

# Well Site Safety Plans

West Virginia Department of Environmental Protection  
Office of Oil and Gas

James Martin, Chief

# Regulatory framework

W. Va. Code § 22-6A-7(b)(13)

*A well site safety plan to address proper safety measures to be employed for the protection of persons on the site as well as the general public. The plan shall encompass all aspects of the operation, including the actual well work for which the permit was obtained, completion activities and production activities, and shall provide an emergency point of contact for the well operator...*

# Regulatory framework

W. Va. Code § 22-6A-7(b)(13), continued

*...The well operator shall provide a copy of the well site safety plan to the local emergency planning committee established pursuant to section seven, article five-a, chapter fifteen of this code, for the emergency planning district in which the well work will occur at least seven days before commencement of well work or site preparation work that involves any disturbance of land;*

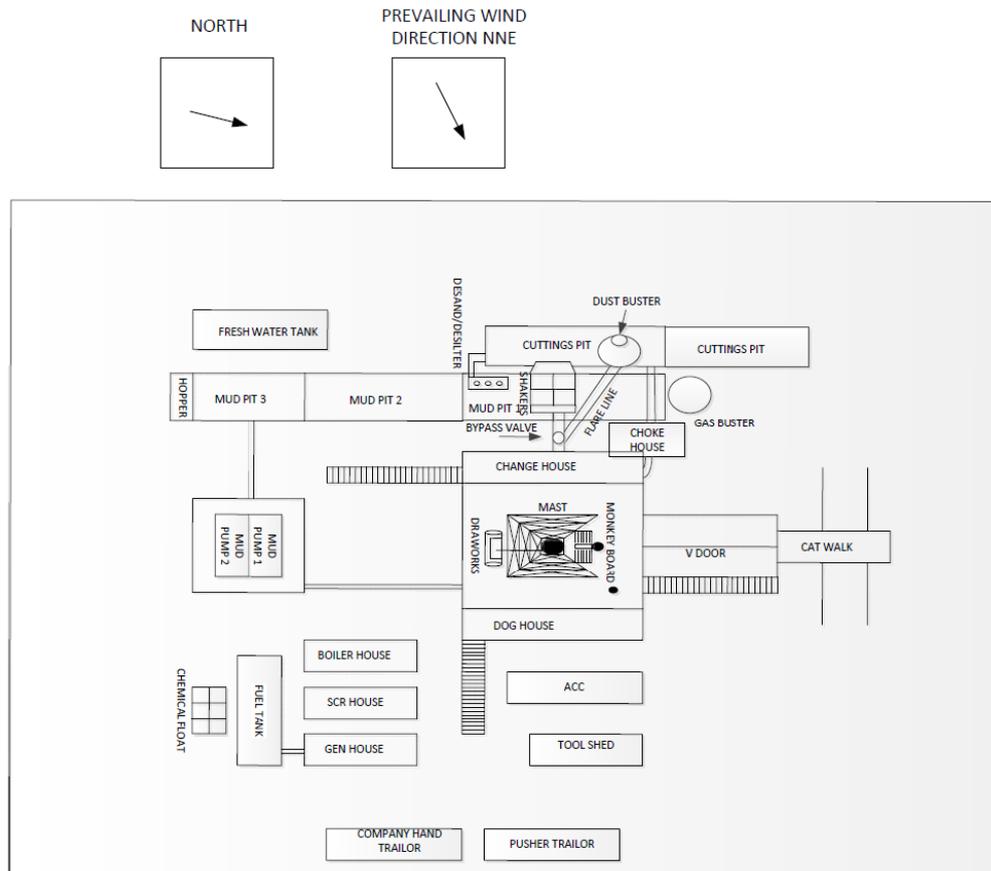
# Well Site Safety Plan Contents

- 35 CSR 8 – 5.7.
  - Coordination with local emergency planning committee/county office of emergency services
  - Siting requirements
  - Well control and blowout preventer (BOP) requirements
  - Well killing operations requirements
  - Hydrogen sulfide operations requirements
  - Notification and protection zones requirements
  - Material safety data sheets (MSDS)
  - Safety meetings

