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Pipeline Safety R&D at the Office of Pipeline Safety

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Office of Pipeline Safety

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Pipeline Safety R&D at the Office of Pipeline Safety

International Pipeline Conference

Calgary, Alberta, Canada

October 5, 2004

Jeff Wiese

Office of Pipeline Safety

Pipeline Safety R&D: Questions

- What are we trying to accomplish through the R&D program?
- What are the elements of our management approach? Goals?
- On what R&D topics are we focusing?
- How have we distributed resources to date?
- How will we know whether the program is succeeding?

What are We Trying to Accomplish Through the R&D Program? Pipeline Safety R&D Mission

To sponsor research and development projects focused on *providing near-term solutions* that will increase the *safety, environmental friendliness, and reliability* of the Nation's pipeline transportation system

What are We Trying to Accomplish Through the R&D Program? Strategic Objectives

- Developing technology that supports the OPS regulatory mission;
- Focusing on near-term technology development needs and opportunities;
- Conducting an effective program of technology transfer and communication with stakeholders;
- Maximizing the return on the R&D investment by coordinating activities with other sources of R&D funding, including other federal agencies;
- Efficiently and effectively managing the R&D program.

What are the Elements & Goals of Our Management Approach?

	<u>Management Elements</u>	<u>Management Goals</u>
1.	Effective and Efficient Program Management	Efficient and effective management of the R&D program
2.	Coordination and Collaboration with Other Stakeholders	Stakeholders role: identify technology gaps and coordinate R&D activities
3.	Communication of R&D Program Activities, Results, and Impacts	Effective communication of program activities, results, and successes
4.	Technology Transfer and Application of Results	Effective and rapid deployment of technology from the R&D program

What are the Components of our Management Approach?

- Identification of R&D needs
- Integration with our regulatory mission
- Leveraging limited resources
- R&D project selection & procurement
- R&D project management
- Assessment of contribution (peer review)
- Technology transfer
- Measuring program effectiveness

R&D Topical Areas: Program Elements (1/2)

- Damage prevention
- Pipeline assessment and leak detection
- Defect characterization and mitigation
- Improved design, construction and materials

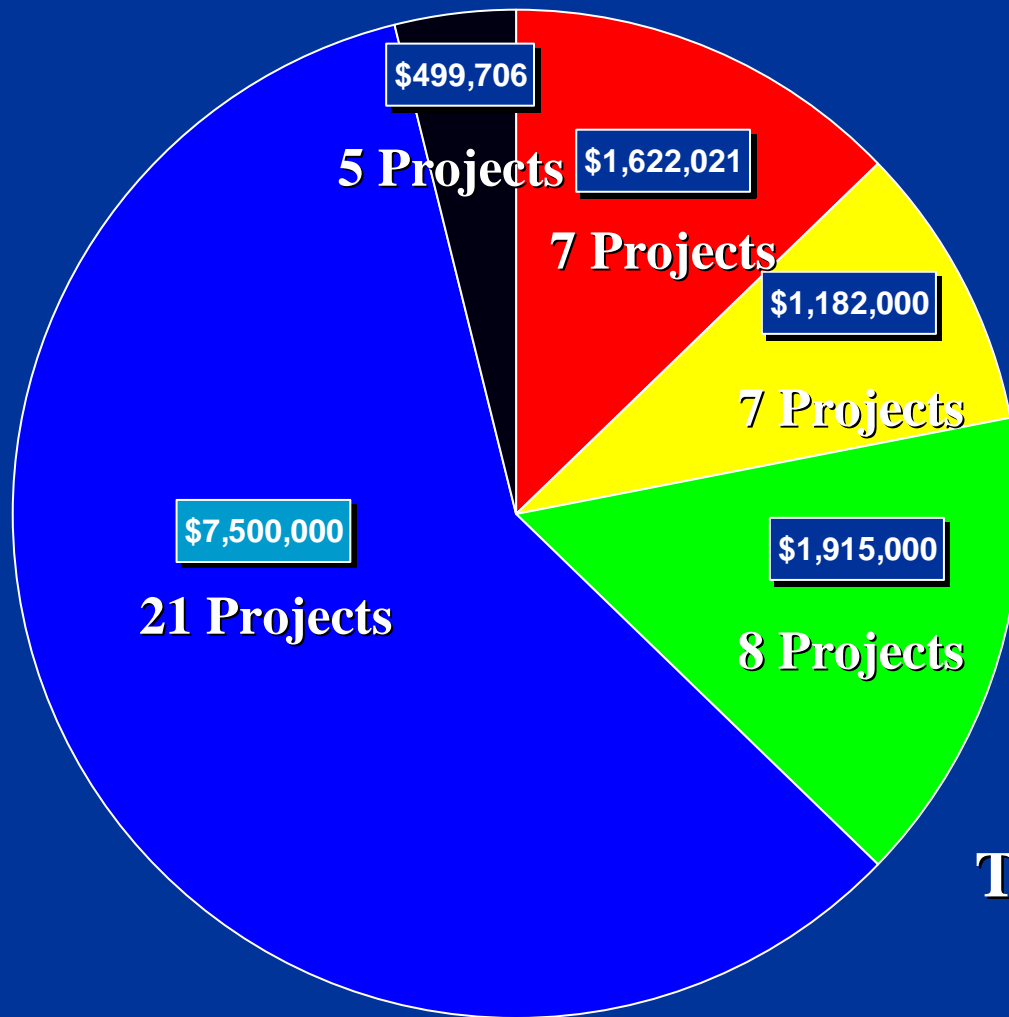
R&D Topical Areas: Program Elements (2/2)

