,000	350,000
Benzo(a)pyrene	2.8	28	280	8,800	88,000	260,000
Dibenz(a,h)anthracene	2.8	28	280	88,000	880,000	2,600,000
Indeno(1,2,3-cd)pyrene	28	280	2,800	8,800	88,000	260,000
Naphthalene	NA	NA	NA	780	7,800	24,000
Metals						
Arsenic	14	140	1,400	93	930	2,800

(a) Trespassers are exposed to surface soil concentrations only. No benzene was detected in surface soil, therefore, no trespasser soil RBC was calculated.

ELCR - Excess lifetime cancer risk.

EPCs - Exposure point concentration.

HI - Hazard index.

mg/kg - Milligrams per kilogram.

NA - Toxicity has not been adequately assessed.

NC - Not evaluated as a carcinogen.

RBG - Risk-based concentration goal.

TCR - Target cancer risk.

THI - Target hazard index.



90-513
DIVISION OF SUPERFUND

2003 JUL 31 PM 1:23

July 29, 2003

Mr. Harold Mattraw
Geologist
Division of Superfund
State of Tennessee
Department of Environment and Conservation
2305 Silverdale Road
Johnson City, Tennessee 37601-2162

RE: 2003 Waste Removal Report
Tennessee St. FMGP
Johnson City, TN
Site I.D. 90-513
Case: 96-035

Dear Mr. Mattraw:

This letter serves as the 2003 Waste Removal Report for the above referenced site. The following information is for the previous Tennessee Department of Environment and Conservation ("TDEC") fiscal year (July 1, 2002 to June 30, 2003) and project cumulative.

During the previous TDEC fiscal year Atmos Energy (formerly United Cities Gas Company) accomplished the following tasks:

- Completed Supplemental Groundwater Investigation
- Completed Risk Assessment
- Submitted Supplemental Groundwater Investigation and Risk Assessment Report
- Disposed of Investigation Derived Waste

Atmos Energy spent \$134,599 in TDEC fiscal year 2003 on the above listed tasks. Of this total, \$119,583 is associated with the Supplemental Groundwater Investigation and Risk Assessment. Disposal of investigation derived waste (drill cuttings and purge water) comprises \$5,697 of the total. Analytical cost associated with the Supplemental Groundwater Investigation comprises \$9,319 of the total.

Page 2

Mr. Harold Mattraw

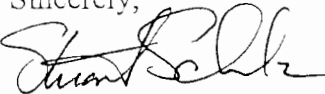
July 29, 2003

During TDEC fiscal year 2003, Atmos Energy reimbursed DSF \$7,065.50 for administrative and oversight costs associated with the Order. Reimbursement costs prior to TDEC fiscal year 2003 totaled \$25,476.78. The cumulative DSF administration and oversight costs to date are \$32,542.28.

The project cumulative total cost as a result of the Order is \$721,990.29. A table summarizing the costs associated with the Order is attached to this letter. The costs reported include invoices received through June 30, 2003. This report is believed to be accurate and complete, however it may or may not represent the final project accounting as recorded by Atmos Energy.

If you have any questions concerning this report please contact me at (615) 771-8405 or by e-mail at stuart.schulz@atmosenergy.com.

Sincerely,



Stuart Schulz, PG, CHMM
Environmental Specialist

cc: Dan Lindsey
Doug Walther, ATMOS
Robert Powell, DSF, NCO
David Randolph, DSF, NCO

Attachment: Tennessee St. FMGP VOAP Cost Summary Table

Tennessee St. FMGP
VOAP Cost Summary

Fiscal Year	<i>Investigation Cost</i>	<i>Treatment Cost</i>	<i>Disposal Cost</i>	<i>Analytical Cost</i>	<i>DSF Oversight Cost</i>	Total Cost
1997	\$0.00	\$0.00	\$0.00	\$0.00	\$6,110.86	\$6,110.86
1998	\$4,163.18	\$0.00	\$0.00	\$15,571.00	\$3,629.41	\$23,363.59
1999	\$21,997.27	\$0.00	\$0.00	\$0.00	\$1,167.19	\$23,164.46
2000	\$139,639.19	\$0.00	\$0.00	\$0.00	\$2,301.52	\$141,940.71
2001	\$154,307.15	\$64,480.20	\$11,041.20	\$33,793.87	\$2,578.58	\$266,201.00
2002	\$66,542.00	\$0.00	\$35,083.95	\$8,230.00	\$9,689.22	\$119,545.17
2003	\$119,583.00	\$0.00	\$5,697.00	\$9,319.00	\$7,065.50	\$141,664.50
	\$506,231.79	\$64,480.20	\$51,822.15	\$66,913.87	\$32,542.28	\$721,990.29

