Options for Reducing Copper Theft

Final Report 657

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16. Abstract

This research investigated the theft of copper, including scope, impacts, and countermeasures. The researchers completed a literature review to demonstrate a global perspective of the problem. They took a survey of other state departments of transportation, utility companies, and developers to determine both successful and unsuccessful techniques being used to deter copper theft and the impact copper theft had on other geographical regions and other industries. Additionally, the researchers conducted a site survey to gain knowledge of the specific issues impacting the Arizona Department of Transportation and what mitigation techniques it was implementing.

During the time of the research it was found:

1. The Arizona Department of Transportation estimates that costs over the last two years have exceeded $500,000.
2. The Arizona Department of Transportation has been diligent in implementing and adapting various methods and/or techniques to prevent copper theft and apprehend culprits.

Suggested mitigation techniques include:

1. Implement a collaborative effort among ADOT, the contracted private investigation firm, and outside consultant(s) to review and amend efforts on a periodic basis to maximize effectiveness through a think-tank type of approach.
2. Implement a program that would monitor ongoing development of methods used by other organizations.
3. Make particular use of the Copper Keeper, a device that makes it difficult to pull wire through conduit by locking the wire in place through the tightening of a compression bolt.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in²	square inches	645.2	square millimeters	mm²
ft²	square feet	0.093	square meters	m²
yd²	square yards	0.836	square meters	m²
ac	acres	0.405	hectares	ha
mi²	square miles	2.59	square kilometers	km²
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft³	cubic feet	0.028	cubic meters	m³
yd³	cubic yards	0.765	cubic meters	m³
	NOTE: Volumes greater than 1000L shall be shown in m³.			
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000lb)	0.907	megagrams (or "metric ton")	mg (or "t")
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5(F-32)/9 or (F-32)/1.8	Celsius temperature	°C
		ILLUMINATION		
fc	foot candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m²	cd/m²
		FORCE AND PRESSURE OR STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm²	Square millimeters	0.0016	square inches	in²
m²	Square meters	10.764	square feet	ft²
m²	Square meters	1.195	square yards	yd²
ha	hectares	2.47	acres	ac
km²	Square kilometers	0.386	square miles	mi²
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m³	Cubic meters	35.315	cubic feet	ft³
m³	Cubic meters	1.308	cubic yards	yd³
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.205	pounds	lb
mg	megagrams (or "metric ton")	1.102	short tons (2000lb)	T
		TEMPERATURE (exact)		
°C	Celsius temperature	1.8C + 32	Fahrenheit temperature	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m²	candela/m²	0.2919	foot-Lamberts	fl
		FORCE AND PRESSURE OR STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in²

SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The United States Department of Energy estimates copper wire theft costs the public $1 billion per year.[1] The Arizona Department of Transportation estimates costs over the last two years have exceeded $500,000. Theft appears to be increasing and the culprits are becoming bolder and more sophisticated.

The severe increase in the cost of copper, coupled with the multiple options for sale of stolen wire, has made theft of copper wire attractive to thieves. Copper wire theft has not been confined to any specific area, as wire has been stolen during shipping, while in storage, and after installation. Vacant buildings and street lighting have been common targets for theft of wire that has been installed.

Legislation in many states has changed or is changing as a result of the magnitude of this phenomenon. The typical change in legislation involves increasing penalties for theft of copper and other metals, as well as initiating new ones or increasing existing reporting requirements for vendors, such as recycling facilities, that may buy scrap metal.

Since this type of theft is relatively new, many of the methods used to combat the problem are untested and theoretical. For this reason, a trial-and-error approach has been common in attempting to decrease these types of theft. Some methods will work for a period of time only to be sidestepped by culprits once they become aware of the method in use.

In this report, the researchers look into the practices that other organizations similar to the Arizona Department of Transportation are implementing and which techniques appear to be successful. We also examine organizations that have experienced theft of copper under different conditions to see if methods used in different situations could be adapted and applied to serve the needs of the Arizona Department of Transportation.

KEY FINDINGS

♦ Although there have been increased penalties for thieves and increased regulation of scrap metal purchases, there has been little or no decrease in thefts.

♦ Three organizations appear to be significant in fighting material theft:
  o The National Conference of State Legislatures, which advises legislators on issues.
  o The Institute of Scrap Recycling Industries, which helps recyclers identify and reject stolen materials.
  o The National Insurance Crime Bureau, which maintains systems to address asset theft.

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[1] Fazzini, Kate (2008, August 11). Copper theft sparks legislation efforts. *Home Channel News*. Retrieved from http://findarticles.com/p/articles/mi_m0VCW/is_9_34/ai_n28013124. (accessed November 25, 2008).

- Some successful techniques used by other organizations in preventing theft of copper include:
  - Using Copper Keeper®, a wire locking device that can be installed in conduit.
  - Installing tamper-resistant units on cabinets, poles, and pull boxes.
  - Performing security assessments on key locations and taking hardening measures, including apprehending thieves instead of chasing them off.
  - Limiting the storage of copper to service centers and not using outlying facilities.
  - Placing guards on job sites.
  - Installing wiring and security devices on all job sites.
  - Burying pull boxes.
  - Installing alarm systems in the pull boxes.

- Some unsuccessful techniques used by other organizations in preventing theft of copper include:
  - Covering pull boxes with concrete slab.
  - Using police surveillance.

- Other techniques that are being used, yet have unknown or inconclusive results, include:
  - Purchasing an enclosed trailer to move copper from site to site.
  - Requesting local law enforcement to look out for copper thieves.
  - Asking the general public through the media to report suspicious activities.
  - Using Data Dots (See page 21 of the report for a detailed description).
  - Using security screws (See page 21 of the report for a detailed description).
  - Delivering copper material on an as-needed basis.
  - Painting copper grounds at substations.

- The Arizona Department of Transportation (ADOT) has been diligent in implementing and adapting various methods and techniques to prevent theft and apprehend culprits. Two specific examples are the continual adaptation of various techniques to limit access to pull boxes and contracting with a private investigation team to patrol problem areas and respond to thefts.

KEY RECOMMENDATIONS

Incorporate the following general practices:

- Implement a collaborative effort among ADOT, the contracted private investigation firm, and outside consultant(s) to review and amend efforts on a periodic basis to maximize effectiveness through a think-tank type of approach. This effort may also include exploring the use of mobile video cameras or other surveillance equipment, developing processes to maximize effectiveness of such equipment, and determining whether increased monitoring equipment is redundant to current practices.

♦ Implement a program that would monitor ongoing development of methods used by other organizations.This is especially necessary due to the relative infancy of the phenomenon, which makes many methods effective for a period of time, but do not provide a final or long term solution.This will reduce theft by gaining exposure to methods of multiple organizations that are also working in a trial-and-error method.It will also offer a reference point for quick response to queries regarding the effectiveness of a new or developing technique and possible adaptation of those techniques that may increase effectiveness.An outside research or analysis firm would be a potential candidate to fill this role.The goal of this effort should be to provide periodic up-to-date status on developing efforts including effectiveness of methods being used.Reports and updates should be short and direct so that evaluation of possible implementation and application to a specific site is simple.

♦ Implement a program within ADOT to encourage cross-departmental collaboration to share lessons learned and identify in more detail loss numbers and potential leveraging of resources to combat theft and vandalism. A holistic approach to attacking theft and vandalism may identify cost-cutting opportunities or cost recovery opportunities that exist within current operations.

♦ When possible and practical, participate in efforts to increase restrictions on sale of potentially stolen copper.This may include local or federal efforts, such as awareness campaigns or legislation changes.

♦ Employ the following methods to deter theft and increase potential of apprehension:
  o Use of Copper Keeper (A more detailed description of the Copper Keeper can be found in the Product Description category on Page 21 in the Quantitative Research section of the report).
  o Continued use of private investigation firm.
  o Continued adaptation of methods used to prevent access to pull boxes.
  o Reporting of thefts to ISRI's Theft Alert System.

INTRODUCTION

BACKGROUND

This report was prepared for the Arizona Department of Transportation (ADOT) to explore options for reducing copper theft.

Copper theft has become a significant problem along Arizona's roads. Reducing theft of copper would decrease monetary losses due to loss and replacement of copper. Additionally, unknown savings resulting from fewer accidents or reduction of other opportunistic crime because of inoperable street lighting would be possible.

As this surge of copper theft is a relatively new phenomenon, many organizations are attempting new methods using a trial-and-error approach. One goal of this study is to identify successful, as well as unsuccessful, methods that have been implemented by others.

SCOPE

This research study was completed through the ADOT Arizona Transportation Research Center (ATRC's) research program for small-budget projects. A literature review was conducted of various sources through a period of Web monitoring. A survey was conducted of other motor vehicle departments, contractors, and developers in an effort to discover methods used to deter theft of copper, as well as to contrast the types of theft. A survey was conducted of two typical sites affected by the theft of copper wire. Final deliverables are this report and a separate PowerPoint presentation.

METHODOLOGY

The Project Manager was ATRC's Frank R. Di Bugnara. The Project Researchers were John Murdock, Dr. Beverly Rawles, and Jeremy Schoenfelder of the Mid-Atlantic Innovative Technology Center and Jarvis Anderson of ArrayNet Inc.

Internet searches were conducted both globally and locally to Arizona to determine the magnitude of the phenomenon. In this original search, no effort was made to study the individual results. Further monitoring was conducted over a one-month period to localize results to specific states. An in-depth study of approximately 50 findings was then conducted to spot trends that might be developing.

Survey questions were developed and distributed for response to departments of transportation of all 50 states, as well as Puerto Rico. The survey and results are attached (see Exhibit 1).The survey was also distributed to contractors and power companies in Arizona. The survey was designed to determine how greatly the agencies have been affected, as well as methods that they have used to combat the problem and the success of these methods.

Site assessments were then conducted on two sites that have been most affected by theft of copper and a Risk Assessment (see Exhibit 2) checklist was completed. This was done in an effort to understand the specific nature of theft to which the Arizona Department of Transportation has been exposed.

OVERVIEW

This report has seven sections:
♦ Executive Summary.
♦ Introduction.
♦ Literature Review.
♦ Survey.
♦ Site Assessment.
♦ Conclusions and Recommendations.
♦ Appendix.

The literature review section contains information regarding various searches that demonstrate the magnitude of the problem.

The survey (see Exhibit 1) section contains information regarding methods other organizations have used and which of the methods were said to have been successful or unsuccessful. It also contains methods that are currently being used with unknown results.More detailed descriptions of some methods are included in this section.

