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January, 2012



LINES & POINTS

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On The Cover

*Boundary Marker & Cairn;
Cairn was helpful in
finding the marker.
(Photo By Tom McDonald)*

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For more information please contact Pete Hutchison or Jack Studley.

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PLSW (Professional Land Surveyors of Wyoming) is a statewide organization of Registered Land Surveyors licensed to practice in the Equality State of Wyoming. PLSW is dedicated to improving the technical, legal, and business aspects of surveying in the State of Wyoming. PLSW is affiliated with the National Society of Professional Surveyors (NSPS) and the Western Federation of Professional Land Surveyors (WestFed).

PRESIDENT'S MESSAGE



Seasons greetings to you all:

As the fall season has come and gone, as well as Santa, I hope everyone had a Happy Holiday!

Since the last column, for those that were not able to attend the Fall Technical Session, we had a great turn out as usual. Mark Schenewerk provided us with New Aspects in OPUS, as well as, a couple of areas related to OPUS processing.

Also during Fall Tech., Lloyd Baker was presented with his Life Membership, and Mike Flaim and the Lines and Points staff with their award for Publication of the Year from NSPS.

I have since attended the Fall Governor's meeting in Gaithersburg, MD, in which the main topic was the reorganization of NSPS and ACSM. It was originally motioned to disband the organizations and create a new one, but due to some legal issues the organizations will now merge with NSPS taking the lead. As of now, the Geodesists (AAGS) are not joining but will be affiliates until they determine the outcome of the merger. They did hold their annual meetings along with us in Gaithersburg. GLIS has decided to not have any affiliation at this time and will handle their own affairs separately. The merger should be complete by January 1, 2012, with most noticing little change except for a slight reduction in dues for 2012. For those who are members please don't forget to pay your dues and the benefits will remain the same.

The next Governor's and Director's meetings for the new organization have yet to be determined. The Board of Directors decided not to have them in conjunction with ESRI in San Diego due to cost, but will continue to support ESRI's Survey Summit.

With that I look forward to seeing everyone in Sheridan for our Annual PLSW Meeting at the WES convention in February. Also remember to fill out your ballots and get them returned as soon as possible. We need your votes to make the By-law amendments and a non-vote is a "no" vote so please vote. I believe the changes that are proposed are minor but very beneficial to us as an organization.

I hope everyone has a safe and Happy New Year!

Respectfully,

Cotton D. Jones, President

Professional Land Surveyors of Wyoming

A N N O U N C E M E N T S / M I S C .

(Casper Star-Tribune; Tues., Nov. 22, 2011, Business page C3)

IN BRIEF

FROM STAFF & WIRE REPORTERS

GEOLOGICAL SURVEY OFFERS NEW MAPS

The Wyoming Geological Survey is offering for sale 10 new maps for areas of the state.

The maps provide geologic information to address water, aggregate and mineral resources, surficial processes and earthquake hazards, as well as a map on a potential new geothermal area for energy production in northwest Wyoming.

The project was accomplished with funding from the U.S. Geological Survey, which was matched by the state Legislature, according to a press release.

For more information, call 307-766-2286, ex. 224.

- The Wyoming Board of Registration is now offering Professional Land Surveyor candidates the opportunity to take the 2-hour State Specific Examination on a given day each month during the year.

- The Bureau of Land Management respectfully requests that readers of the Manual of Surveying Instructions (2009) report any errors found. Email with the details to blmsurveymanual@blm.gov. For information and to view postings of reported errata visit the BLM Manual website at: www.blmsurveymanual.org.

- There are educational resources available at the NGS Online Learning Center with Online Modules, Presentations with Audio, and the Upcoming and Past Classes at: www.ngs.noaa.gov/corbin/online_learning.shtml

- The NGS has announced that the CORS station WYSH has now been added to the national network. This station is in Sheridan, WY.

- The BLM has completed a project to scan approximately 25,000 pages of field notes that had been transcribed. These pages are from field notes of GLO surveys that are nearly illegible. Each page is posted on the Cadastral Survey website following the image of the original page.

(Wyoming Tribune Eagle; Thur., Nov. 10, 2011, page A3)

WYO. STATE LANDS OFFICE ROLLS OUT ONLINE MAPPING

CHEYENNE - Outdoorsmen will soon have a new place to go online to look up which state lands they may access for hunting and fishing, and which are off limits.

The Office of State Lands and Investments plans to roll out the new website within the next couple days and is seeking help from the public. State lands officials are encouraging people to report any inaccuracies they discover on the maps.

While they're at it, people should report any illegal junkyards or vehicle damage they discover on state land, Ryan Lance, director of the Office of State Lands and Investments, said Wednesday at an interagency meeting about the website.

The website is

<http://www.onanypc.com/StateLandAccess>

On Wednesday, it asked visitors for a user name and password, but when it's opened to the public, it will show roads, topography and the boundaries of state and federal lands in Wyoming.

The federal government granted to Wyoming two parcels of land, each measuring a square mile, for every 36-square mile township back when the state was founded. The state manages state trust land to raise money for public education.

Tentative WES Convention Schedule

8:45-10:00	LightSquared Update; Curt Sumner, ACSM
10:30-11:30	GNSS Satellite Constellation and FCC Narrowband Update; Bryan Baker, Frontier Precision
1:15-2:15	Governor of Wyoming Executive Order: Sage Grouse Core Areas. Understanding the Concept and Influence on Land Surveying and Engineering Decisions Related to Energy Development and Related Projects in Wyoming; Bob Budd, Executive Director, Wyoming Wildlife and Natural Resource Trust. Don Schramm, BLM-Retired
2:45-3:45	Sage Grouse Core Areas, Part II.

...STRIVE ON — THE
CONTROL OF NATURE
IS WON, NOT GIVEN...

From The Prexy Pasture Party Chief

By: MARK REHWALDT, PLS

As I am writing this, there is one week of classes left and then finals. Prexy's Pasture will have been surveyed one more time and it will be time for the Pasture to take a well deserved winter break.

While Prexy's Pasture will be taking a break, I will be working on several pieces of the Land Surveying Program.