Note: Fiscal Year July 1 to June 30
Consent Order Signed 1/23/97

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

ENVIRONMENTAL ASSISTANCE CENTER – JOHNSON CITY

DIVISION OF SUPERFUND

OFFICE CORRESPONDENCE

DATE: July 14, 2003

TO: The Record, DSF File # 90-513

FROM: Harold Mattraw *Harold Mattraw*

SUBJECT: Atmos/ARCADIS -Johnson City Meeting

On Tuesday July 8, 2003, Greg Page of ARCADIS convened a meeting that included representatives from Atmos (formerly United Cities Gas), the City of Johnson City, and the Division of Superfund. The meeting lasted from 10:00 AM to 12:00 Noon. The purpose of the meeting was to consider the environmental and health risks of the Atmos property located at the northwest corner of State of Franklin Road and Tennessee Street in Johnson City. Immediately after the meeting, Division of Superfund met with Atmos and ARCADIS. The attendees were:

Greg Page, Project Manager, ARCADIS
Paul Preston, Engineer, ARCADIS
Stuart Schultz, Project Manager, Atmos
Judy Moss, Manager, Atmos
Darrell Hale, Environmental Field Office Manager, Division of Superfund
Kevin Rice, Project Manager, Division of Superfund
Harold Mattraw, Geologist, Division of Superfund

The purpose of the meeting was to agree on the alternatives that should be presented in the Risk Assessment/Feasibility Study. Greg Page began the discussion with the opinion that the risk assessment could not depend on a potential City Ordinance restricting ground water use. Based on the preceding meeting it was unclear whether the City intended to follow through with an Ordinance. Greg outlined four alternatives that he believed were necessary.

1. No action.
2. Deed restrictions on the site and the affected City right-of-way. A cap on the site with monitoring and natural attenuation.
3. Enhanced bioremediation of the aquifer, deed restrictions, a cap, and monitoring.
4. Aggressive treatment, deed restrictions, a cap, and monitoring.

Greg indicated that aggressive treatment might include chemical oxidation, additional source removal and/or pump and treat (vacuum recovery system). Greg reiterated that we need to stick with what we can do and not depend on the City to possibly enact an Ordinance at some future time.

Darrell indicated that modeling or extrapolation was needed to estimate the extent of the contaminant plume. Kevin indicated that ground water modeling in a karst terrain would not be very reliable. Greg indicated that an effort to predict the extent of contamination would be made.

Darrell suggested that source removal had already taken place and what remained on site should be considered contaminated media. He expressed the opinion that additional excavation would not be very productive.

Judy asked what type of cap would be used. Would it affect future use? Greg indicated that a simple cap to restrict contact might be all that the State would require. Kevin added that a cap with a building would require either a vapor barrier or a vapor capture system.

There was general agreement that the corrections to the risk assessment should be completed. In addition, the Feasibility Study could follow the general outline that Greg had proposed.

Stuart indicated that Atmos was anxious that the RA/FS be completed in a timely fashion so the State could make decisions on what was acceptable. Greg indicated that with the agreed approach, ARCADIS should be able to provide Atmos with a review copy in six to eight weeks. The meeting adjourned at about 12:20 PM.

✓Cc: DSF/NCO File #90-513

JAR 7-27

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION**ENVIRONMENTAL ASSISTANCE CENTER – JOHNSON CITY****DIVISION OF SUPERFUND****OFFICE CORRESPONDENCE****DATE: July 9, 2003****TO: The Record, DSF File # 90-513****FROM: Harold Mattraw** *Harold Mattraw***SUBJECT: United Cities Gas-Johnson City Meeting**

On Tuesday July 8, 2003, Greg Page of ARCADIS convened a meeting that included representatives from Atmos (formerly United Cities Gas), the City of Johnson City, and the Division of Superfund. The meeting began at 10:00 AM in the large conference room of Johnson City Environmental Assistance Center. The purpose of the meeting was to consider the environmental and health risks of the Atmos property located at the northwest corner of State of Franklin Road and Tennessee Street in Johnson City. The attendees were:

Greg Page, Project Manager, ARCADIS
Paul Preston, Engineer, ARCADIS
Stuart Schultz, Project Manager, Atmos
Judy Moss, Manager, Atmos
Phil Pindzola, Director of Public Works, Johnson City
Jim Culbert, Environmental Specialist, Johnson City
Mike West, City Manager, Johnson City
Charles Harmon, City Manager's Office, Johnson City
James H. Epps, III, City of Johnson City Attorney, Epps and Epps
Darrell Hale, Environmental Field Office Manager, Division of Superfund
Kevin Rice, Project Manager, Division of Superfund
Harold Mattraw, Geologist, Division of Superfund

Stuart began the meeting by stating that his was pleased that everyone who had an interest in the Atmos property was able to attend. He stated that the purpose was to describe where we were in the remediation of the site and how to move forward in the restoration of the property to its highest use. Stuart indicated that Greg Page of ARCADIS was the project consultant for the site.