# Site Maps (35 CSR 8 – 5.7.b.1.)

*[The well site safety plan shall include] a plan view map showing the well location, access road, pits, flare lines, dwellings, and nothing the north and prevailing wind directions.*

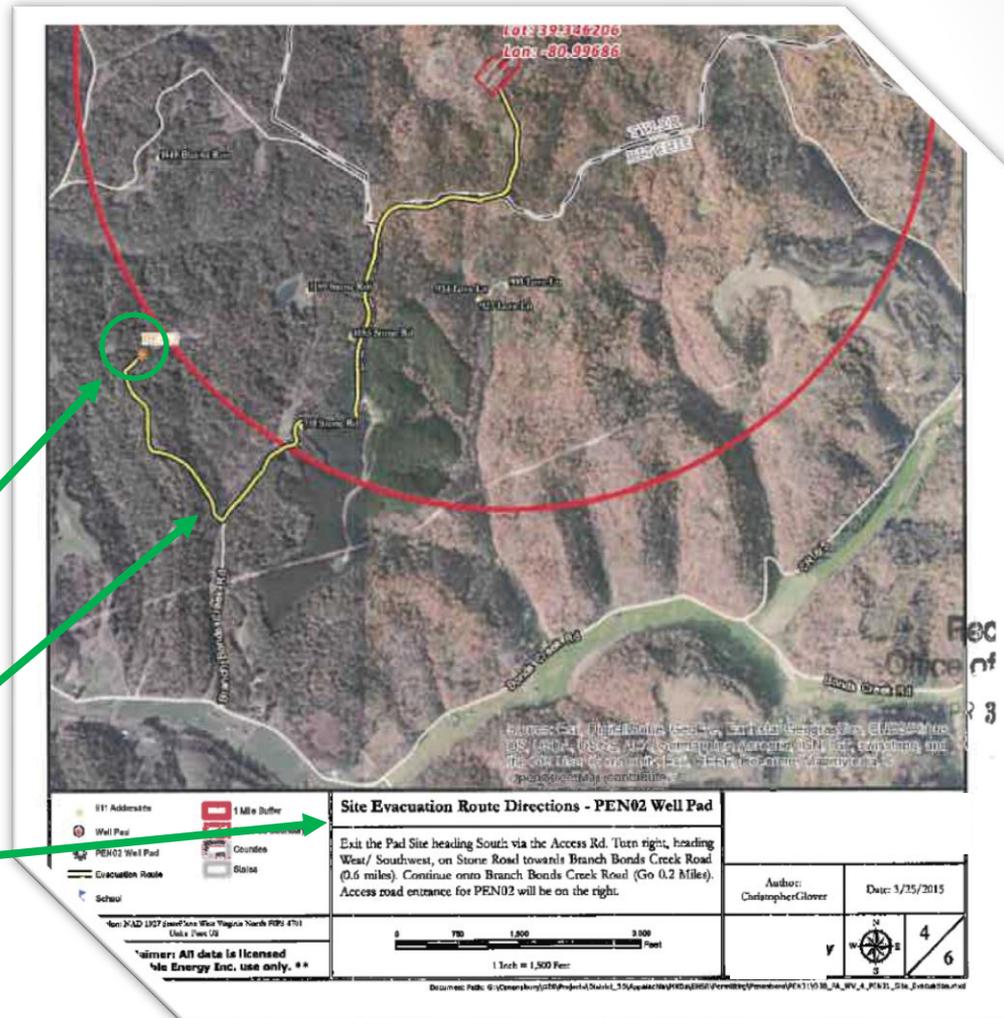
EXHIBIT 1, PAGE 2:  
DRILLING LAYOUT, FLARE LINES & PREVAILING WINDS



# Evacuation Plan (35 CSR 8 – 5.7.b.3.)

*[The well site safety plan shall include] an evacuation plan for the removal of personnel and residents in the surrounding area who have the potential to be affected by an emergency.*