- Systems for pipeline mapping and information management
- Enhanced operation controls and human factors management
- Risk management and communication
- Safety issues for emerging technologies

R&D Topical Areas: Program Elements & Goals

	<u>Program Elements</u>	<u>Program Element Goals</u>
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment & Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
3.	Defect Characterization and Mitigation	Improving the capability to characterize the severity of defects in pipeline systems and to mitigate them before they lead to incidents or accidents
4.	Improved Design, Construction, & Materials	Improving the integrity of pipeline facilities through enhanced materials, and techniques for design and construction
5.	Systems for Pipeline Mapping and Information Management	Enhancing the ability to prevent and respond to incidents and accidents through management of information related to pipeline location (mapping) and threats definition
6.	Enhanced Operation Controls and Human Factors Management	Improving the safety of pipeline operations through enhanced controls and human factors management
7.	Risk Management & Communications	Reducing the probability of incidents and accidents, and mitigating the consequences of hazards to pipelines
8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Element-Level Funding: BAAs & Small Business Innovation Research



- BAA #1 (March 2002)
- BAA #2 (June 2002)
- BAA #3 (Dec 2002)
- BAA #4 (Jan 2004)
- SBIRs (Phase I)

Total Projects Awarded Since March 2002

48

Total OPS Funding*

Approx. \$12,518,727

Total Industry Co-Funding*

Approx. \$18,068,475

* Final award amounts from BAA #4 have not yet been determined

Turning R&D Results into Impacts - Setting Goals

- OPS is using “*program logic modeling*” to define performance objectives for program elements and to begin the process of technology transfer.
- Components of a Program Logic Model
 - **Activities:** The projects being conducted in the R&D program
 - **Outputs:** The results anticipated at the conclusion of the projects.
 - **Customers Reached:** The stakeholders who are expected to use or benefit from the results.
 - **Short-Term Outcomes:** The beneficial effects of R&D project outputs that could occur within five years of completion of the work.
 - **Long-Term Impacts:** The longer-term consequences for the public of having conducted the R&D as related to the mission of OPS.

