U.S. DEPARTMENT OF THE TREASURY

PROGRESS REPORT

Study of

MARKING, RENDERING INERT AND LICENSING OF EXPLOSIVES MATERIALS

- 1998 -

PROGRESS REPORT

STUDY OF MARKING, RENDERING INERT, AND LICENSING OF EXPLOSIVE MATERIALS

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This was last updated on November 19, 1999

I. PERTINENT FINDINGS/SUMMARY OF WORK COMPLETED

A. CONTINUING ANALYSIS OF AVAILABLE STATISTICAL DATA CONCERNING EXPLOSIVES INCIDENTS

The ESG is continuing to analyze statistical data on explosives-related incidents as reported in ATF's annual Arson and Explosives Incidents Report (AEIR), in order to assess the overall threat to the American public posed by the criminal use of explosives. This analysis is directed toward identifying regulatory weaknesses that create vulnerability, as well as determining where the application of detection and identification technology may have the greatest impact in preventing and solving criminal acts.

A-1. Thefts

As stated in the 1997 Progress Report, between 1978 and 1995, approximately 52 percent of explosives thefts occurred at the user level. "Users" are defined in the AEIR as individuals who purchase and use explosives within their State and are therefore not required to obtain a Federal license or permit. Absent the requirement for a permit, these individuals are not subject to Federal inspection of their storage facilities, and these facilities may lack adequate security. Additionally, research indicates that a large majority of thefts result from the destruction of substandard locks on storage facilities belonging to non-permitees. Although Federal regulations require that all explosive materials be stored in magazines secured with ATF-approved locks (as defined in the regulations), ATF has no authority to inspect the premises of non-permitees' to verify the presence of the locks.

In August 1998, the ESG received a pre-publication copy of the 1996 AEIR, and conducted a preliminary analysis of the statistics reported for 1996. During 1996, there were 79 reported thefts – the lowest number in 22 years, which equated to 9,138 pounds of explosive material. Thirty-five (44 percent) of these thefts occurred at the user (non-licensee) level.

A-2. Bombings

The table below reflects the types of filler materials used in explosive and destructive devices. The numbers of incidents involving commercial high explosives and blasting agents remains low.

Table S.1

Fillers Used in Bombings and Attempted Bombing Incidents

	1976 through 1996		1992 through 1996	
Filler	Incidents	%	Incidents	%

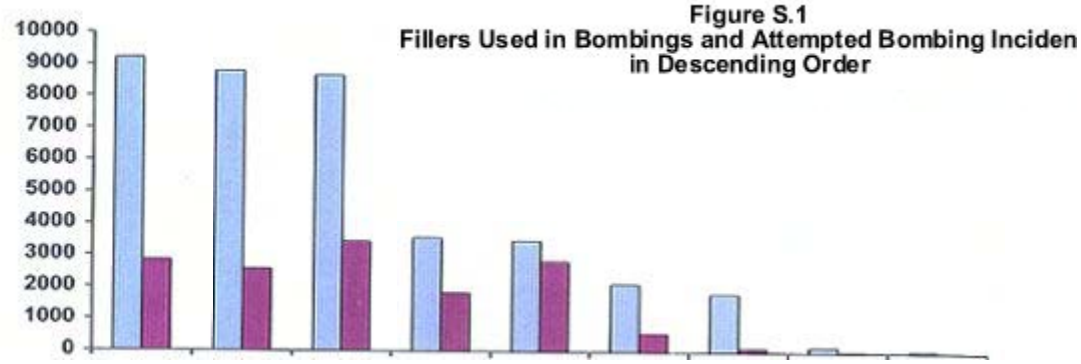
Undetermined/Unreported*	9,224	24.3	2,859	20.0
Black or Smokeless Powders	8,810	23.2	2,578	18.1
Flammable Liquids	8,686	22.9	3,438	24.1
Photo Flash/Fireworks Powders	3,545	9.4	1,833	12.8
Chemicals	3,475	9.2	2,833	19.8
Other**	2,117	5.6	575	4.0
Commercial High Explosives	1,816	4.8	126	.9
Blasting Agents	170	0.5	29	0.2
C4/TNT	56	0.1	11	0.1
Total	37,899	100.0	14,282	100.0

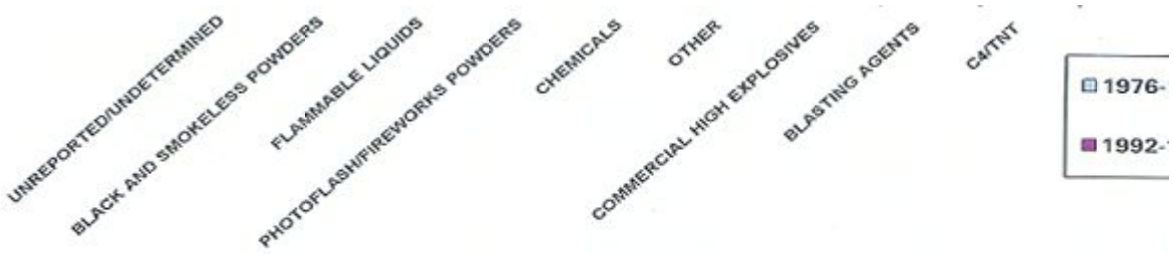
*The Undetermined category captures incidents in which fillers could not be identified through laboratory analysis or incomplete data was reported.

**The Other Category includes match heads, military explosives (excluding C-4/TNT), improvised mixtures, flares, boosters, detonating cord, gases, blasting caps, PETN, RDX, HMTD, model rocket propellant, and smoke grenades.

Source: The Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms, Explosives Incidents Reports 1985 and 1995, and Arson and Explosives Incidents Reports 1994, 1995, and Prepublication 1996.

The statistics in Table S.1 and Figure S.1 show that careful consideration must be given to mandating the use of identification taggants in commercial high explosives and blasting agents in the U.S., since the great majority of criminal bombings are committed with other materials and in improvised devices. While the use of existing identification taggant technologies may be a factor in future strategies





Source: The Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms, Explosives Incidents Reports 1985 and 1995, and Arson Explosives Incidents, Reports 1994, 1995, Prepublication 1996.

to inhibit the criminal use of commercial explosives, significant research in this area remains to be completed.

The focus of this Study has been designed to yield a comprehensive strategy to address a broad range of potential means available to the criminal bomber to make and use a bomb. A wide-ranging prevention strategy will likely include recommendations for regulatory changes regarding commercial explosives, the use of technology to detect explosive materials and to aid in the more rapid investigation of explosives incidents, strengthened voluntary controls on the parts of the impacted industries, and better education of the public.

B. TAGGING EXPLOSIVE MATERIALS FOR THE PURPOSES OF DETECTION AND IDENTIFICATION

B-1. Analysis of Swiss Identification Tagging Program

From November 12-15, 1996, the ESG met with the Swiss Federal Police's Scientific Research Service (SRS), in Zurich, Switzerland; with three manufacturers of explosives; and with one manufacturer of metal powders (fuels) and alloys who produces tagged premix for explosives. From November 12-20, 1997, the ESG met again with the SRS, as well as with officials from three Canton (equivalent to a U.S. State) police departments, one previously visited Swiss explosives manufacturer/importer, and one French manufacturer who exports tagged explosives to Switzerland.

The ESG's initial meeting with the SRS in November 1996, focused on information concerning the practical application of an identification tagging program, particularly concerning its impact on explosives manufacturers. During the subsequent meeting, the ESG focused on quantifying the utility of taggants as an investigative tool, and more thoroughly examined issues such as the historical background of the implementation of the tagging requirement, other requirements of the Swiss Federal Act of Explosives for Civil Purposes (FAECP), the impact of the program on Swiss manufacturers/importers (i.e., cost, record-keeping requirements), and the general administration of the program.

B-1(a). Swiss Explosives Law

The FAECP, which includes the requirement to add taggants to certain explosives, was enacted on July 1, 1980. The FAECP instituted three major changes to Swiss explosives laws: strict licensing and storage requirements for explosives; mandatory safety and handling education for all users of explosives; and the addition of taggants to explosives and explosive materials manufactured for blasting purposes. SRS officials stated that the comprehensive FAECP was enacted to enhance security and safety, and to assist police in

the investigation of explosives-related crimes (i.e., thefts and bombings).

