



STATE OF COLORADO

SALLY SYMANSKI, CPA
State Auditor

OFFICE OF THE STATE AUDITOR
303.869.2800
FAX 303.869.3060

Legislative Services Building
200 East 14th Avenue
Denver, Colorado 80203-2211

MEMORANDUM

Date: July 17, 2006
To: Members of the Legislative Audit Committee
From: Sally Symanski, State Auditor
Re: CBI Insta-Check System Performance Audit

Authority, Purpose, and Scope

This performance audit was conducted in response to a legislative request and pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits of all departments, institutions, and agencies of state government. The audit work, performed from May through June 2006, was conducted in accordance with generally accepted government auditing standards. This memorandum presents our findings, conclusions, and recommendations, and the responses of the Colorado Bureau of Investigation.

The purpose of the audit was to review the efficiency and effectiveness of the Colorado Bureau of Investigation's (CBI's) Insta-Check System. Audit objectives included evaluating the response times for providing Brady Act-related background checks and compliance with laws related to accepting identity documents. We conducted interviews with Insta-Check Unit staff, reviewed state and federal laws and rules, analyzed documents, and contacted other states. We acknowledge staff at the CBI and Insta-Check Unit for their assistance during the audit.

Overview of Colorado's Instant Criminal Background Check System

In November 1993, Congress signed the Brady Handgun Violence Prevention Act (Brady Act) into law. This legislation prohibits the transfer of firearms to certain individuals (e.g., fugitives from justice, an unlawful user and/or addict of any controlled substance, a person adjudicated as a mental defective or involuntarily committed to a mental institution, among others). The intent of the Brady Act is to balance the government's interest in protecting public safety with each citizen's constitutional right to purchase and bear firearms. The Brady Act requires Federal Firearms Licensees (FFLs) to request background checks on individuals attempting to receive a firearm. All firearm dealers located in Colorado, and throughout the United States, must be licensed by the federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) as an FFL and must comply with the Brady Act. According to CBI staff, there are approximately 2,000 FFLs located in Colorado.

The Brady Act required the United States Attorney General to establish the National Instant Criminal Background System (NICS). The United States Attorney General delegated authority for developing the NICS and for eventually conducting Brady Act-related background checks to the Federal Bureau of Investigation (FBI). Until the FBI was able to fully establish the NICS and conduct the background checks required by the Brady Act, the chief law enforcement officers (i.e., local police chief, county sheriffs, or an equivalent officer of the designee of any such individual) of each state were either required to perform the Brady Act-related background checks or allow firearm transfers to occur, without a check being completed, after a 5-day waiting period had elapsed.

In 1994 the General Assembly passed the Statewide Instant Criminal Background Check (Insta-Check) System Act (House Bill 94-1276) and consolidated the duties of the local law enforcement officials by authorizing CBI to conduct the firearm background checks under the Brady Act. CBI's Insta-Check Unit administered Colorado's Brady Act-related responsibilities until April 1999, when the federal NICS system was finally established, and the FBI was able to conduct the required background checks. Federal rules allow states, *at any time*, to designate an agency as a "point of contact" for conducting their own Brady Act-related background checks, or alternatively, states may rely on the FBI to conduct the checks (emphasis added). The General Assembly chose to repeal the Statewide Instant Criminal Background Check System Act and allow the FBI to begin conducting the background checks beginning in April 1999.

During the summer of 1999, a father killed his three children in Castle Rock shortly after purchasing a firearm. The FBI had mistakenly approved the father's request to purchase a firearm because the NICS did not contain some key information maintained in state systems. Following this incident, in August 1999, the Governor signed an executive order temporarily reinstating the State's Insta-Check program until April 2000. In 2000, the General Assembly passed legislation establishing CBI as the point of contact for the federally-required background checks in Colorado. Colorado's point of contact agreement with the FBI sets forth the State's responsibilities for performing background checks under the Brady Act.