The first piece of the program that needs to be updated is the tuition. I, along with the Outreach Credit Programs, the College of Engineering and Applied Science, the Civil and Architectural Engineering Department, and the University's Fee Committee will look at enrollments, course offerings, expenses, and come up with a tuition rate for the Land Surveying Program that will cover expenses and allow the program to operate in a sustainable manner. This will not be a painless process, but it must be done.

The Wyoming Board of Registration requires 30 semester hours of surveying course work to fulfill portions of the Fundamentals of Land Surveying (FLS) education requirements. In December, I will be meeting with the Board of Registration to begin updating the Land Surveying Certificate. The current Certificate requires 24 hours of surveying classes and completion of specific field exercises. The Board wishes to have the Certificate updated from the current 24 semester hours of surveying course work to 30 hours. After the required course work and electives are agreed upon with the Board, and

approved by the University, a student will have clear path for obtaining the required 30 hours and know that they will be accepted by the Board.

The Land Surveying Program Advisory Board had a preliminary meeting in November at the PLSW Fall Technical Session. The main order of business was to discuss proposed bylaws. Once the bylaws are formally approved by the College of Engineering and Applied Science, members will be appointed and the group will formally exist. The next meeting of the proposed Land Surveying Program Advisory Board will meet during February at the Wyoming Engineering Society (WES) Convention. The plan moving forward is for the advisory board to meet during the PLSW Fall Technical Session and the WES Convention when the surveyors normally congregate.

The last winter project will be to prepare a draft copy of the Land Surveying Program's Strategic Plan. This plan will include the program's short term, intermediate, and long term goals, the principles for the development of future classes, financial sustainability, and program sustainability. This plan will be a living document which will need to be revisited and updated on a regular basis.

When you read this, Prexy's Pasture will be tucked in for a winter's nap in a snowy Laramie winter wonderland. Please enjoy the Christmas Holiday and drive safely.

(Reprinted with permission by: Eos, Transactions, American Geophysical Union)

Proposed Wireless System Could Interfere With Key GPS Receivers, U.S. Officials Testify

By: RANDY SHOWSTACK, STAFF WRITER, AGU

A proposed \$14 billion network that would increase broadband wireless access poses significant interference problems for existing GPS signals used for some critical U.S. federal science and public safety systems, said officials from NASA, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS) and other experts at an 8 September hearing of the House of Representatives' Committee on Science, Space, and Technology.

The officials cautioned that a terrestrial wireless network plan proposed by LightSquared LLC - which includes using frequencies adjacent to the GPS band - needs additional testing before it is given a green light by the Federal Communications Commission (FCC). In addition, the officials said that although they hope there is a win-win solution to increasing broadband wireless options without harming GPS signals, a recently revised plan that LightSquared indicates would reduce interference to a large majority of GPS receivers still would present problems for a number of high-precision GPS systems.

Jeffrey Carlisle, executive vice president for regulatory affairs and public policy at LightSquared, testified that his company believes that the proposed network and GPS can coexist. He said LightSquared has proposed a number of mitigation measures - including agreeing to a "standstill" in terrestrial use of the upper 10 megahertz of its frequencies that are immediately adjacent to the GPS band, a reduction in the company's authorized power, and working with federal agencies toward a solution - to lessen the interference to GPS.

In addition, Carlisle objected to having to deal with a moving target in terms of meeting GPS user concerns. He testified that LightSquared "is doing everything it can to work with GPS to address issues raised only a few months ago" and that the GPS industry had previously known about the scope of the company's network and about its planned power levels and had not raised objections.

In an interview with Eos, Carlisle said his company will continue to work with federal agencies, including those testifying at the hearing, along with the FCC and others "to try to figure out, Okay, what's the solution here? Can we implement it and can we move forward and deploy our network?" He said there "absolutely" needs to be a win-win situation. "There's got to be. The stakes are too high," he said.

At the hearing, members of Congress indicated that they would like to move forward with the LightSquared proposal if it does not cause interference with key GPS signals. "We have to find a way to open up more spectrum for broadband but not at the expense of GPS," said committee chairman Rep. Ralph Hall (R-Tex). Committee ranking member Rep. Eddie Bernice Johnson (D-Tex) said that if there is no way for LightSquared to move forward without damaging GPS, the FCC should not approve the proposal. However, she added that she hopes GPS can coexist side by side with the LightSquared network. Rep. Donna Edwards (D-Md.) suggested the federal government has some responsibility to help find a way to allow LightSquared to move forward while protecting vital GPS signals.

Mary Glackin, NOAA deputy undersecretary for operations, said in testimony that the original spectrum plan proposed by LightSquared would have seriously degraded or caused a total loss for a wide range of NOAA operational systems, including putting the agency's entire fleet of meteorological satellites at risk. She added that the company's revised spectrum plan "still raises issues for high-precision GPS receivers that feature a wideband design."

At least five major NOAA systems or functions require wideband GPS equipment, Glackin said. These, include the Constellation Observing System for Meteorology; Ionosphere and Climate; the monitoring of sea level trends; the Ground-Based GPS Meteorology project; the issuance of the U.S. Total Electron Content product used for informing surveyors and others about space weather conditions affecting GPS accuracy; and the maintenance of the National Spatial Reference System. She said that a radio filtering technique suggested by LightSquared could prevent a receiver from detecting a GPS signal.

Victor Sparrow, director of the spectrum policy and planning division within NASA's Human Exploration and Operations Mission Directorate, testified that NASA relies on GPS for navigation services and for monitoring and improving the understanding of Earth science, including climate change, earthquakes, and volcanic activity. He said none of the identified mitigation options to prevent disruption of GPS "have yet been demonstrated to be effective in mitigating potential interference to GPS."

Although limited testing was conducted by a technical working group on the susceptibility of some GPS devices to the use of only the lower 10-megahertz LightSquared channel, which is farther from GPS signals, "limitations - such as filters that have yet to be designed or are theoretical or speculative in nature - prevented adequate testing of this mitigation approach," he said. "NASA believes it would be premature to allow the use of only the lower 10-megahertz channel as a solution until testing has been completed and it is established that there is no negative impact on GPS users."