The FAECP was established at the Federal level in Switzerland due to growing concerns in the 1970s over terrorism and the need to centrally monitor the production and importation of explosives and explosive materials. The FAECP was also intended to address concern within other European countries over easy access to Swiss-manufactured explosives. SRS officials believe that the combination of stringent storage and training requirements and the use of taggants have had a tremendous deterrent effect against the theft and criminal use of explosives.

SRS officials stressed that the taggant requirement is one tiny part of a comprehensive criminal law. The FAECP was passed with very little opposition and has never been publicly challenged or debated.

The effectiveness of the Swiss identification tagging program cannot be measured independently of the other aspects of the FAECP. Therefore, the following information concerning the purchase, storage, and use of explosives in Switzerland is provided.

Permits and Training/Education under the FAECP

Switzerland's FAECP, though established at the Federal level, is generally enforced at the Canton (State) level. For example, the Cantons are responsible for enforcing the FAECP by regulating the manufacture, sale, storage, use, and destruction of explosives and explosive materials within their jurisdictions. Canton-level laws generally identify the specific agencies or offices responsible for enforcing the FAECP.

Manufacturers and importers must obtain a Federally-issued permit to produce or import explosives. They are required to keep records documenting production and inventory for 5 years and must provide any requested information or documents to police officials. Distributors must be licensed at the Canton level (manufacturers have authority to distribute their own products under their Federally-issued manufacturer’s permit).

All purchasers of explosives in Switzerland are required to obtain both a working license (issued at the Federal level) and a purchaser’s license (issued at the Canton level). To obtain the Federal working license, individuals are required to take a course and pass an examination. In order to apply to take the course, individuals must submit (to the designated responsible organization) a certificate of reliability, obtained from their local police department, which reflects any criminal convictions or other conditions, such as psychological or substance-abuse problems, which may preclude them from possessing an explosives working license. A Federal commission, comprised of law enforcement officials and government and commercial explosives experts, approves or denies applications on a case by case basis. If a licensee commits a crime, authorities at the Canton level may revoke his/her license and seize any explosive materials in his/her possession.

Purchasing licenses are issued by local law enforcement authorities and are contingent upon inspection of the applicant’s storage facilities. Purchasing licenses are only issued to holders of working licenses or companies with holders of working licenses.

Small-scale users may purchase up to 25 kilograms (55 pounds) of explosives within a 3-month period, but may purchase no more than 5 kilograms (11 pounds) at once. The

purchasing license expires after 3 months. Upon expiration of the license, the purchaser must return all unused explosives or request a new license. Small-scale users are not required to maintain records.

Large-scale users obtain purchasing licenses for unlimited quantities of explosives (which may be purchased in portions) which are valid for 1 year. Large-scale users are required to maintain detailed records of materials purchased and maintained in inventory for 5 years.

Storage Requirements

There are 64 explosives storage areas authorized by the FAECP in Switzerland. Even though several storage magazines may exist within each area, manufacturers and distributors are limited to storing 20 metric tons (44,100 pounds) of explosives or 100,000 detonators (electric and non-electric) in a single magazine at any given time. Producers and distributors are permitted to share magazines due to the limitation placed on storage space. Small users may have an unlimited number of portable or day-box magazines. However, each magazine is limited to 25 kilograms (55 pounds) of explosives or 100 detonators.

In order to obtain a manufacturer's, distributor's, or working license (only large-scale users), applicants must have approved, safe storage facilities in which to store the explosives. Canton police are responsible for inspecting all storage facilities, and may do so prior to the issuance of a permit and/or at any time an individual holds an active permit. For distributors and large-scale users, yearly inspection of facilities is mandatory. For small-scale users, inspection is at the discretion of the local police. Users are required to re-apply for permits if their storage facilities change.

Thefts of explosives have to be reported to Canton-level authorities. Fines are imposed for failure to report thefts, and for the improper storage of explosives. SRS officials stated that explosives thefts dropped drastically after the enactment of the FAECP due to the establishment of strict explosives storage requirements.

Use of Identification Taggants

Under Swiss law, taggants are only required to be included in explosives and explosive materials that are specifically manufactured for blasting**.** For example, if black powder is manufactured for sporting purposes it is not tagged, but if it is manufactured for blasting purposes it is tagged. Other exemptions also exist: military explosives are not tagged with an identification taggant, and explosives manufactured for blasting purposes are exempted from the tagging requirement if they are manufactured and used on-site (binary explosives for instance). However, for example, if explosives are manufactured off-site, transported, and pumped into blasting holes, they must be tagged. Finally, exemption from tagging can be sought for the use of specified amounts of imported, untagged specialty explosives for use in special seismic or blasting projects. The user must request Federal approval. The user must be licensed and demonstrate the availability of safe storage. Upon completion of the project, unused explosives must be returned to the place of origin (foreign manufacturer or distributor). Permission, along with the specific terms agreed upon by Federal officials and the user are prepared in writing, and the user is required to prepare a written report on the use of the explosives upon completion of the project.

Only small quantities of black powder, imported from Slovenia, are used for blasting, and

therefore tagged, in Switzerland. Smokeless powder is only manufactured for use for military and sporting purposes and is not tagged. Detonators (electric and non-electric) are required by Swiss law to be marked. However, because there are no manufacturers of such materials in Switzerland, this portion of the law has not been implemented. Only a small quantity of fireworks are produced in Switzerland, and most are imported from Germany and China. They are not tagged, since they are not used for blasting purposes. The entire length of safety fuses and detonating cords must be marked with information regarding the manufacturer, and the place, year, and month of manufacture.

Swiss manufacturers are required to buy unused explosives back from purchasers (at a lower rate than the original sale price). The returned explosives must be destroyed by open burning or open detonation, or they can be reworked into the production of a new batch of explosives. However, due to concerns over potential cross-contamination in excess of the SRS-established acceptable 10:1 ratio of newly coded taggants to old taggants, a new production batch may only contain 6 percent of a returned product. In order to rework explosives, manufacturers must obtain specific authorization from the SRS, and are required to submit samples of the explosives to be reworked to the SRS. Specific data on the percentage of explosives bought back by Swiss manufacturers is unavailable. However, the SRS estimates the amount to be less than 1 percent, due to the fact that approximately one request by a manufacturer to rework explosives is received per 5-year period.

The established requirement is that one specific coded taggant is used by a manufacturer for explosives manufactured for a maximum period of 6 months or a maximum of 300 metric tons (661,500 pounds) of explosives. (The initial requirement was to tag each batch of explosives uniquely. However, this proved too cumbersome and in many instances products were miscoded.) When either limit is met, the taggant code is changed. A single (coded) taggant may be used in more than 50 different products. For imported explosives, a different coded taggant is required per import. The maximum quantity per import is 150 metric tons (330,750 pounds) of explosives.

If a sample contains more than a 10:1 ratio of the current taggant to a previously added taggant, or if taggants are not found in the sample, the SRS notifies the Federal police who contact the manufacturer in writing. In such a case, the product will have already been manufactured and distributed, but officials do not view this as a problem because they are aware of the anomaly in the particular product or range of products for the particular time frame.

In 60-80 percent of cross-contamination cases, the cause is identified. If a particular manufacturer demonstrates a pattern of incongruous cross-contamination, the SRS will sample the production, prior to its sale, over a period of time to determine the cause.

Officials recalled only one instance (in approximately 10,000 samples) in which taggants were not found in a sampled portion of a cartridge. A second or third such occurrence may warrant a recall of the explosives. Officials stated that they trust the manufacturers based on their experience and that a recall of explosives has never been necessary.

In 1994, there were 3,000-5,000 metric tons (6,615,000 –11,025,000 pounds) of tagged explosives either manufactured or imported into Switzerland. Between 1980 and 1996, there have been a total of 50,000 metric tons (110,250,000 pounds) of tagged explosives manufactured.

B-1(b). Utility of Identification Taggants to Swiss Law Enforcement

In discussing the utility of taggants to law enforcement officers and prosecutors, SRS officials repeatedly emphasized that the Swiss tagging program is only one part of the comprehensive FAECP. They also emphasized the deterrent value of the tagging program. While it is generally known that Swiss explosives contain taggants, the specifics of the FAECP are not common knowledge. The FAECP simply states that the taggants used must survive detonation and be traceable to the manufacturer of the explosives.

