



FESHM 6013: FACILITY INCIDENT REPORTING UTILITY SYSTEM (FIRUS)

Revision History

Author	Description of Change	Revision Date
J. Priest	Revision 1, Added FESHM Chapter formatting template and more complete guidance on Chapter content. Clarified duties and responsibilities of all parties involved with FIRUS. Added instructions for Users and experimenters for adding FIRUS contacts to experiments. Outlines procedures for having messages placed into FIRUS, use of Emergency Call list. Responsibilities for installation and removal of equipment. Forms are electronic and form process flow charts are included.	August 2012
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1.0 INTRODUCTION

Facility Information Reporting Utility System (FIRUS) is a site-wide proprietary supervising station that is a computerized hardware and software system. FIRUS monitors and reports the status of various fire, security and utility sensors positioned throughout buildings, experiments and systems. Internal diagnostic systems provide for constant monitoring and reporting of the system to display consoles around Fermilab. In the event of sensor being activated, disconnected, or communications between the sensors, mini, console, or the front-end is disrupted; there are consoles that provide audible alerting and pre-written instructions for appropriate personnel to take action.

The primary location for receiving most FIRUS messages is at the Communications Center located on the ground floor of Wilson Hall. Other consoles are located in other areas of the lab to monitor messages pertaining to their areas of operation or responsibilities.

2.0 REFERENCES

- 29 CFR 1910.164 and 1910.165
- NFPA 70, National Electrical Code, 2005 Edition
- NFPA 72, National Fire Alarm & Signaling Code, 2010 Edition
- FESHM 2050 - Building Manager Chapter
- FESHM 2090 - Development, Maintenance, Procurement and Usage of Software Products Related to Environment, Safety, and Health
- FESHM 4240 - Oxygen Deficiency Hazards
- FESHM 6010 - Elements of the Fire Protection Program
- FESHM 6014 - Fire Watch
- FESHM 6020.3 - Storage and Use of Flammable Gases
- FESHM 6030 - Disablement of Fire Protection Systems
- Form 6013-F1 – Message Request Form
- Form 6013-F2 – Message Bypass or Removal Request Form
- Form 6013-F3 – Access Request Form
- Appendix A – Contact Wiring Methods
- Appendix B – Approved Abbreviations
- Appendix C – Message Priority Protocol
- Appendix D –Flow Charts (Forms F1, F2, & F3 New & Modifying FIRUS Messages)

3.0 DEFINITIONS

- **Alarm Message** – Regardless of the type, category or cause, all messages that display on a console or printer are considered an alarm.
- **Building Manager** - Designated employee for each building on site that will serve as the contact point for all activities that will affect that building as a result of daily operations or services requested from both internal and external sources.
- **Communication Center** – Operators tasked with dispatching Fire Department, Security, other organizations related to safety related equipment.



- **Fire Department** – Individuals of an organization trained and tasked with emergency care, preventing, and extinguishing fires, and other emergency responses, such as ODH.
- **Security** – Individual of an organization trained and tasked with on-site security.
- **ES&H Fire Protection Engineer (ES&H-FPE)** - Highly trained and educated professional responsible for overseeing the overall implementation and development of the Fermilab fire protection systems.
- **FESS Operations (FESS Ops)** – Organization tasked with site-wide utility and infrastructure maintenance (including pump vaults, sump pits, and lift stations).
- **Fire Systems Maintenance (FSM) Technician** – Individuals trained in the inspection, testing, and minor maintenance of fire protection systems throughout the Laboratory (including Water Based Systems, Fire Alarm Components, and Special Systems).
- **Facility Incident Reporting and Utility System (FIRUS)** - Lab-wide system that monitors building fire alarm systems and provides alarms at the Communications Center in Wilson Hall.
- **FIRUS Team** – A team comprising of Accelerator Division (AD), Business Services Section (BSS), Environmental, Safety & Health, (ES&H), and Facilities Engineering Services Section (FESS) personnel assembled by the ES&H-FPE.
- **Users/Experimenters** – Individuals responsible for maintenance and operation of an experiment.
- **Central Name and Address database (CNAS)** – A central location for emergency messages related to a facility.
- **Emergency Contact List (ECL)** – A central location of emergency contacts.

4.0 RESPONSIBILITIES

Reference Section 7 of this Chapter for further information related to the FIRUS Team roles.

4.1 Division/Section/Center Heads (D/S/C)

- Ensuring that the installation of necessary detection and other monitoring devices within facilities experimental areas, and equipment has taken place prior to occupancy or the equipment/experiment being permitted to operate.
- Ensuring the disconnection and removal of the detection and other monitoring devices and all associated cabling back to the FIRUS mini when the equipment is no longer required is accomplished in a safe and coordinated manner.
- Ensuring the appropriate parties are notified of the removal of sensors and connections of removed equipment in order for the FIRUS messages to be removed from the FIRUS database.
- Ensuring personnel that are acting as contacts for emergency messages, have their information up to date in the CNAS database and on the appropriate building lists maintained by the Communications Center as well as on internal notification lists.
- Ensuring personnel that are no longer emergency contacts are removed from the building list maintained by the Communications Center and other references.



- Providing a program is in place to provide a Fire Watch appropriate for the facility, area, or experiment, when a fire system is compromised.

4.2 Accelerator Division Controls Hardware Group

- Serving as first point of contact for all FIRUS users for technical support.
- Conducting schedule maintenance of the head-ends, consoles, minis, network communications paths, and all other associated equipment used for FIRUS except as noted in other places in this document.
- Maintaining, publishing and issuing copies of the FIRUS Mini configuration
- Ensuring the FIRUS hardware system is up and running at all times
- Providing detailed information to the Communications Center, Fermilab Fire Department (FFD), and the FESS FSM technicians, ES&H Fire Protection Engineer (ES&H-FPE), and appropriate SSO's as to problems rendering portions of the system inoperative (i.e. bad mini)
- Starting up and maintaining specialty sensors (excluding cable and sensor installation) to FIRUS that are not covered by others i.e. FSM Technicians, FESS Operations or Security.
- Prior to implementing changes involving hardware or system capabilities, coordination with ES&H-FPE will be required to insure compliance with intent of NFPA guidelines and DOE agreements.
- Maintaining a minimal stock of "ready to go" replacement boards and parts to repair, modify, or expand FIRUS hardware or network.
- Battery replacement program for all FIRUS Uninterruptible Power Supplies (UPS) and FIRUS system batteries.
- Installation and set-up of a new console, and removal of unneeded consoles.
- Provide basic training to console users.

