

82nd Annual Field Conference of Pennsylvania Geologists
RECENT GEOLOGIC STUDIES & INITIATIVES IN CENTRAL PENNSYLVANIA
State College, PA

Thursday, October 5, 2017 – Preconference Trips
Friday and Saturday, October 6-7, 2017 – Field Trip

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Headquarters

Ramada Inn and Conference Center, 1450 South Atherton Street, State College, PA 16801
(814) 238-3001 <http://ramadasc.com>



Nittany Valley from Jo Hayes Vista, Pine Grove Mills

The Field Conference returns to State College for the first time since 1985. Leaders have an ambitious schedule that includes both recent advances in research and classic geological sites. This year the conference will run four buses that will be split into two groups. On Friday both groups will visit the same sites although in somewhat different order. Stops include the [Shale Hills Critical Zone Observatory](#), structures in the Brallier and Marcellus Formations, and fold and fault deformation at the Charlie Hill roadcut near Huntingdon. On Saturday, one trip will focus on the stratigraphy and sedimentology of Ordovician carbonates along the Mount Nittany Expressway and on the environmental and engineering problems associated with the construction of I-99 at Skytop. The other trip will concentrate on groundwater, karst and environmental concerns. Stops include the Warrior Formation, the [Penn State Living Filter](#), Big Spring – one of the largest in the state, Oak Hall Quarry, the sinking stream at Schalls Gap, and groundwater contamination in the State College area.

A wide range of preconference trips are also planned. Excursions include 18th century Pb-Zn mining, the unique Penn State Arboretum, Black River carbonates at Union Furnace, using drones for topographic mapping, archeological lithics in Centre County, Mississippian-Pennsylvanian stratigraphy and Bilger's Rocks, the Horseshoe Curve and the Hughes Borehole AMD site, and a relaxing kayak trip on the Bald Eagle Creek.

SCHEDULE OF EVENTS:

Thursday, October 5, 2017

- PRE-CONFERENCE FIELD TRIPS - Eight preconference trips are planned. See descriptions below.
- CONFERENCE REGISTRATION - 4:00 PM - 10:00 PM – **Conference Center Lobby**
- ORIENTATION AND RECEPTION - 7:00 PM - 10:00 PM – **Grand Ballroom**
Reception includes beer, hors d'oeuvres, rock swap, map blast, student posters, and silent auction.
- OVERVIEW OF FIELD TRIP - 8:00 PM – 8:30 PM – **Grand Ballroom**

Friday, October 6, 2017

- REGISTRATION - 6:00 AM - 7:20 AM - **Conference Center Lobby**
- BREAKFAST – 6:00-7:15 **Grand Ballroom**
- FIELD TRIP - 7:30 AM - 5:30 PM - Buses depart from front of Ramada Inn at 7:30 AM. Lunch, doughnuts, fruit, coffee and other beverages will be provided.
- RECEPTION - 6:30 PM - 7:00 PM – **Grand Ballroom**. Hors d'oeuvres and cash bar will be available.
- ANNUAL BANQUET AND BUSINESS MEETING - 7:00 PM - 10:00 **Grand Ballroom**
Guest Speaker - Dr. James Kastig, Evan Pugh Professor, Penn State

Saturday, October 7, 2017

- BREAKFAST – 6:00-7:15 **Grand Ballroom**
- FIELD TRIP - 7:30 AM - 5:30 PM - Buses depart from the front of Ramada Inn. Lunch, doughnuts, fruit, coffee and other beverages will be provided.

ATTENDANCE - The number of conference attendees is limited to 220. If the attendance limit is reached, a waiting list will be developed. The Field Conference is intended for geologists, earth science teachers and students, including graduate students and undergraduates with a faculty recommendation. Please note: in order to encourage student participation, the Field Conference is offering a half-price student rate. Three full scholarships are also available. Twenty student spaces will be held until September 15, then, if unfilled, will be released to the waiting list. Students should visit the student registration page at <http://fcopg.org/contact-us/students> for more information on scholarships.

PROFESSIONAL DEVELOPMENT HOURS - Participants will receive a certificate of attendance. It will be your responsibility to track and report the number of professional development hours obtained based on the FCOPG agenda.