In most cases, criminal investigations are initiated at the Federal level and then turned over to the appropriate Canton. Forensic evidence is always provided to the SRS for analysis, but taggants are not always retrieved. SRS officials stated that they do not always attempt, nor are they always able to analyze taggants

SRS officials stated that taggants always lead them to the manufacturer and time of manufacture of an explosive product, but not always to the distributors or last legal purchasers. When taggants are retrieved, the SRS checks the taggant code against the manufacturer's records to attempt to determine to whom the product or range of products were sold. Taggants are used in conjunction with other evidence retrieved, such as explosives packaging materials or special detonators or safety fuses to narrow the field of potential suspects. SRS officials stated that taggants play a role in building evidence, but never directly identify the perpetrator of a criminal act involving explosives.

In the opinion of the SRS, taggants have provided good pieces of circumstantial evidence in prosecutions. In 1996, SRS officials estimated that taggants have been used as one of the items of evidence in approximately 15 prosecutions, since the enactment of the FAECP. SRS officials also stated that although a better prosecution rate exists with taggants, it is not necessarily because of taggants. There is no cause and effect relationship between the presence of taggants and the rate of prosecution. Further, taggants have never been challenged in a criminal prosecution.

While statistical information on explosives-related incidents is maintained, specific data concerning the effectiveness of taggants as a preventative or forensic tool has not been tracked regularly because statistics have not been relied upon to validate the program. Between 1984 and 1994, there were 254 documented bomb attacks. Of these, 59 (23.2 percent) were solved. One-hundred-ninety-one bomb attacks were perpetrated using untagged explosives; 31 (16.2 percent) of these incidents were solved. Sixty-three bomb attacks were perpetrated using tagged explosives; 28 (44 percent) of these incidents were solved.

During the 10-year period 1984-1994, following the enactment of the FAECP, only 25 percent of all explosives used in bombings were found to be tagged. The Swiss explained five likely causes for the remaining 75 percent being untagged --

- The explosives used were manufactured before the 1980 tagging law went into effect;
- Black and smokeless powders manufactured for sporting purposes (which are not required to be tagged) were used;
- Military explosives (which are not required to be tagged) were used;
- Explosives from other countries were used; or

- Pyrotechnic devices (which are not required to be tagged) were used.

The SRS stated that pipe bombs are a significant problem and black powder (manufactured for sporting purposes) and pyrotechnic mixtures (homemade or taken out of pyrotechnic devices) are the most widely used fillers in pipe bombings in Switzerland.

B-1(c). Swiss Explosives Industry

The Swiss produce approximately 3-5 thousand metric tons (6-11 millions pounds) of tagged explosives each year. The SRS stated that approximately 40 percent of its annual production of tagged explosives consists of dynamite and the remaining 60 percent is other products such as water gels and slurries.

There are four explosives manufacturers in Switzerland, three manufacturers of high explosives and blasting agents and one manufacturer of low explosives (black powder). The three manufacturers of high explosives produce products such as nitroglycerin-based dynamite, slurries, water gels, plastic explosives, and detonating cord.

Plastic explosives produced in Switzerland for civil use, primarily surface rock blasting, currently contain an identification taggant. The Swiss do not produce or import cast boosters for commercial use.

All three types of identification taggants are used to tag sensitizing agents such as ammonium nitrate/fuel oil (ANFO), which is manufactured with low density (explosive grade) AN.

Swiss explosives manufacturers utilize one taggant for a period of 6 months or a maximum of 300 metric tons of explosives, whichever comes first. Taggants can be placed in over 50 different types of explosives included in 10 to 50 different sizes and sold to as many as 300 distributors and/or users of explosives. Swiss manufacturers are only required to identify their explosives for sale with the producer's name, place of production, and month and year. The type and actual day and shift the explosives are produced are not a requirement.

Manufacturers, importers, distributors and large users of explosives must keep records. Small users of explosives are not required to maintain records. Records maintained by distributors and importers are only required to contain the date the explosives were acquired and the name and address of the individual from whom the explosives were received. Disposition records only contain the date of the sale and the name and address of the person receiving the explosives. The Swiss can always trace tagged explosives back to the manufacturer, but it is difficult to trace explosives to the last legal purchaser(s).

By comparison, current Federal law requires U.S. explosives manufacturers to mark their explosives for sale and/or distribution with the manufacturers' name and location, product type, and the month, day, year and shift (date-shift-code) of manufacture. The Federal Explosives Laws and Regulations require that all persons who manufacture, import, distribute and use explosives must keep records. Federal licensees and permittees must maintain all records of importation, production, shipment, receipt, sale or other disposition. Federal licensees' and permittees' records must include: date of importation or other acquisition and disposition; name or brand name of manufacturer and country of manufacture; manufacturer's marks of identification (date-shift-code); quantity; type of

explosive material; and the date the explosives were acquired and disposed of.

The Swiss taggant system is not geared to tracing explosives beyond the manufacturer. In the U.S., the ESG believes the optimum result of a trace is the identification of the last legal purchaser(s). Therefore, the recordkeeping system, as it exists in the Swiss program model, would have to be modified significantly to conform to existing recordkeeping standards in the U.S.

The ESG visited SSC-Isleten, a Swiss explosives manufacturer in 1996 and 1997, to discuss the taggant program's impact on manufacturers of explosives. SSC-Isleten produces tagged explosives and imports both tagged gelatin and marked detonating cord from a French explosives manufacturer, with whom the ESG also met. Taggant-related record-keeping consists of the maintenance of documentation, as well as a sample of each new product manufactured. The documentation indicates the product type and dimension, the production date (month and year), and the taggant code. The quantity of each individual product manufactured with a particular taggant is not tracked. A copy of the document is sent to the SRS, along with a letter indicating the change in taggant codes, which includes the former code with the dates of its use and the first lot number and last lot number, and the new code with its introduction date. Samples of the newly tagged explosives are also shipped to the SRS. (Both Isleten officials and SRS officials stated that they have never had a problem (i.e., theft) shipping the explosives.)

Based on the information developed concerning the Swiss identification tagging program, the ESG believes that, while the program is reasonably effective in Switzerland, as it now exists, it could not be readily implemented in the U.S. Material differences exist between the Swiss and U.S. explosives industries, including differences in production volume (6-11 million pounds in Switzerland vs. 5 billion pounds in the U.S. per year) and production processes (batch-run in Switzerland vs. continuous run in the U.S.). The continuous run production method would likely result in cross-contamination of taggants beyond an acceptable level. Further, based solely on the volume of explosives manufactured in the U.S., in order for taggants to be effective, taggant codes would require frequent changes, which would necessitate a far more cumbersome recordkeeping system than is used in Switzerland. The SRS explained that upon initiating the taggant requirement, manufacturers were required to tag each individual product differently. It was discovered that this practice resulted in a high error rate (i.e., samples forwarded to the SRS were not tagged with the codes indicated by the manufacturer). Because of the relatively low volume of explosives produced annually in Switzerland, the practice was discontinued in lieu of the current requirements for taggant code changes.

As stated above, there is no definitive statistical data available to assess the effectiveness of the tagging program in Switzerland, which leaves its actual utility to investigators and prosecutors in question.

Further, while the goal of tagging in Switzerland is the ability to trace explosives to the manufacturer, in the U.S., the ESG believes that, because of the large number of manufacturers in and importers to the U.S., the desired goal is to enhance the ability to trace explosives to their last legal purchaser(s).

There has never been an accident related to the addition of taggants to explosives reported, nor has there been any indication of incompatibility between the taggants and explosives used in Switzerland. While the use of taggants by the Swiss over a prolonged period of time does not support concerns raised in the U.S. over safety and compatibility between explosives and taggants, the Swiss experience may not be conclusive since the range of explosives products manufactured and imported into the U.S. is more extensive. Therefore, compatibility testing for the full range of explosives manufactured and imported in the U.S. is necessary.

No environmental impact testing has been conducted on the materials now used by the Swiss. Such testing is essential to considering a tagging program in the U.S. These issues will be addressed further under *Plans and Methodology for Completing Study*.