The Conclusions and Recommendations section makes suggestions for consideration and briefly discusses their costs and benefits. The recommendations are divided into two sections:
♦ General: These recommendations are not necessarily meant to be specific practices to deter theft, but rather are general recommendations that can be implemented.
♦ Theft Deterrent/Criminal Apprehension: These are more specific recommendations that can be implemented in order to deter theft or increase the probability of criminal apprehension.

The Appendix contains a copy of the survey with results and the results of the site assessments.

LITERATURE REVIEW

INTRODUCTION

This review is a sampling of copper theft reports, theft damage reports, and theft detection and preventive actions being offered by professional organizations and businesses. Included also is a sampling of responses by local and state law organizations and existing and proposed legislative actions. The final section of this review provides a few search results as a sample of the type of information available through online searches.

Early in the online searches, it became apparent that copper theft information and data are often embedded in general information on materials theft, including theft of other metals such as aluminum.From this preliminary information and data search, it is anticipated that increased global economic development in time may well produce other materials shortages. These shortages will probably lead to price increases that will result in increased thefts of these metals as well as copper.

Numerous new reports appear daily in the press. For example, on April 10, 2008, Google displayed seven copper theft stories from a total of about 300 reports compiled since the previous March 1. The global scope of the problem is illustrated by one of the seven items stating that Guam should follow Hawaii's enactment of a measure that specifically targets copper theft.

RESEARCH METHODOLOGY

This section discusses Internet searches done to identify the depth and breadth of copper theft. The searches were done globally and for Arizona as described in the Introduction. Approximately 50 search results were reviewed in depth for this report, with several extracts from the reports listed in the Specific Findings subsection. The selected items illustrate the nature of the copper theft threats, reactions by public and private organizations, and some vendor descriptions of products and services that purport to help prevent the thefts. It would seem that increased penalties on thieves and increased "regulation of scrap purchases" would begin to slow the number of thefts, but that doesn't as yet seem to be the case. Only a couple of items suggested a decrease of copper thefts.

Another investigational technique was the use of search engine alerts to detect major changes and events that might be of value. A related approach was to use a search strategy for several states and countries to determine responses to the copper theft problem. Initially, to get a general feeling for the nationwide problem and to detect initial variations, if any, for Arizona, compared to other states, the researchers employed a test Google News search strategy using the expression "copper AND (state) OR (state abbreviation) AND theft" every day during the month of September, 2008. A sampling of 10 states was selected, including Arizona. The expressions and their yields were:

State	Reports
copper AND alabama OR al AND theft	14
copper AND alaska OR ak AND theft	3
copper AND arizona OR az AND theft	15
copper AND colorado OR co AND theft	48
copper AND delaware AND theft	10
copper AND florida OR fl AND theft	32
copper AND Illinois AND theft	16
copper AND "new york" OR ny AND theft	28
copper AND utah OR ut AND theft	0
copper AND "west virginia" OR wv AND theft	18

This 10-state search for a one-month period was a sample of the monthly news reporting in the United States on copper theft. No attempt was made to verify or analyze the findings. The purpose was to assess the magnitude of the nationwide copper theft problem and to detect initial variations, if any, for Arizona, as compared to the other nine states.

A similar stratagem, again with no further analysis, was employed for three countries. These expressions and yields were:

Copper AND germany AND theft	3
Copper AND "great britain" AND theft	8
Copper AND china AND theft	33

SCOPE OF THE SEARCH

A telling measure of the copper theft problem is the number of references obtained by using the search expression "copper AND theft" in both Google and Yahoo!. The Google search yielded 219,000 search results on April 11, 2008, and the Yahoo! search yielded 4,380,000. If the search expression "Arizona AND copper AND theft" is used, the numbers of search results are about 235,000 and 548,000, respectively. It is interesting that Google yields 16,000 more search results from the expression "Arizona AND copper AND theft" than from the same expression without "Arizona." If the expression "copper theft" is used, the numbers are 76,100 and 895,000 in Google and Yahoo!, respectively.

No attempt was made to study the search strategies, the results presentations, or the differences in yields of the two search engines. The goal of these searches was merely to get a quick indication of the scope of the problem.

DESCRIPTIVE FINDINGS

A selected number of search results, approximately 50, were studied in depth to get a better understanding of the quality and value of the reporting and to spot trends and resources, both in Arizona and nationally, that might serve as guides for follow-up research. These guides should, of course, lead not only to reduction of copper theft, but also anticipation of solutions to similar theft issues for other materials as product prices increase.

In this brief review of search results, a few organizations stood out as important to theft controls. These include:

- The National Conference of State Legislatures (http://www.ncsl.org), which works with legislators throughout the country to provide a forum for research and assistance on significant state issues. The NCSL has a list of current statutes and is tracking legislation.

- The Institute of Scrap Recycling Industries (http://www.isri.org), which is an association of scrap-industry companies. ISRI has established an e-mail system to notify scrap recyclers to watch for reported stolen materials and has adopted practices and procedures to minimize the risk of purchasing stolen materials.

- The National Insurance Crime Bureau (https://www.nicb.org), which is dedicated exclusively to preventing, detecting, and defeating insurance fraud and vehicle theft through information analysis, investigations, training, and public awareness. The NICB maintains a data base for over a half billion vehicles in an effort to recover stolen vehicles in cooperation with law enforcement agencies. Some of the systems could be applicable to asset tracking in general.

Some search results also revealed that legislative action has been or is being pursued in approximately 20 states. This typically increases penalties for thieves and institutes some sort of protocol to be required of scrap metal purchasers when purchasing metal from a seller. In general, these actions seem to require various forms identification of the seller, such as a photo ID, physical address, picture of the seller along with the seller's material, or, in some cases, a videotape recording of the transaction. Many also require, if a transaction is over a certain dollar threshold, that payment be sent to a physical address. Penalties exist for scrap metal dealers found not following these requirements. Reports were found that questioned whether or not dealers were following protocol. It was also discovered that "sting" operations have been conducted in an attempt to convict those not following protocol. There were no search results on similar federal legislation, but there was evidence that some parties are working on such federal laws.

Various methods of surveillance and tracking equipment were discovered within these search results:

- Oncor Electric Delivery out of Texas uses a nanotechnology that serves to mark its assets invisibly to the naked eye. This helps to identify stolen material as well as to prosecute thieves. Says its Web site, "In addition to the nanotechnology, Oncor has taken a number of other measures to address copper theft, such as installing security systems on perimeter fences, clearing foliage away from fences, increasing security lighting to make the area more visible and replacing stolen copper with copper weld, which has the same electrical properties as copper but with less market value."[2]

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[2] Pegasus News Wire. (2007, August 3). Oncor uses nanotechnology in fight against copper wire theft. *Pegasus News*. Retrieved from http:// www. pegasusnews. com/ news/ 2007/ aug/ 03/ oncor-uses-nanotechnology-fight-against-copper-wir/.(accessed November 25, 2008).

- Intelligent Video Systems (IVS) uses automated systems to analyze security video. IVS claims that it can include motion and sound detection, allowing for real-time alerts of a potential threat. It could also purportedly increase the probability of crime prevention, whereas traditional video systems are limited to evaluation post-theft.[3]
- Hidden cameras can help with conviction of thieves by decreasing camera tampering.
- Various GPS systems are used to track assets and prevent thefts. Some examples are Livewire GPS,[4] DeWalt Mobile Lock GPS Locator,[5] and Super PocketTrack GPS.[6]

Another form of prevention seems to be in the form of restricting access to wire. Examples are:
- Authorities in Clark County, Nevada, have tack welded access points to street lighting wire.
- Fresno's Public Works Department is "…now installing something like concrete under the (access) lids."[7]

Various techniques are being implemented in an effort to increase reporting and convictions. One form that appears to be widely used is a dedicated phone number or hotline to local police officials to report thefts. The effectiveness or response time of some such hotlines has been questioned. As mentioned above, a Web-based e-mail alert system has been established by ISRI in an effort to notify scrap dealers of stolen material that may be brought to them for an attempted sale. This system alerts not only local dealers but dealers in nearby states, making it more difficult to sell known stolen material.

Local and regional task forces are being formed to combat copper theft. Many appear to strive to promote public awareness, initiate legislative action, discover or test new prevention techniques, or a combination of these.
Lastly, one search result brought up an important statistic illustrating the seriousness of the theft problem. Replacement costs for the items damaged through stolen copper are many times the dollar amount the thieves receive for the copper; up to 50 times by some estimates.

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[3] Axis Communications. (2007, November). Axis and Intelligent Video (IV)-Whitepaper, *Axis Communications.* Retrieved from http:// www. axis. com/ files/ whitepaper/ wp_ axis_ iv_ en_ 0711. pdf. (accessed November 25, 2008).

[4] Brickhouse Security. LiveWire Wired Real-Time GPS Tracking Unlimited. Retrieved from http:// www. brickhousesecurity.com/livewire-lightninggps-trackingdevice.html. (accessed November 25, 2008).

[5] Brickhouse Security. Mobile Alarm GPS Locator. Retrieved from http:// www. brickhousesecurity. com/ mobile-alarm-gpslocator.html. (accessed November 25, 2008).

[6] Brickhouse Security. Super PocketTrack Covert GPS Tracker. Retrieved from http:// www. brickhousesecurity.com/h0001.html. (accessed November 25, 2008).

[7] Corin, Hoggard. (2008, December 22). The Fight against Copper Wire Theft. *ABC 30.* Retrieved from http://abclocal.go.com/kfsn/story?section=news/local&id=5953581. (accessed December 29, 2008).