Greg indicated that he had received comments from Kevin regarding the computation of risk factors at the site. Greg also had conversations with Brad Parman who is the risk factor coordinator for the Division of Superfund in Nashville. He indicated that he would like to make the corrections to the risk factors in the Supplemental Groundwater Investigation and Risk Assessment Report (March 2003) and convey the revised text and tables to Kevin for

incorporation in the report. The principal corrections involve the computation of risks related to arsenic and removal of the concluding statement that exposure was unlikely. Kevin agreed.

Greg stated that the final use for the site would most likely be a building of some sort. Assuming that the Risk Assessment was approved, the next step is a Feasibility Study. The study would focus on the cleanup goals and the remediation alternatives. Among the several alternatives would be Deed restrictions with groundwater monitoring. Other alternatives would consider more aggressive treatments. Greg indicated that for the sake of efficiency he would like to limit the number of alternatives to four.

Stuart indicated that there were environmental considerations and Johnson City responsibilities. The nature of the final cap and the future use were related. The future use would ultimately be determined by the City either directly or through ordinance or zoning. Kevin indicated that alternatives that barely met the National Contingency Plan objectives but not consider future use, would not be consistent with the sites highest use. Stuart continued with the statement that what the City would do with the transfer of property may have an effect on selection of the final alternative. He indicated that what we need to do is leave here with an understanding of where we are now and what the next steps will be.

Mike West asked how drastically would the remediation affect future improvements. Kevin indicated that selection of the least cost alternative, a cap, would still have some risks. The likely use of institutional controls and remediation will still pose some risks to future users. Mike West asked if there would be any risk from contact with the soil. Greg indicated that even with a cap, excavation during development might expose on-site workers to contaminated soils. Mike asked if the locked gate did not prevent access to the property. The University has access through the alley way to their property. Kevin indicated that trespasser risks would be considered in the final risk assessment/Feasibility Study. Mike stated that he wanted to put the property on the tax roles.

Jim Culbert stated that a cap could cause a problem of vapor migration. Greg indicated that this was not a landfill type situation where the migration of potentially explosive methane gas needed to be prevented and monitored.

Phil Pindzola asked what kind of remediation was needed. How much time, what schedule, how much cost is involved? Can clay be used as a vapor barrier? What would the final elevation be? What are the impacts on deep groundwater? Greg responded that use of a cap would require removal of the monitoring wells since they are potential migration pathways for vapors.

Jim stated that during the early days of Johnson City that there was a restriction on the use of groundwater because of settling problems. Kevin indicated that excessive pumping of groundwater would lower the water table and increase the likelihood of sinkholes in karst terrain. Kevin stated that expansion of the area of restricted groundwater use was something that the Division would like to explore. Charles Harmon asked if the expansion of the groundwater-restricted zone would include water pumped for industrial processes.

Phil asked what we knew of groundwater flow in the area. Could the extent of contamination be measured? Greg indicated that the removal of the source would reduce the extent of plume migration and the length of time that the contamination would continue. However, the length of time for natural attenuation was very long. Phil indicated that if the contamination was restricted to the City right-of-way then the city had control of the groundwater use and an ordinance amendment would not be necessary. Mike asked what was the direction of groundwater movement. Stuart indicated that the shallow ground water tended to flow in the direction of the creek. Deeper ground water appears to flow toward the River. Phil asked why the creek was not contaminated. Greg indicated that any creek contamination probably occurred when the plant was in operation and that the contaminants were probably flushed away during heavy rainfall/runoff events.

Mike asked what was involved in the Feasibility Study. Greg indicated that the level of cleanup and the needed remediation would be described in general terms. The alternatives would range from no action to digging up additional hot spots and aggressive treatment of the groundwater contamination with chemical oxidants. The alternatives would be evaluated against the nine criteria in the State regulations. Most likely the summary section of the study report would contain a recommendation for the most cost effective treatment. After the report had been reviewed and approved by the Division of Superfund, a public hearing would be held. After considering public comments, the State would issue a Record of Decision. Mike asked what the future land use would be. Stuart indicated that the area was zoned commercial and that was its highest use. Mike added that it could be designated green space.

Phil stated that there were two issues, vapor encapsulation and the aquifer. It was in Atmos and the Cities best interest that there be an ordinance restricting water use in the affected area. Darrell Hale asked if the City could restrict groundwater use. James Epps indicated that the historical purpose of the ordinance was not sufficient justification to substantially extend the area. Restitution for requiring the use of public utilities might come into play. In addition, the City must have standards for exercising controls on water rights. Phil asked if it was possible to characterize the remediation zone. Greg indicated that Atmos could restrict water use on their property with a Deed notification. Phil suggested that with local control of the Cities present right-of-way that they could eliminate public use.