(Continued on Page 16)

Cmdr. Paul Scherbel, Big Piney

By: MARGARET MATRAY

STAR-TRIBUNE STAFF WRITER, trib.com

Everywhere the fleet tug went, it towed.

Its job was to haul destroyers, and when a ship was in trouble, the tug was there to help rescue.

Paul Scherbel was in charge.

He enlisted in the Navy on Jan.15, 1942.

"Had to go somewhere," he said.

His pay was \$21 a month.

In July, he was sent to Columbia University to be a midshipman, which involved classroom work and a lot of marching.

An APC-109 auxiliary personnel ship was his first assignment, and the ship was to haul Marines to the beach.

But Scherbel caught pneumonia.

When he got out of the hospital in San Francisco six weeks later, he joined the fleet tug USS Pakana ATF-108.

First the fleet tug trailed up and down the West Coast for training. At Pearl Harbor, it towed targets for other ships and aircraft to practice.

The Pakana carried about 100 men and was about the size of a destroyer, and in the South Pacific it towed concrete barges to be used as commissaries and store rooms by MacArthur's Army at Eniwetok.

"We made two knots," Scherbel said, "which is about going across the plains 20 miles a day."

A small handful of six to eight men worked for the communications office, and Scherbel was the officer. He ran the radio room and coded and decoded messages. Scherbel never got any interesting ones, he said, just the usual where to go, what for and when.

Before long, the captain promoted Scherbel to navigator and second officer. The four quartermasters helped Scherbel manage the navigation, but "I was basically in charge of the ship," he said.

At Saipan, the Pakana tried to pull LCMs off the beach.

"They got them on but couldn't get them off," Scherbel said.

Towing was fairly simple: hook the vessel that needed moving and give it a little juice.

"It's just like towing a car," Scherbel said.

Scherbel remembers towing large craft through turbulent weather. The Pakana got stuck in a typhoon for several days while towing an ARD auxiliary repair dry dock. The tow line broke, and the tug nearly lost the ARD.

"We had to circle that great big ship, great big thing, all night," Scherbel said.

The Pakana was sent in as part of the Okinawa campaign, the landing beginning April 1, 1945. On the way in, the tug towed a submarine chaser into battle.

"We set out there and watched the landing," Scherbel said. "Beautiful, no problems."

Five days later, the Pakana was dispatched on a rescue mission. Japanese kamikazes had attacked the destroyer USS Bush.

On the way over, as Scherbel remembers, a kamikaze flew right over the Pakana. No one saw it coming.

"I could have thrown a rock where I was," he said.

When the fleet tug arrived, the Bush had sunk. The Pakana crew spent the night sending out a two small boats, shining an arc light, searching for survivors.

The destroyer USS Colhoun also responded to the Bush's call for help, but it was attacked and beyond salvation, Scherbel said. U.S. forces finished it off and sunk it.

Over the course of the war, some Pakana crew members were injured by shrapnel, but "we never lost a man," Scherbel said.

The fleet tug participated in other rescue missions and also towed wreckage as part of salvage operations. One day they came across an LCM that had been attacked, the only survivors the captain and the dog mascot. Pakana took them aboard and gave the LCM a tow to harbor.

He can recall one instance when a kamikaze flew close, and one of the Pakana sailors single-handedly shot it down, saving the ship.

"That was all my nightmares," Scherbel said.

Scherbel got off the Pakana at Guam and was on leave in the U.S. when the war ended. He helped navigate a destroyer, one that had served the war on the West Coast, through the Panama Canal and up to Norfolk, Va. Scherbel was released from active duty in 1946 and then joined the Navy Reserve, where he made rank as commander.

Before the war, Scherbel attended college to become a forester. He met his wife then, coming out of a bank.

"You wouldn't believe this," he said.



Scherbel walked out of the bank, looked at the statue of Brigham Young outside, "and I said, 'I need a girl.' I didn't have one yet, and it wasn't right," he said.

He looked at the statue's hand, and it was pointing right at a bus.

"This girl was getting on the bus. So I run down and got on."

One thing led to another, and they married. The Scherbels had four children, 32 grandchildren and 35 great-grandchildren.

Scherbel worked for the Soil Conservation Service and was the first surveyor to serve on the Board of Registration of Professional Engineers and Professional Land Surveyors. The Conservation Service had asked him where he wanted to work after war, and he said he wanted to be as close to Salt Lake City as possible. It's where he grew up.

They placed him in Big Piney.

He told his wife they'd be there for a few years.

"Still here," he said. Since 1946.

At 93, Scherbel still works, and he considers himself still in the Reserve. No one ever bothered to tell him he was released, Scherbel said.

He could get a dispatch today, "and I'll be on my way."

Biography:

Age: 93

Unit: USS Pakana (ATF-108), Navy

War fronts: Pacific Theatre, including the Marshall Islands, Guam, Saipan, Ulithi, Okinawa and Kyushu, 1942-1946

His words: On joining the Navy Reserve: "It turned out to be a good choice."

On the Web: Watch more of Scherbel's story and see profiles of other veterans at www.trib.com/honor

About "They Served with Honor"

Some have said that 1,000 World War II veterans die each day in United States. History dies with each one.

"They Served With Honor" is a special project by the Star-Tribune to collect stories from Wyoming World War II veterans. We will feature one story each week through Veterans Day 2011.