SPECIFIC FINDINGS

Below are a few extracts, including the title and Web site, and with certain relevant information in bold font, that demonstrate some aspects of the phenomenon:

Extent of Global Epidemic
One article relating to a gang of thieves caught in Spain provided an interesting quantitative statistic in the passage, "The gang is accused of more than 100 acts of theft and selling 700 tonnes of copper in Germany and 800 in China…"[8]

Cable Theft Cost C&WJ $40m Last Year
"Communications giant Cable and Wireless Jamaica has been hit by an upsurge in cable theft that has cost the company approximately $11 million in two months and over $40 million last year…Increasingly, trucks laden with scrap metal of all descriptions — from old car parts, to water pipes — can be seen traversing Jamaica's roads. And recently reports have been made regarding the removal of large sections of railway lines in Manchester belonging to the Jamaica Railway Corporation, ostensibly for the export market…The scraps, for the most part, are shipped to the Far East, especially China…"[9]

Police, Recyclers Unite Against Metal Theft
In Georgia's "…Walton County, efforts by the Sheriff's Office to reach out to local recyclers has been showing results…After the four main local scrap centers voluntarily agreed to stop accepting the copper coils commonly found in air conditioning units at the WCSO's request, thefts of air conditioners dropped to 'almost nonexistent,' said [WCSO deputy SSgt. Gary] Couch."[10]

"Within the metal recycling industry, the trend is also to be more proactive instead of reactive, said Bruce Savage, vice president of communications for the Institute of Scrap Recycling Industries, a trade industry made up of more than 1,350 scrap recycling companies…'We're pushing our member companies to establish relationships with local law enforcement and encouraging them to require photo identification with all transactions and keep good records so that should the police need information, it's immediately available.'" [11]

ISRI member and co-owner of Macon Iron and Paper Stock Co., "…(Chip) Koplin was one of the founders of the Macon-Middle Georgia Metal Theft Committee, an innovative, loose alliance of 35 metal recycling yards, utilities, businesses and law enforcement agencies that meet once every six weeks to exchange ideas and discuss how to avoid buying stolen metal." [12]

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[8] Javno.(2008, April 1).Spanish Police Break Up Copper Stealing Gang.*Javno*Retrieved from http://www. javno.com/en/world/clanak.php?id=136561.(accessed November 25, 2008).

[9] Foster, Patrick.(2007, July 25)."Cable theft cost C&WJ $40m last year.*Jamaica Observer.* Retrieved from http://www.jamaicaobserver.com/magazines/Business/html/20070724T000000-0500_125580_OBS_ CABLE_THEFT_COST_C_WJ____M_LAST_YEAR_.asp.(accessed November 25, 2008)

[10] Kim, Michelle.(2008, March 12).Police, recyclers unite against metal theft.*The Covington News.* Retrieved from http://newmedia.covnews.com/news/archive/2332/.(accessed November 25, 2008).

[11] Ibid.

[12] Ibid.

Groups Come Together To Combat Metal Theft

"A Riverside County [CA] task force is forming to crack down on what some officials call an epidemic: the theft of precious metals like copper, aluminum and brass…The task force will include county lawmakers and law and code enforcement officials, agricultural officials and farmers groups and at least one scrap metal and recycling industry representative…The crime trend has hit local farmers, utilities and schools hard, resulting in tens of thousands of dollars in property damage. Thefts of wiring taken from overhead telephone and power lines have caused outages and problems with 911 emergency calls, officials said…

"State Sen. Abel Maldonado, R-Santa Maria, introduced a bill in February that would require scrap metal and junk dealers to report all receipts or purchases and seller identification to local sheriffs within one business day."[13]

Kinzie Industrial Corridor [Chicago, IL] Businesses See Spike in Crime

"Lori Crowder, property manager of the Fulton-Carroll Center [Chicago, IL]…said the center and the businesses it represents have seen an increase in metal theft." [14]

"Steve DeBretto, director of Outreach and Member Services for the Industrial Council [of Nearwest Chicago]…said in most of the incidents, the thieves are stealing condenser tubes from air conditioning units and stripping out the copper wiring, which can cause about $10,000 of damage to the unit. [15]

"Even with a new City Council ordinance in place that requires scrap metal dealers to get identification or photos of the people they are buying from when accepting certain metals, DeBretto and Crowder said scrap metal theft is still a serious problem."[16]

AZ HB 2509 "Scrap Metal Theft Authority"

Among other requirements, this Arizona legislative bill, not passed at this writing, requires that scrap dealers keep records of all transactions of a value greater than $25. The records must be kept for a period of one year. For each transaction fitting this profile, the record must include:

1. The date, time, and place of the transaction.
2. A photograph and an identifying description and weight of the specific scrap metal received.
3. The dollar amount of the transaction.
4. The seller's name, physical description including gender, height, weight, race, eye color, hair color, physical address, date of birth, and signature and a photocopy of a current driver license, non-operating identification license issued pursuant to

[13] Vittachi, Imran.(2007, March 27).Groups come together to combat metal theft.*The Press-Enterprise.* Retrieved from http://www.pe.com/localnews/rivcounty/stories/PE_News_Local_D_ metal27.3ee3fc3.html.(accessed November 25, 2008).

[14] Graham, Hayley.(2007, October 31).Kinzie Industrial Corridor businesses see spike in crime.*Chicago Journal.*Retrieved from http://chicagojournal.com/main.asp?Search=1&ArticleID=3595&SectionID= 1&SubSectionID=60&S=1.(access November 25, 2008).

[15]Ibid.

[16]Ibid.

Arizona Revised Statues (ARS) Section 28-3165, or photo identification card issued by a tribal government or the United States military. The scrap metal dealer must validate the recorded information by using one of these four documents.
5. The seller's transaction privilege tax number, if applicable.
6. The number and state of issuance of the license on the vehicle used to deliver the scrap metal.
7. A photograph, video record or digital record of the seller involved in the transaction.
8. A right index fingerprint of the seller.

The legislation also requires that payment be sent to a physical address.[17]

Red Gold Rush: The Copper Theft Epidemic

This article outlines the theoretical path of stolen copper. Once the challenge of selling the stolen copper to a scrap yard is overcome, the stolen copper quickly becomes mixed with legitimate scrap copper and formed into pressed bales of copper. A scrap yard can sell these bales of copper to a metal manufacturer, where the copper is melted and formed into bars or sheets. These are then sold and shipped to companies in Asia, which then create a product such as wire or pipe. The article demonstrates the global scale of the copper theft phenomenon.[18]

Copper Thieves Grow More Brazen As Cost of Metal Rises

"On Monday, Minneapolis police were called to the city's Logan Park neighborhood shortly after 10 p.m. when a woman heard several car doors slamming outside her home. When the woman looked out her window, she saw three men walking from a van to the sidewalk. After a few moments, they walked into the intersection of 18th Avenue Northeast and Jackson Street Northeast and tried to remove a manhole cover. A car approached, spooking the men, but after it passed, they returned and pried off the manhole cover, and one of them climbed down, the witness told police. The other two men replaced the cover and went back to their van. After seeing this, the witness called police. When officers arrived, they said, they found Smith and Green sitting in the front seats. Police then opened the manhole. When they peered in, they say they found Orcutt cutting and stripping copper wire. Police said he had two hacksaws, a headlamp and a winch. Some lines had been sawn through…'People can get killed doing that,' said Xcel (Energy's) Sandok.…"[19] The article references the industrial development of China and India as a cause of high copper prices.

[17] Arizona State Legislature.HB 2509.Retrieved from http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/48leg/2r/bills/hb2509p.htm.(accessed November 25, 2008)

[18] Berinato, Scott.(2007, February 1).Red Gold Rush: The Copper Theft Epidemic.*Security Smart.* Retrieved from http://www.csoonline.com/article/221225/Red_Gold_Rush_The_Copper_Theft_Epidemic.(accessed November 25, 2008).

[19] Hanners, Dave.(2007, November 8).Copper thieves grow more brazen as cost of metal rises.*St. Paul Pioneer Press.*Retrieved fromhttp://nl.newsbank.com/nl-search/we/Archives?p_action=list&p_topdoc=11.(accessed November 25, 2008).

Schools Hit Hard by Thefts of Copper

WeTip (www.WeTip.com) has created a hotline for reporting information on copper thefts. "According to WeTip spokeswoman Sue Mandell, schools in Santa Fe Springs, Brea, Fullerton, Riverside, Upland and Anaheim have all been targeted. According to Alliance of Schools for Cooperative Insurance Programs, the school liability joint powers authority, 15 of their member schools have been affected. WeTip is offering up to $15,000 for information that leads to an arrest or conviction." [20]

Copper thefts have caused some schools to be temporarily shut down. The WeTip hotline has, as of the date of this article, not led to any arrests.

Saugus Man Arrested for Stealing Copper Piping, Causing Flood

"A [Massachusetts] Department of Public Works crew was called to Emory Street early Friday morning to turn off the water after a thief broke into a vacant home and began cutting out the copper piping."[21]

Police Trying New Methods to Stop Copper Theft

"A month after employing a new sting operation in high-target areas, Chandler (Arizona) police have snagged their first big catch with the new technique.[22]

"The arrest has encouraged police to believe their tactics are working and that more arrests will follow. But they're not quite ready to explain their method — not even to other police agencies…"[23]

As already stated, these news items are an extremely small sample of available reports, legislation, news, and vendor information. They were chosen from a massive number of items to represent a small range of available information. This information provides a base of knowledge important in recognizing the scope of copper theft, both in geographic impact as well as monetary impact at a localized level.

[20] Scruby, Airan.(2008, April 4).Schools hit hard by thefts of copper.*Whittier Daily News.*Retrieved from http://nl.newsbank.com/nl-search/we/Archives?p_product=WDNB&p_theme=wdnb&p_action=search&p_maxdocs=200&s_dispstring=headline(copper)%20AND%20date(4/1/2008%20to%204/31/2008)&p_field_date-0=YMD_date&p_params_date-0=date:B,E&p_text_date-0=4/1/2008%20to%204/31/2008)&p_field_advanced-0=title&p_text_advanced-0=("copper")&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no.(accessed November 25, 2008).

[21] The Daily Item.(2008, April 4).Saugus man arrested for stealing copper piping, causing flood.*The Daily Item.*Retrieved from http://www.thedailyitemoflynn.com/articles/2008/04/05/news/news05.txt.(accessed November 25, 2008).

[22] Boehnke, Megan.(2008, March 31).Police Trying New Methods To Stop Copper Theft. *firstcoastnews.com.* Retrieved from http://www.firstcoastnews.com/news/usworld/news-article.aspx?storyid=105969. (accessed November 25, 2008).

[23] Ibid.

SURVEY

METHODOLOGY

A survey was sent to three different types of organizations: departments of transportation, utility companies, and contractors. The survey and a summary of responses are attached.

The survey was sent to the departments of transportation of all 50 states, as well as to the District of Columbia and Puerto Rico. Virginia requested two questionnaires, one each for the Culpeper and Hampton Roads districts. In all, therefore, a total of 53 surveys were sent to departments of transportation. 23 responded, resulting in a response rate of 43%.

ADOT provided a list of contacts in highway maintenance departments. Follow-up telephone calls were made and e-mails sent in an attempt to achieve the highest possible response rate. Throughout this period, contact information of a more relevant party was sometimes provided and the survey was forwarded to the suggested individual or department.

Table 1 below shows respondents by state.