4.3 Accelerator Division Controls Software Group

- Ensuring the software and resulting data is maintained in a functional state.
- Conducting schedule maintenance of the head-ends, consoles, minis, network communications paths, and all other associated equipment used for FIRUS except as noted in other places in this document.
- Maintaining documentation of the system design and subsequent modifications and upgrades.
- Upgrading software OS system components as necessary, and provide recommendations for necessary hardware or software upgrades to the ES&H-FPE.
- Where possible and practical, utilize the capabilities of the hardware and software for enhancing the quality of work performed by the primary users of the system.
- Prior to implementing changes involving hardware or system capabilities, coordination with ES&H-FPE will be required to insure compliance with intent of NFPA guidelines and DOE agreements.
- Maintain Listserver for the notification of FIRUS message or password access changes.
- Provide 24hr emergency on-call personnel, coordination with the ES&H-FPE if this is not possible.
- Registration of new console, and removal of unneeded consoles from front ends.



- Advanced training and technical support for using the console application.

4.4 ES&H- Fire Protection Engineer (ES&H-FPE)

- Overall use, operation, and oversight of FIRUS by ensuring system compliance with the intent of NFPA guidelines and DOE agreements.
- Chairing the FIRUS meetings. Spokesperson for the FIRUS Team to FNAL Management.
- Performs periodic reviews of “BYPASSED” messages for need or removal.
- Performs periodic audits for scheduled maintenance activities.
- Performs periodic reviews of messages for compliance with formatting.

4.5 Fire Department

- Response to activations of fire, emergency and similar FIRUS alarms.
- Verify FIRUS messages when testing and report problems for service.

4.6 Security

- Response to activations of fire, emergency and similar FIRUS alarms.
- Installation, maintenance, and testing of selected security alarms installed on FIRUS, including third party and in-house devices and systems.
- The input, modifications, and removal of Security FIRUS messages as outlined in this procedure.

4.7 Communications Center

- Monitoring FIRUS on a 24 hour basis
- Dispatching emergency response personnel as directed by received FIRUS messages.
- Notifying Duty personnel (FSM Technicians, Mechanics, Electricians, etc) as directed by received FIRUS messages.
- Maintain appropriate call lists, for D/S/C buildings. Providing periodic requests to update to these lists.
- Informing personnel on specified call lists referenced on received FIRUS messages.
- Providing timely status updates to the ES&H-FPE and Fire Department when reported FIRUS problems cannot be resolved in a timely manner.
- Providing timely status updates to the ES&H-FPE and Fire Department when unexpected issues arise with the FIRUS system.

4.8 FESS Fire Systems Maintenance (FSM) Technicians

- Inspection, testing, maintenance and modifications for all fire detection and suppression systems as defined in FESHM 6010 ‘Elements of the fire protection program’.



- Provides entry, modification, bypassing, or removal for fire protection and like kind messages (i.e. Flammable Gas or In-Rack smoke detection).

4.9 FESS Operations (FESS Ops)

- Installation, maintenance and removal of utility detection and monitoring sensors.
- Responding to requests to reset or repair activated sensors.
- The input, modifications, and removal of Utility FIRUS messages as outlined in this chapter.

4.10 Users/Experimenters

- Complying with the instructions in this chapter pertaining to the installation, testing, maintenance and removal of detection and monitoring sensors from the FIRUS system. Typically acts as the requestor.
- Using the instructions on the forms found in this chapter; complete the appropriate form to:
 1. 6013_F1: "REQUEST for NEW or MODIFY FIRUS MESSAGE"
 2. 6013_F2: "REQUEST for REMOVAL or BYPASS of FIRUS MESSAGE"
 3. 6013_F3: "REQUEST for FIRUS PASSWORD"
- Complying with the instructions in this chapter pertaining to maintaining accurate and updated call lists at the Communications Center and on-line in CNAS for all personnel that are to be notified as a result of a message received from the FIRUS system by the Communications Center.
- For all experiments requiring FIRUS monitoring: all sensors must be installed, messages entered, and tested prior to the experiment being permitted to run.
- Provide documented testing and maintenance of systems or sensors as described in 6.4

4.10.1 Experiment Protection Requirements

- **Rack Protection**

Install Rack smoke detection and/or other FIRUS connections, as required or approved by the ES&H-FPE.

- **Flammable Gas Protection Requirements**

For experiments using flammable gases; the experiment must be authorized and approved for operation per FESHM 6020.3 Storage and Use of Flammable Gases prior to startup.

A high level FIRUS alarm must be installed and set to activate at no higher than 20% LEL. Local alarms at a lower percentage of the LEL may be used to initiate corrective action.



A high level alarm shall automatically shut off the supply of flammable gas and turn off power to potential ignition sources within three meters of operative gas usage apparatus.

- **Oxygen Deficiency/ Nonflammable Gas Hazards Requirements**

Possible Oxygen Deficiency Hazards shall be addressed according to FESHM Chapter 5064. The hazard shall be reviewed for each building or room using or storing flammable or inert gas.

- **Other Sensors**

Sensors for items such as: temperature, power, flow, or pressure shall also be considered.

5.0 REQUESTER\USER REQUIREMENTS

5.1 Installation of a sensor

The party requesting the connection of the sensor to the FIRUS system will be responsible: for the installation of the sensor, cable installations. The connection of the cable to the FIRUS mini will need to be done by a delegated qualified technician(s).