GUIDEBOOK - The guidebook will be delayed this year. When it is available, you will receive a link to download it. If you wish to receive a printed copy of the guidebook, please indicate such on your registration form. The cost is \$40. We will not be giving out CDs at the meeting; however, there WILL be a printed road log with stop abstracts provided to you at registration.

IMPORTANT NOTES

TRANSPORTATION - Transportation is by bus only. No private cars are allowed since parking space and traffic control require that we limit the number of vehicles. We plan to have a geologic tour guide on each bus.

REGISTRATION- Registration is required for all conferees. To register, fill out and mail the registration form, the original, signed liability release form, and a check or money order for the registration fee, made payable to the “Field Conference of Pennsylvania Geologists.” OR fill out the form and send it electronically to stshank@pa.gov and submit your payment via PayPal by visiting www.fcopg.org/.

Registrations will be accepted in the order they are received based on the postmark date of the envelope or the digital time stamp on the PayPal account.

A release and hold harmless waiver is required for this field conference. Failure to sign and return the waiver will result in the return of your registration without a reserved space.

Registrations will be accepted only if accompanied by payment. *Reservations will NOT be accepted without payment.*

REFUND POLICY - If you need to cancel before September 15th, 2017, a full refund will be given. If you cancel after that date, refunds will be given only if your space can be filled. Usually it can be.

ACCOMODATIONS

Lodging: Ramada Conference Center, 1450 South Atherton Street, State College, PA 16801, (814) 238-3001, <http://ramadasc.com>. A block of rooms has been reserved at the rate of \$82+tax. The rooms will be held until Sept 5. **When making your reservation, be sure to indicate that you are with Field Conference of PA Geologists.** Call direct at (814) 238-3001. There are several other motels and inns within two miles.

Buses will pick up attendees in front of the Ramada Inn. Commuters may park at the Ramada Inn for the day.

Preconference Field Trips, October 5, 2017

Only contact the leaders if you have questions, otherwise sign up with the registration form!

Fort Roberdeau Pb-Zn Mining Area (free)

Leader: George Pedlow, retired geologist, georgepedlow@hotmail.com

Limit: unlimited

Exertion Level: Easy

Fort Roberdeau, in its present form, is a Blair County, Pennsylvania public historic park featuring a modern reconstruction of a Revolutionary War fort. The original fort had been built in 1778 to protect mining operations carried out nearby to secure lead from fracture/breccia mineralization containing galena, sphalerite, barite and other minerals. The Revolutionary War lead mining activity was an attempt to provide military ammunition to the Continental Army. Blair County reconstructed the fort for the 1976 Bicentennial, following up on initial archaeological work done in the late 1930s to define the actual site of the fort.

A question repeatedly asked by fort visitors is, "Where were the actual mines?" The absence of definitively known sites for the 1778 mining effort is a matter of historical interest. The public park lands surrounding the fort site do in fact contain some evidence of old mining, but it is at present unknown if these represent actual 1778 mining. The historical documentary record is poor, and complicated in the field by several iterations of 19th and 20th century lead/zinc exploration attempts.

This field trip will visit a (single ?) site on the Ft. Roberdeau property where the Juniata College Geology Dept. has used resistivity and GPR geophysics to identify subsurface excavation, now filled with low-grade mineralized waste rock. Because of the high probability of unharvested crops on the Ft. Roberdeau property, the park will restrict access to only one field site. The plan is to move from the field to the Fort, its museum, and its well-equipped meeting hall for further presentations. At the fort museum and on a brief fort tour, we will receive historical background and then convene in the meeting hall for several short presentations of relevant geology. Including geochemistry, mineralogy, geophysics and environmental concerns.

Field trip meets at 12:00pm at Arch Spring Farm (40°36'26.27"N, 78°12'8.95"W), owned by George & his wife Linda.. Bring a bag lunch and drink. Come at 11:00 if you wish. Attendees will drive themselves to the stops and leave for the conference hotel at 4:30.

The Arboretum at Penn State (free)

Leaders: Duff Gold, Arboretum staff, Penn State University

Limit: 45 attendees

Exertion Level: Easy

Enjoy a guided tour of The Arboretum at Penn State and see the H.O. Smith Botanic Gardens at the height of their autumn display. The 7-acre gardens showcase over 850 different types of ornamental plants and are a favorite spot on Penn State's campus. In addition, the Arboretum uniquely integrates local geologic history and materials in its educational displays.