- *Muster point*
- *Evacuation Route*
- *Directions*



# Emergency Contacts (35 CSR 8 – 5.7.b.4-5.)

*The well site safety plan shall include a list of telephone numbers, including 24 hour contact information for the following entities:*

- *Operator*
- *Contractors*
- *DEP*
- *OOG Inspector and Inspector Supervisor*
- *Local emergency responders*
- *Local ER personnel*
- *All schools and public facilities within 1 mile*

# BOP Design (35 CSR 8 – 5.7.c.1.)

*[The well site safety plan shall include] BOP equipment and casing heads with types, sizes and ratings to be utilized during drilling, completion, and work-over operations...*

## **A. BOP Equipment and Casing Heads (35-8 5.7.c.1 & 5.7.c.8)**

A list of all BOP equipment and casing heads, including the relevant specifications for utilized and available during drilling, completion, and workover can be found in the table below.

DRILLING BOP EQUIPMENT AND CASING HEADS			
Item	Type	Size	Rating
Whip stock 24			
Wellhead	MBU	13 5/8"	5,000 lbs
Double BOP	Shaffer	13 5/8"	3,000 lbs
Annular	GK	13 5/8"	3,000 lbs
Choke Manifold	Cameron	2"	3,000 lbs
Nabors M59			
Wellhead	MBU	13 5/8"	5,000 lbs
Double BOP	Cameron Type U	11"	5,000 lbs
Annular	Hydrill Type VK	11"	5,000 lbs
Choke Manifold	Cameron	4 1/16"	5,000 lbs
COMPLETIONS AND WORKOVER BOP EQUIPMENT AND CASING HEADS			
Item	Type	Size	Rating
Wellhead	Weatherford	7 1/16"	10,000 lbs
Double BOP	TBD	7 1/16"	5,000 lbs
Frac Valves	TBD	5 1/8"	10,000 lbs
Frac Valves	TBD	7 1/16"	10,000 lbs
Choke Manifold	TBD	2"	10,000 lbs

# Well Control (35 CSR 8 – 5.7.c.4.)

*[The well site safety plan shall include] a list of all personnel with approved well control training and current certification recognized by the International Association of Drilling Contractors (IADC) shall be provided to the Office prior to the pre-spud meeting*