SCHERBEL ON SURVEYING

A compilation of parts of the
WYOMING STATUTES

And other items of interest to

PROFESSIONAL LAND SURVEYORS

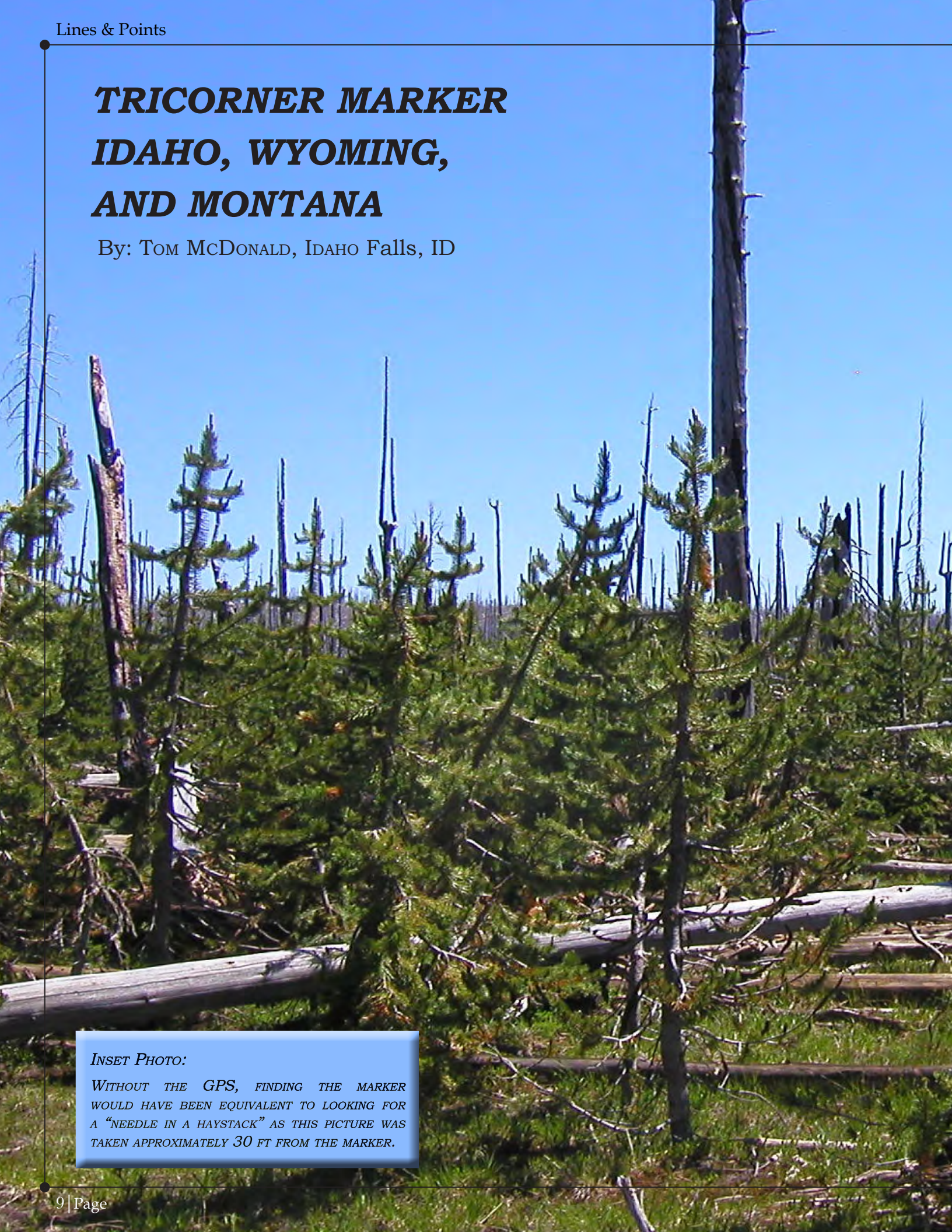
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TRICORNER MARKER IDAHO, WYOMING, AND MONTANA

By: TOM McDONALD, IDAHO Falls, ID



INSET PHOTO:

WITHOUT THE GPS, FINDING THE MARKER WOULD HAVE BEEN EQUIVALENT TO LOOKING FOR A "NEEDLE IN A HAYSTACK" AS THIS PICTURE WAS TAKEN APPROXIMATELY 30 FT FROM THE MARKER.

My wife Joan and I thought it would be fun to search for the tricorn marker for Idaho, Wyoming, and Montana. It is located in a remote area of Yellowstone Park near the Park's west boundary and several miles south and a couple of miles east of West Yellowstone, Montana.

We found a set of coordinates on the internet that were based on a survey by Wyoming surveyor Paul Scherbel when he confirmed the marker in the mid-1990s. The route we chose included a six mile hike along a closed dirt road (FR-066, known as the Black Canyon Loop Rd.), which begins roughly 11 miles east of Mack's Inn, Idaho, off of Fish Creek Road (FR-082) near Latham Spring. The route then required about three miles of bushwacking up the dry Thirsty Creek drainage to a plateau littered with downed trees, making hiking difficult.

Using our GPS and Scherbel's coordinates, we found the marker (a pipe, cap, and rock cairn). All of the signed "Bearing Trees" were down, and the marker could not be seen from more than 10 feet away, due to all the downed timber. Other maps showed different coordinates for the tricorn; some of them were off by more than a quarter mile from where the marker was located.

We made the 18-mile round trip on July 29, 2011. It was a hot day, and the only water we found was in a lily pad-covered pond a few hundred yards west of the marker, and in a stagnant pool from a culvert under the road at Thirsty Creek. In the dense forest, the mosquitoes were voracious that day; nevertheless, the scenery was superb. The coordinates we used were: N44°28'32.27" and W111°03'08.62", NAD 83.



TOP VIEW OF THE MARKER.

WYOMING TERRITORY GLO CONTRACT NO. 1

By: JACK STUDLEY, PLS, CHEYENNE CITY SURVEYOR

With the development of the Transcontinental Railroad came the need to provide for the survey and disposition of Federal lands to the western pioneers. In the spring of 1870 Silas Reed, the first Surveyor General for the new Wyoming Territory arrived in Cheyenne to open the General Land Office (GLO, today being the Bureau of Land Management or BLM). With this opening came the request for surveys of the public lands in the immediate area of the newly developing Cheyenne City, in order to resolve the conflicting ownership claims of the Cheyenne City and Union Pacific Railroad.