Example of a Program Logic Model

- **Goal:** reduce incidents from outside force
- **Activity:** damage prevention & leak detection technology development and demonstration
- **Output:** new methods for locating pipe and detecting leaks
- **Customer reached:** pipeline operators, pipeline suppliers, suppliers of detection equipment
- **Short-term outcomes:** proof-of-concept for new technology, technology being deployed
- **Long-term impacts:** fewer incidents

Program Driver, Collaborators, and Controls

- Pipeline Safety Improvement Act (PSIA) of 2002 (driver)
- Joint Government/Industry R&D Forum, Interagency Coordination Meetings (collaboration)
- Blue Ribbon Panel, Pipeline Safety Advisor Committees, GAO, OMB (controls)

Defining Documentation

**Interagency
R&D
Five-Year
Program Plan
for Pipeline
Safety and
Integrity
(Complete)**

**OPS R&D
Program
Strategic Plan
(Final Draft)**

**OPS R&D
Program
Performance
Plan
(Final Draft)**

R&D Program MIS: Features & Benefits

- Paperless processing:
 - BAA through project selection
 - Overall reduction in time: solicitation to award
- Tracking & accountability features:
 - Linking project activities with financial requirements
 - Notification for approaching milestones
- Rapid query functions for information requests

OPS R&D Program Contacts

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Backup Slides

Management Oversight Process

1. Identifying gaps and technology needs focusing on priority requirements.
2. Managing the individual projects effectively and efficiently to successful conclusion.
3. Planning and implementing specific steps for demonstrating newly-developed technologies and utilizing R&D results.
4. Coordinating activities with other federal or state agencies and industry organizations with guidance from stakeholder groups.
5. Widely communicating and disseminating the results of the R&D program.
6. Using expertise and tools of analysis to identify technology opportunities and synergies between programs.

Topics Covered in Defining Documentation

- Program Elements
- Program Goals
- Program Logic Models
- Performance Measures
- Peer Review Role & Approach
- Management Oversight Approach
- Approach: Collaboration, Coordination, Co-Fund
- R&D Results Dissemination
- Technology Demonstration & Transfer

Peer Review of Projects

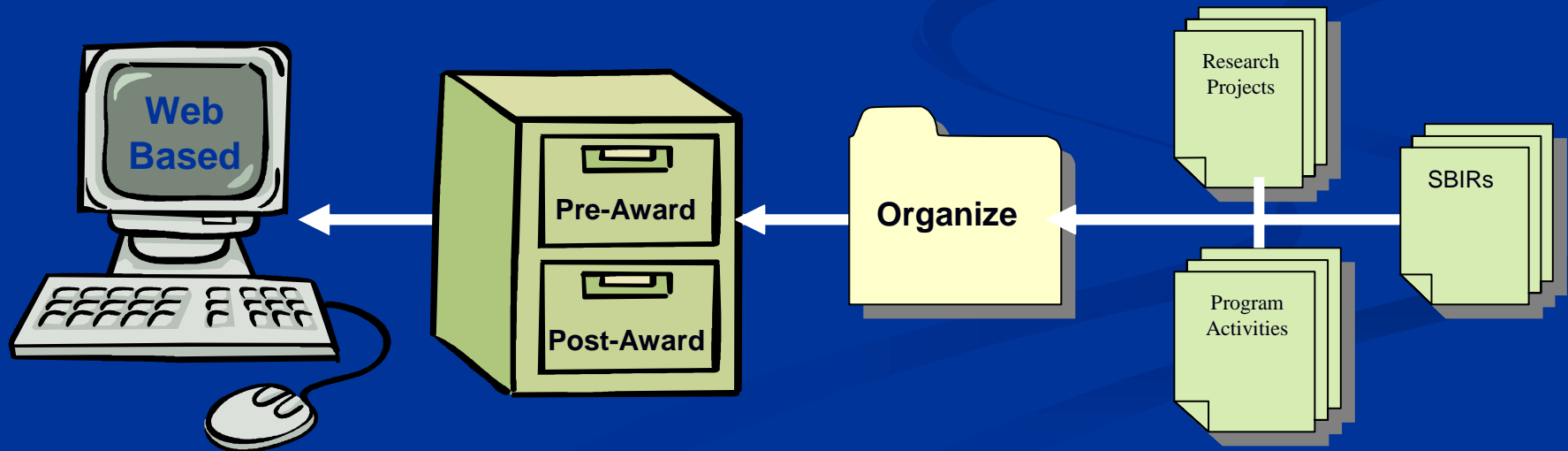
- Relevance of projects to the pipeline safety mission
- Soundness of the technical approach and design of the project
- Effectiveness and efficiency of project management
- Appropriateness of the plan for technology transfer
- Coordination of the project with related efforts
- Quality of the results