As of May 2006, the FBI reports that 13 states have agencies acting in a full point of contact capacity. Full point of contact states designate a local or state law enforcement authority to conduct the federally required background checks within state boundaries. Full point of contact states include California, Colorado, Connecticut, Florida, Hawaii, Illinois, Nevada, New Jersey, Oregon, Pennsylvania, Tennessee, Utah, and Virginia. Eight states (Iowa, Maryland, Michigan, Nebraska, New Hampshire, North Carolina, Washington, and Wisconsin) participate as partial point of contact states. These states have agencies that conduct checks for handguns and/or handgun permits, while the FBI processes all long gun (i.e., rifles and shotguns) transactions. Since the inception of the NICS, the states of Arizona, Georgia, Indiana, New York, South Carolina, and Vermont have stopped conducting Brady Act-related background checks and requested that the FBI conduct the checks. As of May 2006, the FBI reports that a total of 29 states rely entirely on the FBI to conduct all Brady Act-related background checks.

Program Statistics

From August 1999 through December 2005, the CBI's Insta-Check Unit received and processed almost 940,000 requests for firearm background checks. About 96 percent (900,000 requests) of the requests were approved and 4 percent (40,000) were denied. Of the 40,000 denials, almost 13,000 (33 percent) were appealed by the person prohibited from receiving the firearm. Almost 6,600, or about half, of the appeals were later reversed and the firearm transaction was approved.

For Calendar Year 2005, the CBI reports denying approximately 4,700 firearm transfers. The transfers, by percentage, were denied for the following reasons:

Colorado Bureau of Investigation Brady Act-Related Background Check Denials by Reason Calendar Year 2005	
Reason for Denial¹	Percentage of All Denials
Assault	23 %
Dangerous Drugs	13 %
Burglary	10 %
Larceny	7 %
Restraining Order	5 %
Sexual Assault	2 %
Robbery	1 %
Other ²	39 %
<p>Source: Colorado Bureau of Investigation.</p> <p>Notes: ¹Reason for denial includes both convictions and arrests where the CBI could not determine the disposition or outcome of the arrest. Restraining orders are not convictions but court orders restraining one's conduct and protecting a victim from past abusive behavior.</p> <p>²Includes denials for all other reasons prohibited by federal and state law (e.g., persons found to be mentally defective, addicted to a controlled substance, fugitives from justice, dishonorably discharged from the armed forces, or illegally or unlawfully in the United States).</p>	

The CBI staff report that almost 40 percent of all denials are based on information contained in state databases unavailable to the FBI. Additionally, CBI staff report that about 43 percent of denials issued involve arrest records that lack disposition data. State law requires that, when the disposition of an arrest is unknown, the applicant's request for a firearm be denied.

Funding

For Fiscal Year 2006 CBI's Insta-Check Unit was appropriated approximately \$1.4 million in general funds and employed 22 full-time equivalents (FTE) for conducting Brady Act-related firearm background checks. The CBI Insta-Check Unit receives no federal funds. As the table below shows, the funding appropriated to the Insta-Check Unit declined from \$1.6 million in Fiscal Year 2002 to \$1.4 million, or 13 percent, in Fiscal Year 2006. The appropriated FTE have remained constant at 22 over the five-year period.

Colorado Bureau of Investigation Insta-Check Unit Appropriated Funding and FTE for Conducting Firearm Background Checks Fiscal Years 2002 through 2005 (in millions)					
	Fiscal Year 2002	Fiscal Year 2003	Fiscal Year 2004	Fiscal Year 2005	Fiscal Year 2006
Funding	\$1.6	\$1.3	\$1.3	\$1.3	\$1.4
Full-time Equivalent¹	22	22	22	22	22
Source: Appropriation bills for Fiscal Years 2002 through 2006. Note: ¹ The number of FTE does not reflect temporary workers, which could be as high as 14 during the CBI Insta-Check Unit's "peak season."					

Response Times

The Brady Act allows a person to take possession of a firearm *immediately* after completion of a background check, unless the check determines the transfer is prohibited by federal or state law. The General Assembly, by requiring the CBI to implement the provisions of the Brady Act, intended Colorado's Insta-Check system to provide *prompt and accurate* information to Colorado firearm dealers on whether the transfer of a firearm to a particular individual would be in violation of federal or state law. To that end, one of the Insta-Check Unit's objectives is to ensure that background checks are completed promptly.