The specific location (Trunk, Node, Slot, and Channel) within the mini will be provided by the database administrator responsible for the message.

The Requestor will provide the basic information required on form 6013_F1 as described in 6.1.1.

Having completed form 6013_F1, follow the instructions on the form and send it to the appropriate location. Electronic processing is the preferred method.

5.1.1 New Message Information (Required)

Only 160 characters can be used for the message. The FIRUS Team member will craft the message into the appropriate format as described below, providing instructions and clarity for required actions.

- Type of message: “CODE 1”, “Security Entry”, “High Water”, “Power Loss”, etc.,
- The building FIMS name and FIMS number: (not Fermi Common use name).
- Location and FIMS number where the sensors is located: Building, Floor, Area or Experiment, or other identifying description. i.e. Minos Detector Hall Minerva Rack Smoke Detection or MI65 Enclosure sump located behind elevator.
- Action requested by Users when the sensor is activated. What personnel should respond or what notifications should be made.
- Call list to be used to identify the D/S/C personnel that are to be notified (if required). Individual names and personal numbers are not to be listed in a message. For example, not



allowed is “Contact John Smith at X-5555”, what is allowed is “Contact AD Safety X-5555”.

The ES&H-FPE, reserves the right to modify messages to ensure standardization of content and format.

5.1.2 FIRUS Cabling Requirements

As a general rule, exposed FIRUS cables not installed in raceways and used in an underground enclosure or cavern shall be plenum or FT-6 rated. Elsewhere a minimum of a pair of wires between 14 and 24 AWG are needed for each sensor that will be connected to FIRUS. Cables for fire protection shall be installed in accordance with NFPA 70, *National Electrical Code*, and specifically with Articles 760, 770, and 800 where applicable.

5.1.3 FIRUS Electrical Contacts Requirements

For reliability all contacts for use on FIRUS should be a minimum of a Form C, Single Pole, Double Throw Relay. The contacts should be wired to provide a “Backup” message identical to the original message if the contacts fail to provide a low resistance short upon activation. **Refer to Appendix A for contact wiring diagrams.**

5.1.4 Initial Testing of Messages and Sensors

Once it is confirmed that the sensor has been installed and the message has been placed into the FIRUS database, the FIRUS Team member will coordinate with the User, Communications Center, appropriate consoles, and the qualified technician to test the performance of the sensor. Verify receipt of message(s) in the Communications Center and other appropriate consoles.

5.2 Response Personnel Emergency Call List Information

The Communication Center primarily uses electronic emergency call lists (ECL) to make notifications to appropriate Fermilab personnel as indicated by FIRUS messages. The User will be required to ensure all personnel needing to be contacted have current contact information in the Emergency Call Lists (ECL) which are tied to Building Names, FIMS numbers and is Cross Referenced by abbreviations and other references. The names of the individuals are directly linked to the FNAL CNAS on-line personnel database where the dispatcher obtains the phone number(s) that are used to make the notifications.

Personnel are to go on-line at <http://wdrs.fnal.gov/hrs/dataform.html> to update their address and telephone number information. Visitors are to go to the International Office and request that their information be placed into the database. Employees and visitors may elect to keep specific information from being disclosed as general information by selecting “NO” under release to Public Option. In this manner information only the Communications Center has the ability to access the telephone numbers in an emergency.



The Communications Center will issue periodic requests to update to these lists. Further information can be found on <http://esh.fnal.gov/xms/ESHQ-Security> website Security page.

5.3 Modifications, Bypassing, Activation, or Removal of Messages

For quality assurance, all modifications to the FIRUS database messages will be electronically captured by the AD Software group and emailed to the appropriate group(s): AD Controls, Security, FESS Operations Supervisors, Fire Chief and FSM Technicians.

5.3.1 Modifications to existing messages

Messages may be required from time to time to be modified for content. Following the instructions on Form 6013_F1 “Request for New or Modify FIRUS Messages”, prepare the new text as described in paragraph 6.1.1, and send it to the appropriate location for the type of message being modified. Electronic processing is the preferred method.

5.3.2 Bypassing messages

There will be occasions that equipment will need to temporarily be taken off-line to perform maintenance, or repairs. In order not to send false alarms to the Communications Center, prior to beginning work, the sensors may be placed in a by-pass mode for the duration of the maintenance period. This is a software by-pass, done through a console, which prevents nuisance messages from displaying. For Fire Department and FESS FSM personnel performing testing and/or maintenance of FIRUS or sensors they may use the Key Test function. Because of this ability for the FESS Operations and/or FSM group to bypass a fire card and its messages, any ancillary or supplemental fire systems (such as Code 1 Flammable Gas, Code 1 Rack Smoke Detection) should be on their own fire card.

User must complete FORM 6013_F2 “Request for Bypass or Removal of FIRUS Messages”. Following the instructions on the form complete and send via email (preferred) or appropriate Mail Station as listed on the form.

Additionally, the Communications Center and Fire Department are to be notified of the location, device and nature of work being done and the anticipated completion date/time. If the impairment will stay that way or unattended (not being worked on or under the control of a knowledgeable person), then additional steps may be required. If the impairment is fire protection related and is going to be greater than 48 hours, a long term disablement is required. See FESHM 6030 for the Long Term Disablement Form. The need for a fire watch (FESHM 6014 “Fire Watch”) shall be considered.

5.3.3 Activation of bypassed message

The User shall notify the appropriate FIRUS Team member contact to reactive bypassed messages at the earliest opportunity. It is strongly suggested that all previously bypassed messages be completely tested following reactivation.



5.3.4 Removal of a Sensor or System and associated Messages

When a sensor or system is no longer required, the D/S/C will be responsible for: any required approvals, the disconnection from the FIRUS mini by a designated qualified technician, and request for removal of associated messages.