R&D Program Efficiency Measures

1. Percent of OPS R&D projects satisfying project performance objectives
2. Ratio of OPS R&D funding to number of OPS R&D staff participation (FTE)
3. Fraction of OPS R&D funding to total R&D funding on OPS projects
4. Percent of R&D projects competitively funded
5. Percent of OPS R&D funding that is one year or less in duration
6. Percent of OPS R&D funding that is one to two years in duration
7. Percent of OPS R&D funding that is greater than two years in duration

Office of Pipeline Safety Research & Development Program's

Management & Information System (MIS)



Management Information System (MIS)

OPN Research and Development: DTRS56-04-BAA-0002 - Microsoft Internet Explorer

OPN Research and Development

DTRS56-04-BAA-0002

Welcome to the online research solicitation submission system for the Department of Transportation's Office of Pipeline Safety

Pipeline Safety Research and Development -- Damage Prevention; Leak Detection; Enhanced Pipeline Operations, Controls, and Monitoring; Improved Materials Performance, and Other Safety Improvements

SPECIAL NOTE: This announcement will be open for white paper submission through **March 3, 2006** or unless otherwise awarded. The announcement is purely paperless and requires registration before the submission of your white paper. You will then receive a user ID and password via email to a private and secure location for uploading your white paper. The period for registration expires on **February 27, 2006** or 5 working days prior to and of this announcement.

The purpose of the BAA is to select research projects to assure the long-term integrity and security of the nation's gas and hazardous liquid pipeline network. A team of experts will review white papers submitted in response to this announcement and offers will be advised of the outcome and anticipated follow-up from this review as it is completed.

More information is available below:

[Register for DTRS56-04-BAA-0002](#) [Q & A](#)

All inquiries concerning the announcement shall be directed to the OPN Office of Contracts and Procurement, ATTN: Mr. William D. Osterberg, Contracting Officer, Telephone: (202) 365-6342; email: william.osterberg@dot.gov

For questions or problems with the Registration or Application of the Web Site, please email Randy Pearson at randy.pearson@dot.gov

Announcement Details
DTRS56-04-BAA-0002
U.S. Department of Transportation, Research and Basic Program Administration, Office of Contracts and Procurement

OPN Research and Development: Registration Page - Microsoft Internet Explorer

OPN Research and Development

Registration Page

Entity Form

Organization/Entity Name

Official Name of Organization/Entity

Entity Type

For Profit
 Educational/University
 Other Non-Profit
 Government - Federal
 Government - State
 Government - Local

Home Address

Street Address: (as defined by ZIP) City/State: (as defined by ZIP) ZIP:

Country:

Summary of Type of Research Performed: For information only. This does not constrain what white papers you can take action on.

Principal Contact Data

Last Name: First Name:

Job Title:

OPN Research and Development: White Paper Review - Microsoft Internet Explorer

Recuse Yourself for this White Paper

No.	Review Criteria	Score	Strengths	Weaknesses
1.	Officer's understanding, and description, of the "state of the art" in the research area the officer is preparing to address.	Score: <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 1 = Unacceptable, 5 = Excellent	<input type="text"/>	<input type="text"/>
2.	The scientific and technical merit of the proposal to advance pipeline safety.	Score: <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 1 = Unacceptable, 5 = Excellent	<input type="text"/>	<input type="text"/>
3.	The adequacy and feasibility of the technical approach and realism of cost estimate.	Score: <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 1 = Unacceptable, 5 = Excellent	<input type="text"/>	<input type="text"/>
4.	Technical experience and capabilities of the officer in federal research program.	Score: <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 1 = Unacceptable, 5 = Excellent	<input type="text"/>	<input type="text"/>
5.	Time line to implement the proposed technologies and concepts into practice in the pipeline industry (one to three years preferable).	Score: <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 1 = Unacceptable, 5 = Excellent	<input type="text"/>	<input type="text"/>