So the first objective was to have the Federal lands surveyed into the required townships for disposal. With this in mind, CONTRACT AND BOND No.1 was prepared and issued to Edwin James, U.S. Deputy Surveyor, on June 13, 1870. This contract was to:

"Survey & establish the following Guide Meridian, Standard Parallel & Township exterior lines within the Territory of Wyoming, to wit. To extend the 8th Guide Meridian, west of the 6th 1st P.M., Commencing at the intersection therewith of the 3rd Standard Parallel North, and from thence due North Forty Eight miles on the true Meridian at intervals of 24 miles to their intersection with the east boundary of Wyoming Territory (say 28 to 30 miles each). Also to survey the said 4th & 5th Standard Parallels from their proper intersection with the 8th Guide Meridian, at intervals of 24 miles, extending the same West on a true line forty eight miles to the 9th Guide Meridian (when established).; Also to survey the exterior lines of Townships No. 13, 14, 15 & 16 North, in Ranges No. 65, 66 & 67 West of the 6th Principal Meridian."

The Special Instructions accompanying this CONTRACT AND BOND No.1 also state why there is a limit to the northward extension of the surveys, as follows:

"It is useless to survey further north at present for the country on the Lower Chug & Laramie river valleys is infested by "bushwacking" squads of Sioux Indians, and it would require a large military protection to insure safety to my Surveying Corps. My Deputies will not be safe, even ten miles from Cheyenne without some protection, and since the late visit of Red Cloud to Washington appears to have resulted unsatisfactorily to him, I fear our prairies will be soon alive with roving, hostile bands of Sioux Indians."

Now that is the kind of written encouragement I would want to accompany each of my contracts or assignments.

Contract and Bond No. 1

SURVEYOR GENERAL'S OFFICE,

Cheyenne, Wyoming June 13, 1870

Silas Reed

Surveyor General.

Edwin James

U. S. Deputy Surveyor.

\$4500.00

Done

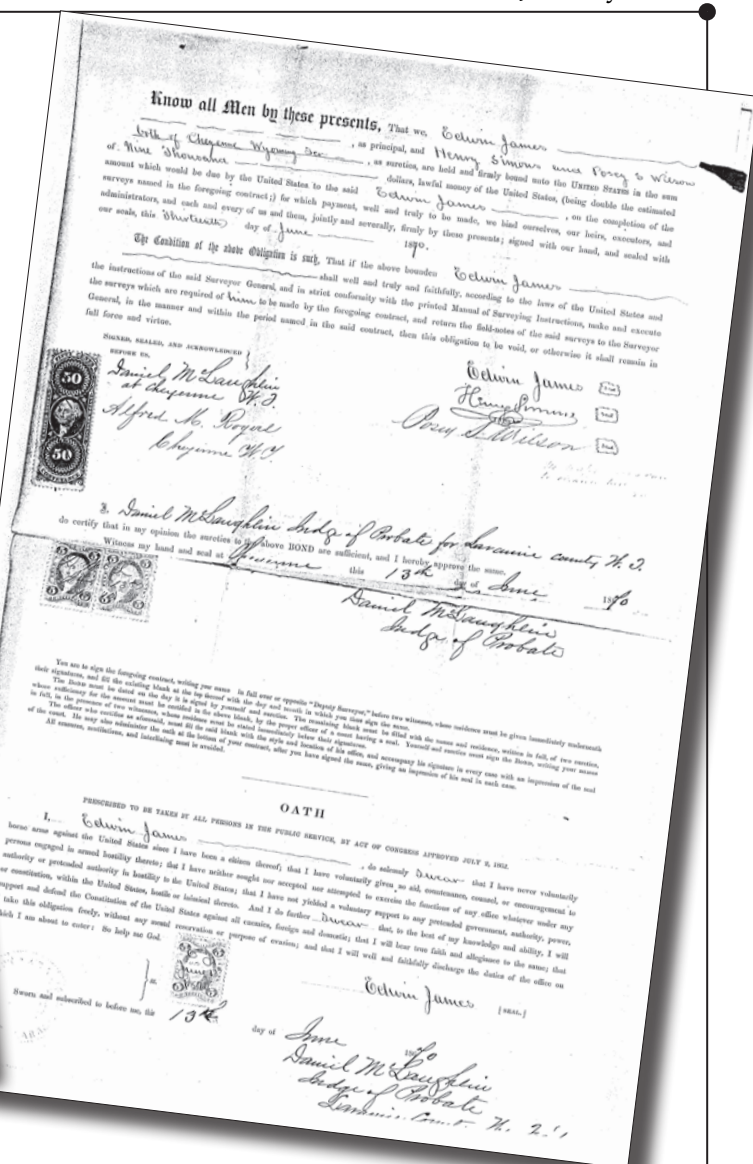
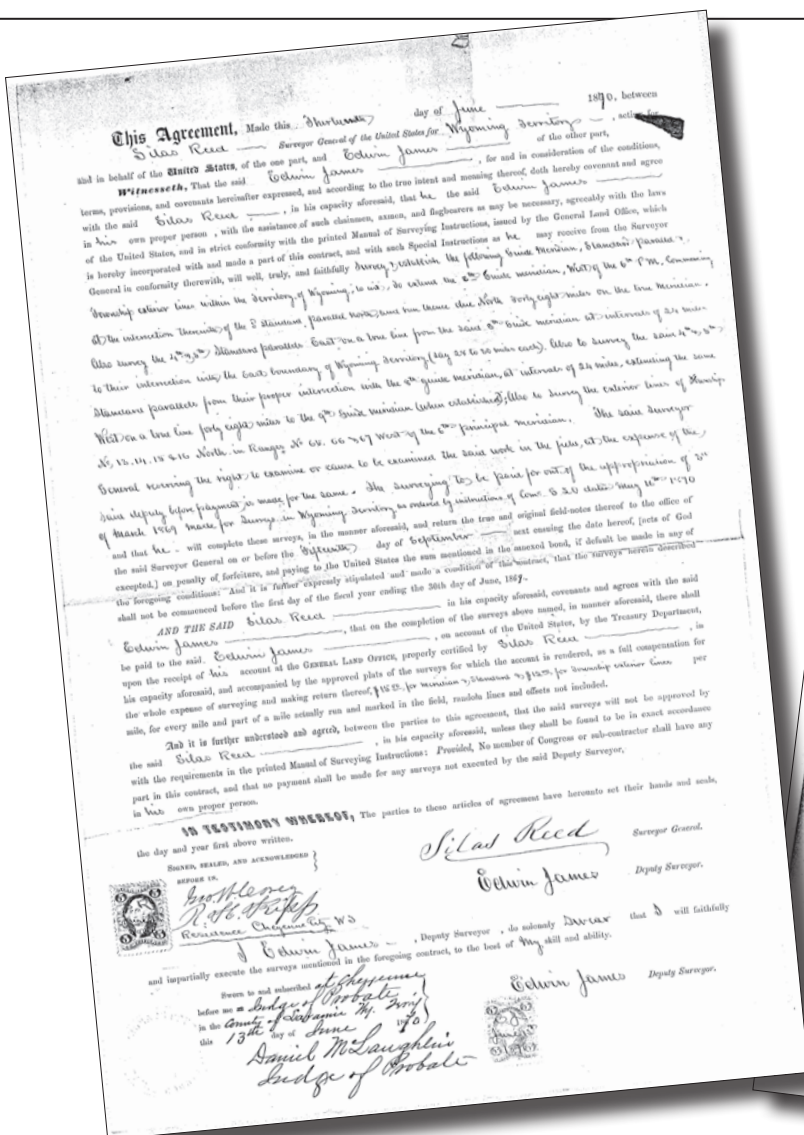
Approved by Edwin James