Documentation is required for any life safety, mission critical, fire alarm system, or security system.

5.3.4.1 Approvals

If the system being removed involves hazardous materials process/system (flammable gas, piping of liquids, etc.) approval of appropriate safety experts and the ES&H-FPE is required.

5.3.4.2 Disconnection from FIRUS Mini requirements

Once it has been documented for removal the D/S/C will coordinate for a designated qualified technician to disconnect and remove the sensor, cable, and provide for proper disposal of all components.

5.3.4.3 Removal of messages from FIRUS database

Removal of all associated messages from FIRUS will reside within the specific area of responsibilities and following the requirements of the preceding paragraphs:

The requestor shall use and follow the instructions on FORM 6013_F2 "Request for Bypass or Removal of FIRUS Message". Send completed form via email (preferred) or to the appropriate Mail Stop as shown on the form.

The Users must also remove names from call lists maintained in the Communications Center as well as from the D/S/C call lists.

5.4 Sensor Maintenance and Testing Requirements

Once the sensor has been installed, the party requesting the connection of the sensor to the FIRUS system will be responsible for all cable installations, connections, and sensors.

The requestor is to periodically test sensors and messages. Smoke, fire, or flammable gas detection systems shall be maintained in accordance with FESHM 6010 for maintenance, calibration, cleaning and testing, the same as any system getting a fire department response. If no requirements exist and it involves a hazardous materials process/system the ES&H-FPE shall be consulted for maintenance and/or testing requirements which shall be no less than annual. Maintenance and testing activities of these sensors shall be documented.



User will need to coordinate with the Communications Center and all other appropriate monitoring parties, providing them the start time of the test, what device is being tested and what should be ignored as part of the test. Once the test is completed, the User will need to reset the sensor, and advise all personnel in the area that the testing is completed, and then contact the Communications Center and all previously notified parties to inform them that the test has been completed and sensors have been placed back into service.

5.5 Password Request Process

The D/S/C SSO will evaluate the need and initiate the request on behalf of the requestor. Following the instructions on FORM 6013_F3 "Request for FIRUS Password" complete and send it to the ES&H-FPE (electronically is preferred).

6.0 FIRUS TEAM

The following section is for the exclusive use of FIRUS Team personnel and those having or seeking authorization for access to the FIRUS database. This portion is for personnel involved with the physical maintenance of the FIRUS system hardware and software infrastructure.

When working with any message it is considered good practice to review existing messages for consistency.

6.1 Access to FIRUS Console Parameters and Database Editing

The FIRUS database is a restricted database accessible only to those authorized. The need and ability to access console parameters, and/or the ability to read, write or change Fire, Security, Emergency, Utility, or Trouble message parameters or text are reviewed and approved by the ES&H-FPE.

6.2 Establishing and Maintaining a New FIRUS Message

6.2.1 Fire alarm and Experimental fire related sensors:

- This work will be limited in scope to database entry, modifications, deletions, and confirmation of signal during initial testing with the message owner.
- This work will be chargeback to offset the efforts taken away from our core work.
- Requestor shall contact FSM to obtain the necessary input point(s) (Trunk, Node, Slot, and Channel) including location of the mini for the requestor to run cable(s) for termination.
- Requestor shall contact FSM and provide required message information for data entry.
- Requestor is responsible for getting their sensors and wire installed to the FIRUS Mini.
- Requestor will contact FSM for connection(s) to the Mini.
- Requestor is responsible for contacting FSM to test and confirm proper message for each new alarm.



- Requestor is responsible for continued testing and maintenance of their sensors, wire, and database information.

6.2.2 Security related systems and sensors:

- Requestor will contact Security for any new security related FIRUS messages.
- Security will contact AD Controls Hardware group to provide a FIRUS Mini location (Trunk, Node, Slot, and Channel) for the creation of messages' and connection by a qualified technician.
- Security will input the messages.
- Security will test and confirm proper message for each new alarm.
- Security will test the systems, sensors, and FIRUS messages according to their prescribed schedule.
- Requestor is to provide required maintenance of the systems and components.

6.2.3 Utilities related systems and sensors:

- Requestor is to contact FESS Operations for any new utility related FIRUS messages.
- Operations will determine a FIRUS Mini location (Trunk, Node, Slot, and Channel).
- Operations will input the messages and provide terminations to sensors and Mini.
- Operations will test and confirm proper message for each new alarm.

6.2.4 FIRUS related systems, sensors, and Select sensors:

- Requestor is to contact AD Controls Hardware group for any new Select sensor (not covered by others) for any new related FIRUS messages.
- AD Controls will determine a FIRUS Mini location (Trunk, Node, Slot, and Channel).
- AD Controls will input the messages and will provide direction for terminations to sensors and Mini.
- AD Controls will participate in the testing and to confirm proper message for each new alarm.

6.3 Constructing a FIRUS Message

Refer to **Appendix B** for a list of **Approved Abbreviations**

6.3.1 Formatting Instructions:

“Alert Message” (“Code 1”, “Security Entry”, “High Water”, “Power Loss”, etc..) followed by a colon and one space.

If there are instructions to dispatch the fire department, the message the message will begin with a “CODE”

1- Building/Structure Fire,



- 2- Injury to Person/Rescue,
- 3- Fire other Structure,
- 4- Mechanical, Odor or Hazardous Material/Condition,
- 5- Radiation Incident.

Otherwise the message can begin with the Alerting Statement (“Security Entry”, “High Water”, “Power Loss”, etc.)

“Building” (using formal FIMS building names - not Fermi Common use names) followed by one space.

“Location in building” (if appropriate) followed by a Comma and one space.

“Zone” (to identify a specific alarm panel zone if appropriate), followed by a period and one space.

“FIMS Nos.” (in parenthesis, e.g. (FIMS 325)) followed by one space.