From <https://arboretum.psu.edu/>: “The Ridge and Valley Sculpture is a three-dimensional ‘map’ that depicts the Spring Creek watershed surrounding the University and community. The 924-sq.-ft. map is made of Pennsylvania bluestone cut and laid in the shape of the watershed and carved to depict major features and their names. Natural limestone boulders represent the three mountain ridges that define our valley, all of which can be seen from the gardens. When it is dry, the sculpture is a scale map of the geology and watershed of this area. When it rains, the runoff from the roof of the Overlook Pavilion drains onto the map and flows along the carved waterways, creating a watershed in miniature.”



Meet at the Arboretum at 1:00pm - the entrance to the parking lot is on Bigler Road. Additional details will be forthcoming.

sUAS (Drones) for Topographic Mapping and Site Characterization with Structure-from-Motion Imagery and Lidar (free)

Leaders: Doug Miller & Nooreen Meghani Center for Environmental Information, EESI, Penn State

Limit: 25 attendees,

Exertion Level: Easy

Small Unmanned Aerial Systems or sUAS's, both fixed-wing airframes and multi-rotors, have the potential to revolutionize remote sensing in natural resources applications. The marginal cost of flying a sUAS is a fraction of that using current industry-standard satellite or aircraft systems. Because they fly at relatively low altitudes – less than 150 meters – the spatial resolution of the imagery collected with these airframes is much higher, on the order of a few square centimeters or better. These data can be used for a wide variety of applications, such as mapping environmental, ground-based attributes. We now also have the ability to use recently developed, inexpensive LiDAR sensors that are small and economical enough to mount on one of these low-cost UAVs. Just as in ground-based applications, the ability to use LiDAR extends our mapping and topographic assessment abilities beyond what a standard camera can ‘see’.

This pre-conference field activity will, weather permitting, demonstrate our fixed-wing and multi-rotor aircraft and our mapping activities over a large, inactive sinkhole on the grounds of Penn State's Ag Progress Days. The demonstration will also include a review of our image-based structure-from-motion topographic mapping as well as our use of a low-cost, high-resolution LiDAR unit (Velodyne VLP-16) mounted on a T18 octocopter for topographic mapping.

Meet at 2:00 at Penn State Ag Progress Days Grounds, 4.5 miles west of Pine Grove Mills along PA Route 45, turn at Gate J. Map will be sent to attendees. Parking is plentiful.

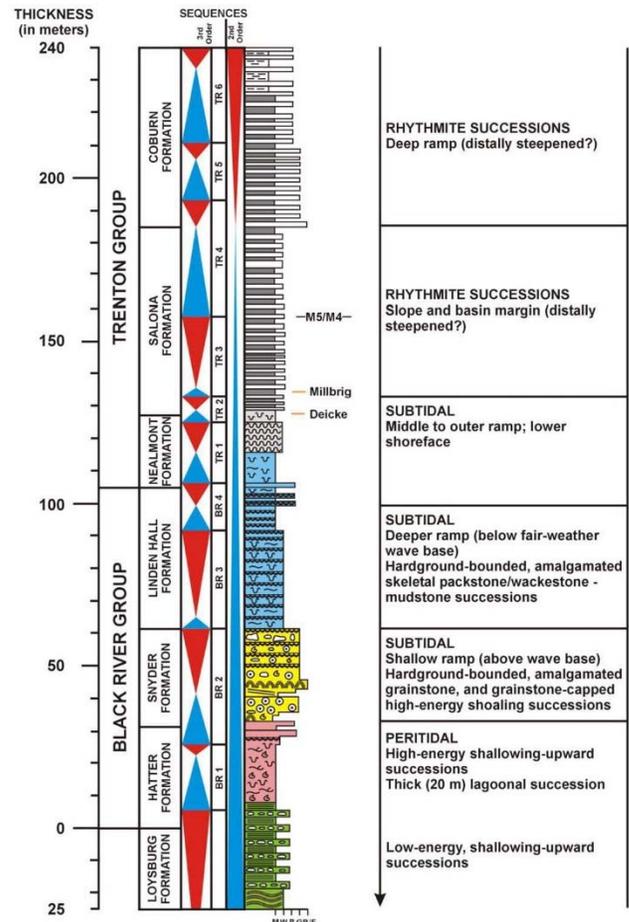
Geology of the Upper Ordovician Trenton and Black River Carbonates of the Union Furnace Roadcut, Huntingdon County, PA (free)