We reviewed the Insta-Check Unit's response times for providing the results of Brady Act-related background checks to Colorado gun dealers and found the Unit lacks complete data to measure its response times or assess its effectiveness in meeting legislative intent. First, we found that the Insta-Check Unit does not capture any data on response times for background check requests received over the Internet. Internet requests represent more than 70 percent of the Brady Act-related background check requests received by the Insta-Check Unit annually. The CBI staff report that operators are advised to process Internet requests before those received over the telephone; therefore, response times for Internet-based requests should be lower than response times for telephone requests. Data are not available, however, to support this assertion.

Second, we found that, for the approximately 30 percent of background check requests received over the telephone, the Insta-Check Unit collects inadequate data to measure response time. The Insta-Check Unit collects data only on “queue” time, which is the amount of time a firearms dealer must wait on hold before being connected with a CBI operator. The Insta-Check Unit does not collect any data on “processing” time. Processing time is the time it takes the CBI operator, once the operator begins speaking with the firearms dealer, to conduct the actual background check and transmit the results to the firearms dealer.

To determine how long firearm dealers are required to wait before a background check is completed, both queue and processing times are necessary. We evaluated the CBI’s queue (based on telephone requests only) and processing times and attempted to calculate Insta-Check Unit response times for all Brady Act-related background check requests using available data. We found:

- **Queue time.** CBI’s goal is to maintain an average queue time of 5 minutes or less. We reviewed queue time data for Calendar Years 2002 through 2005 and found that the Insta-Check Unit has not met its 5 minute goal since Calendar Year 2002. As the following table shows, the Unit’s average annual queue time has increased from 1 minute 46 seconds in Calendar Year 2002 to 12 minutes 46 seconds in Calendar Year 2005, an increase of almost 625 percent. During the same time, the number of requests from firearms dealers for background checks has increased by only 9 percent, from about 138,800 in Calendar Year 2002 to almost 151,800 in Calendar Year 2005.

Colorado Bureau of Investigation Insta-Check System Average Queue Times Calendar Years 2002 through 2005					
	Calendar Year 2002	Calendar Year 2003 ²	Calendar Year 2004	Calendar Year 2005	Four-Year Average
Average Annual Queue Time¹	1 minute, 45 seconds	16 minutes	8 minutes	12 minutes, 46 seconds	9 minutes, 38 seconds
Total Background Requests	138,800	141,600	146,500	151,800	144,700

Source: Colorado Bureau of Investigation.

Notes: ¹Queue times are based on telephone requests. Data are not available for background requests received over the Internet.

²CBI staff report that for the first time, starting in 2003, the Integrated Online Courts Network (ICON) was searched for *all* requests for Brady Act-related background checks. Prior to 2003, ICON was only searched if disposition data were missing from CCIC and other federal databases. CBI staff report that this new search increased processing times. CBI staff report that approximately 15 percent of all denials are based on information found exclusively in ICON.

- **Processing time.** Insta-Check Unit staff report that, once the operator is speaking with the firearms dealer, the operator can typically process the background check through the various federal and state database systems and provide a result back to the firearms dealer in about 15 minutes.
- **Response time.** Using the data available, we conservatively estimated that during Calendar Year 2005, a firearms dealer in Colorado spent, on average, 27 minutes and 46 seconds (12 minutes and 46 second average queue time plus 15 minutes of processing time) on the phone waiting for each background check to be completed, or about a half hour. Data to compare Colorado's results with other states or the FBI were not available.

Factors Affecting Response Times

We assessed several factors that could contribute to long response times, including information systems availability, staffing, and the Insta-Check Unit's hours of operation. We discuss these issues in the sections that follow.

Information Systems Availability

During the audit, we received information suggesting that problems with automated information systems could be contributing to the substantial wait times for firearms background checks. When conducting background checks, Insta-Check Unit operators query several databases, including:

- **Colorado Crime Information Center (CCIC).** The CCIC was established in 1971 as the State's criminal history repository. CCIC is a fingerprint-based identification system that enables all law enforcement agencies in Colorado to communicate with each other and with other states. Law enforcement agencies access CCIC to identify suspects and to respond to situations in which the arrest of an offender may occur. The Insta-Check Unit also uses the CCIC to access the Division of Motor Vehicles' files to verify the drivers' licenses and state identification cards presented to the FFLs. CCIC also provides information on victims and restraining orders. CBI maintains and administers the CCIC.
- **Integrated Courts Online Network (ICON).** ICON is the state courts information system. ICON provides probation case management services and tracks adjudication information from the court system on felony, juvenile, and most misdemeanor and traffic cases statewide. The Insta-Check Unit uses ICON to locate case disposition data, which is not always maintained in CCIC. The CBI staff report that the number and percentage of Brady Act-related denials found exclusively through ICON have increased every year. The Judicial Branch administers ICON.
- **National InstaCheck System (NICS).** The NICS is a system created and maintained by the FBI in response to passage of the Brady Act. The NICS consolidates data from the National Crime Information Center (NCIC), Interstate Identification Index (III), and NICS Index databases. These databases must be searched to complete Brady Act-related background checks. The NCIC and III databases contain criminal history records from other states and