“Action message” to instruct COMMUNICATIONS Center Operators or users on what action is required to be taken by personnel at the receiving console. Example: “Dispatch Fire Department”, “Dispatch Security”, “Auto-Aid”, “Notify (appropriate ECL)”, Notify Duty electrician P-0101, etc., followed by a period.

Additional valuable information not to be read as part of the dispatching of a code by the Communications Operator shall be in parenthesis.

Capital letters are used only for the first letters of “Alert Message” words and other normally capitalized words (e.g. building names). Words describing equipment, etc. should not normally be capitalized. The long text should not use upper case unless it absolutely necessary.

Messages should be brief (e.g. “Dispatch Security”).

The “NAME” field begins with the FIRUS trunk where the alarm point is located, followed by either a (.)(*)(#) or (l) depending on the type of message. The remaining twelve spaces are to be used to indicate the building – (if appropriate location within the building) - and the type of alarm. All lettering are to be capital letters and separations between the identifiers are made with a dash (-) and not a period. For example, “01.AP50 -S-GAS10” is the entry for the AP50 Service Building south end 10% LEL flammable gas alarm.

6.3.2 Kind Field for Messages

This field is a pull down menu choice and is used to display the messages in the associated console display area (Fire, Emergency, Utility, and Trouble).

6.3.3 Alarm Priority Assignments



Alarms are assigned a priority based on the type of alarm (fire, emergency, utility, trouble) and the system being reported. The highest priority is for fire alarms in high population/critical facilities. **Refer to Appendix C** to determine the appropriate priority code for the message(s) being developed.

6.3.4 Console Mask

A pull down menu used to direct messages to selected consoles.

6.3.5 Units

A four (4) character description primarily used on analog messages to define the units of measure for display i.e. GPM, PSIG, RPM, INCH ect...

6.3.5.1 Analog sensor values and set points

For analog sensors this is a required field. Contact AD Controls Hardware group for setting up, using, or plotting analog sensors.

6.3.5.2 Contact sensors

This is an optional field to provide a descriptor of the primary function of the message.

6.4 Process for the Removal of and messages from FIRUS

Messages for processes that are hazardous\dangerous will not be removed on the basis of a telephone call or email by anyone other than the ES&H-FPE. For all other messages contact the appropriate responsible group.

There must be documentation that any life safety risks, any hazardous or dangerous processes, have been rendered harmless. Documentation shall be from subject matter experts with final approval from the ES&H-FPE before a FIRUS message can be deleted.

7.0 SYSTEM CONFIGURATION & MAINTENANCE REQUIREMENTS

7.1 FIRUS Consoles

FIRUS Consoles may be an Apple iMac or Mac Mini terminal that provides a particular location/operation an interface to monitor the FIRUS information/database. The terminal is capable of data base entry/modifications, alarm logging, prioritized alarms, chronological alarms, parameter readings via a list or pictures, plotting, and data logging. The console has numerous aids to tailor the console to an area's needs such as control of alarm annunciation and type of alarms received.

7.1.1 AD Hardware Controls



Will provide the new User a console at a specified location and provide the wiring and node connection onto the FIRUS network. AD Hardware Controls will setup the console preferences, provide basic user training, and document the installed node.

7.1.2 The AD Software Controls Group

- Will register the new console node on both the Red and Blue front-ends.
- If required, they shall develop a new console identifier (Mask).
- Maintain, modify, and distribute new versions of console software application.
- Provide Technical training and support beyond basic user training.
- Create, modify, or remove user passwords.

7.2 Component and Battery Replacement Requirements for FIRUS

As basic components of the FIRUS system become obsolete, it is the responsibility of the AD Control Hardware and Software Groups to replace the items with more state-of-the-art, in kind replacements.

AD Hardware Controls is charge with the task of maintaining the batteries in all FIRUS components including backup UPS devices. Batteries are to be replaced in the primary FIRUS components on a four year cycle consistent with FESHM 6010.

8.0 Retention of FIRUS Print outs

FIRUS log printouts are generated in the Communications Center and are recorded for a period of not less than one year.



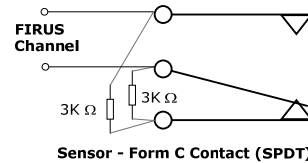
TECHNICAL APPENDICES Appendix A CONTACT WIRING

NOTE: These are the most common methods to be used. However, different circumstances may require a different configuration from these shown.

- Standard wiring of ONE SENSOR (dedicated circuit) for:
IDENTICAL Primary/Backup messages,
Has "OPEN" and "GRND" Faults

This method is the MOST reliable for receipt of an alarm. It shall be used when the sensor has a Form C (SPDT) contact.

CONDITION:
 NORMAL: 3K ohms (supervised circuit)
 ALARM: 0 ohms (shorted on alarm)
 BKP: 6K ohms (when NO contacts failed to close)
 OPEN: > 6K ohms (broken wire or High Resistance connection)
 GND: when one conductor is shorted to ground

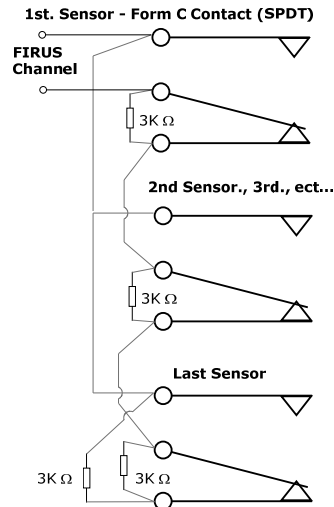


Sensor - Form C Contact (SPDT)

- Standard wiring of MULTIPLE SENSORS for:
IDENTICAL Primary/Backup messages,
Has "OPEN" and "GRND" Faults

This method shall be used when multiple sensors have Form C (SPDT) contacts. IF Form C contacts are not available then it is preferred to be a separate and dedicated circuit for each sensor.