B-2. NRC Findings

The NRC Committee on Marking, Rendering Inert, and Licensing of Explosive Materials concluded in its 1998 report that "the information currently available about nearly all of the taggant concepts {particulate, isotopic, and biological} is inadequate to evaluate their effectiveness in real operational or economic terms. More research and development are needed to find new approaches and to improve those that currently hold the most promise for future use before implementation could be advised."

The NRC Committee also determined that differences between the U.S. and Swiss explosives industries are significant enough to leave a number of questions unresolved as to the practical application of an identification tagging program in the U.S. The Committee further concluded that no known taggant, including the Microtaggant, has been subjected to sufficient testing to determine if all technical and economic requirements have been met.

The ESG believes, and the NAS Report concurs, that it would be premature to make a determination as to whether or not an identification tagging program should be implemented in the U.S. at this time.

B-3. Testing Activities

The ESG is engaged in ongoing testing to determine the survivability and retrieveability of existing identification taggants. There are currently two types of taggants being tested: the Microtaggant (formerly 3M) and Microspheres (small glass beads), with the potential for testing at least one other taggant technology. Comprehensive testing remains to be conducted in a number of other areas, such as environmental safety, toxicity, and compatibility with the full range of products used and imported into the U.S.

B-3(a). Participation in Dipole Might Project

The ESG is continuing to work with ATF's Dipole Might project to conduct survivability and retrieveability testing of developed identification taggants placed in explosive materials. The Dipole Might project is a multi-national endeavor, initiated in 1992, which uses a computer aided design program to conduct comprehensive, scientific analyses of large scale vehicle bombs.

In May 1998, the ESG participated in Dipole Might testing in Israel. Two 1-ton ANFO car bombs, containing two types of identification taggants were detonated in order to determine the retrieveability and survivability of the taggants. The taggants were added to the mixtures during the explosive manufacturing process. Prior to the tests, samples of the ANFO were taken to verify the presence and even distribution of the taggants throughout the mixtures.

The first explosive charge, which contained 2 pounds of fluorescent glass microspheres, manufactured by the Mo-Sci Corporation, was placed in a vehicle and detonated utilizing Amatol as a booster. Because of ensuing, extremely high wind conditions, the scene could not be processed until the following day. The processing consisted of sifting approximately 100 pounds of debris, as well as scanning both debris and sweepings with ultraviolet light. No taggants were retrieved, possibly due to the high winds following the test. Additional testing of these taggants is required.

The second explosive charge, which contained 1 pound of color-coded, polymer microchips (Microtaggants, formerly known in the U.S. as 3M Microchips) manufactured by Microtrace, Inc., was placed in a truck and detonated utilizing Amatol as a booster. Extremely high wind conditions again delayed the processing of the scene. The following day, the blast area was processed using magnets and ultraviolet light. Approximately 50 pounds of debris was sifted, from which 9 identifiable Microtaggants were recovered. Given the limited amount of testing performed to date, the ESG believes that further testing is necessary to achieve reliable results. The presence of any remaining Microtaggants under the conditions discussed suggests that additional testing under less severe conditions should be undertaken.

B-3(b). Testing by the Ad Hoc Group of Specialists on the Detection of Explosives, International Civil Aviation Organization (ICAO)

Members of the Ad Hoc Group of Specialists on the Detection of Explosives, representing 14 countries are currently engaged in testing to determine the feasibility and practicability of marking non-plastic explosives (such as emulsions and water gels), with DMNB (one of the four detection agents identified in the ICAO Treaty). Status reports on testing activities are being provided to the ESG. The results of these tests, as well as research performed under contract specifically for the Study, will be presented in the final report on the Study. Ad Hoc Group members are also conducting other testing of ICAO detection markers. This testing is sensitive in nature. Further details concerning this work will be provided upon its completion.

C. FEASIBILITY AND PRACTICABILITY OF RENDERING COMMON CHEMICALS USED TO MANUFACTURE EXPLOSIVE MATERIALS INERT

C-1. NRC Findings

The NRC concluded that AN is the most readily accessible common chemical with the potential for use in explosive devices, and research to date has not yielded an effective means of rendering AN inert. The report also cautions that comprehensive study of the economic and agronomic effects of any proposed inerting methods is critical prior to the implementation of any requirements.

The NRC recommends establishing protocols for evaluating the detonability of bulk AN, and selling packaged AN only as non-detonable mixtures, as well as imposing regulations on its sale in retail outlets. These recommendations will be fully evaluated by the ESG, in conjunction with the results obtained from ongoing research and testing independent of the NRC's work.

C-2. IFDC Findings

Under contract with ATF, the International Fertilizer Development Center (IFDC) conducted a "Study of Imposing Controls on, or Rendering Inert, Fertilizer Chemicals Used to Manufacture Explosive Materials." The objectives of the study were: to assess the feasibility, practicability, and impact of implementing requirements to render common nitrate-based fertilizer chemicals inert; and to assess the feasibility, practicability, and impact of imposing controls on precursor chemicals used in the manufacture of nitrate-based fertilizers. The IFDC's March 1997 report concludes that it is not presently feasible or practicable to render ammonium nitrate (AN) inert, without impacting on its effectiveness and efficiency as fertilizer**.** As stated in the 1997 Progress Report, this conclusion is supported by other data gathered by the ESG from sources such as the British Ministry of Defence, and representatives of the U.S. chemical and fertilizer industries.

D. FEASIBILITY AND PRACTICABILITY OF IMPOSING CONTROLS ON PRECURSOR CHEMICALS USED TO MANUFACTURE EXPLOSIVE MATERIALS

D-1. Department of Justice Study

In April 1997, the Department of Justice (DOJ) submitted a report to Congress, mandated by the Antiterrorism Act, entitled "Report on the Availability of Bombmaking Information, The Extent To Which Its Dissemination is Controlled by Federal Law, and The Extent To Which Such Dissemination May be Subject to Regulation Consistent with the First Amendment to the United States Constitution." The report contains the results of a DOJ study, in which ATF participated, concluding that bombmaking information is readily accessible from a variety of legitimate sources. The DOJ report makes recommendations concerning proposed legislation, which would enable prosecution for disseminating information where criminal intent can be asserted. Such legislation should inhibit criminal acts involving explosive materials to some degree. However, it may be impossible to prevent the publication of all information concerning the making and use of explosives. The problem of easy availability of information on how to make improvised explosive devices is compounded by the ease with which anyone can also obtain the necessary materials to make a bomb. Improvised explosive devices can be manufactured from such common chemicals as acetone (fingernail polish remover), peroxide (hair bleach), and one additional readily available ingredient. For example, Triacetone Triperoxide (TATP), a combination of these ingredients, is currently the most common explosive used by terrorists in Israel. Based on its analysis to date, the ESG believes that trying to impose regulations on small quantities (one gallon or less) of such chemicals is not feasible**.**

D-2. NRC Findings

The NRC report concludes that, "It is not feasible to control all possible chemical precursors to explosives." The report also concludes that, for the current threat level, existing controls are adequate for most of the small number of precursor chemicals identified by the NRC as posing the greatest risk. The report recommends that future efforts focus on establishing stricter regulations for explosive materials themselves; assessing the feasibility of establishing incremental controls on a small number of chemicals, particularly if the threat level escalates; and utilizing voluntary control programs to curtail criminal access to materials which may be used to make bombs.

The NRC's recommendations concerning the regulation of explosive materials will be addressed later in this report. The ESG is continuing to assess the imposition of regulations on explosive precursor chemicals, and the specific recommendations of the NRC. Finally, the ESG is working with the fertilizer industry on improving the "Be Aware for America" program (discussed below), and is currently assessing the chemical industry's "Responsible Care" program

D-3. Current IFDC Study

The 1997 IFDC report recommends two proposals, which have been initiated. First, the ESG has contracted for a second study by the IFDC to conduct an "Assessment of Commingling of Ammonium Nitrate at Distribution Points and Ammonium Nitrate Identification Taggants Based on Product Crystallographic and Chemical Properties." This study is intended to assess the logistical and technical feasibility of identifying AN fertilizer products by their point of manufacture, through their existing chemical composition (i.e., without the use of additives). The study will be conducted in two phases. The first phase will determine the feasibility and practicability of the fertilizer industry undertaking voluntary actions to eliminate commingling of

AN at distribution points.