Leaders: Christopher Laughrey and Jaime Kostelnik, Weatherford Labs, Golden, CO; John Harper, PA Geological Survey, retired, paleoharper12@gmail.com

Limit: 25 people

Exertion Level: Easy

The primary purpose of this field trip is to acquaint participants with the complex diversity of carbonate depositional facies that characterize the Trenton and Black River carbonates in Pennsylvania. The Trenton and Black River have been targets of active petroleum exploration in the Appalachian basin since the mid-1990s. Most of the reservoir targets are fractured dolostones and limestones associated with structural traps (i.e., seismic plays). The sedimentary geology of these Ordovician rocks also is critical for exploration efforts, however, particularly the distributions of porous and permeable facies. They have a direct bearing on understanding the petroleum source rocks of this play, as well as the migration and accumulation of fluids in the rocks. Understanding the sedimentary history of the carbonates also means understanding their reservoir storage capacity. In addition, robust facies analyses are critical for assuring the application of accurate, high-resolution surface and subsurface sequence stratigraphy. To these ends, we will examine a continuous 250-m (820-ft) long roadcut along PA Route 453 near Union Furnace, Huntingdon County, that exposes strata ranging from the Middle Ordovician Loysburg Formation to the Upper Ordovician Coburn Formation (= uppermost Trenton), including numerous well-documented K-bentonites useful for correlation throughout the midwestern region of the US. This is literally the best and most continuous exposed section of these rocks in central Pennsylvania.



We will meet at noon for lunch at Arch Spring, approximately three miles south of the roadcut. Bring a bagged lunch and a beverage. A map of the area and directions to and from State College will be provided to participants prior to the field trip. Following lunch, we will proceed in caravan formation to the outcrop and spend the afternoon examining the rocks. Carpooling is encouraged as there is limited parking space at the roadcut.

Archeological Lithic materials in Centre County, PA (free)

Leaders: Barry E. Scheetz (bescheetz63@gmail.com), Robert Altamura, Paul Raber, Mary Alice Graetzer, Sherman Stoltzfus

Limit: 20 attendees

Exertion Level: Easy, short walks in farm fields, boots recommended

The aboriginal inhabitants of North America relied on the use of stone tools to survive. They were skilled knappers who chose the best lithic materials from which to make their tools. Such material were generally homogeneous, dense silica-base stone that, when chipped, broke uniformly with conchoidal fractures to create sharp cutting edges. From the archaeological record, it is clear that these peoples would travel great distances, up to 250 to 300 km, to acquire these

materials. Centre County has two deposits that would qualify as “good” lithic materials: the black cherts of the early Ordovician and the brown Bald Eagle jasper (a.k.a. Houserville jasper). The jasper was the most widely exploited resource in the area and was utilized for perhaps 12,000 years from Clovis times but was most heavily exploited during the Transitional period between 4300BC and 2700BC.

Meet at the Ramada Inn at 1:00pm. Trip will return by 5:00pm. Travel will be by personal auto – carpooling is encouraged. Please eat before the trip and bring along your own water.

Eugene G. Williams Memorial Field Trip: Pennsylvanian Stratigraphy of the Curwensville Area

Leaders: Bill Bragonier, retired coal geologist, billbragonier@yahoo.com

Limit: 20 attendees

Exertion Level: Easy to Moderate

This trip will examine the Upper Mississippian, Pottsville and Lower Allegheny stratigraphy of the Curwensville area, as well as the industrial past of the area. Eugene Williams, renowned stratigrapher and former Penn State professor led numerous field trips, including several Field Conference trips, to the Curwensville area to expound upon some of the basic principles of Pennsylvanian stratigraphy. This trip is dedicated to his memory.



The trip consists of four stops.

STOP 1 will examine the temporally substantial Mississippian/Pennsylvanian unconformity and the unique lower Mercer high-alumina hard clay, which occurs at this systemic boundary in the Curwensville area. The immediately overlying rocks consist of a classic Pennsylvanian fluvial sandstone and laterally correlative overbank deposits. A splay deposit containing rotational slump blocks that demonstrate the existence of an unconformity will also be discussed.