CONDITION:
 NORMAL: 3K ohms (supervised circuit)
 ALARM: 0 ohms (shorted on alarm)
 BKP: 6K ohms (when NO contacts fail to close)
 OPEN: > 6 ohms (broken wire or High Resistance connection)
 GND: when one conductor is shorted to ground



1st. Sensor - Form C Contact (SPDT)

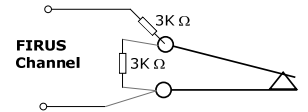
2nd Sensor, 3rd., ect...

Last Sensor

- Standard wiring of ONE SENSOR where:
Backup message equals "ALARM"
Primary "ALARM" message is a "FAULT".
Has "OPEN" and "GRND" Faults

This method shall be used when the sensor has ONLY a: Form B (SPST Normally Closed) contact.

CONDITION:
 NORMAL: 3K ohms (supervised circuit)
 ALARM: 0 ohms (FAULT, shorted cable)
 BKP: 6K ohms (sensor operated/alarm)
 OPEN: > 6K ohms (broken wire or High Resistance connection)
 GND: when one conductor is shorted to ground



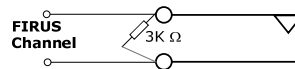
Sensor - Form B Contact ONLY
(SPST-Normally Closed)

- Standard wiring of one ONE SENSOR where:
Primary "ALRM" message
No Backup ("BKUP")
Has "OPEN" for conductor fault (NOT Contact) and "GRND" Faults

NOTE: This is the **least preferred and least reliable** method.

This method shall be used when the sensor has ONLY a: Form A (SPST Normally Open) contact.

CONDITION:
 NORMAL: 3K ohms (supervised circuit)
 ALARM: 0 ohms (shorted on alarm)
 BKP: Normally NA. Create message "CKT TRBL- HI OHMS"
 OPEN: > 6K ohms (broken wire or High Resistance connection)
 GND: when one conductor is shorted to ground

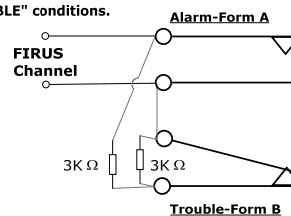


Sensor - Form A Contact ONLY
(SPST-Normally Open)

- Standard wiring when **only one pair of copper wires is available** for "ALARM" and "TROUBLE" conditions.
Primary "ALRM" message = Alarm
Backup "BKUP" message = Trouble message.
Has "OPEN" and "GRND" Faults

This method is used where the Panel/Controller has ONLY a: Single pair of wires to FIRUS available for; Alarm, and Trouble signals. By design "ALRM" (ALARM) overrides "BKUP" (TROUBLE).

CONDITION:
 NORMAL: 3K ohms (supervised circuit)
 ALARM: 0 ohms ("ALARM")
 BKP: 6K ohms ("TROUBLE")
 OPEN: > 6K ohms (broken wire or High Resistance connection)
 GND: when one conductor is shorted to ground



Trouble-Form B

Rev 3

**Appendix B APPROVED ABBREVIATIONS**

Abbrev	Full Name	Category	Abbrev	Full Name	Category
1	WH, Bsmnt, CUB,LIN, AntiProt	Area	LOB	Low Battery	Word
2	MR 1st half A0-DAB	Area	LOP	Low Pressure	Word
3	MR D1-F4	Area	LOT	Low Temperature	Word
6	Neutrino Sites 37,38,39 Fire	Area	LVL	Level	Word
7	Meson Line	Area	D	Detector	Fire Sys
#	Grounded Cable	Area	DAB	D-0 Assembly Bldg	Bldg
\$	Mini Alarms	Fire Sys	DC	Dry Chemical	Fire Sys
*	Trouble, Default alarm	Fire Sys	DCHG	Discharge	Fire Sys
@	Out of Service/Bypassed/disabled	Word	DCT	Duct Detectors	Fire Sys
ADD	Addition	Word	DR	Door	Word
AP	Anti-Proton	Bldg	E	East	Compass
ASIL	Aisle	Area	EMPWR	Emergency Power	Word
AUX	Auxiliary	Bldg	ENCL	Enclosure	Bldg
BAT	Low Battery	Word	EQ	Equipment	Word
BGL	Booster Gallery	Bldg	FCC	Feynman Computer Center	Bldg
BHK	Blackhawk	Area	FL	Fail/failed	Word
BTWR	Booster Tower	Bldg	FLR	Floor	Word
C4P	C4 Pump House	Bldg	G	Ground	Word
CAB	Cabinet	Word	GLS	Glass	Word
CDF	Collider Detector Facility	Bldg	GLYC	Glycol	Word
CH	Collision Hall	Bldg	GT	Gate	Word
CHE	Cheche Pinque	Area	H	Halon	Fire Sys
CHL	Central Helium Liquefier	Bldg	HI	High	Word
CHLOR	Chlorine	Word	HIT	High Temperature	Word
CMPT	Computer	Word	KRSS	Kautz Road Sub Station	Bldg
CPSR	Compressor Room	Bldg	LA	Liquid Argon	Area
CR	Control Room	Bldg	LAB	Lab	Area
CRYO	Cryogenics	Fire Sys	LIN	Linac	Bldg
CSY	Casey's Pond	Bldg	LK	Leak	Word
CUB	Central Utility Bldg	Bldg	LO	Low	Word