## **5.4 Well Control Training**

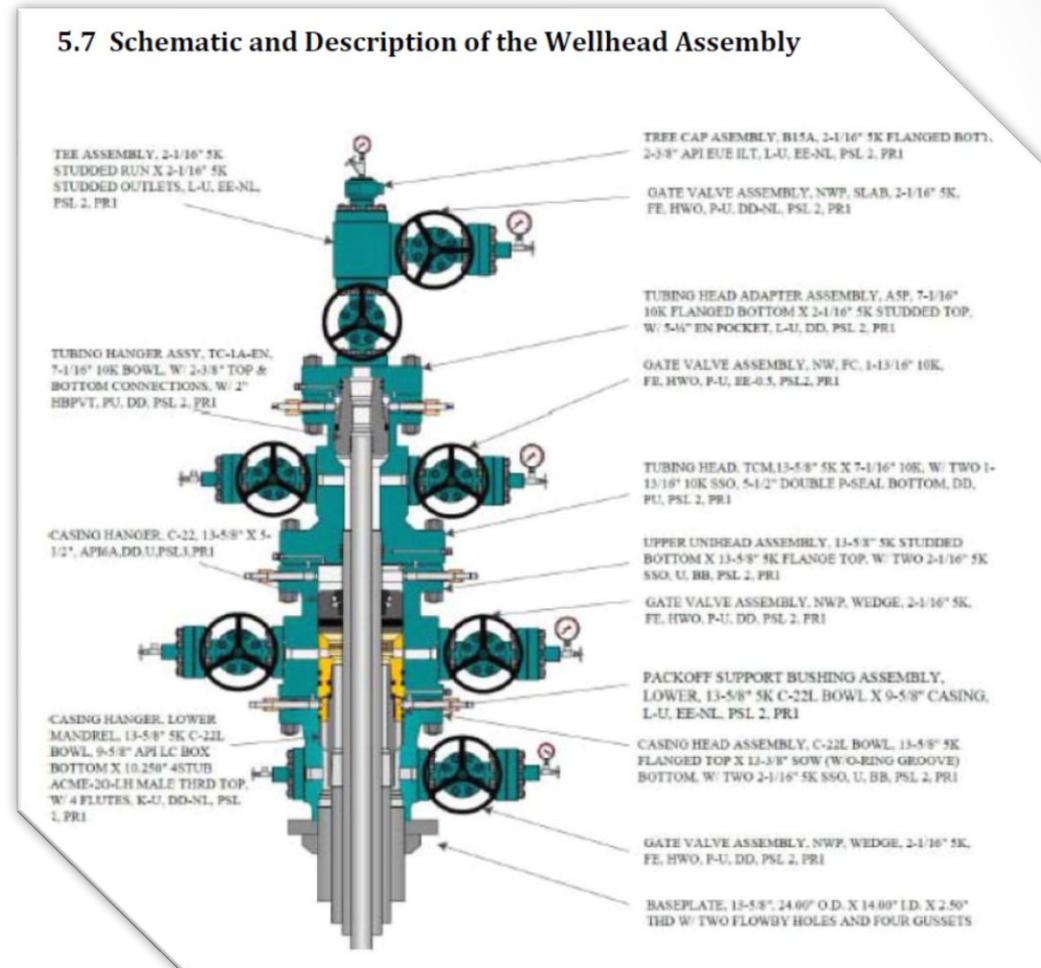
All Drilling Supervisors and Toolpushers used on this well will be IADC trained and certified. A trained person will be present during the drilling operations. Training certificates will be available for review on the location. The list of personnel with said training is provided below

### **List of Well Control Trained Personnel**

- 1.
- 2.
- 3.
- 4.

# Wellhead Assembly (35 CSR 8 – 5.7.c.6.)

*[The well site safety plan shall include] a schematic and description of the wellhead assembly placed on the well upon completion.*



# Collision Avoidance (35 CSR 8 – 5.7.c.7)

- Separation factors
- Survey intervals and frequency
- Tool alignment
- Planning
- Spacing

# Well killing operations (35 CSR 8 – 5.7.d.)

## Requirements:

- An inventory of all material onsite for the mixing of mud

### 6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud = pit volume + equivalent volume in tanks  
= 500 bbls + 500 bbls  
= 1000 bbls total

Mixed Mud Weight The mixed mud weight will vary depending on the bottom hole pressures and will be calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available

Volume of Add'l

Weighting Mat'l

Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite

# Well killing operations (35 CSR 8 – 5.7.d.)

## Requirements:

- Description of mixing units
- IADC-recognized kill procedures

### **6.2 Mud Mixing Units**

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

### **6.3 Kill Procedures**

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

#### Kill Procedures

- 1.) Drillers Method
- 2.) Wait and Weight Method
- 3.) Circulate and Weight Method
- 4.) Concurrent Method
- 5.) Reverse Circulation Method
- 6.) Dynamic Kill Method
- 7.) Bullheading Method
- 8.) Volumetric Method

# H<sub>2</sub>S Monitoring (35 CSR 8 – 5.7.e.1.)

*[The well site safety plan shall include] the equipment and method used for the monitoring, detection, and warning of the presence of hydrogen sulfide gas during drilling, completion, and work-over operations, specifying the location of the monitoring and detection equipment.*

**A. Detection and Monitoring Equipment (35-8 5.7.e.1)**

Depending on the known threat of the presence of hydrogen sulfide, monitors may be utilized onsite. Should a basic monitoring system be utilized, it will be positioned in the shaker area.