from federal agencies. The NICS index contains information on persons who are prohibited from receiving a firearm for reasons *other* than their criminal history (e.g., dishonorable discharge, commitment to a mental institution). The FBI maintains the NICS.

- ***Immigration and Customs Enforcement (ICE)***. The ICE database is administered by the federal Immigration and Customs Enforcement Agency. The database contains information pertaining to a person's immigration status. The Insta-Check Unit queries the database when a prospective firearm purchaser declares non-citizen status.

We reviewed information system metrics to determine whether automated systems were unavailable when Unit operators attempted to process background checks. Data collected during Fiscal Years 2004 through 2005 indicate that these systems were available to operators more than 98 percent of the time. Therefore, lack of system availability does not appear to contribute to Brady Act-related background check delays. We discuss system-related issues later in this report.

Staffing

Statute requires the CBI to “employ and train personnel at levels that ensure prompt processing of the reasonably anticipated volume of requests for background checks received.” [Section 24-33.5-424 (7)(b)(IV), C.R.S.] CBI's Insta-Check Unit typically receives more requests at the onset of the state hunting season and during the year-end holidays. Data indicate that the “peak season” for firearm sales begins in late summer and progressively gains momentum through the month of December. The CBI adjusts staffing levels by hiring temporary staff during the peak season to accommodate the increased workload.

We found that CBI had problems retaining temporary staff during the Insta-Check Unit's peak season and that these problems contributed to the sharp increase in queue times between Calendar Years 2004 and 2005. For example, during July and August 2005, CBI reported hiring and training 14 temporary staff. Of these 14 workers, 10 left the Unit for other employment by mid-September and only 4 remained to handle requests for background checks during the remainder of the peak season. Prior to Calendar Year 2005, the CBI Insta-Check Unit had not experienced similar problems. Since the hiring and training processes are relatively lengthy, it is essential that CBI retain these temporary workers. Once peak season arrives, temporary workers are not easily replaced. Each candidate must pass a background check and polygraph exam and receive one month of training before beginning work.

Hours of Operation

Statute [Section 24-33.5-424 (7)(b)(IV), C.R.S.] requires the CBI Insta-Check Unit be open for business at least twelve hours per day every calendar day, except Christmas and Thanksgiving. Currently, the Unit accepts background check requests every day from 9 a.m. to 9 p.m. The minimum federal requirements are that states conducting Brady Act-related background checks be open for business from 10 a.m. to 9 p.m., Monday through Saturday, and “during normal retail business hours within the state on Sundays.” CBI management reports that the Insta-Check Unit could be staffed more effectively if the hours on Sunday were reduced to reflect more normal retail

business hours, which are typically from about 10 a.m. to 5 or 6 p.m. CBI management also reports that few requests are received between 9 a.m. and 10 a.m. on weekdays and Saturdays.

Improvements

CBI needs to implement several steps to improve the timeliness of its Brady Act-related background checks. First, the Insta-Check Unit needs to collect and evaluate data on total response times, including queue and processing times, for both telephone and Internet requests. Accurate information on the response time to complete background checks should be used to assess performance in relation to goals, identify and address reasons for background check delays, and better allocate staff. The CBI should also revisit its current performance goal for queue times and develop additional goals for processing and response times. The CBI should report the Insta-Check Unit's performance in relation to its goals on the agency's state website and in its annual budget request.

Second, CBI needs to survey state firearms dealers to determine normal retail business hours and assess fluctuations in call volume to identify opportunities for targeting resources more effectively. This should include evaluating call volume on Sundays and between 9 a.m. and 10 a.m. on weekdays and Saturdays to determine whether operating hours could be reduced to those permitted by federal law. Additionally, CBI should collect data on hours of operation for the firearms dealers submitting requests on Sundays. On the basis of evaluating these data, CBI should assess whether statutory changes are needed to allow for more efficient staffing of the Insta-Check Unit.