Jim asked how migration of vapors through utility corridors would be controlled. Kevin indicated that the risk to indoor receptors in buildings at the site was a major concern. Greg indicated that the Feasibility Study would address the type of construction that would be required to reduce this risk factor.

Phil asked if the State had the authority to enact Deed restrictions. Darrell responded that the property owner had that responsibility under the VOAP Consent Order. Stuart asked if the City could join the Brownfield. Darrell indicated that they could but that the program would not provide any greater flexibility than the VOAP that Atmos was currently enrolled. In terms of liability, the City could not claim protection as an innocent landowner because they did not have an environmental audit and in addition, they had prior knowledge of contamination at the site. Mike asked what would be the City liability if they assumed

ownership of the property. Darrell indicated that a PRP was already identified so liability would largely remain with Atmos.

Judy Moss indicated that the site was a valuable piece of property. Atmos would work to allay the concerns of the City. Application of the most appropriate remedial alternative should benefit the City as well as Atmos. Sinkhole problems were another concern that could be addressed by expansion of water use restrictions. Phil asked how long the Feasibility Study would take. Stuart indicated that they had begun work on part of it and he hoped it would be completed in six to eight weeks. It might take the State a few weeks to review and comment on the report and then any corrections could be made in a matter of a few weeks.

Stuart asked if the City would consider an ordinance restricting water use. Phil suggested that the City would not have to make that decision until they saw the Feasibility Study. Phil asked what alternatives would be considered in the study. Greg responded that the alternatives would range from nothing to star wars. Phil asked if that would include a cap with engineered fill. Greg said yes. Charles asked if the City had to be a willing participant. Kevin indicated that the State has to accept a reasonable alternative. Stuart asked how long it would take to carry an alternative to a final use. Darrell suggested that it might take as much as eighteen months. Phil asked if that would include a liner. Darrell indicated that an alternative that reduced the risk to future users would be a decision made by the State based on the alternatives in the Feasibility Study.

Darrell indicated that the best way to deal with the groundwater pathway was through a City ordinance. Greg added that the minimum that Atmos may need is a cap with a Deed restriction. Dealing with the off-site contamination may require an aggressive approach. Darrell indicated that the State would probably not require any more removal actions because the remaining contamination was contaminated media and not waste. In terms of the groundwater pathway there were only two alternatives, a City ordinance or treatment. Either way there would need to be a monitoring program to ensure that contamination was not getting worse or moving further off site. At this point, it appears that a Deed restriction with a vapor barrier will be required. Modeling may be required to define the impact zone and help establish an ordinance boundary.

James indicated that an ordinance should not be too restrictive and should have well defined limits. The City does not want to be put in the position of over regulating. Darrell reiterated that Deed restrictions and a City ordinance are critical in this situation. Greg indicated that the Feasibility Study could not depend on a potential action by the City at some indefinite time in the future. Charles suggested that the City might want to widen the ordinance beyond the immediate location because of other contamination sources in the general area. Greg indicated that he would like to restrict the number of alternatives in the Feasibility Study to four or five alternatives. Stuart indicated that they had no alternatives beyond the property line that were cost effective and technically feasible.

The meeting concluded at approximately 12:00 Noon.

✓ Cc: DSF/NCO File 90-513



DIVISION OF SUPERFUND

2003 JUL -8 AM 10:32

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF SUPERFUND
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
PHONE (423) 854-5400 FAX (423) 854-5401

Mr. Greg B. Page
ARCADIS Geraghty & Miller, Inc.
97 Midway Lane
Oak Ridge, TN 37830

June 30, 2003

RE: Supplemental Groundwater Investigation and Risk Assessment Report, dated
March 2003.
United Cities Gas Site ID# 90-513

Dear Mr. Page:

The Division of Superfund (DSF) received the document entitled Supplemental Groundwater Investigation and Risk Assessment Report, dated March 2003. After review, the DSF has the following comments:

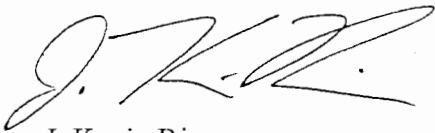
Comments

1. **Page 4-16, Section 4.4.2.4, Relative Absorption Factors (RAF):** The use of RAF in risk assessments is an emerging science. The Division of Superfund is not able to review new or novel toxicity determinations based solely upon journal articles. While the peer-reviewed journal article may be correct in its assessment of arsenic absorption, it is up to the EPA or ATSDR to come up with the means to incorporate this new information into risk assessments. At this time, the DSF has not been able to determine if using the RAF values from other non-related studies as default values is acceptable to EPA, Region 4. Numerous physical, chemical and biological processes influence contaminant bioavailability. A limited literature review of the use of RAF in risk assessments indicates that the Relative Absorption Factors have only been calculated after extensive, site-specific exposure studies were completed. Please recalculate arsenic-related risk using the standard techniques and toxicity values or provide an approval letter or other such documentation from EPA, Region 4 that states that the use of a default RAF for arsenic is approved.
2. **Page 4-26, Section 4.7, Risk Assessment Summary:** The text states that some potential future use exposure pathways pose an unacceptable risk to on-site and off-site industrial workers, but "all of these exposure scenarios are considered unlikely...". The DSF does not agree that all of the potential future use scenarios are unlikely. Since the site is located within a high-traffic area of Johnson City and the surrounding area is developing relatively rapidly, the DSF believes that the potential for a future owner to construct a building on the