June 15, 1870

See letter to S.G. June 18, 1870

Recorded in Contract Book

No. 2, page 228



Today, most of the GLO survey corner monuments within the corporate limits of the City of Cheyenne are not known to be the original stone markers as set in 1870. So, in performing the research for a survey involving the North Quarter Corner of Section 5, Township 13 North, Range 66 West of the 6th P.M., I was intrigued to find old survey notes calling for an original stone. This corner being on one of the exterior township boundaries under CONTRACT AND BOND No.1, I was anxious to see if this old stone monument was in fact still in place. After all, it would be one of the oldest set survey monuments in the State of Wyoming if it were still found to be in place.

The first record for this stone monument was found in the Cheyenne City Engineer's Field Book (CEFB) No. 364, page 68. This reference provided dimensional ties to a street survey monument at the intersection of 9th Street and Bradley Ave., which exist and is available today. It also called for "Brass Cap in Conc., Stone underneath, Mkd. 1/4"

The second record for this stone monument was found in the CEFB No. 415, page 41, dated September 4, 1941.

This reference also provided dimensional ties to the same street survey monument at the intersection of 9th Street and Bradley Ave., along with other ties. And then specifically describes how a concrete cap with pipe and brass cap were set directly over the original stone.

It was typical of the City Engineer's Office during this time period to set survey control monuments with a 3/4" dia. iron pipe, topped with a 1 1/4" dia. water line brass cap, having a concrete collar around the pipe. And in this case, both the quarter corner monument and street monument were of this type construction.

Having used the dimensional ties to the street intersection monument, the quarter corner position was found to be in the backyard of 1006 East 9th Street (E.44' of Lot 6, Block 542, Original City of Cheyenne). So I contacted the land owner to get permission to enter his backyard and try to recover the corner position. The owners were very happy to cooperate in this recovery effort, and eventually very happy to give permission for a rehabilitation effort.

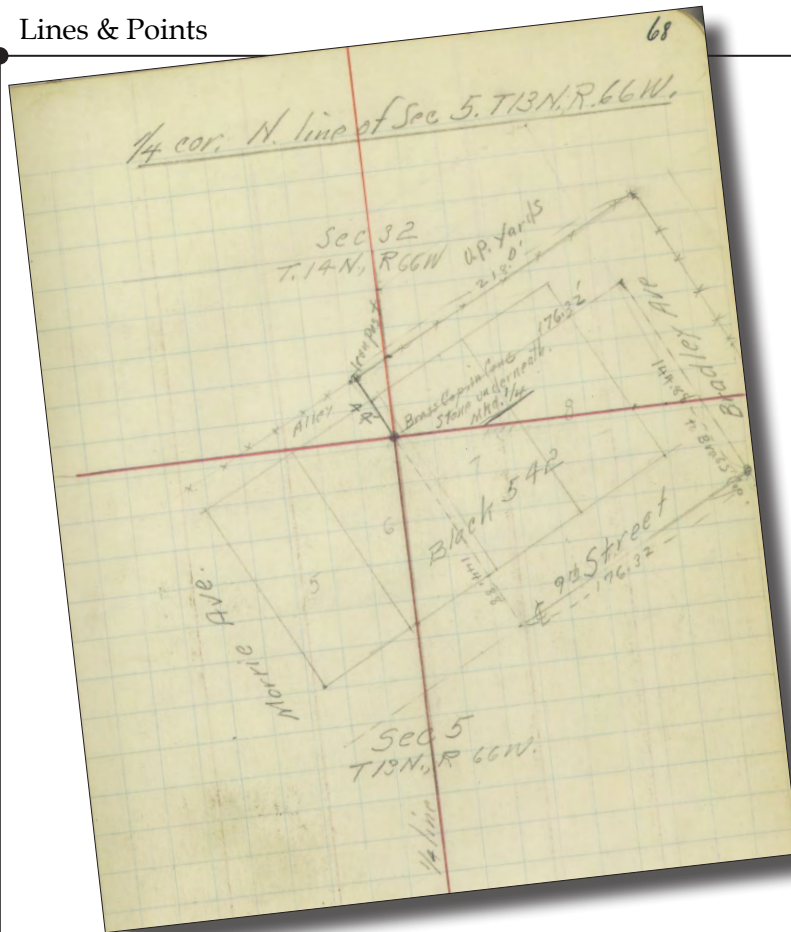
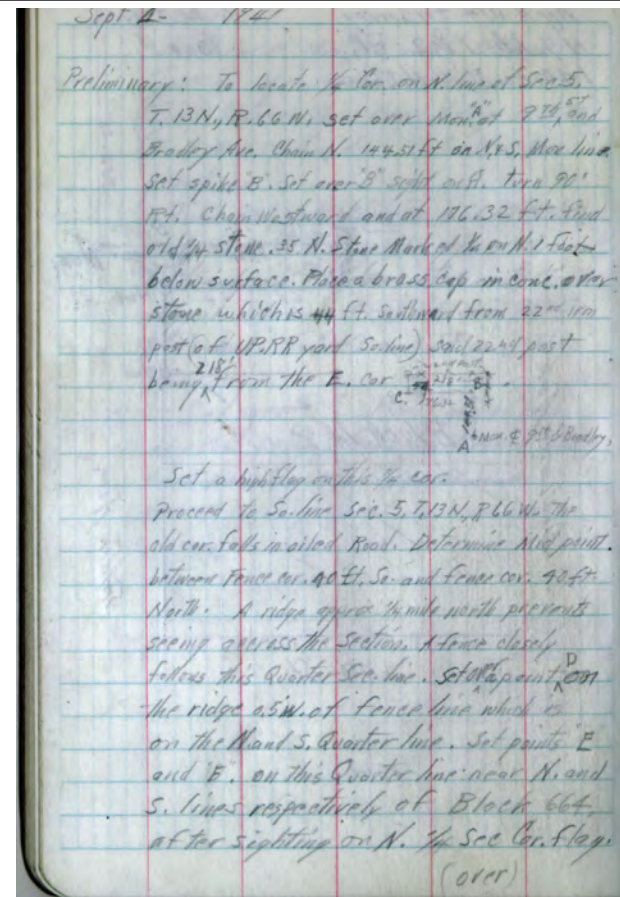