Finally, CBI should determine the reasons for the high turnover of temporary staff in the Fall of 2005. Once the reasons for the high temporary staff turnover are identified, CBI should consider options for improving retention of these workers and ensure that sufficient permanent and temporary staff are available as needed during peak season. Options include offering bonuses to those temporary workers that stay through the Insta-Check Unit's peak season. CBI should also consider other sources of available help. For example, local colleges often partner with businesses to provide students or interns with practical work experience. The CBI should consider partnering with local colleges and using student workers or interns to supplement permanent and temporary staff.

Recommendation No. 1:

The Colorado Bureau of Investigation should improve the timeliness of Brady Act-related background checks to meet its own standards and to comply with legislative intent. More specifically, CBI should:

- a. Develop methods to track, analyze, and report response times for telephone and Internet background check requests, including queue and processing time. CBI should use this information to assess performance, identify and address reasons for delays, and better allocate staff. CBI should also revisit its goal for queue time and develop additional performance goals for processing and response times. CBI should report its performance results on its website and in the agency's annual budget request.

- b. Survey firearm dealers to determine normal retail and business hours and assess fluctuations in call volume. CBI should use the call volume and hours of operation data, as compared to the minimum federal requirements, and recommend statutory changes if needed for more efficient staffing of the Insta-Check Unit.
- c. Determine the reasons for high turnover of temporary staff. CBI should also evaluate its process for hiring temporary workers to complete firearm background checks and consider options, including bonuses, for improving retention. CBI should also consider other sources of temporary workers, such as college students or interns.

Colorado Bureau of Investigation Response:

Agree. Implementation Date: June 2007

- a. The Colorado Bureau of Investigation (CBI) will seek funding to continue with the next phase of the Insta-Check Internet Project. CBI will increase the scope of the next phase to include documenting all of the processing time that the Colorado Crime Information Center (CCIC) system can account for, as well as documenting the demand load and peak time periods of Internet checks; in this way the information can be combined with our known statistics that are currently gathered via our telephone system.

The CBI currently has adequate tools to assess performance (number of checks conducted, denial rates per Full Time Equivalents (FTE), number of denials overturned by supervisor), which we will combine with the processing times mentioned above. We will revise our queue time goals, and (as processing time becomes available) we will develop additional performance goals for processing and response times.

There will remain some post processing time [processing that occurs following the issuance of a transaction number to the Federal Firearm Licensees (FFLs)] that would require manual logging, which would include research involving communications (telephone, Internet, mail) with courts, arresting agencies, and state and federal attorneys. In light of the already high queues, the CBI is reluctant to require manual logging of non-system-related post processing time until resources allow.

- b. The CBI will survey FFLs, as recommended, to determine normal retail and business hours. We will attempt to gauge and gain FFL support for shortening hours of operation, which we feel would increase our efficiency. After analyzing the survey results and our own records of call volume, CBI will recommend needed statutory changes.
- c. The CBI will continue to explore the reasons for high turnover of temporary staff. As reported by the audit staff, our recent problems were a result of ten out of fourteen temporary employees being offered permanent positions elsewhere. This

situation has become difficult to alleviate. Temporary employees are seeking benefits of full time employment in the workplace. CBI will implement the recommendation to establish bonuses for those temporary employees who remain for the duration of the contract period. CBI will also explore the option regarding college students/interns.

Identity Documents

The Brady Act requires firearms dealers to identify the person requesting to purchase a firearm by examining a valid government-issued identification document that contains the photograph of the holder [18 U.S.C. 922(t)(1)(c)]. Federal law defines an identity document as:

. . . a document made or issued by or under the authority of the United States Government, a State, political subdivision of a State, a foreign government, political subdivision of a foreign government, an international governmental or an international quasi-governmental organization which, when completed with information concerning a particular individual is of a type *intended or commonly accepted for the purpose of identification of individuals*. [18 U.S.C. 1028 (d) (3)] (Emphasis added).