site is high. Therefore, some of the exposure pathways have a good possibility of being completed, especially the vapor migration to indoor air pathway for an on-site worker. The last sentence in the section should be revised to reflect this possibility, unless Atmos Energy intends to propose that institutional controls be implemented that provide for the site to be perpetually covered with an asphalt cap (or similar device) without the presence of an on-site structure for human use.

If you have questions or comments, please contact me at (423) 854-5468.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. K. Rice', with a stylized, flowing script.

J. Kevin Rice
Project Manager

cc: Mr. Stuart Shulz, United Cities Gas Company
Mr. David Randolph, TDEC/DSF, NCO
Mr. Andy Shivas, TDEC/DSF, NCO
EAC-JC DSF File # 90-513

ACCOUNTING FOR PUBLIC UTILITIES

ROBERT L. HAHNE

GREGORY E. ALIFF

DELOITTE & TOUCHE LLP

Contributing Authors: The following were the original contributing authors of *Accounting for Public Utilities*. While much of what these individuals originally wrote has been removed or replaced through the annual update process, we wish to continue to recognize their contributions in the creation of this book.

FRANCIS J. ANDREWS, JR.

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2003

Filed Through:

RELEASE NO. 20, OCTOBER 2003

- (2) programs that provide for additional billings (incentive awards) if the utility achieves certain objectives, such as reducing costs, reaching specified milestones, or demonstratively improving customer service.

Both types of programs enable the utility to adjust rates in the future (usually as a surcharge applied to future billings) in response to past activities or completed events. The EITF did not address the accounting for credit balances (amounts due to customers) that may also result from alternative revenue programs. These credits should be recognized as liabilities because they are considered "refunds" of past revenues that are accounted for as contingent liabilities that meet the conditions for accrual under Statement No. 5, "Accounting for Contingencies," or in accordance with Statement No. 71, Paragraph 11.

The EITF addressed the following questions:

- (1) What should the appropriate accounting be for the additional revenues to be billed in the future under alternative revenue programs?
- (2) Should accounting for the two types of programs be the same?

The EITF reached a consensus that once the events permitting billing of the additional revenues under either type of program have been completed, the regulated utility should recognize the additional revenues if all of the following conditions are met:

- The program is established by an order from the utility's regulatory commission that allows for automatic adjustment of future rates. The regulator's verification of the adjustment in the future would not preclude the adjustment from being considered automatic.
- The amount of additional revenues for the period is objectively determinable and is probable of recovery.
- The additional revenues will be collected within 24 months of the period in which they are recognized.

As a transition, if a rate-regulated utility was operating under an approved alternative revenue program that did not meet the above conditions and it had based recognition of revenues on the program, it was allowed to continue to recognize revenue under the program if: (1) the utility filed a rate application to have the plan amended to meet the above conditions (or intended to do so as soon as feasible); and (2) it was probable that the regulator would change the terms of the program to meet these conditions.

[4] Environmental Issues

Many utilities are faced with potential hazardous waste cleanup costs on property the utility owned, or previously owned, or at disposal sites owned by

others. Utilities may be obligated to pay for hazardous waste cleanup and related fines and litigation costs. A utility may be able to recover some or all of these costs through insurance claims or claims against other third parties.

The Securities and Exchange Commission (SEC) has expressed concern that companies are delaying the accrual for environmental contingencies until the liability is fixed and determinable. FASB Statement No. 5, "Accounting for Contingencies," states that an estimated loss from a contingency should be accrued by a charge against income if it is probable that a liability has been incurred and the amount of the loss can be reasonably estimated. If the amount of a contingent liability is likely to fall within a range, but no amount within the range can be identified as the best estimate, FASB Interpretation No. 14, "Reasonable Estimation of the Amount of a Loss," requires that at least the minimum amount of the range be accrued.