Figure 1 - CEFB Bk. 364, Pg. 68 - not dated.

I then proceeded into the backyard with a calculated GPS position and set a stake, then searched this point with a metal locator and immediately found a very strong signal. Only 3 inches below the surface I located the iron pipe and brass cap described in the CEFBs. Unfortunately the iron pipe was very rusted and in my recovery efforts the brass cap broke loose from the pipe.



Figure 3 - Concrete cap with pipe and broken off water line brass cap.



Note in the Figure 3 photograph that a 1 1/2" square top bolt was also found alongside and 0.38' directly north of the pipe and brass cap found in the concrete cap. I found no references to this item in any survey records to identify who placed it, or what it may possibly represent. Finding no evidence of it representing anything of record it was then removed from the site during rehabilitation efforts to eliminate any possible confusion with the quarter corner.



Figure 4 - Original quarter corner stone found 14" below ground surface, with chiseled markings.

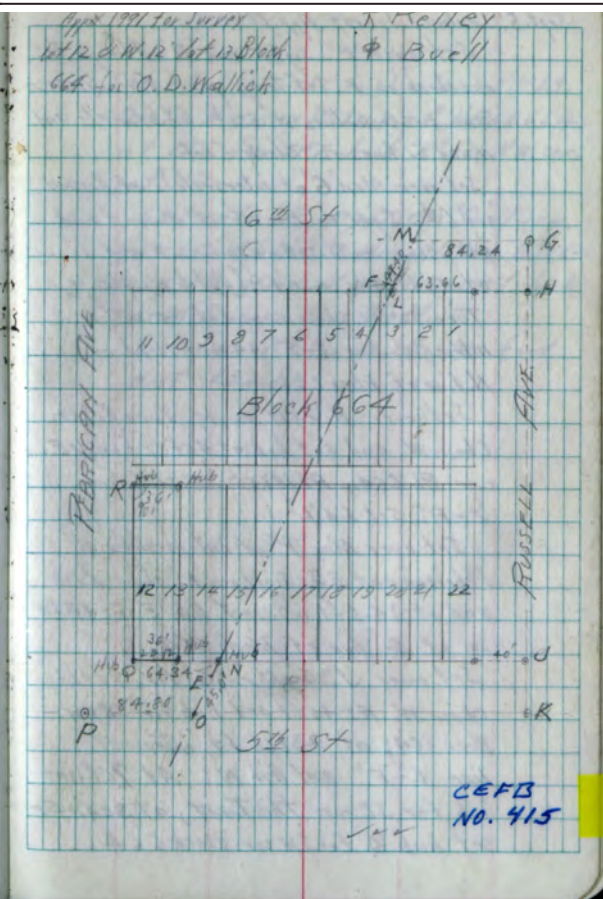


Figure 2 - CEFB Bk.415, Pg.41, dated Sept. 4, 1941.

I then proceeded to dig out along the northerly face of the monument to see if the original GLO set stone was underneath as recorded. The GLO FIELD NOTES, TP. EXTERIOR, VOL.2 - 1870, page 32/23, called for a 16 x 7 x 6 granite boulder. And lo and behold, 14" below the surface I found the original quarter corner stone, still well set and in place with very clear chiseled markings on the north face.

The iron pipe with the 1 1/4" water line brass cap was in fact set directly over the original stone. This also eliminated the 1 1/2" square top bolt as a possible representation of the 1/4 Corner.

I then backfilled the stone and set bricks around the concrete cap for the placement of a cast iron monument box. A 3" No. 5 rebar with 2 1/2" dia. Aluminum Cap, replacing the water line brass cap called for in the CEFBs, was set with epoxy inside the remnants of the 3/4" rusted iron pipe in the top of the concrete cap.

Reference points were set in the alley, on the other side of the shed shown in the photo, and a Wyoming Corner Recordation prepared and filed in the Laramie County Clerk's Office. So this corner position is now



Figure 5 - Reset Aluminum Cap in cast iron box with water line brass cap lying alongside.

recovered, rehabilitated and made accessible for future use and reference.

The owner of this lot is also a teacher at McCormick Junior High School, and has requested that I prepare a presentation before her Social Study classes sometime in the near future. Perhaps a good opportunity to encourage land surveying as a possible career choice.



Figure 6 - Cast iron box at ground level.

Quality Control

By: HERBERT W. STOUGHTON, Ph.D., P.E., P.L.S., C.P.

GEODETIC ENGINEER

The buzz words are quality control. They are one of the set of terms (like TQM - total quality management and "QA" - quality assurance) business and government use to indicate a high level of productivity, efficient management, and economic productivity to produce a product or outcome. MBA academic programs dedicate at least one course to the subject.