Overall Comments:

Total Score:

OPN Research and Development: My Reviews for DTRS56-04-BAA-0002 - Microsoft Internet Explorer

OPN Research and Development: Robert Smith

My Reviews for DTRS56-04-BAA-0002

Message DTRS56-04-BAA-0002 (URL for DTRS56-04-BAA-0002) (Information for Reviewed) (Manage BAA) (White Papers) (BAA PDF) (Open Submissions) (Research Tables)

White Paper Reviews by Robert Smith, sorted by: My Score (Sorted By Focus Area)

NO.	Title	Project Title	Co-Authors (Partners) Name	White Paper File	Score
1.	WPR55 General Electric Global Research	Third Party Damage: High Probability Area Identification		[View/Download...] 96,473 byte (PDF)	22
2.	WPR61 General Electric Global Research	Third Party Damage: Field Prototype and Demonstration		[View/Download...] 113,277 byte (PDF)	21
3.	WPR54 Engineering Mechanics Cooperative of Colorado	Failure Reduction Modes of Pipe with High Charge Transition Temperature		[View/Download...] 235,363 byte (PDF)	20
4.	WPR24 C-PEC Technologies	EFFECTIVENESS OF PREVENTION METHODS FOR OCCUPATION DAMAGE	PEC	[View/Download...] 141,251 byte (PDF)	18
5.	WPR27 Center for Underground Infrastructure Research & Education, Michigan State University	Investigation on New Technologies, Professional and Educational Requirements for Damage Prevention during Horizontal Directional Drilling		[View/Download...] 998,532 byte (DOC)	18
6.	WPR10 Eastman Kodak Company	RF Methods for Adoption of SAM Detection Technology		[View/Download...] 47,638 byte (DOC)	18
7.	WPR15 Integrity Supply & Training	The Mutual Interference Bridge for Pipeline Inspection - Enhanced Pipeline Inspection Technologies & Risk Assessment		[View/Download...] 671,744 byte (DOC)	17

OPS R&D Website

<http://primis.rspa.dot.gov/rd>

RD Home Page - Microsoft Internet Explorer

Address: <http://primis.rspa.dot.gov/rd>

Research & Development

U.S. Department of Transportation

R&D Home

Welcome to OPS's pipeline safety Research and Development website. This site is dedicated to the collaboration and dissemination of Research and Development information related to Pipeline Safety.

OPS conducts and supports research to support regulatory and enforcement activities and to provide the technical and analytical foundation necessary for planning, evaluating, and improving the pipeline safety program. OPS is sponsoring research and development projects focused on providing near-term solutions that will increase the safety, clearness, and reliability of the Nation's pipeline system.

Recent R&D projects are focused on: leak detection; detection of mechanical damage; damage prevention; improved pipeline system controls, monitoring, and operations; and improvements in pipeline materials. These projects are addressing technological solutions that can quickly be implemented to improve pipeline safety.

In 2003, a study by the General Accounting Office (GAO) found that OPS's R&D program is aligned with OPS's mission and pipeline safety goals.



U.S. Department of Transportation - Research and Development Program - Office of Pipeline Safety

<http://primis.rspa.dot.gov/rd/rd/home>

Project Map - Microsoft Internet Explorer

Address: <http://primis.rspa.dot.gov/rd/rd/projects/map>

Recent R&D Projects Map

U.S. Department of Transportation

The symbols on the following map indicate the locations of research firms conducting projects for the Office of Pipeline Safety. Click these symbols to display further project information.