Table 1. Department of Transportation Respondents

Responded to Survey	Did Not Respond to Survey
AK, AZ, CA, CT, FL, ID, IL, IA, MD, MA, MI, MS, NJ, NC, ND, OH, OR, PR, UT, VA (CUL), VA (HR), WA, WY	AL, AR, CO, DE, DC, GA, HI, IN, KS, KY, LA, ME, MN, MO MT, NE NV, NH, NM, NY, OK, PA, RI, SC, SD, TN, TX, VT, WV, WI

The survey was also sent to three electric utilities, four communications providers, and 31 contractors or installers. These selected participants were confined to organizations with operations in the greater Phoenix metropolitan area, except for Oncor, which was selected because of a previous search as detailed in the following paragraph.

Of the electric utility providers, two responded. Both are Arizona companies and the two largest providers in the state. The third was a Texas-based company that had, according to our Internet search, implemented the use of Data Dots to prevent theft of copper wiring. We received no response from this company. This resulted in a 67% response rate.

We received no responses from the four communication utility companies, resulting in a 0% response rate.

We received four responses from the 31 contracting companies, resulting in a 13% response rate.

The lists of contracting companies and communication utility companies were provided by ArrayNet USA and consisted of various points of contact based on previous contact with the company or a suggested individual or department within the company. Phone calls and e-mails were made in an attempt to achieve the highest possible response rate. Throughout this period, contact information of a more knowledgeable person was sometimes provided and the survey was forwarded to the suggested individual or department.

Table 2 below shows responses by companies in each of the three categories considered:

Table 2. Utility Companies/Contractors Respondents

Electric Utility Companies		Communication Utility Companies		Contracting Companies	
Responded to Survey	Did Not Respond to Survey	Responded to Survey	Did Not Respond to Survey	Responded to Survey	Did Not Respond to Survey
2	1	0	4	4	27

These varied organizations were surveyed to examine the phenomenon from different perspectives. The departments of transportation were chosen in an effort to get perspective as to the significance geography may have on copper theft. In contrast, the communications and contracting companies were surveyed in an effort to offer perspective on how other types of organizations are being affected by the phenomenon.

Analysis of the magnitude and impact of copper theft may be influenced by states estimating theft statistics in lieu of accurate tracking, states not responding altogether, agencies within states transferring data incorrectly, and the research team copying data incorrectly. The organization and jurisdiction of departments of transportation may also vary from state to state. For example, in some states, the department of transportation may not be responsible for maintaining highway lighting and would not be affected by stolen copper wire taken from roadway lighting. Lastly, the infancy of copper theft proved influential of itself, as additional Internet searches undertaken to corroborate claims of no copper theft turned up conflicting data that revealed that issues had arisen in those states.

MAGNITUDE/IMPACT

Questions were asked in an effort to determine the magnitude of the effects that copper theft has had on the participant's organization, recognition of the issue, and reporting consistency. We have separated results into two categories: departments of transportation and utility companies and contractors.

**1) DEPARTMENTS OF TRANSPORTATION**

Overview

Thirteen respondents (56.5%) reported a known issue with theft of copper from their organization. These participants represent 11 states plus Puerto Rico, as Virginia expressed issues from two jurisdictions as noted earlier. See Table 3 below comparing states with issues and showing states that reported no issue. Geographically, eastern, midwestern, and western states reported issues with copper theft. Therefore, this phenomenon does not appear to be isolated to any geographic area of the country.

Table 3. States Reporting Issues

Respondents Reporting Issues or Losses.	Respondents Reporting No Issues or Losses.
AK, AZ, CA, FL, IA, MI, NC, NJ, OR, PR, VA (a), VA (b), WA	CT, ID, IL, MA, MD, MS, ND, OH, UT, WY

Of the states that responded to the survey, 30% reported a dollar loss of greater than $10,000 in 2007. These include Arizona, California, Florida, Iowa, Oregon, Puerto Rico, and Washington. Figure 1 below shows the percentage of respondents experiencing various amount ranges of copper stolen.

Figure 1. Amount of Copper Stolen
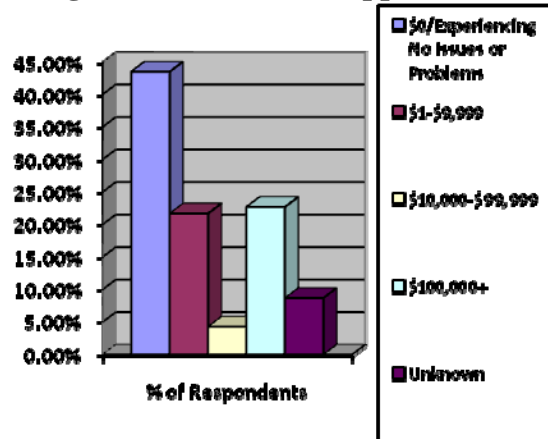
Reporting

Eleven of the 13 states that reported having an issue with copper theft reported all thefts to local law enforcement officials. California and Iowa did not report all thefts. California reported 249 separate events, of which its personnel estimate less than half were reported to law enforcement. Iowa estimated that six of its estimated 12 events were reported.

Three respondents reported more than 20 separate events and reported each event to local authorities. Figure 2 below shows the percentage of respondents experiencing various ranges of separate incidents of theft.

Figure 2. Separate Incidents of Theft

16
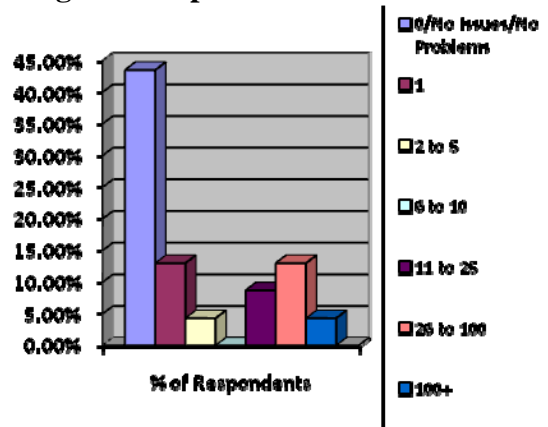
There appears to be a significant variance between the number of reported incidents and known arrests. The survey results showed 417 reported incidents of theft compared with seven reported or known arrests (See Figure 3).

Figure 3. Incidents vs. Arrests
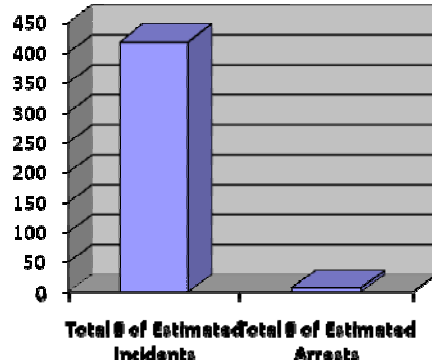
2) UTILITY COMPANIES AND CONTRACTORS

Overview

Of six responding utility and contracting companies, three reported a known issue with copper theft. However, two of the remaining companies, though denying theft problems because they did not know the value of copper stolen, did admit to at least some instances of theft. The one remaining company, though also denying having a known issue, admitted that its subcontractors did. Thus, all respondents had at least indirect experience with copper theft.

The utility company participants reported significant losses in 2007. Figure 4 below shows the percentage of respondents experiencing various ranges of monetary issues or problems.

**Figure 4. Amount of Copper Stolen**
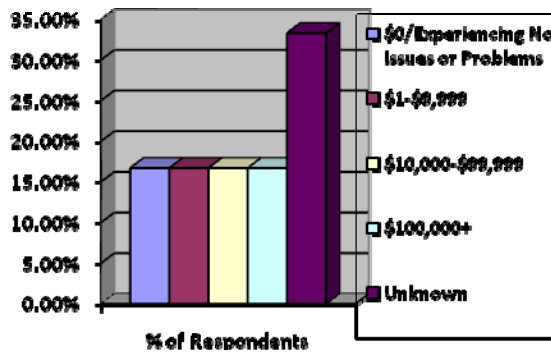
Reporting

Of the organizations reporting issues with copper theft, all (100%) reported every incident of theft. There were an estimated 126 reported incidents resulting in 11 estimated arrests. Figures 5 and 6 demonstrate the number of separate incidents that have affected the organizations as well as a comparison of the number of reported incidents to the number of known arrests.

Figure 5. Separate Incidents of Theft
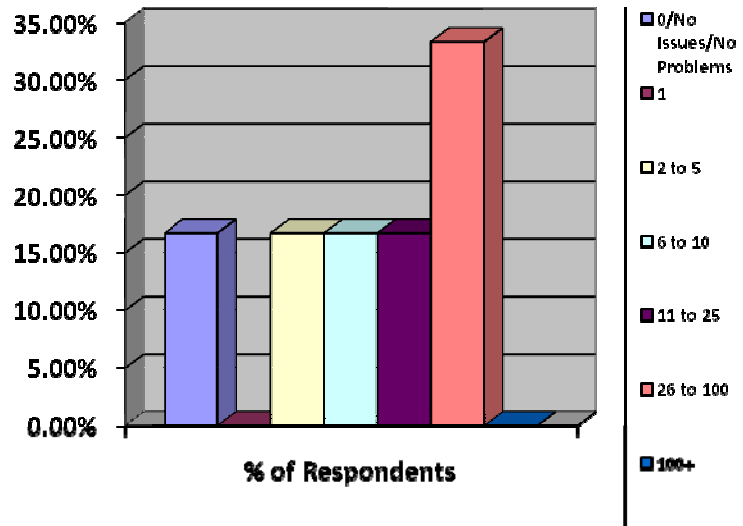
Figure 6. Arrests vs. Thefts
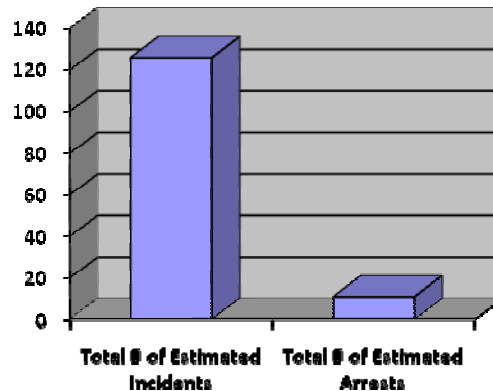
MEASURES TAKEN

Overview

The organizations that responded to the survey have collectively taken many measures in an effort to reduce the impact theft of copper has had on them. These measures can be separated into three categories: monitoring, limiting access, and identification of property.

Monitoring

Table 4 below lists the type of measures that have been taken in an effort to monitor potential theft sites. The most common types of monitoring were video surveillance and use of security guards, with 38.9% and 33.3% of those reporting issues using those methods.