Phase two is intended to analyze the properties of AN to determine if "internal taggants" exist. Based on the theory that AN has unique crystallographic properties resulting from the environment and process by which it is manufactured, the IFDC will research the possibility that different AN products may already contain these "internal taggants," which could identify the origin of a particular product. The fact that these internal taggants may exists allows for the possibility of tracing AN products to their manufacturers and then through the distribution chain, without the need to consider environmental impact, toxicity, compatibility, and cost, as would be the case with the introduction of a taggant.

D-4. "Be Aware for America"

The second recommendation made by the IFDC in its 1997 report concerns the "Be Aware for America" program. "Be Aware for America" is an industry-based voluntary program, designed to draw retailers, distributors, the public, and law enforcement into a partnership aimed at heightening awareness and providing a network for reporting any suspicious activity relative to the purchase or use of AN fertilizer. The program was developed and implemented by The Fertilizer Institute (TFI), with the assistance of ATF, following the Oklahoma City Bombing.

The IFDC assessed the program, in its 1997 report, and recommended expanding it. The NRC conducted a very limited survey of law enforcement agencies' knowledge of, and level of involvement in the program, and found them to be insufficient. In its 1998 report, the NRC concluded that "Be Aware for America: constitutes a "positive step," toward establishing voluntary controls to inhibit criminal access to explosive chemicals, but that the program needed strengthening.

Based upon the IFDC's and NRC's recommendations, and following the ESG's evaluation of the program, ATF and TFI agreed that although "Be Aware for America" has had some success, the program's potential is not fully realized. ATF and TFI have worked together to develop a strategy to thoroughly reeducate the law enforcement community and industry concerning the program and to establish firm guidelines and procedures for its operation.

On August 10, 1998, ATF's Director wrote to the President of TFI to reaffirm ATF's commitment to working with TFI to make the program a success. Following this, the President of TFI and the Director of ATF forwarded letters, cosigned by them, to the heads of State fertilizer associations. In the letters, they requested the cooperation and assistance of these association heads, asking that they contact each of their retail dealer members, particularly those who handle pure, dry AN, and provide them with the program's toll-free hotline number (800-800-3855) at ATF's Enforcement Operations Center. The dealers were asked to call the ATF hotline number to identify themselves and the local law enforcement agency or official who they would most likely contact in the event of a suspicious purchase, theft, or vandalism. Once ATF has received this information, the identified law enforcement officials will be contacted and fully briefed on the program and on the availability of assistance from ATF.

In October 1998, ATF personnel staffed a booth at the International Association of Chiefs of Police (IACP) Conference in Salt Lake City, Utah, and discussed the "Be Aware for America" program. Information concerning the program is also available on the Internet at www.atf.treas.gov/hlines/hlines.htm. Finally, ATF officials are considering a proposal to broadcast information on the program on the Law Enforcement Training Network (LETN).

This new effort should serve to heighten awareness on the part of association leaders, dealers, and law enforcement officers, and advise all concerned of the existence of this potentially highly effective network for reporting criminal or suspicious activity. Sharing such information among appropriate officials will contribute to the prevention of criminal incidents involving potentially explosive fertilizer chemicals.

E. STATE LICENSING REQUIREMENTS FOR THE PURCHASE AND USE OF COMMERCIAL HIGH EXPLOSIVES

Based on independent analyses of current Federal and State laws and regulations, both the ESG and NRC have concluded that stricter Federal regulation of explosives and explosive materials is critical to lessening the threat of criminal bombings.

E-1. NRC Findings

The NRC report recommends "Creating uniform national regulations for the purchase of commercial high explosives. At a minimum, these regulations would extend current interstate controls to cover intrastate explosives transactions." The report further recommends that ATF be given the authority and resources to ensure the use of secure storage facilities by all purchasers of commercial high explosives. "This precaution would sharply reduce the number of opportunities for would-be bombers to steal explosives from unsecured storage facilities."

E-2. ESG

The ESG's analysis of existing laws has identified several areas for further consideration. For instance, commercial high explosives can currently be purchased intrastate with the completion of an Explosives Transaction Record, ATF F 5400.4. No Federal license or permit is required, nor is any type of background check completed on the purchaser. The ESG has reviewed recent legislative proposals in this area. In 1996, the Administration proposed legislation in the International Crime Control Act (ICCA) to require that all purchasers of explosive materials obtain a Federal permit. In 1998, the proposal was revised to require an instant criminal background check for all explosives purchases by nonlicensees.

While both proposals are currently being evaluated by the Treasury Department, the ESG is also analyzing both concepts, in order to offer recommendations for inhibiting criminal access to explosives.

One of the greatest benefits to be gained from the mandatory licensing of all purchasers of explosives is that it would broaden ATF authority to conduct inspections of all persons who store explosives. As previously reported, between 1978 and 1995, approximately 52 percent of explosives thefts occurred at the user level. As defined in the AEIR, a user is an individual who purchases explosives within his State, is not required to obtain a Federal license or permit, and is therefore not subject to Federal inspection of his storage facilities. Although current law requires that all persons store explosive materials in conformance with the regulations in 27 C.F.R. Part 55, ATF only has a statutory right to inspect the storage facilities of licensees and permittees.

Additionally, an instant criminal records check for each purchase of explosives may be more effective in preventing the sale of explosives to felons than a single records check conducted prior to the issuance of a 3-year permit.

While the ESG is continuing to assess the benefits associated with both options, based on information available to date, the ESG recommends the development of a Federal license/permit system that also incorporates the benefits of an instant criminal background check system for each individual explosives transaction.

The ESG further recommends that a system of penalties and/or fines for individuals in violation of the Federal Explosives Laws and Regulations (i.e., found in possession of explosives or explosive devices without a license, improper storage, etc.) be considered.

F. NEW PREVENTION (DETECTION) TECHNOLOGIES

F-1. Ongoing Assessment of Existing/Proposed Technologies

F-1(a). Consultation with other U.S. Entities

The ESG is continuing to meet with other Government agency officials, industry officials, national organizations and representatives from the scientific community.

The ESG has coordinated extensively with the Department of Defense's (DOD) TSWG, and the U.S. Army Research Laboratory to conduct testing of explosive materials related to survivability and retrieveability of taggants, as well as desensitization of AN.

The ESG has met with Federal Aviation Administration (FAA) officials to discuss the mutual interests ATF and the FAA have in achieving the goals of the White House Commission on Aviation Safety and Security, and to explore the potential for joint research projects. Additionally, at the invitation of FAA officials, ESG representatives attended an Interagency Security Technology Symposium in May 1998.

In January 1998, a representative from the ESG attended a meeting in Washington, DC, at the invitation of the Westinghouse Science and Technology Center. Westinghouse has performed research, development, and testing for the U.S. Customs Service on a radiation-enhanced vapor detection system for currency and narcotics. Westinghouse has proposed the use of a vapor detection system for explosives, and convened the meeting to discuss the direction of work on the technology and the possibility of establishing a multi-agency funding vehicle for future work. Representatives from the FAA, the U.S. Customs Service, the DOD, and the U.S. Secret Service also attended the meeting.

Representatives from the ESG attended the International Society of Explosives Engineers' (ISEE) 24th Annual Conference in New Orleans, Louisiana, in February 1998, in order to answer technical questions concerning the Study. Representatives from the ESG also attended a meeting of the International Association of Bomb Technicians and Investigators (IABTI) conference in Reno, Nevada, in June 1998, to discuss the Study.

In keeping with ATF's commitment to maintain open lines of communication

with industries which have an interest in the Study, the ESG is continuing to hold periodic meetings with industry representatives to discuss the progress of the Study and respond to questions.

F-1(b). Consultation within International Community

Since the drafting of the first Progress Report, representatives from the ESG attended an International Gordon Research Conference on the detection of explosives in Oxford, England. The Conference combined presentations on state-of-the-art technologies with discussions of policy issues surrounding the potential use of various technologies currently in developmental stages. ESG representatives also attended an international conference for bomb technicians and investigators hosted by the Bundeskriminalamt (German Federal Police) in Bayreuth, Germany. Representatives from the ESG attended the European Union Symposium on Emerging Technologies for Contraband Detection for Drugs and Explosives in London, England. And in July 1998, the ESG participated in the 6th International Symposium on Analysis and Detection of Explosives in Prague, Czech Republic. One hundred and sixteen participants from 24 countries attended the Symposium. The program included 50 formal presentations which addressed such topics as post-blast residue analysis, contamination of laboratories and other workplaces by particles of explosives, detection of explosives using x-ray diffraction, Nuclear Quadrupole Resonance technology, pre-blast detection of explosives and the use of identification taggants for post-blast detection.