During 1993, both the FASB Emerging Issues Task Force (EITF) and the SEC staff addressed aspects of accounting and reporting for environmental liabilities. The EITF reached a consensus in Issue No. 93-5 that an environmental liability should be evaluated independently of any potential claim for recovery. A loss arising from the recognition of an environmental liability may be reduced by a potential claim for recovery if it is probable (i.e., likely) that the claim will be realized. Issue No. 93-5 also concluded that discounting a cleanup site's environmental liability is appropriate only if the entity can determine the aggregate amount of the cleanup obligation for the site and the amount and timing of the cash payments for the site's cleanup are fixed or can be determined reliably. If an environmental liability is discounted, the entity should also discount any asset it has recognized for a claim for recovery.

In Staff Accounting Bulletin (SAB) No. 92, the SEC staff addressed the accounting for, and disclosure of, product or environmental liability costs. SAB No. 92 draws on the guidance in FASB Statement No. 5, FASB Interpretation No. 14, and EITF Issue No. 93-5. In SAB No. 92, the SEC staff acknowledges that estimates and assumptions about the extent of environmental or product liability, methods of remedy, and amounts of related costs frequently differ from the ultimate outcome. Nevertheless, entities registered with the SEC cannot delay recognition of a contingent liability until they can reasonably estimate a single amount. An entity should measure its liability based on current facts, law and regulations, and existing technology. The entity should evaluate the likely effect of inflation and other societal and economic factors in its measurement. The entity should consider both its own remediation experience and that of other companies, as well as data released by organizations such as the Environmental Protection Agency (EPA).

FASB Statement No. 71 requires rate-regulated enterprises to capitalize costs if it is probable that future revenue will be provided to recover the costs (i.e., the costs are considered allowable costs for ratemaking purposes). SAB No. 92 states that environmental costs meeting the criteria of paragraph 9 of Statement No. 71 should be presented as an asset on the balance sheet, not as an offset against the environmental liability. Contingent recoveries that do not meet the criteria of paragraph 9 of Statement No. 71 should not be recognized as an asset or as a reduction of the probable liability.

Even though a regulator's actions can affect whether a utility capitalizes or expenses a cost (pursuant to Statement No. 71), SAB No. 92 concludes that the regulator's actions cannot affect the timing of the recognition of a liability. Therefore, a rate-regulated enterprise cannot delay recording a probable and estimable environmental liability until the enterprise is able to determine whether the costs will be considered allowable costs for ratemaking.

[5] Planned Major Maintenance Activities

On March 16, 2000, the SEC announced guidance included as EITF D-88: Planned Major Maintenance Activities. The Accounting Standards Executive Committee (AcSEC) of the American Institute of Certified Public Accountants (AICPA) added a project to its agenda in January 1999 to develop a Statement of Position (SOP) that would address accounting and disclosure issues related to determining which costs related to real estate assets should be capitalized as improvements and which should be expensed as repairs and maintenance. The SOP would also address the capitalization of indirect and overhead costs and the componentization of real estate assets for depreciation purposes. AcSEC has agreed to expand the scope of its project to address (a) all types of property, plant, and equipment and (b) the accrual of a liability in advance of a planned major maintenance activity.

Pending AcSEC's completion of its revised project, the SEC indicated that registrants should:

- Disclose their accounting policy for repair and maintenance costs incurred in connection with planned major maintenance activities as well as the types of costs subject to this policy.
- Include in Schedule II, pursuant to SEC Regulation S-X, Rule 12-09, Valuation and Qualifying Accounts, any liabilities accrued for costs expected to be incurred in connection with planned major maintenance activities.
- Reclassify any liability balance that has been reported otherwise, such as a component of accumulated depreciation, to the liability section of

[15] Tax Treatment of Recoverable/Unrecoverable Line Pack Gas and Cushion Gas

In Revenue Ruling 97-54¹¹¹ the Internal Revenue Service concluded that the cost of unrecoverable line pack or cushion gas will be treated as depreciable. However, the cost of recoverable line pack or cushion gas will not be treated as depreciable.

Line pack gas is the minimum volume of natural gas necessary to provide the pressure to allow gas to flow through a pipeline. Cushion gas is the minimum volume of natural gas necessary to provide the pressure to allow gas to flow from a storage reservoir to a pipeline. Recoverable line pack gas and recoverable cushion gas will be available for sale or other use upon the abandonment of the pipeline or storage reservoir. Unrecoverable line pack gas and unrecoverable cushion gas will not be available for sale or other use upon the abandonment of the pipeline or storage reservoir, but will become obsolete with the abandonment.

The IRS identified two issues concerning the treatment of line pack gas and cushion gas:

- (1) Is the cost of line pack gas or cushion gas a capital expenditure under IRC Section 263 or an amount that is included in inventory under IRC Section 471?
- (2) If the cost of line pack gas or cushion gas is a capital expenditure under IRC Section 263, is that cost depreciable under IRC Section 167 and IRC Section 168?