STOP 2 consists of a transect through a lower Allegheny abandoned oxbow channel into the main fluvial channel that caused the cutoff. A secondary discussion will examine Gene William’s insights into peat-to-coal compaction ratios.

STOP 3 Bilger’s Rocks. Bilger’s rocks is Pennsylvania’s premier “rock city”. Shrouded among hemlocks and mountain laurel that create a scenic, primal atmosphere, giant blocks of joint controlled Homewood (?) sandstone (Pottsville formation) provide a rare three-dimensional overview of high-energy unidirectional fluvial cross bedding.

STOP 4 Russell Stone Products. Sandstone quarries in the Curwensville area date to the mid 19th century and have provided dimension stone for a multitude of high profile construction projects including the Cathedral of Learning in Pittsburgh, the Philadelphia Art Museum, the Arlington Memorial bridge in Washington, D.C., the Rockville and Market Street bridges in Harrisburg, the Princeton University Chapel and numerous smaller scale buildings and bridges. In this tradition, Russell Stone Products provides dimension stone for a variety of uses that range from counter tops to building construction. They have graciously consented to provide us with a tour of their operations, which are located a short distance from Bilger’s rocks.

Meet at the Ramada Inn at 9:00 or meet at the Clearfield Mall at 10:00. Additional information regarding potential travel costs and lunch options will be forthcoming. A van may be available which may result in a rental fee. Vehicles will return to the Clearfield Mall by 4:00 and State College by 5:00.

Kayaking Bald Eagle Creek

Leaders: Albert Mabus, albertmabus@gmail.com; Rose-Anna Behr, PA Geological Survey

Limit: 20 people

Exertion Level: Easy, just pools and riffles, but experience with kayak required.



We will explore the topography, rocks, fossils, and industrial connections along Bald Eagle Creek in Centre County, Pennsylvania. Starting at an Oriskany outcrop in Spring Creek, we will then float 4.9 miles downstream, visiting outcrops of Needmore, Marcellus, Mahantango, and Keyser and discuss the depositional history of the rocks. There is a nice spring near the stream to visit, and it ties into the structural history of the area. A smattering of cultural history from the canals to the rails to the Curtin iron empire will round out this trip. This trip will be cancelled if the river is at

a dangerously high level. Low water does not affect the trip.

Meet at 12:30 at the Milesburg boat launch. 40.942874, -77.786993. This is located on the south side of Bald Eagle Creek, just west of Turnpike Street/Route 144. This is the only traffic bridge in town, so you can't miss it. Trip will last from 1:00 to 3:30. Cost is free if BYOB or \$45 for a single kayak, \$75 for a tandem (find your own partner). Launch permit and life vest are required, please bring your own water.

Horseshoe Curve and Hughes Borehole AMD Site

Leaders: Steve Lindberg, Pitt-Johnstown, slindber@pitt.edu

Limit: unlimited

Exertion Level: Easy to moderate, wet, muddy, rubber boots or waders helpful

The first stop will be Horseshoe Curve National Historic Landmark located along the Allegheny Front just outside of Altoona. Travel time from State College will be about 1 hour. **Admission to the museum and "Kittanning Point" at the top of the curve is \$8 per person, to be paid by each participant.** Kittanning Point offers an excellent exposure of the Devonian-Mississippian Rockwell Formation. From Horseshoe Curve we will continue east to the town of Portage (approx. 30 minutes) to the Hughes Borehole deep mine AMD blowout. The Hughes Borehole produces an artesian flow of up to 1,000 gallons per minute and has created a large (spectacular) multi-acre terraced mound of iron-oxide precipitates. Getting to the borehole will require an easy to moderate low gradient 1/4 mile hike on a path through the woods. We will be walking directly on the flow; participants should wear sturdy shoes and be prepared for the possibility of getting wet, muddy and somewhat iron-stained. Water level at the mound varies with recent rainfall amounts. Rubber boots or knee-high waders would be worth having; but are not a necessity.



This field trip will depart from the Ramada Inn and Conference Center at 9:30 am. Return time to the Ramada Inn will be approximately 4:00 pm. The first 10 registered participants can request to ride in provided transportation (11 passenger university van) free of charge. Other trip participants may follow along in their own cars; parking at field trip locations will not be an issue. Our lunch stop will be in Portage before heading out to the borehole. **Participants can bring along their lunch or dine in comfort at the Portage "Sheetz".** Following the stop at the borehole we will return to State College.