Areas that have a known threat for the presence of hydrogen sulfide will be monitored according to a separate contingency plan specific to hydrogen sulfide operations.

# H<sub>2</sub>S Monitoring (35 CSR 8 – 5.7.e.2.)

*[The well site safety plan shall include] a statement of the training to be provided or that has been provided to all personnel who will be involved in hydrogen sulfide operations.*

## **B. H<sub>2</sub>S Training (35-8 5.7.e.2)**

Personnel on all sites will be trained on the sites alarm system, evacuation procedures, and awareness of the basic hazards associated with hydrogen sulfide gas.

In the event that operations are being conducted in an area known to hold the threat of hydrogen sulfide, or if there is reason to believe that the threat is present, all personnel onsite will have additional training on personal protective equipment (PPE), respiratory protection, and will be fit tested. In all circumstances a portion of the personnel onsite will have hydrogen sulfide training.

# H<sub>2</sub>S Monitoring (35 CSR 8 – 5.7.e.3.)

*[The well site safety plan shall include] a list of the personal protective equipment (PPE) that will be maintained on the well site when in areas where hydrogen sulfide gas is likely to be encountered.*

**E. Personal Protective Equipment (35-8 5.7.e.3)**

In the event that operations involve a known threat of hydrogen sulfide release or exposure, the following PPE will be maintained on the wellsite:

- Personal hydrogen sulfide monitors
- A full rig hydrogen sulfide monitoring system
- SCBA escape packs

Additional consideration may be given to the use of supplied working air if the situation warrants.

# Notification and protection zones (35 CSR 8 – 5.7.f.)

*The operator shall establish a method of notification to all residents and emergency response personnel who may be affected by specific events during the operation.*

## **1.3 Method of Notification of Public**

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H<sub>2</sub>S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Drilling Supervisor or Toolpusher. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. . . . safety coordinators who are located in the field may assist with the notification of local residents.

# Chemical Inventory (35 CSR 8 – 5.7.g.)

## **4. Chemical Inventory & MSDS**

### **A. Material Safety Data Sheet Storage (38-8 5.7.a)**

Material Safety Data Sheets (MSDS) for all materials and chemicals will be readily available and maintained in the operations trailer on the well site. Should a material for which there is not an MSDS on file be brought onto the site a copy of the MSDS that accompanies the shipment will be filed with the rest of the sites MSDS.

### **B. Statement of Availability (35-8 5.7.g)**

It is the responsibility of onsite safety personnel to ensure that the MSDS for each material that is delivered to the facility is on file at the location.

Additionally be sourced through subscription to the 3E Company's online database. The URL and login for this database is found in the table below:

3E COMPANY ONLINE MSDS DATABASE	
URL	
Login	
Password	

Additionally, the 3E company may be contacted at :

### **C. Inventory of All Materials (35-8 5.7.d.1 & 5.7.d.2)**

The inventory of all materials on site for mixing of mud shall be recorded. This inventory includes, but is not limited to:

1. Numbers of types of mixing units
2. Mud amount and weight
3. Amount of weighting material, and
4. Volume of mixing fluid

# Safety Meetings (35 CSR 8 – 5.7.h.)

*Safety meetings shall be held on-site weekly, at a minimum, and specifically prior to the beginning of drilling (pre-spud meeting), completion, and work-over operations...*

**DAILY PRE-SHIFT SAFETY MEETING**

RIG NUMBER: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
COMPLETED BY: \_\_\_\_\_ (please print clearly)

SAFETY TOPICS	DISCUSSION LEADERS	COMMENTS or SIGNIFICANT POINTS DISCUSSED
1. Introduction and Opening		
2. Third Party Contractors (Current or Expected at Worksite)		
3. Review of Inspections, Visits, Assessments or Audits		
4. Review of Safety Alerts, Technical Advisories or Weather Warnings		
5. Review and Discussion of the Last 24 hrs. of Operations (what has been done)		
6. Work that has been Completed		