Abbrev	Full Name	Category	Abbrev	Full Name	Category
MCH	Movable Counting House	Bldg	SP	Sprinkler	Fire Sys
MCH1	Movable Counting House1st flr	Bldg	SSB	Switchyard Service Bldg	Bldg
MES	Meson	Area	STG	Stage	Word
MEZ	Mezzanine	Area	STK	Stockroom	Area
MR	Main Ring	Area	STO	Storage	Area
MSUB	Master Substation	Bldg	STWY	Stairway	Area
MU	Muon Lab	Bldg	SUP	Super Shed	Bldg
MVR	Major Vehicle Access	Bldg	T	Trouble, Default alarm	Fire Sys
N	North	Compass	TEC	Tech	Word
NEQ	Neuqua	Area	TN	Tunnel or Pit	Bldg
NEU	Neutrino	Area	TP	Tape	Word
ODR	Overhead door	Bldg	TPL	Tagged Photon Lab	Bldg
OFC	Office	Area	TRG	Trigger Rack	Area
OPNC	Open Cable	Area	TST	Test	Word
P	Pull Box	Fire Sys	TX	Telephone	Word
PK	Portakamp	Bldg	UC	Users Center	Bldg
PL	Panel	Fire Sys	UNFLR	underfloor	Area
PLT	Platform	Area	UTL	Utility	Fire Sys
PMP	Pump	Word	VEH	Vehicle	Word
POT	Potawattomi	Area	VEH	Vesda High air flow	Fire Sys
PRG	Purge	Word	VIL	Village	Area
PRO	Proton	Word	VLO	Vesda Low air flow	Fire Sys
PSI	Pressure	Word	VLT	Vault	Area
PWR	Power	Word	W	West	Compass
QC	Quality Control	Word	WAL	Wall	Area
REFGR	Refrigerator/Refrigeration	Word	WH	Wilson Hall	Bldg
RM	Room	Area	WIN	Winnebago	Area
S	South	Compass	WIN	Winnebago	Area
S37	Site #37	Area	WL3	Well #3	Bldg
S38	Site #38	Area	WRNVL	Warrenville	City
S39	Site #39	Area	WTR	Water	Word
SB	Service Bldg	Bldg	XFR	Transfer	Word
SGAS	South Gas Room	Bldg	XGL	Cross Gallery	Bldg
SHB	Shabbona	Area	Z	Zone	Fire Sys
SKB	Sauk Blvd	Area			

**Appendix C MESSAGE PRIORITY PROTOCOL**

	ALARM	SUPERVISORY	TROUBLE
FIRE PROTECTION SYSTEMS			
LIFE SAFETY			
Wilson Hall, Curia I, Residential	63	40	20
MASTER SUBSTATION	62	39	19
INDUSTRIAL/OFFICE/GENERAL			
Labs, Ind. Bldgs., etc	59	38	18
LOW HAZARD			
Barns, trailers, etc.	58	38	18
EMERGENCY SYSTEMS			
LIFE SAFETY Wilson Hall, Curia I, Residential	56	35	16
MASTER SUBSTATION	55	35	16
HIGH VALUE/MISSION CRITICAL/ HIGH HAZARD			
Footprint, Main Ring, Beamlines Casey's Pond, etc.	54	35	16
INDUSTRIAL/OFFICE/GENERAL			
Labs, Ind. Bldgs., etc	52	33	14
LOW HAZARD			
Barns, trailers, etc.	51	33	14
SECURITY SYSTEMS			
DURESS	62	39	19
LIFE SAFETY Wilson Hall, Curia I, Residential	49	31	12
MASTER SUBSTATION	48	31	12
HIGH VALUE / MISSION CRITICAL/ HIGH HAZARD			
Footprint, Main Ring, Beamlines Casey's Pond, etc.	47	31	12
INDUSTRIAL/OFFICE/GENERAL			
Labs, Ind. Bldgs., etc.	45	29	10
LOW HAZARD			
Barns, trailers, etc.	44	29	10



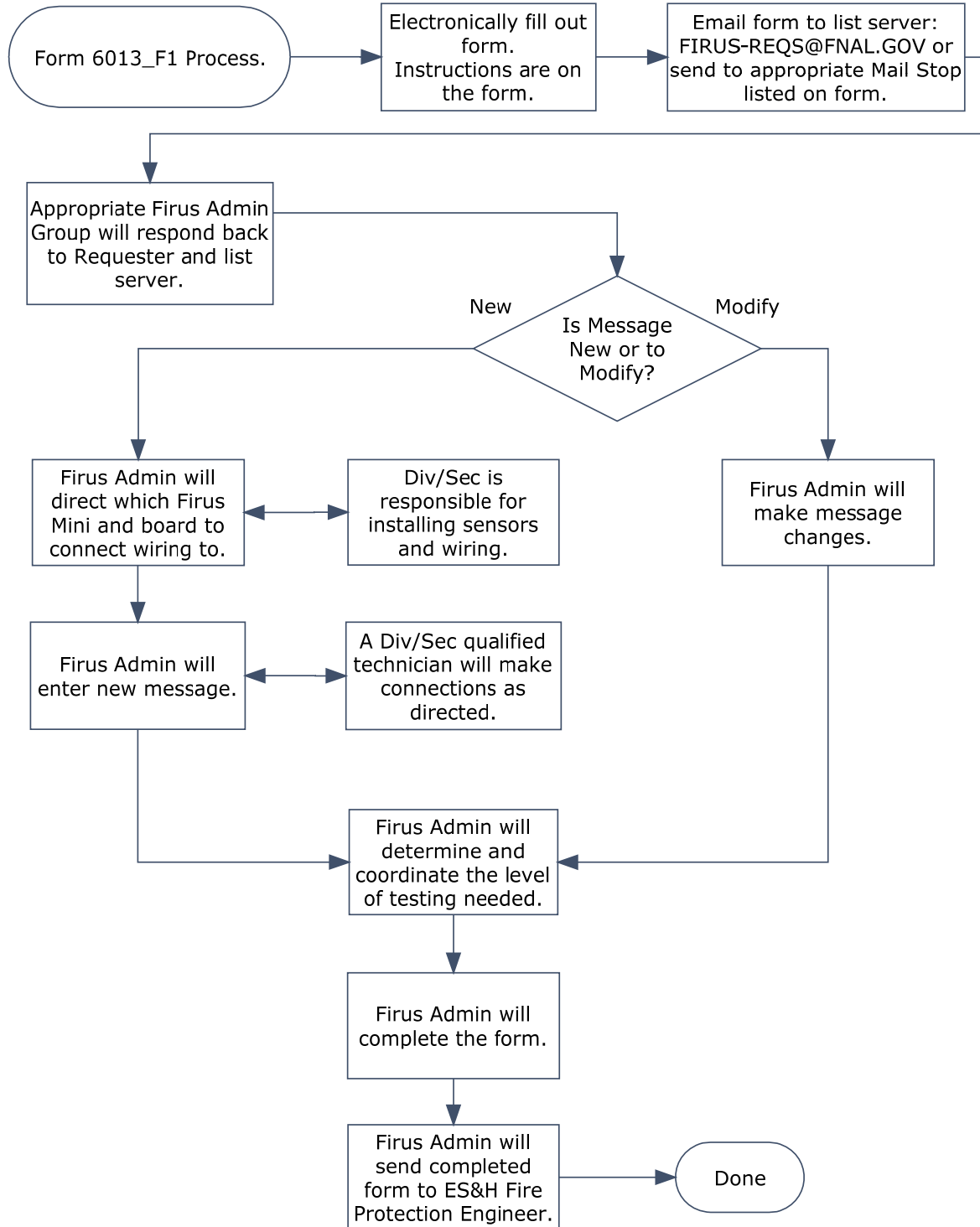
SYSTEM (FIRUS)			
ALL	43	27	8
UTILITY SYSTEMS			
LIFE SAFETY/HIGH VALUE/ MISSION CRITICAL/HIGH HAZARD	42	25	6
INDUSTRIAL/OFFICE/GENERAL/ LOW HAZARD	42	23	4
MISCELLANEOUS			
ALL	41	21	2
ACKNOWLEDGE SYSTEM RESTORATION			
ALL			