The IRS concluded (1) the cost of line pack gas or cushion gas is a capital expenditure under IRC Section 263, and (2) the cost of recoverable line pack gas or recoverable cushion gas is not depreciable, but the cost of unrecoverable line pack gas or unrecoverable cushion gas is depreciable under IRC Section 167 and IRC Section 168. The IRS will treat line pack gas or cushion gas as recoverable to the extent that the gas will be recovered from an abandoned pipeline or storage reservoir pursuant to a plan, a requirement of law, or economic feasibility, whichever method projects the greatest actual recovery.

[16] District Court Ruling on Claim of Right and Environmental Cleanup Costs

A U.S. district court held in *Dominion Resources, Inc. v. United States of America*,¹¹² that Dominion Resources, Inc. is entitled to a refund of federal taxes

¹¹¹ 1997-2 C.B. 23.

¹¹² 49 F. Supp. 2d 527 (E.D. Va. 1999), 224 F.2d 250 (4th Cir. 2000).

for the 1991 tax year because the IRS erroneously refused to allow Dominion Resources' subsidiary, Virginia Power, to use IRC Section 1341 (claim of right) in calculating its tax liability. The district court also decided that Dominion Resources cannot deduct, but must capitalize, expenses incurred by another subsidiary in cleaning up environmental contamination on property formerly used by Virginia Power.

IRC Section 1341—claim of right. For IRC Section 1341 to apply, a taxpayer must prove that:

- (1) there was the appearance of an unrestricted right to such income in a prior year;
- (2) in a subsequent year it was determined that the taxpayer did not have an unrestricted right to the income; and
- (3) the item at issue qualifies as a deductible expense under the Internal Revenue Code.

The IRS took the position that IRC Section 1341 did not apply because Virginia Power had an actual unrestricted right to the funds, not an appearance of an unrestricted right, and the obligation to refund arose from a subsequent event. The IRS cited the “subsequent event” test articulated in *Blanton v. Commissioner*,¹¹³ *Kraft v. United States*,¹¹⁴ *Bailey v. Commissioner*,¹¹⁵ *Usher v. Commissioner*,¹¹⁶ and *Pahl v. Commissioner*¹¹⁷ to support its position. The subsequent event test was applied in these cases to deny IRC Section 1341 relief if the defeasance of the right to income did not arise from the same “circumstances, terms and conditions” under which the right to the income arose.

This portion of the decision was distinguished by a later Eighth Circuit case. That case rejected a public utility and gas distributor's claim that it could deduct the revenue state regulators had forced it to return to its customers after it had made substantially higher profits than the regulators had foreseen when they initially set the rates it could charge. The court held that, unlike in *Dominion Resources*, the reimbursement was not a refund but a nondeductible reduction in future profits. The claim of right doctrine cannot apply if the expenses in question are not deductible.¹¹⁸ A case decided in the Seventh Circuit also took this position.¹¹⁹

¹¹³ 46 TC 527 (1966).

¹¹⁴ 991 F.2d 292 (6th Cir 1993).

¹¹⁵ 756 F.2d 44 (6th Cir 1985).

¹¹⁶ TC Memo 1980-130.

¹¹⁷ 67 TC 286 (1976).

¹¹⁸ *MidAmerican Energy Co v Commr*, 271 F.3d 740 (2001).

¹¹⁹ *WICOR, Inc v US*, 263 F.3d 650 (7th Cir 2001).

Environmental clean-up costs. In the second issue decided by the Court, Virginia Power transferred property on which an electric generation plant was located to another subsidiary of Dominion Resources. It was the other subsidiary's intention to develop the property and cease generation of electricity on the property. Upon discovery of contaminants from the property, Dominion Resources contended that the clean-up costs were incidental repairs that are deductible under IRC Section 162. The court held that the environmental clean-up costs are not currently deductible and must be capitalized under IRC Section 263 based on the "put versus keep" distinction. That is, the expenses were incurred to "put" the property into a useable condition for a new and different use as a real estate development business, rather than to "keep" the property in its previous condition as an electric power plant.

[17] Power Purchase Contract Buyout Tax Consequences

During the 1980's, many public utilities entered into contracts to purchase electricity from qualifying small power producers and qualifying cogenerators [collectively referred to as "qualifying facilities" (QFs)]. Under FERC regulations, utilities were required to purchase electricity from the QFs at a rate equal to the utility's "avoided costs" (the cost to the utility had it generated its own electricity, or purchased it from another source). In recent years, many of these contracts have become uneconomical to utilities for a number of reasons including reduced costs for utilities to produce their own electricity, excess capacity available to many utilities, and deregulation of the utility industry. Accordingly, many utilities have terminated or renegotiated, or are attempting to terminate or renegotiate, their contracts to purchase electricity from QFs.

Generally, when a public utility terminates, renegotiates, or otherwise modifies an existing QF contract, the utility will make a payment to the QF. The tax consequences (i.e., deduction vs. capitalization) of this payment may vary depending upon the facts surrounding the transaction. Two recent IRS letter rulings provide taxpayers with valuable insight into how the IRS may treat a power purchase contract buyout (a letter ruling may not be used or cited as precedent).