Important Items

- 1. Registration and waiver forms are available digitally and can be submitted by email. If printing, print the waiver form on the backside of the registration form to reduce paper waste. (p. 9-10)**
- 2. We now accept credit cards via PayPal. Visit www.fcopg.org.**
- 3. You will receive an email indicating your registration has been accepted or you have been placed on the waiting list. Student spaces will be held until September 15, then if unfilled, released for the waiting list. Emails will be sent out every Monday. Please be patient.**
- 4. Please sign the Field Conference waiver.**
- 5. Hard hats are not required this year but boots are recommended.**
- 6. For PA State employees who plan to have their registration paid by the state, our Federal ID # is 25-1592474. Our SAP Vendor #151625.**

82nd ANNUAL FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS
RECENT GEOLOGIC STUDIES & INITIATIVES IN CENTRAL PENNSYLVANIA
State College, PA, October 5-7, 2017

Registrations will be accepted in the order received, based on postmark or PayPal timestamp. Registration includes bus transportation, printed road log, digital download of entire guidebook, FCOPG trinket, evening reception, two lunches, banquet dinner, doughnut-like objects, fruit, coffee, and beverages. Registration must be accompanied by payment. You must sign waiver as explained on page 8 of the announcement, Important Items.

NAME _____ PHONE NUMBER _____

STREET _____

CITY _____ STATE _____ ZIP _____

Please check one: Home address Business address

NAME & AFFILIATION (for badge) _____

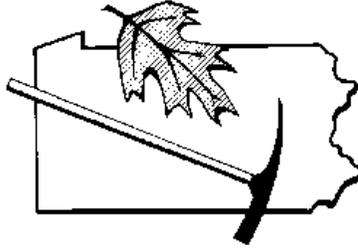
E-mail _____ Cell _____

Registration \$250/ Student registration \$125	
Guidebook (optional printed volume) \$40	
Field Trip Option – Hydro & Environmental	
Field Trip Option – Carb Stratigraphy & Skytop	
PRE-CONFERENCE TRIPS: Indicate first and second choice.	
Fort Roberdeau Pb-Zn Deposits (free) Ordovician Carbonates at Union Furnace (free) Topographic Mapping by Drones (free) Artifacts in Centre County (free) Penn State Arboretum (free) Kayaking the Bald Eagle Creek (free if BYOB) Mississippian-Pennsylvania Strat (possible van rental) Horseshoe Curve & Hughes Borehole (\$8 for Horseshoe– pay onsite)	
Safety Vest size (M, L, XL, 2X, 3X) – This year’s giveaway	
Donation to Student Scholarship Funds	\$
Donations to General Field Conference Funds, beer fund, etc.	\$
Dietary Restrictions-	
Total:	\$

Make checks payable to
FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS, Inc,
 3240 Schoolhouse Road
 Middletown, PA 17057-3534

Signature acknowledging that you have read and accept the conditions on the page entitled “Important Items.” Your registration will be rejected if it is not signed.

Signature: _____



FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS, INC
RELEASE AND HOLD HARMLESS WAIVER

The undersigned, having been fully advised as to the nature and possible dangers and hazards of the field trip ***RECENT GEOLOGIC STUDIES & INITIATIVES IN CENTRAL PENNSYLVANIA*** ***OCTOBER 5 PRECONFERENCE TRIPS, AND OCTOBER 6-7, 2017 FIELD TRIP,*** which are sponsored by the Field Conference of Pennsylvania Geologists, Inc., does hereby assume any and all risks involved in connection with the trip, and does hereby save and hold harmless, the ***FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS, INC., ITS OFFICERS, REPRESENTATIVES, AGENTS, OR MEMBERS, and LANDOWNERS*** from any and all claims, losses, and damages (including attorney's fees and any other costs involved because of said claims) on account of injury, death, property damage, or inconvenience or loss of money due to any delay that may arise, by reason of my participation. I understand that my use of alcohol or drugs would impair my judgment and coordination, and will hold the above stated organizations and individuals harmless from claims arising from the use of either. I understand that I am solely responsible for carrying my own life and health insurance.

SIGNATURE _____

PRINTED NAME _____

DATE _____

THIS FORM MUST BE RETURNED WITH YOUR REGISTRATION FORM