Legend:

- Leak Detection
- Damage Prevention
- Material Science
- Control Systems
- Operations
- Other

U.S. Department of Transportation Office of Pipeline Safety (PHS000)

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OPS Research and Development - Microsoft Internet Explorer

Address: <http://primis.rspa.dot.gov/rd/rd/home/rd/rd>

Query by Category

Pipeline Type/Location	Risk Analysis Methods	Pipeline Condition/Pipeline Activities
<ul style="list-style-type: none"> Onshore Transmission Pipeline <ul style="list-style-type: none"> Gas Pipeline Liquid Pipeline Arctic Offshore Liquefied Natural Gas/LNG Marine Gas Distribution Storage Other Pipeline Types <ul style="list-style-type: none"> CO₂ Drainage Marine Hydrogen 	<ul style="list-style-type: none"> Fracture Analysis Damage Consequence Assessment Consequence Analysis Risk Assessment Incident/Event Cause Analysis 	<ul style="list-style-type: none"> Pipeline Condition <ul style="list-style-type: none"> Internal Corrosion External Corrosion Stress Corrosion Cracking Manufacturing Defects Installation Defects Regimes Outside Force Damage
	Regulatory Issues <ul style="list-style-type: none"> Damage Prevention Public Safety Pipeline Design/Construction Pipeline Mapping/Location Emergency Response Incident Reporting Data Quality Right-of-Way 	<ul style="list-style-type: none"> Cathodic Protection Equipment Failure Pipeline Maintenance Pipeline Hydrates Pipes/Rehabilitation Generator Sites Excavation Techniques
Inspection and Assessment Technologies <ul style="list-style-type: none"> Leak Detection Automated Monitoring In-Line Inspection/Logging Hydrostatic Testing Direct Assessment Emerging Technology Non-destructive Testing/Evaluation Remote Sensing 		Processes/Tools <ul style="list-style-type: none"> Quality Assurance Change Management Integrity Management LEIS Computer-Aided Tools Performance Measures One-call Systems Types of Study <ul style="list-style-type: none"> Literature Review Study Project International Comparisons Types of Project <ul style="list-style-type: none"> Systems Development

OPS Research and Development - Microsoft Internet Explorer

Address: <http://primis.rspa.dot.gov/rd/rd/home/rd/rd/rd>

OPS Research and Development

Baseline Study of Alternative In-Line Inspection Vehicles

U.S. Department of Transportation

Project Categories

- In-Line Inspection/Logging
- External Corrosion
- Internal Corrosion
- International Comparisons

Project Description

The purpose of this research is to conduct a baseline study of alternative ILI vehicles that might be able to separate ungrapple pipelines. The researchers will: (1) document the status of ungrapple pipelines and mitigation options; (2) document design of ILI devices being used in other industries; (3) identify options to inspect transmission and distribution lines; (4) document current ILI systems in the U.S. and abroad; and (5) determine minimal tool capability in other related industries (nuclear, water, plant production).

Cost

- Total Project Proposal \$80,000.00

Status History

Project initiated in October 2002. Project duration of 9 months. Third-quarter 2003 status report posted. 9/20/03. Final Report and Close-out Presentation posted November 2003.

Attachments

- Report: ILI_1st_0719_04_1st_0719_04_1st_0719_04.pdf (177,049 bytes)
- Report: ILI_2nd_07_04_1st_0719_04_1st_0719_04.pdf (33,900 bytes)
- Third-quarter 2003 status report from Southwest Research Institute: Report: ILI_3rd_07_04_1st_0719_04_1st_0719_04.pdf (11,306 bytes)
- Report: ILI_Download_Oct19_2003_Public.pdf (2,936,294 bytes)

Fast Facts	
Research Entity:	Southwest Research Institute
COPIA:	Arade Van Nguyen
Contract #:	DTES99-CD-T-0084
OPS Library No.:	Unknown
Contact info:	Dr. Janice Jackson 6220 Outback Road San Antonio, Texas 78249 Email: annj@swri.org http://www.swri.org
Collaborators:	El Paso Pipeline Company Pipeline Research Council International, Inc. (PRCI)
Financial Data	
Study Order:	Ordered
Cost Year Started:	2002
End Year:	2003
Budget Allocation Type:	Unknown
Published by:	OPS
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