Generally, payments made by a utility to terminate a power purchase contract with a QF are currently deductible for tax purposes if the buyout is not contingent upon the creation, alteration, or enhancement of any other relationship with the QF. If the utility and the QF have a continuing relationship, the utility may be required to capitalize the buyout payment made to the QF.

In Letter Ruling 9615028, the IRS held that an ongoing relationship did not exist between the utility and the QF, and that the utility was entitled to a current

the year incurred. This ruling, which was targeted at the costs of removing telephone poles, appears to end the debate for many investor-owned utilities that had been told by the IRS to capitalize removal costs as part of the replacement assets.

The IRS ruling applies to retired depreciable assets accounted for in a single or multiple asset account. According to the ruling and contrary to the position previously taken by examining agents, the removal costs relate not to the replacement asset but rather to the retired asset. In addition, the ruling stands for the proposition that removal costs do not relate to assets having a useful life in the utility's business that extends substantially beyond the year in which the costs were incurred. It should be noted, however, that the ruling does not apply to either the removal of a component of a depreciable asset or to building demolition costs.

In conclusion, based on Revenue Ruling 2000-7, the costs associated with the retirement and removal of a depreciable asset occurring in connection with the installation or production of a replacement asset are not required to be capitalized. Should a taxpayer change the method of accounting based on this ruling, the change will be subject to the applicable IRS procedures for accounting method changes.

[21] Environmental Remediation Costs Are Deductible in the Year Incurred

Public utilities are often must incur costs to remedy environmental contamination on their properties. A major consideration is whether the expenses associated with the clean up are deductible currently for tax purposes or instead must be capitalized. In a recent letter ruling, the IRS ruled that the remediation of a manufactured gas plant site gave rise to currently deductible expenses to the extent that the costs are allocable to contamination that occurred during the taxpayer's ownership of the properties at issue.¹²⁴

The ruling was requested by a public utility that distributes gas and electricity. The utility owns properties where it owned and operated a manufactured gas plant (MGP) site from the 1880's until the 1950's. Byproducts of coal burned to produce the gas in the MGPs included coal tars, sludges, oils, and other chemicals. During the plant's operations these chemicals were often disposed of on the plant sites in unlined pits.

The utility developed a plan to consolidate its corporate facilities. In conjunction with this plan, it conducted a site investigation and determined that remediation was necessary due to the level of contamination. In its ruling, the

IRS allowed the utility to currently deduct the costs associated with cleaning the property to the extent that the contamination occurred during its ownership of the property.

In general, the test to determine whether costs are currently deductible or capitalizable is whether the expenditure increases the property's value. The IRS determined that the remediation merely returned the property to its approximate pre-contamination condition and did not increase its value. Moreover, the restoration activities neither prolonged the property's useful life nor adapted it to a new or different use. This test, termed the "plan of rehabilitation doctrine," has been applied by the Tax Court in *Norwest Corporation*¹²⁵ and by the U.S. Circuit Court in *Moss*.¹²⁶ Both of those decisions noted that the plan of rehabilitation doctrine has only been applied in cases involving substantial capital improvements and repairs to the same specific asset.

Comment: Based on the IRS ruling and on related court decisions, utilities appear to have a position to currently deduct environmental remediation costs for a particular site for contamination that occurred during its ownership of the site. Remediation applicable to contamination that occurred before the utility's acquisition of the site must be capitalized.

[22] Research and Experimentation Credit

With the issuance of the final IRC Section 174 regulations in 1994, the IRS appeared to be moderating its historically adversarial approach to claims for the IRC Section 41 research credit. Since 1994, however, the volume of research credit claims and the amounts at issue have skyrocketed and the IRS pendulum has swung back. In the current climate, it is not unusual to see the rejection of all, or an overwhelming part, of research tax credit claims, particularly if software development is involved. A weapon in the IRS arsenal is the decision in *United Stationers, Inc. v. United States*.¹²⁷

In *United Stationers*, the taxpayer purchased a software package ("DCS") from a business consulting firm for \$956,000. The taxpayer then spent over \$1,000,000 in significantly modifying the package to produce eight custom software systems to perform its customer service, record keeping, and inventory management functions. Only the file structure and access code elements of the DCS product were used in the taxpayer's final systems—the taxpayer designed all application codes to meet its needs.

The *Lockheed Martin* case, decided April 27, 2000, in favor of the taxpayer, should be viewed as good news for taxpayers that perform research in contractual

¹²⁵ *Norwest Corp & Subs v Commr* 108 TC 265 (1997).

¹²⁶ *Moss v Commr*, 831 F2d 833 (9th Cir 1987).