Table 4. Monitoring Methods

Method	Number	% of Those Reporting Issues
Video Surveillance	7	38.9%
Motion Sensors	4	22.2%
Security Guards	6	33.3%
Other	8	44.4%
No Monitoring	7	38.9%
"Other" Types of Monitoring		
Leave Lights on at Night	1	5.6%
Third Party Video Surveillance	1	5.6%
Law Enforcement Patrols	2	11.1%
Radio Alarms at End of Line	1	5.6%
Video and Intrusion Detection	1	5.6%
Alarms and Night Runs	1	5.6%
Periodic Check of Site	1	5.6%

Limiting Access

Table 5 below demonstrates the various methods and the degrees to which respondents have used or are using these methods. Traditional locks and lock bolts/nuts are the two most common methods used, with 61.1% and 55.6% of those reporting theft issues making use of those methods.

Table 5. Methods for Limiting Access

Method	Number	% of Those Reporting Issues
Traditional Locks	11	61.1%
Lock Bolts/Nuts	10	55.6%
Security Keypads	2	11.1%
Other	5	27.8%
None	2	11.1%
"Other" Techniques		
Copper Keeper	1	5.6%
Concrete Slab	1	5.6%
Lock Handhole/Manhole Covers	2	11.1%
Security Access Cards	1	5.6%
Vandal Proof Inserts	1	5.6%

Identification of Property

Four organizations that reported theft issues (22%) uniquely mark copper owned by their organization. Two types of identification were mentioned: painting copper wire so that it is easier to identify and the use of Data Dots, which are small particles that have a unique identification code etched into them.

Other Techniques

There appears to be a large number of trial-and-error efforts taking place in an attempt to reduce theft as well as increase convictions. The following is a list of techniques mentioned by the survey respondents. They are, by reported degree of success:

- Successful or Somewhat Successful
    - Copper Keeper device
    - Tamper-resistant units on cabinets, poles, and pull boxes
    - Security assessments and hardening measures
    - Storage of copper at only service centers and not outlying facilities
    - Guards on job sites
    - Wiring and security devices on all job sites
    - Buried pull boxes
    - Alarm systems in the pull boxes
- Unsuccessful
    - Concrete slabs covering pull boxes
    - Police surveillance
- Results Unknown or Inconclusive
    - Enclosed trailers to move copper from site to site
    - Requesting local law enforcement to be on the lookout for copper thieves
    - Asking the general public through the media to look for suspicious activities
    - Data Dots
    - Security Screws
    - Delivery of copper material on as-needed basis
    - Painted copper grounds at substations

Product Descriptions

- Copper Keeper
    - The Copper Keeper is a device that makes it difficult to pull wire through conduit by locking the wire in place through the tightening of a compression bolt.Further information can be found on the manufacturer's website: (http://www.copperkeeper.com).
- Data Dots
    - Data Dots are small microdots containing an identification code that is etched on each dot. The Data Dots come premixed in an adhesive so that they can be applied to the desired asset (http://www.datadotusa.com).

- Security Screws
    - Security Screws, also termed lock bolts by some, refer to screws or bolts that have special heads requiring a specific socket to loosen or tighten the screw or bolt.

SITE ASSESSMENT

OVERVIEW

Two impacted sites were visited in order to determine the specifics of the type of theft typically affecting the Arizona Department of Transportation. A risk assessment (see Exhibit 2) was also completed.Both sites were along a main freeway and had experienced theft of installed copper wire. The typical theft involved accessing pull boxes and cutting the copper wire to allow the wire to be pulled out of the conduit that runs underground between the pull boxes.

Visibility at the sites is relatively open with minimal tree cover, but ingress and egress points provide ready access, allowing a thief to escape into a neighborhood with relative ease. Through interviewing an ADOT employee, it was found that the majority of mitigation efforts involved limiting access to the pull boxes. This stratagem appears to have had minimal, if any, impact on limiting theft thus far. However, installation of new pull boxes made of steel to make the wires more difficult to access than through the current plastic boxes was about to take place at the time of inspection.

Some success was realized through the use of an alarm system installed to signal a cut in the wire. However, collaboration with local Department of Public Safety officials was said to have had mixed results, as response to an alarm may have been too visible to the thieves, giving them ample time to escape into the adjacent neighborhood. Independent of the site assessments (but important to note), it was discovered that a contractor hired for investigation of copper theft and graffiti was unaware of the most active areas of theft and unaware that any alarm system was in use.

CONCLUSIONS AND RECOMMENDATIONS

The problem of copper theft is relatively new and, as such, methods to counteract the problem may work for a time or in some situations while not providing a complete solution. As thieves become exposed to tactics, they endeavor to bypass them. Thus, when the methods' success rates are seen to diminish upon periodic evaluation, they must be adapted to the new conditions.

The Arizona Department of Transportation is partnering with a private investigation team to counter the problem. Due to the infancy of this phenomenon and the similar problems that affect ADOT, it is important to consider a holistic approach to theft and vandalism in general and not limit efforts strictly to theft of copper wire. An overall approach should involve efforts that encourage not only collaboration between ADOT and other organizations that may have similar issues, but also collaboration among divisions within ADOT. Such an approach should also encourage quick responses as issues and/or solutions are discovered. This could develop a true resource that can be adapted to the changing problem as the nature of theft and vandalism changes or culprits adapt to implemented intervention. Such a solution may be a welcome complement to the current efforts being undertaken by ADOT.

The following conclusions are based on data that may be less than perfect and has been exposed to human interpretation. They are offered for consideration based on review of articles and information gathered from the survey and site assessment, as well as other tracking methods employed over the last several months. Some methods may have been used successfully or unsuccessfully in the past by ADOT. However, it may be beneficial to mention these methods for potential application in potentially different situations.

NOTE

During the course of the study, we became aware of the electrocution death of an 8-year-old boy that was reportedly caused by an exposed copper wire coming into contact with a steel pull box cover that was under a pool of rain water.[24] We feel it important to mention this, as we are aware that one potential method ADOT had considered was the use of steel pull box covers.

GENERAL

1. Ongoing collaboration with private investigation team and outside consultants.

   Cost: Costs would include human resource time involved in meetings among the parties and consultation fees.
   Benefit: The contracted private investigation team would be exposed to outside methods that may be applicable or beneficial to their current efforts. This collaboration would also allow for a natural periodic review of high-theft areas and the latest effective deterrent methods so as to maximize the benefit.

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[24] Sagara, Eric.(2008, October 9).Report: Faulty wiring caused boy's electrocution at Reid Park.*Tucson Citizen*.Retrieved from http://www.tucsoncitizen.com/ss/breakingnews/99128.php.(accessed November 25, 2008).

2. Implement a program that would monitor ongoing development of methods used by other organizations. This is especially necessary as the perpetrators of this relatively new crime learn countermeasures to methods that seem effective at first.

    Cost: Costs would vary depending on the monitoring method used. Potentially, such monitoring could be done in-house, and costs would be limited to administrative costs. Alternatively, an outside service specializing in information monitoring might be used, in which case cost would possibly be limited to a membership or some other like fee that allows access to a data base. Using outside services may have an added benefit of more direct exposure to the problem-solving approach that many other organizations are taking.

    Benefit: Periodic monitoring would help minimize use of a technique that has been recognized by another like organization as unsuccessful while fostering exposure to new techniques that seem to provide some degree of success. This is important to note, as many techniques are currently being tested through trial and error, and the likelihood of another organization using a new method similar to ADOT's is relatively high.

3. Implement a program to encourage cross-departmental collaboration to identify in more detail loss numbers and potential leveraging of resources to combat theft and vandalism. Note that these efforts should begin within the ADOT maintenance districts. Affected departments should count not only loss of materials through actual theft, but also damage caused by attempted theft.

    Cost: Cost would vary depending on the ability to integrate the programs mentioned, but would include increased administrative costs and costs of outside analysis research contracts.

    Benefit: Identification of cost savings methods through a holistic theft/vandalism approach so as to not limit efforts solely to attacking theft of copper. Additional benefit may be to increase recovered losses through insurance claims.

4. Participate in efforts to increase restrictions on sale of potentially stolen copper.

    Cost: Costs would be limited to additional administrative and human resource costs associated with participation in such efforts.

    Benefit: Increased awareness as well as restrictions may make it more difficult for a culprit to sell stolen copper wire, resulting in a potential decrease in the number of attempted thefts.

THEFT DETERRENCE/CRIMINAL APPREHENSION

1. Use of the Copper Keeper. The Copper Keeper is a simple system that makes it difficult to pull copper wire through conduit.

    Cost: Costs would include approximately $20 per Copper Keeper and $15 for the lock socket. Additional installation costs would be confined to internal employee pay.

Benefit: A conversation with a City of Tucson employee revealed that this city has had some success with the use of the Copper Keeper. He also mentioned that he thought that it has been the best system implemented thus far for the amount spent. Also important to note was that he felt it was best to tighten the device's compression bolt beyond the recommended specifications.

2. Undercover surveillance detail. Note that this effort is currently underway in some form via the private investigation team with which ADOT has partnered.

   Cost: Approximate costs for a two-person crew would be potentially $50 to $75 per hour per person.

   Benefit: Increased potential for apprehension of culprits.

3. Report thefts to ISRI's Theft Alert System.

   Cost: Costs would be limited to additional hours associated with entry of data into the Theft Alert System.

   Benefit: Increase potential for apprehension of culprits. The Theft Alert System makes details of stolen material available to members to increase the potential of apprehension at the point of sale.

APPENDIX

EXHIBIT 1
Survey and Summary Results

ARIZONA DEPARTMENT OF TRANSPORTATION
SURVEY: COPPER THEFT

The Arizona Transportation Research Center of the Arizona Department of Transportation (ADOT) is currently undertaking a project to better understand the magnitude and impact copper theft is having on organizations throughout the country. We understand your time is valuable and as such, we very much appreciate you participation in this survey. The contractors for this work are ArrayNet and Mid-Atlantic Innovative Technology Center.

Person completing this survey:

_____

Organization:

_____

Telephone: _____ Email: _____

PLEASE EMAIL, FAX OR MAIL YOUR COMPLETED SURVEY TO JOHN SEMMENS AT ONE OF THE
FOLLOWING CONTACTS:
FAX: 602-712-3400   EMAIL: jsemmens@azdot.gov
MAILING ADDRESS: Arizona Transportation Research Center
206 S. 17 Ave., MD 075R
Phoenix, AZ 85007

If you have any questions regarding this survey, or if you are not the correct person to complete this survey, please contact the consultant directly by calling Jarvis Anderson (480-577-3754; jarvis@arraynetUSA.com) or Jeremy Schoenfelder (602-576-2747; jschoenfelder@mitc.org). If you have questions regarding the ADOT project overall, please contact John Semmens at the Arizona Transportation Research Center at 602-712-3137 or jsemmens@azdot.gov.