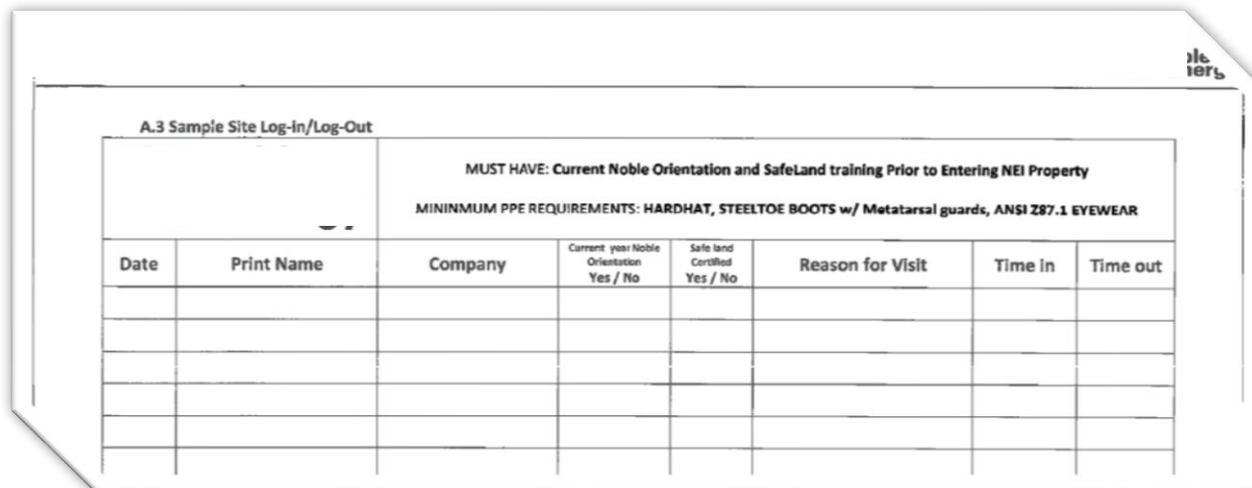
\_\_\_\_\_  
of Near Misses, Incidents.

**A.1 Sample Pre-Spud Safety Meeting Attendance Log**

PRE-SPUD SAFETY MEETING ATTENDANCE LOG		
Print Name	Company/Title	Signature

# Personnel Tracking (35 CSR 8 – 5.7.h.)

*...A check-in and check-out list of all personnel shall be maintained during the drilling and completion phases of the operation, as well as a system for logging personnel and visitors to the drilling location to allow for an accurate count of people on the site at any time...*



**A.3 Sample Site Log-in/Log-Out**

**MUST HAVE: Current Noble Orientation and SafeLand training Prior to Entering NEI Property**

**MINIMUM PPE REQUIREMENTS: HARDHAT, STEELTOE BOOTS w/ Metatarsal guards, ANSI Z87.1 EYEWEAR**

Date	Print Name	Company	Current year Noble Orientation Yes / No	Safe land Certified Yes / No	Reason for Visit	Time in	Time out

# Other Authorities

- Imminent danger related to well sites
  - W. Va. Code § 22-6-3(a)
- Permit conditions
  - W. Va. Code § 22-6A-2(a)(5)
- Imminent danger related to centralized pits or impoundments
  - W. Va. Code § 22-6A-9(i)
- Oil and Gas Conservation Commission/Office of Oil and Gas  
Deep Well Policy

# Communications to the Office

- Pre-spud meeting (35 CSR 8 – 5.7.h.)
- Unusual drilling events or large kicks (35 CSR 8 – 5.7.c.5.)
- H<sub>2</sub>S (35 CSR 8 – 5.7.e.4.)
- Underground collisions or unacceptable risk (35 CSR 8 – 5.7.c.7.)
- Accidents (35 CSR 8 – 5.7.f.3.)