One of the prime factors is to develop or have established several levels of command. These command levels provide the forum for the ability to have work being preformed to be checked and edited by one or more independent individuals. Many organizations believe that the checking of data input/reduction and editing the final work product is a minimally necessary activity that elevates the client's bill. However, careful study of liability cases, particularly related to construction matters, indicate that many of the problems cited in the litigation were the result of not carefully addressing the preparation and execution of the surveys. In one instance, a project surveyor noticed a discrepancy between an architect's paper and electronic plans concerning the layout of a building. Instead of contacting the architect and informing them of the discrepancy between the paper and the electronic version of the plans, he selected one submission. It resulted in a location of the foundation not satisfying the regulatory minimum setbacks. Oops!

The second factor is failure to adhere to the minimum quality level of service stipulated in the contract or failing to define an agreeable level of quality of the provided service. In many instances, the client is not knowledgeable as to the level of service required to have a quality product at a reasonable fee. Then it is the responsibility of the professional to indicate the level of service required and the fee thereby associated. If there is more than one alternative for the requested service, then the economically reasonable approaches should be identified and presented for the client's selection. Whatever work product is required, the professional should have a documented set of instructions for making the observations

and ensuring that the resulting data statistically satisfies the minimum constraints imposed for the project. "Check lists" are a viable approach of ensuring that the desired work product provided is adequate.

The third factor is to have a definite office administrative system. This is sometimes referred to as the "chain of command", which is a simplistic approach. The real problem is establishing these lines of communication (and authority) from the front office to various offices, departments, and individuals. Identify the personnel at each level in the organization with their level of authority for communicating to individuals and organizations outside the office and have the authority to "speak for the chief executive officer". Change orders on a construction project usually are not the purview of a survey technician, but only within the authority of the design engineer/architect or their identified representative (sometimes called the contracting officer representative). Also, clear lines of communication and authority minimize issuance of conflicting instructions and in more than one instance the "blind siding" of senior level staff and managers. Liability insurance companies look intently at this problem in order to assess the cause of the problem and minimize damage payments.

The fourth factor is payment for provided services. This problem is serious and results from the complex nature of the project economics. Until the last three decades, the economic factors which provide increasing item prices have followed classical economic philosophy. Historically, it was relatively simple to quote the fee for construction services to be x percent of the contract bid quotation. This is no longer true as the construction contract bids have multi-faceted payment schedules based upon labor, management, and materials costs. Also, the relatively new approach of "design-build", while innovative, have little historical data to provide surveyors with viable data for estimates of surveying services.

The fifth factor is documentation of support services required for providing your contracted services. This problem results from individuals failing to document. Suppose that you have a contract to provide a service requiring a particular piece of survey instrumentation, and this instrument must be leased. Then, a contract must

be made with the firm providing the instrument. Included in the terms of this contract should be the process of notification when the instrument is required (including the lead time of notification, the calibration of the instrument, etc.), the rental fee, method of delivery, training of personnel, and the penalties for failure to comply. In order to justify damages, written records are required. A significant number of cases of litigation in this arena have been rejected by the courts, because the individual seeking damages has failed to provide adequate documentation.

The sixth factor is to keep records of all meetings with clients and others about the project. The simplest form is the "Memorandum for Record". This document lists the attendees, states the matters discussed, and the conclusions reached (if any). After the document is drafted, copies should be transmitted to all attending parties with the request that each recipient verify the validity of its contents. Non responses mean acceptance. These documents and receipts are important for future litigation.

The final factor is to read your contract and provide the services you agreed to provide. Many surveyors rely on the standard AIA and other professional services contracts for the project. In many instances, these contracts do not address the technical and professional issues. However, the surveyor should carefully compare the terms of the "standard contract" with the technical requirements of the specific project to ensure that an excessive burden of liability is not saddled upon the surveyor.

The surveyor must realize that there are two components which can be argued as to duties, responsibilities, and services provided. The first component is to address the perceived duties as outlined in the contracts and the documents supporting compliance. The second component is only applied when the first are ambiguous and conflicting. Then, outside experts are called in to state a level of acceptable performance based upon the current level of compliance by the practicing professionals in the area of the project. This is sometimes called "standard of care". Liability insurance companies rely on the latter principle in providing payment and future insurability of the professional.

(Continued from Page 6)

David Applegate, associate director for natural hazards with the USGS, noted that the Department of the Interior (of which USGS is part) "has significant concerns" about the LightSquared proposal. Applegate stressed that GPS technology is an essential tool for many USGS mission responsibilities including stream gages and water quality monitors, the Advanced National Seismic System, and volcano observatory monitoring.

He told Eos that the agency's big concern is that "there has just not been adequate testing" to know whether LightSquared's proposed solution to use a lower band frequency will solve the problem. "In fact, the indications at this point are that [the company's proposal is] not going to be adequate," he said. Applegate added that he, too, would like to see if a win-win solution can be found, stating that the agency would benefit from having national broadband Internet coverage for GPS stations. "We just can't have it at the expense of the high-precision capabilities that we need to have. Whether it's possible to have a win-win in that portion of the spectrum, I don't know."

Also weighing in at the hearing was Anthony Russo, director of the National Coordination Office for Space-Based Positioning, Navigation, and Timing. The office oversees U.S. agency interest in GPS services and was established to help with implementation of the Obama administration's National Space Policy objectives, which call for "protection of radio navigation spectrum from disruption and interference." The administration issued that policy on 28 June 2010, the same day it issued a policy statement regarding expanding the spectrum for wireless broadband use while ensuring no loss of critical existing and planned government capabilities.

Russo testified that the National Space-Based Positioning, Navigation and Timing Systems Engineering Forum (NPEF) found that "LightSquared's proposed system would create harmful interference throughout all three phases of its planned deployment." Further, he said, NPEF "could not identify any feasible option that would mitigate harmful interference for all or even most GPS users and still allow LightSquared to meet their system requirements."

After the hearing, Russo elaborated to Eos that federal experts disagree on whether there is a possible solution to move forward with the LightSquared network without harming vital GPS receivers. He said it is not clear "whether it's a physics issue, that it's just too tough to do, or whether it's an engineering issue, that if you put enough money into it, spend enough time, that you could figure out a way" to resolve the problem.

(*Eos*, Transactions, American Geophysical Union; V. 92, No. 38, Page 315; 20 September 2011)

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