Directions for Survey:

Please complete the attached survey by checking "YES" or "NO" when applicable. Fill out the written responses as best as possible and estimate dollar amounts if necessary. We understand that, because of the magnitude of this phenomenon, some techniques must remain confidential. In this situation, if possible, please state that the technique or technology is confidential rather than simply leaving the area blank. This way we will be able to differentiate between action and no action being taken. If necessary, attach any other pages for written answers.

Magnitude/Impact (Asked of only DOTs) :

1. What was the estimated total dollar amount of copper stolen from your organization in 2007?

Total Amount Stolen (Departments of Transportation)

	Number	% of Respondents
$0/Experiencing No Issues or Problems	10	43.5%
$1-$9,999	5	21.7%
$10,000-$99,999	1	4.3%
$100,000+	5	22.7%
Unknown	2	8.7%
Did Not Respond	30	
Total	53	

2. How many separate incidences of theft of copper do you estimate affected your organization in 2007?

Separate Incidences

	Number	% of Respondents
0/No Issues/No Problems	10	43.5%
1	3	13.0%
2 to 5	1	4.3%
6 to 10	0	0.0%
11 to 25	2	8.7%
26 to 100	3	13.0%
100+	1	4.3%
Unknown/Few	3	
Did Not Respond	30	
Total	53	

3. In 2007, were all incidences of copper theft reported to local law enforcement officials (check one)?
    ☐ YES
    ☐ NO - If no, please list the estimated number of 2007 theft incidents not reported.

All Incidences Reported

	Number	% of Those Reporting Issues
Yes	11	84.6%
No	2	15.4%
Not Applicable	10	
Did Not Respond	30	
Total	53	

If No, How Many Reported

Response	Number
Probably most not reported	1
6 (of 12+)	1
Total	2

4. In 2007, how much money do you estimate your organization spent in replacing copper due to theft? Please include the cost of repairing damages incurred during a theft incident.

Money Spent on Replacement

	Number	% of Respondents
$0/Experiencing No Issues or Problems	11	47.8%
$1-$9,999	3	13.0%
$10,000-$99,999	1	4.3%
$100,000+	6	26.1%
Unknown	2	8.7%
Did Not Respond	30	
Total	53	

5. In 2007, what was the estimated amount of monies recovered through paid insurance claims due to copper theft?

Money Recovered Through Insurance (Of Those Reporting Losses)

	Number	% of Those Reporting Issues
$0	10	76.9%
$1-$9,999	1	7.7%
$10,000-$99,999	1	7.7%
$100,000+	0	0.0%
Unknown	1	7.7%
Total	13	

6. How many arrests were made of those who stole copper from your organization in 2007?
   - ☐ _____
   - ☐ Don't know

Arrests

Total # of Estimated Incidents	Total # of Estimated Arrests	As % of Incidents
418	7	1.7%

Measures Taken (Asked of all parties—DOTs, utilities, and contractors):

7. Are you currently working with local law enforcement officials in any special efforts to prevent copper theft (check one)?
   - ☐ YES
   - ☐ NO

Working With Law Enforcement

	Number	% of Those Reporting Issues
Yes	10	55.6%
No	7	38.9%
Unknown/Did Not Answer	1	5.6%
No Issues	11	
Total	29	

8. Are you uniquely identifying the copper owned by your organization (check one)? This could mean any identifying marks or tracking devices.
   - ☐ YES
   - ☐ NO

Uniquely Identifying Copper

	Number	% of Those Reporting Issues
Yes	4	22.2%
No	14	77.8%
Unknown/Did Not Answer		0.0%
No Issues	11	
Total	29	

9. Which of the following methods are you currently using to monitor potential theft sites (check all that apply)?
  □ video surveillance
  □ motion sensors
  □ security guards
  □ other (please specify)_____
  □ no monitoring.

Monitoring Methods

	Number	% of Those Reporting Issues
Video Surveillance	7	38.9%
Motion Sensors	4	22.2%
Security Guards	6	33.3%
Other	8	44.4%
No Monitoring	7	38.9%
"Other" Types of Monitoring		
Leave Lights on at Night	1	5.6%
Third Party Video Surveillance	1	5.6%
Law Enforcement Patrols	2	11.1%
Radio Alarms at End of Line	1	5.6%
Video and Intrusion Detection	1	5.6%
Alarms and Night Runs	1	5.6%
Periodic Check of Site	1	5.6%

10. Which of the following forms of locking mechanism are you currently using to secure access points to copper (check all that apply)?
- ☐ traditional locks
- ☐ lock bolts/nuts
- ☐ security keypads
- ☐ other (please specify)_____
- ☐ none

Securing Access

	Number	% of Those Reporting Issues
Traditional Locks	11	61.1%
Lock Bolts/Nuts	10	55.6%
Security Keypads	2	11.1%
Other	5	27.8%
None	2	11.1%
"Other" Types of Monitoring		
Copper Keeper	1	5.6%
Concrete Slab	1	5.6%
Lock Handhole/Manhole Covers	2	11.1%
Security Access Cards	1	5.6%
Vandal Proof Inserts	1	5.6%

11. Are you currently collaborating with other companies or government organizations in an effort to reduce copper theft?
- ☐ YES
- ☐ NO

Collaborating with other Organizations

	Number	% of Those Reporting Issues
Yes	6	33.3%
No	12	66.7%

12. Are you interested in collaborating with a large group of other companies and/or government organizations in an effort to minimize copper theft?
- ☐ YES
- ☐ NO

Interested in Collaborating

	Number	% of Those Reporting Issues
Yes	14	77.8%
No	3	16.7%
No answer	1	5.6%

13. Do you believe your organization is currently using adequate theft prevention devices and techniques to minimize copper theft?
- ☐ YES
- ☐ NO

Adequate Use of Techniques

	Number	% of Those Reporting Issues
Yes	10	55.6%
No	7	38.9%
Other	1	5.6%

14. Please briefly describe the incident of copper theft that resulted in the largest dollar amount of stolen copper? Was the culprit apprehended?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

15. Are you aware of any alternative material that may replace your company's reliance on copper?
- ☐ YES - If yes, what is that material?

   _____
- ☐ NO

Aware of Alternative Materials

	Number	% of Those Reporting Issues
Yes	13	72.2%
No	5	27.8%
"Other" Materials		
Aluminum	3	16.7%
Copper Weld	1	5.6%

16. What measures not described above has your company undertaken in an effort to reduce copper theft? Please indicate "successful," "unsuccessful," or "result unknown."

Other Measures Taken
Cover pull boxes with concrete slab - unsuccessful, use of Copper Keeper - some success, bury pull boxes - just started to use, unknown result
Effectively monitor/police the recycling industry. Any person/company that is bringing in copper to scrap should be able to verify where the material was taken. Proper identification and contact information should be required.
Trying to purchase a enclosed trailer to move copper from site to site at a cost of over $7000 - result unknown
1) Installed tamper resistant units on cabinets, poles and pull boxes - successful so far. 2) Requested local law enforcement to be on the lookout for copper thieves - results unknown. 3) Asked the general public through the media to look for suspicious activities - results unknown.
Changing Oregon law to make it easier to catch the thieves.
Police Surveillance (unsuccessful)
We haven't had any more occurrences since this one. We replaced the guttering with aluminum instead of copper and the attendants try to keep a better watch for anyone messing with the building in any way.
We have performed security assessments on locations within our District and taken hardening measures. Thus far we have been successful.
Data Dots, Security Screws, results inconclusive at this time.
Limit the storage of copper to service centers and not outlying facilities - successful. Placing guards on job sites to deter theft - successful.
We paint copper grounds at substations one of our corporate colors. This reduces the value of the copper at the recycler and deters thieves because they must remove the paint before they can sell it. We don't allow any wire to be stored at unattended locations. If wire must be stored at construction sites, policy requires uniform guards to be posted.
We don't buy a lot of copper as a general contractor, but our subs do so we haven't had any problems but our subs do and one thing they do is only bring enough copper out to work w/ for what is needed and store the rest at their shop.
successful - wiring and security devices on all job sites
Copper material is delivered on site on as-needed basis. What gets delivered is installed same day.
We have buried pull boxes as far as 4' deep, that was successful but hard on the maintenance crew to get back in the box for trouble shooting, so we quit doing that. We installed boxes in the middle of a run and buried it about 6", that was successful. We have buried the pull boxes about 6" and then poured concrete over it. That was 50% successful. We have installed alarm systems in the pull boxes and that has been about 75% successful. We are now installing vandal proof inserts in the pull boxes and it is too soon to tell.

EXHIBIT 2
Site Risk Assessment

Arizona Department of Transportation

Risk Assessment

Site Security Survey

Checklist

Worksheets

Risk Assessment and Prevention Goals

- To ensure that all involved parties and vendors communicate current security implementations.

- To research new and improved areas of security technology for pull boxes and cabling to reduce bottom line losses and liability. This includes, but is not limited to, cameras, alarm boxes, and wire security devices.

- To research the use of contract security services for mobile response to alarm calls, apprehension of thieves, and minimization of property damage.

- To formulate a plan to maximize apprehension of criminals involved in wire theft with the assistance of private investigation vendors.

- To develop an alliance with local law enforcement agencies to detect and help prosecute those selling stolen copper wire to local scrap dealers.

- To analyze and reevaluate current ADOT copper theft deterrent policies and procedures.