The ESG has obtained valuable information and established extremely useful contacts from these conferences, particularly the 6th International Symposium.

F-2. NRC Findings

The ESG is assessing a range of recommendations made in the March 1998 NRC report relative to the detection of explosives. The NRC Committee's research indicated that significant progress has been made with regard to technologies for the detection of unmarked explosives, and that advances in technology will continue. The committee suggests that future efforts would be most effectively directed toward pursuing technologies to detect unmarked explosives, rather than toward developing detection agents to mark explosives. The report supports the accomplishments of ICAO, but based on potential costs and concerns over cross-contamination resulting from wide use, recommends against the use of DMNB in explosives other than those required under the ICAO Treaty. The report does recommend that the technical feasibility of using DMNB to mark commercial boosters, detonating cord, and other low vapor pressure, detonator-sensitive commercial explosives be explored. Because these components are currently difficult to detect, and are used in terrorist explosive devices, the NRC committee further recommends that implementation of any requirement, should feasibility be established, be contingent upon the escalation of the current threat level in the U.S.

II. PLANS AND METHODOLOGY FOR CONTINUING STUDY

A. TAGGING OF EXPLOSIVE MATERIALS FOR PURPOSES OF DETECTION AND IDENTIFICATION

A-1. Swiss Model

The identification taggant technologies currently in use in Switzerland are viable. However, based on the information gathered by the ESG, and supported by the NRC concerning the Swiss identification tagging program, it is recommended that this program no longer be considered as a model with potential for immediate implementation in the U.S. Identification taggant technologies will continue to be tested, and the full range of issues associated with the feasibility and practicability of their use in the U.S. will be assessed. Accordingly, the ESG is engaged in identifying qualified contractors to conduct compatibility testing, an environmental impact assessment, toxicity testing, and a cost analysis of this technology. The completion of such studies will address issues left unanswered by the Swiss identification tagging program.

A-2. Partnership with TSWG

The ESG, in partnership with TSWG and in conjunction with the Dipole Might project is continuing to conduct survivability and retrieveability testing of existing taggant technologies to determine their technical viability.

A-3. Taggant Research in the Czech Republic

During the 6th International Symposium on the Analysis and Detection of Explosives, officials from the Research Institute for Industrial Chemistry, Synthesia, a manufacturer of Semtex in the Czech Republic, indicated that they had developed a type of identification taggant called IPCM. The ESG will attempt to follow-up with these officials to discuss the technology and whether the Czech Republic has, or is considering the implementation of an identification tagging program.

B. FEASIBILITY AND PRACTICABILITY OF RENDERING COMMON CHEMICALS USED TO MANUFACTURE EXPLOSIVE MATERIALS INERT

B-1. Continuing Research/Coordination with TSWG

The ESG is continuing to work with the DOD, Office of Special Technology (OST), and the British Ministry of Defence, and in conjunction with the Dipole Might project to see if it may be possible to render AN inert. The ESG has entered into a reimbursable agreement with OST, through TSWG, whereby ATF will fund several small-scale and mid-scale explosives tests designed to evaluate the feasibility of using various additives to AN products to decrease the explosive sensitivity of those AN products and/or render them inert. (This testing will be conducted simultaneously with taggant survivability and retrieveability testing.)

The ESG recognizes that establishing technical feasibility is only the necessary first step. Should technical feasibility be proven, the global economic and agronomic impacts of implementing requirements will be fully analyzed.

C. FEASIBILITY AND PRACTICABILITY OF IMPOSING CONTROLS ON PRECURSOR CHEMICALS USED TO MANUFACTURE EXPLOSIVE MATERIALS

C-1. Informational Video

The ESG is preparing an informational video, which dramatizes the ease with which anyone can obtain both materials and information to make bombs, and will demonstrate the complexity and scale of the issue of regulating chemicals used in an extremely wide-range of products that are integral to daily life in the U.S.

C-2. Voluntary Control Initiatives

DEA regulates the sale of precursor chemicals or equipment utilized in the manufacture of controlled substances. Typically, DEA controls common chemicals in bulk form, i.e., 50 gallons or more, except for specific chemicals (used solely for the manufacture of drugs) which are regulated in lesser quantities (one kilogram).

The ESG has obtained data concerning the Chemical Manufacturers' Association's "Responsible Care" program, and is evaluating the program. Upon completion of its analysis, the ESG will work with chemical industry officials to address the issue of access to materials, simultaneously examining any voluntary programs in use.

D. STATE LICENSING REQUIREMENTS FOR THE PURCHASE AND USE OF COMMERCIAL HIGH EXPLOSIVES

D-1. State Law Compilation

ATF's compilation of State licensing requirements for the purchase and use of commercial high explosives is nearing completion. Upon completion, the ESG will address the possibility of placing this information on the Internet and publishing it in the next update of ATF Publication 5400.7, ATF – Explosives Laws and Regulations, Bureau of Alcohol, Tobacco, and Firearms, Department of the Treasury. The ESG will simultaneously examine this information in the context of strengthening laws and/or proposing model Federal legislation.

D-2. Partnership with Department of Transportation

The Department of Transportation (DOT) has invited ATF to participate in its Cooperative Hazardous Materials Enforcement Development (COHMED) program. Through this program, DOT solicits the input of State and local enforcement agency and industry personnel on issues of mutual interest. A representative from the ESG will attend the next bi-annual meeting to assess the program and to determine if ATF participation may establish a mechanism for ATF to solicit information to ensure that Federal regulatory measures relative to the purchase, use, and storage of explosives are effective and comprehensive.

D-3. Outreach Program

The ESG is holding periodic meetings with representatives of the potentially affected industries to afford them the opportunity to raise concerns and pose questions, and to advise them the Study's progress. In the course of these briefings, participants have expressed concern over current gaps in the Federal Explosives Laws and Regulations, specifically addressing the purchase, use, and

storage of explosives and explosive materials, and many have indicated that they would support strengthening current Federal regulations. Furthermore, many representatives have conveyed their willingness to participate in an outreach program with ATF, whereby they will provide their input and advice for use in the development of recommendations for proposed model legislation. The recommendations above will be among those presented to the program participants. Consideration is being given to conducting this program in partnership with DOT, under COHMED.

E. NEW DETECTION (PREVENTION) TECHNOLOGIES

E-1. Partnerships with Other U.S. Authorities

The Naval Surface Warfare Center, Indian Head, Maryland, has invited ATF to co-host a symposium on "Sensors for the Detection and Analysis of Energetics and Pyrotechnics. " The symposium will include representatives from the DOD, FBI, FAA, U.S. National laboratories, and the medical industry, and will be open to international attendees as well. It is anticipated that the symposium will provide an excellent forum for exchanging information on ongoing and proposed research projects, and facilitating a coordinated effort to address issues of detection and to encourage joint approaches to funding research and to assessing proposed technologies.

E-2. Oak Ridge National Laboratory

Currently the most promising detection technology focuses on the microcantilever, developed and patented by the Oak Ridge National Laboratory (ORNL). ATF has entered into an interagency agreement with the Department of Energy, represented by ORNL, to conduct research, development, engineering, prototype development, and training on advanced sensing technologies for explosive material detection. ORNL will conduct a study to determine whether the microcantilever, a sensor technology developed and patented by ORNL for other applications, is functionally superior and more sensitive than current state-of-the-art technology and can sensitively identify the chemical signatures of specific threat explosives in their raw state, without the addition of a taggant or marker. The explosives to be studied include AN, water gels, slurries, emulsions, non-nitroglycerine dynamites, single-base black powder, smokeless powder, as well as other explosives which are included in the chemical families of aliphatic nitro compounds, aromatic nitro compounds, nitrate esters, nitramines, and acid salts. The final prototype is intended to analyze both vapor phase and solid residues

The study will be conducted in stages, beginning with feasibility studies in stage one. Each phase of the study will be evaluated to gauge the potential success and direction of the succeeding phases.