According to CBI policies, acceptable identity documents under the federal laws and rules include state driver's licenses, state-issued identification document cards, passports, military identification documents, and Colorado county-issued concealed firearm permits. When the firearms dealer contacts CBI's Insta-Check Unit for a background check, the Unit operator will ask the dealer for the prospective purchaser's identifying information (e.g., name, date of birth, social security number) and for information regarding the document(s) being used to prove identification (e.g., driver's license number, state-issued identification document number). Insta-Check Unit operators verify Colorado and other states' driver's licenses and state-issued identification documents, which can be done instantly through existing databases. Operators do not verify passports, military identification documents, or concealed firearm permits. Databases do not exist to verify these documents instantly. Neither federal nor state law require CBI to verify identity documents.

Our audit reviewed CBI's acceptance and use of identity documents and found that the Unit is accepting concealed firearm permits, which do not qualify as identity documents under federal law. Federal law provides that an identity document must be a document "commonly accepted for the purpose of identification of individuals." Colorado statutes appear to question the validity and acceptance of concealed firearm permits as a form of valid identification. Specifically, statutes require each person with a concealed firearm permit to "carry the permit, together with valid photo identification, at all times during which the permittee is in actual possession of a concealed handgun and shall produce both documents upon demand by a law enforcement officer." [Section 18-12-204 (2)(a), C.R.S.]

According to the CBI management, concealed firearm permits are not typically accepted as identification for a number of reasons. Concealed firearm permits are issued by county sheriff's offices and the documents are not standardized (i.e., a permit issued by one sheriff's office will not

look the same as a permit issued by another sheriff's office). Additionally, these permits do not contain security features, are not always laminated, and therefore, are easily altered. As a result, a licensed gun dealer may be unable to distinguish between a valid and falsified concealed firearm permit. Insta-Check Unit staff report that increasingly, firearms dealers are accepting concealed firearm permits to verify identity.

Recommendation No. 2:

The Colorado Bureau of Investigation should comply with federal law and discontinue accepting concealed firearm permits as identification documents. The CBI should notify licensed gun dealers of this change, establish appropriate procedures, and train operators on these procedures.

Colorado Bureau of Investigation Response:

Agree. Implementation Date: September 2006

The CBI has, following discussions with audit staff, established a procedure to discontinue the acceptance of concealed firearm permits as identification documents. We recently provided training on this procedure to all FTE and temporary staff. We will include notification of this procedural change when we survey FFLs per recommendation 1(b) and will also post this information on our web site.

Information Systems

Finally, we were asked to determine whether CBI's request for funding from the General Assembly's Capital Development Committee to replace the Colorado Crime Information Center (CCIC) Message Switch (MSS) was related to the Insta-Check Unit's slow response times for background checks. The MSS is the communication gateway for accessing a variety of automated law enforcement services and networks, including information related to national criminal histories, Amber Alerts, wanted persons, stolen vehicles, driver information and registration, sex offenders, state to state intelligence sharing, and judicial and department of corrections information and databases. We evaluated the CBI's request for capital funding, interviewed staff, and reviewed information system configurations and metrics to determine if the MSS has impacted the Insta-Check Unit's queue times and if increasing queue times were used by the CBI to support its capital funding request.

As discussed previously, we found that automated systems issues, including those related to MSS, were not contributing to Insta-Check delays. Additionally, we found that Insta-Check delays were not the basis for CBI's funding request. Rather, CBI reported to the Capital Development Committee that the MSS system is obsolete. The MSS consists of three legacy mainframe computers that are over eleven years old. Replacement parts are no longer manufactured. Programming language (COBOL) is difficult to maintain or modify. When the MSS was deployed,

its useful life was estimated at 5 years; however, the MSS has now been in production for over 11 years.

The MSS processes over 130 million transactions each year. The majority of these transactions are initiated by over 320 different users, including all local and state law enforcement agencies in Colorado; state and local crime labs; and homeland security, emergency management, and federal law enforcement agencies. The Insta-Check Unit initiates only 152,000 transactions annually, or about one-tenth of one percent of all transactions. According to CBI reports, MSS was unavailable, due to both planned and unplanned outages, approximately 17 hours per month during Fiscal Year 2005. During these outages, there were about 29,000 local law enforcement contacts that were not processed because critical information provided through MSS was unavailable. According to CBI management, replacement of the MSS is a matter of public and law enforcement personnel safety.