Pre-survey Information

Information that should be researched and on record from the risk assessment

General Information

Date survey initiated and completed.	August 12, 2008
Name of each facility and/or site.	Interstate 10 / 59th and 67th Avenues
Surveyed company's name.	Arizona Department of Transportation
Surveyed company's address.	206 S 17th Ave, Phoenix, AZ 85007
Surveyed company's CEO/Director/Manager.	Frank Di Bugnara
Surveyed company's officers.	N/A
Facility contacts and their phone numbers.	Frank Di Bugnara 602-712-3137
Main facility telephone numbers.	602-712-3130
Emergency telephone numbers for all facilities.	N/A
General purpose of each site.	Lighting for Highway
Range of hours of use for each site.	24/7
Facility ownership records.	N/A
Number of people who have access.	N/A
Who performs facility maintenance?	N/A
Maintenance schedule.	N/A
Facility dollar value of equipment and property.	Unknown
Location of areas with highest dollar value.	Interstate 10 / 59th and 67th Avenues
Location of areas containing sensitive material.	Interstate 10 / 59th and 67th Avenues

Historical Information

Abductions?	N/A
Alarms?	Yes
Batteries?	N/A
Bomb threats?	N/A
Burglaries?	N/A
Disorderly situations?	N/A
Domestic violence involving employees	N/A
Employee "down" reports?	N/A
Fights?	N/A
Fires?	N/A
Homicides involving employees?	N/A
Intoxicated employees?	N/A
Missing or runaway juveniles found on your property?	N/A
Open doors or windows?	N/A
Police requesting to execute an arrest warrant on property?	N/A
Reports of employee-involved child abuse?	N/A
Robbery involving employees?	N/A
Sexual assaults?	N/A
Shootings?	N/A
The death of an employee on company property?	N/A
Traffic accidents?	Yes, due to copper theft and no lights
Vehicle and vessel thefts?	N/A
Theft (internal and/or external?)	Yes, External from Highway
Vandalism?	N/A
Armed Robbery?	N/A

Site Description

	What are the physical boundaries of the facility grounds?	N/A Open Roadway
	Attach the following drawings, sketches, plans, or schematics.	N/A
	Facility perimeter.	N/A
	Topography.	N/A
	Perimeter barriers.	Trees and walls
	Neighboring facilities.	N/A
	Ingress/egress points.	Canal concealed from view
	Facility and exterior roadways.	Yes
	Facility locations.	Multiple
	Storage locations.	N/A
	Locations of doors, windows, and similar openings.	N/A
	Alarm placement and diagrams (schematics).	N/A

Site Security Survey Checklist

Each and every question is not necessarily germane to a client's individual site risk assessment survey. This checklist is a guide and not intended to be all-inclusive.

Management Issues

	Does the company's top management visibly support security efforts?	Yes, but they are unaware
	Have clear security policies been developed and promulgated?	No
	Have we established partnerships with local, state, and federal law enforcement agencies, other public safety agencies, and surrounding communities?	Yes, DPS
	Have we clarified relationships and procedures with other management functions to provide a more coordinated response to security incidents?	No
	Do we have a well-understood system for employees to report security incidents?	No, ADOT personnel with alarm, information, and specifics of high-theft areas has not relayed information to "Lion Strikes" private investigators subcontracted for private investigation of copper theft and graffiti
	Have we developed security awareness programs for employees and contractors?	Unknown
	Have we developed a procedure for referring suspicious incidents and breaches of company policy to corporate counsel or corporate security management?	Unknown
	Have we developed a policy of referring all suspected illegal activity to law enforcement?	Unknown
	Have we developed procedures for emergency response and crisis management?	Unknown
	Do we periodically reassess the site's security posture (threats, vulnerabilities, risks, and countermeasures)?	Unknown

Physical Security

	Have we implemented appropriate access control measures, such as signs, secure doors and windows, locks, technology based access control systems, parcel inspection, and control of gates and docks?	N/A
	Do we have appropriate perimeter protection, using, for example, fences, bollards, trenches, turnstiles, lighting, and video surveillance	NO
	Do we need security officers on patrol or at fixed locations? If so, do they have written post orders to direct their activity?	Yes No
	Have we appropriately protected crucial communications equipment and utilities?	Unknown

Facility Clear Zones, Grounds and Signs

	Does this facility have a "clear zone" on the outside of the perimeter fence?	
	Does this facility have a "clear zone" on the inside of the perimeter fence?	
	Is the exterior "clear zone" at least 50 feet wide?	
	Is the interior "clear zone" at least 20 feet wide?	
	Is there a clear path for vehicular access around the exterior of the perimeter fence?	No
	Is the "clear zone" kept clear of all visual obstructions including tall grass?	N/A
	Are "clear zone" areas adequately illuminated?	Unknown
	Are "clear zone" areas under CCTV surveillance?	N/A
	Are there any scaling hazards around the perimeter fence line?	N/A
	Is any part of the fence overgrowing with vegetation, obstructing a clear view of the "clear zone"?	N/A
	Has shrubbery near doors, windows, fence lines, gates, and access roads been kept to a minimum?	Yes
	Are all blind alleys located near buildings protected or under surveillance?	No

Physical Perimeters

	Does the facility's physical environment include a perimeter zone of grounds and/or property surrounding the facility?	
	Does the perimeter zone surrounding the facility's property have a fence or other barrier restricting entry?	
	How many entrances to the perimeter zone are there?	
	Is there additional perimeter barrier or deterrent?	
	Is someone responsible for periodically verifying the structural integrity of the perimeter barrier (who, when)?	
	Does the entire perimeter zone have functioning alarms or monitors (e.g. CCTV, guards, etc.) at all times?	Alarms, However the response time in place is poor
	Are there alarms, stationed guards, or CCTV monitors for all perimeter zone entrances?	N/A
	Are there alarms, roving guards, or CCTV monitors for the perimeter zone in general?	N/A
	Is there access control on mechanisms (e.g. badges, keys, combinations, and/or cards) used for entry to the perimeter zone?	N/A
	Do all gates have top guards?	N/A
	Do top guards for gates meet same criteria as perimeter fence top guards?	N/A
	Are gate bolts and nuts spot-welded for security?	N/A

Perimeter Personnel Control

	State who is responsible for authorizing perimeter zone entry.	N/A
	Are there effective procedures and systems in place for authorizing perimeter zone entry?	N/A
	Are all entrances to the perimeter zone controlled during normal working hours?	N/A
	Are all entrances to the perimeter zone controlled after normal working hours?	N/A
	Are all entrances to the perimeter zone controlled during emergencies?	N/A
	Is entry to the perimeter zone controlled by a guard(s), locks, cipher locks, or access control system?	N/A
	Are authorization lists and control mechanisms permitting entry to the perimeter zone updated when a person is no longer authorized for perimeter-zone entry?	N/A

Building Personnel Control

	Do security personnel control all perimeter openings to the facility?	N/A
	Is there a designated individual responsible for authorizing building entry?	N/A
	Would access to the facility still be controlled in case of fire or other emergency or disaster?	N/A
	Are custodial personnel permitted entry to the facility when it is unattended?	N/A
	Are physical security personnel permitted entry to the facility when it is unattended?	N/A
	Is there a procedure to control badges, keys, combinations, and/or cards used for entry to the facility?	N/A
	Are authorization lists and control mechanisms allowing entry into the facility updated when a person's authorization for entry has been revoked?	N/A
	Is access to facility resources denied quickly enough to prevent damage to the resources by a person whose facility entry authorization has been revoked?	N/A
	Is there a record of entries to and exits from the facility by employees?	N/A
	Does the area non-employee entry/exit record provide notation for time in, time out, identification of entrant, and authorization mechanism?	N/A

Access Control Systems

Are the entire access control procedures and systems managed by one designated security person?	N/A
What type of access system provides entrance into the facility?	N/A
Who is responsible for authorizing facility entry?	N/A
Are there effective procedures for authorizing facility entry?	N/A
Does the facility have an enforced limited access policy?	N/A
Are there effective procedures for authorizing facility entry for abnormal situations (emergencies, outside of normal hours, etc.)?	N/A
Is there a physical access control system limiting access to the facility?	N/A
Are all doors kept closed and locked?	N/A
Is positive identification required for a person to receive facility entry authorization?	N/A
Are all entrances to the facility, including emergency, equipment, and maintenance portals, controlled?	N/A
How many facility entrances are there?	N/A
How many facility entrances are available for personnel access?	N/A
Is facility entry controlled during normal working hours?	N/A
Is facility entry controlled after normal working hours?	N/A
Does the company utilize access control procedures to limit access into the facility?	N/A
What areas are these systems located in?	N/A
Is an access control card also used as an employee badge?	N/A
Are biometric technologies used in access control?	N/A
Is the system controller on an independent PC or network?	N/A
Are vendors and visitors required to wear identification badges in the facility area?	N/A
Are visitors and vendors required to sign in before entering the facility?	N/A
Is it policy to provide a staff escort for visitors, vendors, and service personnel?	N/A
Are authorization lists and control mechanisms allowing facility entry updated when a person's entry authority is revoked?	N/A
Do employees challenge persons in the facility if they are not properly badged?	N/A
Is there a control on badges, keys, combinations, and/or cards used for facility entry?	N/A
Are appropriate procedures for responding to a notification from facility monitors and alarms defined and documented?	N/A
Are personnel trained or drilled in how to respond to facility monitors and alarms?	N/A
Are emergency exits from the facility operable only from within?	N/A
Is there one power source for the control unit, readers, and the locks?	N/A
Are the systems equipped with battery backup?	N/A
Do the access-controlled doors employ contacts, which indicate whether the door is open or closed?	N/A
Are these systems installed in accordance with fire and facility codes?	N/A
Is preventive maintenance and cleaning regularly scheduled?	N/A
What are the optimal intervals for these services?	N/A

Intrusion Alarm Systems

	Is the facility alarmed?	N/A
	What type of alarm system is used?	Honeywell
	Which of the following perimeter, wall, under floor, above ceiling, perimeter fence alarm sensors are used in your facility (Where are they placed?) What are they protecting?...)	Security wire ran next to copper wire
	Mechanical switches (door, windows)?	N/A
	Break wire (in walls, floors, ceilings)?	N/A
	Magnetic switches - unbalanced?	N/A
	Audio?	N/A
	Vibration?	N/A
	Ultrasonic?	N/A
	Microwave?	N/A
	Infrared passive?	N/A
	Infrared break beams?	N/A
	Capacitance?	N/A
	CCTV?	N/A
	Biometric?	N/A
	Other?	N/A
	How old is the alarm system and/or major components of the alarm system?	Unknown
	Is the alarm system Underwriters Laboratories, Inc. (UL) approved?	Yes
	Is output from the intrusion sensors and/or detection devices transmitted outside the facility?	N/A
	Indicate the location(s) to which the intrusion sensors and/or detection devices transmit output:	N/A
	Main security station (where guards are located)?	N/A
	Security station same building?	N/A
	Security station in different building?	N/A
	Municipal police station?	N/A
	Other?	N/A
	Are adequate spare alarm components located at the facility?	N/A
	Can the alarm system be deactivated from outside the secured area?	No
	Are external alarm system components tamper-proof and/or alarmed?	No
	Is there a backup power source for the alarm system?	Yes
	Is the entire alarm system frequently tested to insure reliability?	Unknown
	How often is the alarm system tested?	Unknown
	Who conducts alarm tests?	Unknown
	When was the last test conducted?	Unknown
	Have emergency repair provisions been established for the alarm system?	Unknown