The ultimate goal of the ORNL study is the development of a device that can be used in the field to detect explosives, which will exhibit a short real-time response rate, is miniature in size, utilizes low power, and is affordable.

III. SCHEDULE FOR COMPLETING STUDY

The ESG will issue annual progress reports for the duration of the Study. Future reports will focus on the issues and action items identified during phases I and II of the Study, and make interim recommendations as appropriate. A final report will be issued upon completion of the Study.

GLOSSARY

AMMONIUM NITRATE

Is classified as an oxidizer. An oxidizer is a substance that readily yields oxygen or other oxidizing substances to promote the combustion of organic matter or other fuel. Ammonium nitrate alone is not an explosive material. However, Federal explosives storage regulations require the separation of explosive magazines from nearby stores of ammonium nitrate by certain minimum distances.

ANFO

An explosive material consisting of ammonium nitrate and fuel oil.

BLACK POWDER

A deflagrating or low explosive compound of an intimate mixture of sulfur, charcoal, and an alkali nitrate (usually potassium or sodium nitrate). See LOW EXPLOSIVES.

BLASTING AGENT

Any material or mixture consisting of fuel and oxidizer intended for blasting, not otherwise defined as an explosive, provided that the finished product, as mixed for use or shipment, cannot be detonated by means of a No. 8 test blasting cap when unconfined.

BOOSTER

An explosive charge, usually a high explosive used to initiate a less sensitive explosive. A booster can be either cast, pressed, or extruded.

BULK MIX

A mass of explosive material prepared for use in bulk form without packaging.

COMMERCIAL EXPLOSIVES

Explosives designed, produced, and used for commercial or industrial applications, rather than for military purposes.

COMMON CHEMICALS

Any chemical compound or element that, as part of a physical mixture, would be necessary for that mixture to be considered an explosive mixture; or any chemical compound or element that could be classified as an oxidizer or as a readily available fuel.

C4

A military plastic/moldable high explosive.

DEALER (FEDERAL)

Any person engaged in the business of distributing explosive materials at wholesale or retail.

DETECTION TAGGANTS

A marker or taggant placed into an explosive material that has utility before a bomb explodes.

DETECTION TAGGANTS WITH IDENTIFICATION CAPABILITIES

A marker or taggant placed into an explosive material that has both pre-blast and post-blast utility.

DETONATION

An explosive reaction that moves through an explosive material at a velocity greater than the speed of sound.

DETONATOR

Any device containing an initiating or primary explosive that is used for initiating a detonation. A detonator may not contain more that 10 g of total explosives by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors, and nonelectric instantaneous and delay blasting caps which use detonating cord, shock tube, or any other replacement for electric leg wires.

DETONATING CORD

A flexible cord containing a center core of high explosive and used to initiate other explosives.

DMNB

2,3-Dimethyl – 2,3-dinitrobutane. One of four high-vapor pressure chemicals approved by the U.N. Council of the International Civil Aviation Organization (ICAO) to be added to plastic explosives as a detection marker.

DYNAMITE

A high explosive used for blasting, consisting essentially of a mixture of, but not limited to, nitroglycerin, nitrocellulose, ammonium nitrate, sodium nitrate, and carbonaceous materials.

EMULSIONS

An explosive material containing substantial amounts of oxidizers dissolved in water droplets surrounded by an immiscible fuel.

EXPLOSIVE

Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion.

EXPLOSIVES INCIDENTS

This term encompasses actual and attempted explosive/incendiary bombings, stolen, and recovered explosives, hoax devices, and accidental explosions, as defined in ATF's Arson and Explosives Incidents Report.

EXPLOSIVE MATERIALS

These include explosives, blasting agents, and detonators. Explosive materials include, but are not limited to, all items in the List of Explosive Materials.

EXPLOTRACER TAGGANT

ExploTracer is based on synthetic granules dyed with fluorescent pigments and iron particles. To ensure that each particle has a distinctive code of its own, rare earth elements are added.

FERTILIZER

A substance used to make soil more fertile, such as ammonium nitrate.

FILLER

A type of explosive/incendiary/chemical substance which, in combination with a fusing and/or firing system, constitutes an improvised explosive device (e.g. dynamite, match heads, gasoline).

FLAMMABLE LIQUID

Combustible. A flammable material is one that is ignited easily and burns readily, i.e., gasoline, charcoal lighter fluid, diesel fuel, and paint thinners.

FUEL

Any substance that reacts with the oxygen in the air or with the oxygen yielded by an oxidizer to produce combustion.

HIGH EXPLOSIVES

Explosives which are characterized by a very high rate of reaction, high pressure development, the presence of a detonation wave in the explosive, and which can be caused to detonate by means of a blasting cap when unconfined.

HF-6 TAGGANT

HF-6 is similar to the 3M (Microtaggant) and is coded according to its several layers of color. The HF-6 taggant was developed by Swiss Blasting, and is used exclusively in its own products.

HMTD

An abbreviation for the name of the explosive hexamethylene triperoxide diamine.

ICPM

A minute post-blast taggant manufactured by Synthesia, Czech Republic. The taggant is comprised of Urea Formaldehyde Resin, Silicon Oxide, Rhodamin B, Iron, and oxides of metal.

IDENTIFICATION TAGGANTS

A marker or taggant placed into an explosive material that has utility after an explosion to identify the manufacturer, the date, and shift when it was manufactured. Once this type taggant is located and identified, the information it provides would allow law enforcement to trace all of the same type explosives manufactured on that specific date and shift to all of the legal purchasers.

IMPORTER

Any person engaged in the business of importing or bringing explosive materials into the United States for purposes of sale or distribution.

INTERSTATE OR FOREIGN COMMERCE

Commerce between any place in a State and any place outside of that State, or within any possession of the United States (not including the Canal Zone) or the District of Columbia, and commerce between places within the same State but through any place outside of that State.

INTRASTATE

Pertaining to or existing within the boundaries of a State of residence.

ISOTAG

A readily identifiable, mass-enhanced, non-radioactive molecular marker that employs the unique chemical structure of the host product without harm to the quality of the product or the environment.

LICENSE (FEDERAL)

Required if a person is intending to engage in the business as an explosive materials manufacturer, importer, or dealer and allows a person to transport, ship, and receive explosive materials in interstate or foreign commerce.

LICENSEE

Any importer, manufacturer, or dealer licensed under the Federal explosives laws.

LOW EXPLOSIVES

Explosives which are characterized by deflagration (a rapid combustion that moves through an explosive material at a velocity less than the speed of sound).

MARKER

See Taggant.

METRIC TON

2,204.6 pounds or 1,000 kilograms.

MICROSPHERE

A solid glass ball, 37-840 microns in size, which can be manufactured to contain different chemical compositions to be used as identifiers.

MICROTAGGANT

Color-coded, polymer microchip consisting of ten layers including a magnetic layer and a fluorescent layer, which is intended to function as an identification taggant. The chip was developed by the 3M Company, but is now manufactured by Microtrace, Minneapolis, Minnesota, which acquired the rights to production in 1984.

NITROGEN (N)

N is one of the three primary plant nutrients, together with phosphorus (P) and potassium (K).

OTHER

For purposes of the AEIR, the category of Other includes: match heads, military explosives (excluding C4 and TNT), improvised mixtures, flares, boosters, detonating cord, gases, blasting caps, PETN, RDX, HMTD, model rocket propellant, and smoke grenades.

OXIDIZER OR OXIDIZING MATERIAL

A substance, such as a nitrate, that readily yields oxygen or other oxidizing substances to stimulate the combustion of organic matter or other fuel.

PERMIT

Is required if any person intends to acquire for use, explosive materials from a licensee in a State other than the State in which he/she resides, or from a foreign country, or who intends to transport explosive materials in interstate or foreign commerce.

PERMITTEE

Any person who has obtained a Federal User Permit to acquire, ship, or transport explosive materials in interstate or foreign commerce.

PERSON

Any individual, corporation, company, association, firm, partnership, society, or joint stock company.

PETN

An abbreviation for the name of the explosive pentaerythritol tetranitrate.