Appendix D -

**NEW or MODIFY FIRUS MESSAGE
FORM 6013_F1 PROCESS**

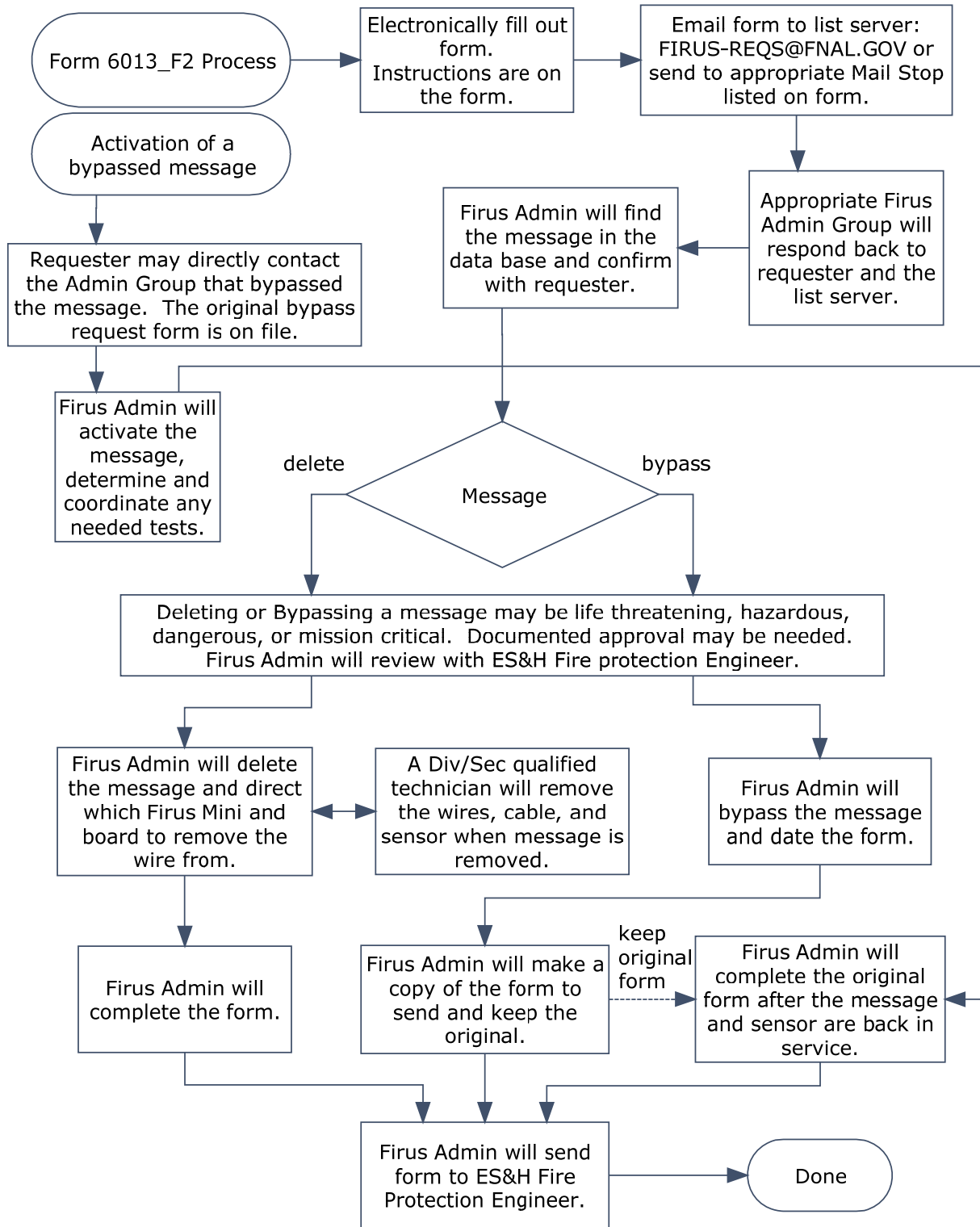
(Sending/forwarding the form electronically is preferred).





BYPASS or REMOVE A FIRUS MESSAGE FORM 6013_F2 PROCESS

(Sending/forwarding the form electronically is preferred).





FIRUS PASSWORD REQUEST FORM 6013_F3 PROCESS

(Sending/forwarding the form electronically is preferred).