Key/Critical Areas

	Are there critical or restricted areas?	N/A
	How many critical and/or restricted areas are there and where are they located? (attach drawings or plans)	Unknown
	List all controls, barriers, and restrictions placed on these areas	ADOT Freeway Locations
	How are these areas administratively controlled?	N/A
	List the methods of access for each of these areas. (skylights, ventilation shafts, doors, windows...)	N/A
	Do these areas have perimeter fencing?	N/A
	What types of alarm systems, access control system, or components are used in restricted area controls?	N/A

Information, Computer, and Network Security

	Have we taken steps to protect and isolate information that could be of use to our adversaries?	N/A
	Do we follow appropriate procedures for protecting and destroying sensitive documents?	N/A
	Are we using appropriate hardware, software, and procedural techniques for protecting our computers and networks?	N/A
	Do we periodically analyze computer transaction histories to look for irregularities that might indicate security breaches?	N/A

Access Control to Computer Area Areas

	Who is responsible for the operation of the computer area access control systems?	N/A
	Is this individual also responsible for the monitoring security, fire protection, HVAC functions, and alarm systems to insure proper functionality?	N/A
	Is the computer area staffed 24 hours per day?	N/A
	What type of access system provides entrance into the computer area?	N/A
	Is there a physical access control system limiting access to the computer areas?	N/A
	Do access control readers or biometric readers control computer area entry?	N/A
	Are employee identification badges worn at all times in the computer area?	N/A
	Are vendors and visitors required to wear identification badges at all times while in the computer area?	N/A
	Are visitors escorted and documented when in a computer area?	N/A
	Are emergency exits from the computer area operable only from within?	N/A
	Does this facility have an enforced limited number of personnel-access policies?	N/A
	Do operations or employees monitor the activities of emergency, service, and other "invisible" personnel when they are servicing the computer area, area, building, or equipment?	N/A
	Do operations or employees monitor the activities of other "invisible" personnel (e.g. vending machine suppliers, protective force, janitors, health and safety personnel, etc.)?	N/A
	Are there procedures permitting computer area access to emergency personnel in case of fire, major power outage, or emergency or disaster?	N/A
	Are there monitors (e.g., CCTV cameras) and alarms for the computer area entrances?	N/A

Computer Area Alarm Systems

	What steps are taken to insure protection of the computer area (segregation, security alarm systems, security officers, CCTV...)?	N/A
	Which surveillance or sensor devices are used in the computer area:	N/A
	Door switches?	N/A
	Motion detectors?	N/A
	Breakglass sensors?	N/A
	Vibration sensors?	N/A
	Closed-circuit TV?	N/A
	Other (specify)?	N/A
	Is all alarm and CCTV wiring enclosed in conduit?	N/A
	Are there surveillance monitors (e.g., CCTV), intrusion sensors, or alarms for the computer area entrances?	N/A
	Who monitors the alarm and CCTV systems?	N/A
	Is output from the computer area surveillance or sensor devices transmitted outside the computer area?	N/A
	Are records from the computer area entrance surveillance monitors, intrusion sensors, and/or alarms kept in some form available for audit?	N/A
	Are procedures for responding to notification from area monitors and alarms defined and documented?	N/A
	Who is responsible for responding to computer area intrusion alarms?	N/A

Shipping and Receiving

	Is the shipping/receiving area or building surrounded by a fence with a controlled access gate?	N/A
	Are these areas designed so vehicle operators do not have direct access to storage areas without passing through a monitored area, such as a shipping or receiving processing office?	N/A
	Are all freight doors secured when not in immediate use?	N/A
	Are high value items stored in a special area with additional physical security considerations?	N/A
	Does the security department randomly audit shipping and receiving procedures to determine accuracy?	N/A
	Are the receiving and shipping areas physically separated?	N/A
	Does CCTV cover all areas?	N/A
	Are there surveillance cameras located in the inventory area?	N/A
	Are all areas covered by a monitored intrusion alarm?	N/A
	Are employee's entrances monitored by electronic access control, which record all employee pass code transactions?	N/A
	Are these records regularly reviewed by security for irregularities?	N/A
	Are delivery, pick-up, and vendor personnel prevented from having unsupervised access to merchandise areas?	N/A
	Do all employees display photo-ID badges while in the shipping/receiving areas?	N/A
	Are permanent records maintained for all issued and lost badges?	N/A
	Are all personnel working in the shipping/receiving areas photographed, thumb printed, and processed through a complete background check (which should include job and personal reference checks, criminal records, and credit history)?	N/A

Shipping and Receiving (continued)

	Are all shipments loaded and unloaded only by company personnel?	N/A
	Do surveillance cameras monitor the loading dock?	N/A
	Is the high value storage area protected by additional intrusion detection equipment?	N/A
	Is this alarm system capable of being activated independently of the host building's system to provide security during regular operational hours?	N/A
	Does the high value area's alarm system record all individual access users' numbers, which activate and deactivate the system?	N/A

Hazardous Materials Receiving

	Are special precautions taken when receiving and storing potentially hazardous materials?	N/A
	Are special monitoring provisions provided (gas detectors, CCTV cameras)?	N/A
	Are material safety data sheets kept on-site for all hazardous materials?	N/A
	Do emergency response plans incorporate the special requirements for hazardous materials?	N/A
	Are OSHA requirements satisfied by the facility's operation?	N/A
	Is all proper safety training courses and devices to safeguard personnel utilized for all equipment present?	N/A

Warehouse and Storage Facilities Security

	Do physical barriers, access control systems or staffed gates, control access to all storage facilities?	N/A
	Is the number of access points to the facility kept to a functional minimum?	N/A
	Are security badges or ID cards required of all personnel once they are inside the facility?	N/A
	Are all visitors, vendors, and employees required to present a valid state-issued driver's license or identification card before they are given a badge or pass?	N/A
	Are all visitors, vendors, and employees required to keep this valid ID and their badges on their person at all times when they are at the facility?	N/A
	Are visitors and vendors issued special badges, which are easily differentiated from employees' badges?	N/A
	Are visitors and vendors escorted once inside the facility?	N/A
	Have facility personnel been educated in how the badging systems work so they are able to recognize any irregularities?	N/A
	Have facility personnel been educated in how to maintain and clean the badging system?	N/A
	Are lost badges access immediately terminated?	N/A
	When a new badge is issued in place of a lost one, does the new badge have a new number, not a duplication of the old one?	N/A
	Are employees issued special parking permits?	N/A
	Are visitors and vendors issued special passes which are easily differentiated from employee passes?	N/A
	Is there specified procedures used for common carrier vehicle movement in to and out of the facility?	N/A
	Are all permits and passes for vehicles routinely inspected to insure they are valid?	N/A
	Are all interior parking areas locked away from loading or sensitive areas and under CCTV surveillance?	N/A

Warehouse and Storage Facilities Security (continued)

	Are all individuals parking in interior areas required to pass through an access controlled pedestrian gate to a working area when entering or leaving?	N/A
	Are all fire lanes and loading zones clearly marked?	N/A

Fire Prevention and Storage of Flammable and Combustible Liquids

	Are fuels such as solvents, acetone, alcohols and toluene, gasses (like acetylene and propane), and solids (such as wood, paper, and ordinary trash) stored properly (How)?	N/A
	Are common oxidizers including acids, especially nitric and perchloric acids; chlorine dioxide; and other agents, such as potassium permanganate and potassium chlorate, stored away from all flammable materials?	N/A
	Are possible sources of ignition segregated from these materials?	N/A
	Are flammable gases, solids, or solvents stored in well-ventilated areas?	N/A
	Is smoking prohibited in and around all storage areas?	N/A
	In laboratory or manufacturing areas, is all electrical equipment in ventilated hoods and are spray booths explosion proof?	N/A
	Is this equipment well maintained?	N/A

Storage of Hazardous and Flammable Materials

	Does your hazardous material program account for selecting the least hazardous/flammable material possible?	N/A
	Are storage areas inventoried to reduce the amounts of hazardous or flammable materials?	N/A
	Are all storage areas designed to use safe storage procedures and containers to hold hazardous or flammable materials?	N/A
	Are there monitoring systems in the storage areas?	N/A

Heating, Ventilation, and Air Conditioning (HVAC) Issues

	Is there an automatic monitoring system (with alarms) for the heating/ventilating/air-conditioning (HVAC) system used for the facility?	N/A
	Is airflow restriction or failure monitored with an alarm?	N/A
	Are temperature-rise limits/rate monitored with an alarm?	N/A
	Is humidity monitored with an alarm?	N/A
	Do alarms from the automatic monitoring system for the heating/ventilating/ air-conditioning (HVAC) system used for the facility transmit to the security management information system or other locations outside the facility?	N/A
	Do appropriate personnel take immediate action when the automatic HVAC monitoring system alarm transmission is received?	N/A
	Are there preventive maintenance and service agreements supporting the HVAC system?	N/A

Facility Power Supplies

	Are the building's transformers, motor generators, breaker panels, cooling towers, etc, protected from unauthorized access?	N/A
	Does the facility have an isolated and regulated power service (Should it have one)?	N/A
	Does the kind of work done at the facility require an uninterruptible power supply?	N/A
	Has the local power supply been determined to be adequate, consistent, and reliable?	N/A
	Does the facility have standby power for electrically controlled doors in case of power outages?	N/A
	Does the facility have standby power for electrically controlled security systems in case of power outages?	N/A
	Does the facility have standby power for electrically controlled alarms in case of power outages?	N/A
	Is the standby power for electrically controlled doors, security systems, and alarms tested at regular intervals determined by site management?	N/A
	Is there emergency lighting available for the facility if a power failure should occur?	N/A
	Does the facility have a separate emergency lighting system that activates when the main lighting fails?	N/A
	Is the facility's emergency lighting system tested on a regularly scheduled basis?	N/A

Employee and Contractor Security

	Have we developed appropriate security practices for voluntary and involuntary terminations of employment?	N/A
	Have we adopted policies and established procedures to prevent and respond to workplace violence?	N/A
	Have we adopted policies and established procedures to for pre-employment screening?	N/A

Security Education

	How is employee security education and awareness conducted?	Unknown
	Are personnel given continuing or periodic refresher education about security practices?	Unknown
	Are both initial and periodic security educational briefings conducted to educate employees in general and employee-specific security responsibilities?	Unknown
	Are employees actively involved in developing risk analyses and contingency planning?	Unknown
	Does the security education program address the need for limiting discussions of sensitive topics in public	Unknown

Reporting Security Deficiencies, Intrusions and Thefts

	Are the following intrusions or thefts reported to security:	Yes
	Unauthorized use of company facilities?	Unknown
	Unauthorized use or attempts to access sensitive information?	Unknown
	Entering the facility without authorization?	Unknown