PHOTOFLASH AND FIREWORKS POWDER

An explosive material intended to produce an audible report and a flash of light when ignited, and typically containing potassium perchlorate, sulfur or antimony sulfide, and aluminum metal.

PRECURSOR CHEMICALS

Any chemical compound or element which can be subjected to a chemical reaction or series of reactions in order to synthesize the chemical compound or element into an explosive compound.

PYROTECHNIC

A chemical mixture which, upon burning, produces visible, brilliant displays, bright lights, or sounds.

RDX

An abbreviation for the name of the explosive cyclonite, hexogen, T4, cyclo-1,3,5,-trimethylene-2,4,6-trinitramine; hexahydro-1,3,5,-trinitro S-triazine.

REWORKED EXPLOSIVES

Any residual or off specification material which can be recycled within the manufacturing process.

SMOKELESS POWDER

Any of a class of explosive propellants that produce comparatively little smoke on explosion and consist mostly of gelatinized cellulose nitrates.

SPECIALTY EXPLOSIVES

Any specialty tool used for a particular purpose other than blasting, such as explosive-actuated device (jet-tappers, jet perforators), propellant-actuated power device (construction nail guns), commercial C-4, detasheet, oil well perforating guns, etc.

SLURRY

An explosive material containing substantial portions of a liquid, oxidizer, and fuel, plus a thickener.

TAGGANT

A solid, liquid, or vapor emitting substance put into an explosive material for the purposes of detection or identification. Also known as a marker or tracer element.

(For purposes of this report, "tagging" is the act of marking or adding a taggant to an explosive material.)

TATP

Triacetone Triperoxide – A highly sensitive primary explosive manufactured from common chemicals such as acetone, peroxide, and acid.

TNT

An abbreviation for the name of the explosive trinitrotoluene.

TON

2,000 pounds or 0.907 metric ton.

TRACER ELEMENT

See Taggant.

UNDETERMINED

For purposes of the AEIR, the category of Undetermined captures incidents in which fillers could not be identified through laboratory analysis or incomplete data that was reported.

UREA AMMONIUM NITRATE (UAN)

UAN solution is a popular liquid fertilizer in the United States and other industrialized areas.

USERS

Any persons who purchase and use explosives within their State of residence and are not Federal licensees or permittees.

WATER GEL

An explosive material containing substantial portions of water, oxidizers, and fuel, plus a cross-linking agent which may be a high explosive or blasting agent.

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U.S. Court of Appeals (4^{th} Circuit--Baltimore, Maryland)

U.S. vs Peter McFillin - CR 80-5063

U.S. Department of the Interior (U.S. Geological Survey)

Mineral Industry Surveys - Explosives - 1995

United States General Accounting Office

Report to Congressional Requesters, Terrorism and Drug Trafficking,

Technologies for Detecting Explosives and Narcotics, September, 1996,

GAO/NSIAD/RCED-96-252

THE LAW

THE ANTITERRORISM AND EFFECTIVE DEATH PENALTY ACT OF 1996, Approved April 24, 1996, AS AMENDED BY THE OMNIBUS CONSOLIDATED APPROPRIATIONS ACT OF FISCAL YEAR 1997, Approved on September 30, 1997.

TITLE VII-CRIMINAL LAW MODIFICATIONS TO COUNTER-TERRORISM

SECTION 732, MARKING, RENDERING INERT, AND LICENSING OF EXPLOSIVE MATERIALS.

(a) STUDY. -

(1) IN GENERAL. -- Not later than 12 months after the date of enactment of this Act, the Secretary of the Treasury (referred to in this section as the "Secretary") shall conduct a study of --

(A) the tagging of explosive materials for purposes of detection and identification;

(B) the feasibility and practicability of rendering common chemicals used to manufacture explosive materials inert;

(C) the feasibility and practicability of imposing controls on certain precursor chemicals used to manufacture explosive materials; and

(D) State licensing requirements for the purchase and use of commercial high explosives, including --

(i) detonators;

(ii) detonating cords;

(iii) dynamite;

(iv) water gel;

(v) emulsion;

(vi) blasting agents; and

(vii) boosters

(2) EXCLUSION. -- No study conducted under this subsection or regulation proposed under subsection (a) shall include black or smokeless powder among the explosive materials considered.

(3) New prevention technologies: In addition to the study of taggants as provided herein, the Secretary, in consultation with the Attorney General, shall concurrently report to the Congress on the possible use, and exploitation of technologies such as vapor detection devices, computed tomography, nuclear quadropole resonance, thermal neutron analysis, pulsed fast-neutron analysis, and other technologies upon which recommendations to the Congress may be made for further study, funding, and use of the same in preventing and solving acts of terrorism involving explosive devices.

(b) CONSULTATION.

(1) IN GENERAL. -- In conducting the study under subsection (a), the Secretary shall consult with --

(A) Federal, State, and local officials with expertise in the area of chemicals used to manufacture explosive materials; and

(B) such other individuals as the Secretary determines are necessary.

(2) FERTILIZER RESEARCH CENTERS.-- In conducting any portion of the study under subsection (a) relating to the regulation and use of fertilizer as a pre-explosive material, the Secretary of the Treasury shall consult with and receive input from non-profit fertilizer research centers.

(c) REPORT.-- Not later than 30 days after the completion of the study conducted under subsection (a), the Secretary shall submit a report to the Congress, which shall be made public, that contains --

(1) the results of the study;

(2) any recommendations for legislation; and

(3) any opinions and findings of the fertilizer research centers.

(d) HEARINGS.--Congress shall have not less than 90 days after the submission of the report under subsection (c) to —

(1) review the results of the study; and

(2) hold hearings and receive testimony regarding the recommendations of the Secretary.

(e) REGULATIONS.--

(1) IN GENERAL .-- Not later than 6 months after the submission of the report required by subsection (c), the Secretary may submit to Congress and publish in the Federal Register draft regulations for the addition of tracer elements to explosive materials manufactured in

or imported into the United States, of such character and in such quantity as the Secretary may authorize or require, if the results of the study conducted under subsection (a) indicate that the tracer elements --

(A) will not pose a risk to human life or safety;

(B) will substantially assist law enforcement officers in their investigative efforts;

(C) will not substantially impair the quality of the explosive materials for their intended lawful use;

(D) will not have a substantially adverse effect on the environment; and

(E) the costs associated with the addition of the tracers will not outweigh benefits of their inclusion.

(2) EFFECTIVE DATE.-- The regulations under paragraph (1) shall take effect 270 days after the Secretary submits proposed regulations to Congress pursuant to paragraph (1), except to the extent that the effective date is revised or the regulation is otherwise modified or disapproved by an Act of Congress.

(f) SPECIAL STUDY:

(1) In general.--Notwithstanding subsection (a), the Secretary of the Treasury shall enter into a contract with the National Academy of Sciences (referred to in this section as the "Academy") to conduct a study of the tagging of smokeless and black powder by any viable technology for purposes of detection and identification. The study shall be conducted by an independent panel of 5 experts appointed by the Academy.

(2) Study elements.--The study conducted under this subsection shall--

(A) indicate whether the tracer elements, when added to smokeless and black powder--

(i) will pose a risk to human life or safety;

(ii) will substantially assist law enforcement officers in their investigative efforts;

(iii) will impair the quality and performance of the powders (which shall include a broad and comprehensive sampling of all available powders) for their intended lawful use, including, but not limited to the sporting, defense, and hand loading uses of the powders, as well as their use in display and lawful consumer pyrotechnics;

(iv) will have a substantially adverse effect on the environment;

(v) will incur costs which outweigh the benefits of their inclusion, including an evaluation of the probable production and regulatory cost of compliance to the

industry, and the costs and effects on consumers, including the effect on the demand for ammunition; and

(vi) can be evaded, and with what degree of difficulty, by terrorists or terrorist organizations, including evading tracer elements by the use of precursor chemicals to make black or other powders; and

(B) provide for consultation on the study with Federal, State, and local officials, non-governmental organizations, including all national police organizations, national sporting organizations, and national industry associations with expertise in this area and such other individuals as shall be deemed necessary.

(3) Report and costs.--The study conducted under this subsection shall be presented to Congress 12 months after the enactment of this subsection and be made available to the public, including any data tapes or data used to form such recommendations. There are authorized to be appropriated such sums as may be necessary to carry out the study.