



The Bullsheet

The Official News Bulletin of
The Texas DX Society
An ARRL Affiliated Club

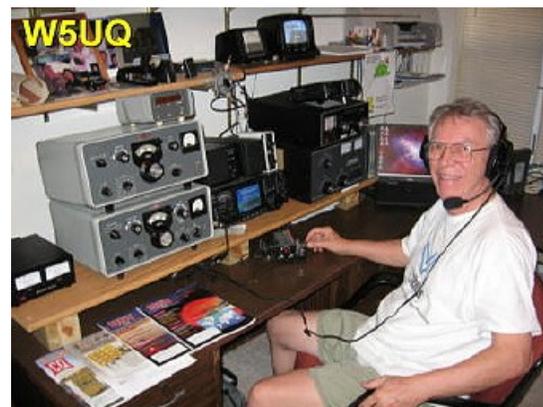
The Texas DX Society, Houston TX K5DX@tdxs.net April 2010

From Crystal Sets to Klystrons

Thursday, April 8, 7:00 PM

TDXS Meeting Night: Tracy Gee Center, 3599 Westcenter Dr, Houston. Pre-meeting dinner get-together starts around 5:30/6PM at Pappas BBQ on S. Gessner & Westheimer.

Program by Bob W5UQ entitled "From Crystal Sets to Klystrons" which recounts a career in broadcast engineering.



Editor's Note de Doug WB5TKI

Spring has sprung, the grass has riz ...and it's refreshing to hear Europe coming in on the mobile during the evening commute. Just worked HI3K on 10m with my ground-mounted vertical (SteppIR) so I guess things are looking up for my favorite band.

Well, I'm gonna do it. After 23 years I'm going to return to Dayton for the Hamvention. Not that anything bad hap-

pened the last time. It was with my father W9LCQ (SK). We had a great time, but I never seemed to be able to find the time to go back. Now I've told the family and the employer that I have to keep my priorities straight, so I'll be among the teeming masses in May. Hope to see you there. I'll be the one with the handie talkie.

Before I forget, please congratulate Bob Mennell

WB5IUU for achieving 5BDXCC. Bob has DXCC Honor Roll status with 331/337 Mixed and 335 Phone.

Also report, Allen N5XZ now has 8BDXCC with Honor Roll status 336/349 Mixed, 306/310 CW, and 330/342 Phone.

Please report your latest updates to W9DX so our DXCC webpage is current.

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The Prez Sez de Paul W5PF

This month three new TDXS members were elected. That makes a total 4 new members this year. Last month we welcomed Steve Niles N5EN. Steve was sponsored by Keith NM5G. Steve has 323 countries confirmed and is a DX chaser. Steve is also very interested in the latest technology and has done a lot of work with software defined radios. He occasionally participates in contests and enjoys the TQP. Welcome Steve, maybe we can talk you into giving a program on SDRs.

Bob Hardie W5UQ is one of the new members elected this month. Bob is a long time DXer and has recently retired from a career in broadcast engineering. Bob has worked 297 countries but has not chased the QSL cards. He did well with the recent YI9PSE expedition work 5 band mode slots. Bob repairs boat anchors, especially Collins equipment. He made a presentation on broadcast engineering at the April meeting. Welcome Bob, we look forward to seeing you at the ham-fests and Field Day.

Also elected this month was Stan Polak K5STZ. Stan is currently working on DXCC and is interested in contesting. Last Field Day he was very active on the GOTA station. He also assisted Jim NN5O with the satellite station. Stan is interested in learning about many facets of Amateur Radio

and is an eager participant. Welcome Stan.

The third new member this month is Tom Campbell KD5TIO. Tom has recently become more active and is very interested in chasing DX. His shack is located on his sail boat and has recently been rebuilt. He and his sponsor Cal WF5W have been doing a lot of work with maritime mobile antennas and have been enjoying the DX from Galveston Bay. Tom really is a rocket scientist and gave a TDXS meeting presentation on a satellite being developed by the University of Texas last year. Welcome Tom.

Field Day 2010 is fast approaching. Mike K5UO has stepped up as our Field Day Coordinator. Several folks have volunteered to help him but there is still plenty of work to be done. Mike will be looking for help with set up and tear down and is currently working on the antenna farm. The station captains will be looking for operators. With everyone's participation this can be a successful event. It is always a great social occasion, let's make it a memorable operating event also. Watch the reflector for further details and lend a hand when the Field Day team asks for participants.

See you all in May

Paul W5PF

From the Bullsheet Archives by Steve W9DX

Ten years ago this month

April 2000: TDXS President Earl Morse N5TU (now N8SS) was lamenting the light showing at the Compaq tour last month, and thought "city folks" from within the 610 Loop must think Tomball is a scene out of "Deliverance". TDXS was planning to raffle a Yaesu FT-100D at the Dallas Ham-Com to raise money for needed DX Cluster software. DX Chairman Buzz Jehle N5UR reported that Bhutan's new telecommunications act had authorized amateur radio, and many DX'ers eagerly awaited the activation of the #2 most needed entity. N5KO had just completed the Chesterfield Island DXpedition plus East Timor. BQ9P Pratas Island was just about to hit the airwaves at press time. Repeater and Cluster Chairman Jim Lane N5DC explained the need for new cluster software that was Windows compatible and capable of running on Windows 98! We were having intermod problems at the 2m repeater site and had to activate tone access. We needed to service the 440 antenna but building management was being difficult.

Twenty years ago this month

April 1990: President Ken KE5IV (now KZ5KG) announced that the April meeting would be held on Good Friday evening at the recreation center at N5RP's subdivision. The program was a video by K6DUE on "The World of Amateur Radio". The "Greatest Distance Traveled"

award for CQ WPX - SSB went to Joe Staples W5ASP who joined Andy GM0ECO in Kenrosshire, Scotland for the event. DX Chairman Bob AK5B (now N5ET) reported on his good time south of the border with K5LZO, WB5N, and KD5SP for their MS/AB entry as XE2FU in ARRL DX-Phone with 6.8M claimed points (6893/327). Bill Schrader K2TNO gave the results of his latest TDXS receiver clinic results, with K5AAD's new Kenwood TS-950 coming out on top with an impressive -140 dBm noise floor and two-tone dynamic range of 115 dB.

Bill remarked that you might have to sell your house to buy one. Madison Electronics was targeting the end of May to transition to a mail order only business from the Zavalla location.

Thirty years ago this month

April 1980: TDXS Editor Tom Taormina K5RC announced the April meeting and buffet dinner would be held at the Red Carpet Inn on the Katy Freeway. KA5CHW was to speak about contesting. The club was reviewing a member survey to determine what direction TDXS should take in the future to reflect member interests. TDXS's 2m net control operator Lee Norman W5DOZ was putting together a club DXCC "need list". Lee said that TDXS's top 10 most needed countries were: VU/Laccadives, XU, BY, VS9K, VK0/Heard, VU/Andaman, ZA, 4W, and 7O. The 1980 Convention plans were shaping up

for the Marriott-Brookhollow location (rooms for \$30/night), with Orville K5VWW to handle the all day DX and Contesting forums.

2010 TDXS QSO Party: Quite a few expatriate members have come out of the woodwork in response to my latest reflector survey with all but one enthusiastically in support of participating in a TDXS 40th Anniversary QSO Party this year. A number of good ideas have been presented. I will summarize these for the board, and W5PF will discuss this with the membership during the next meeting. We may elect to do away with log extracts or complicated scoring procedures since the object is to reconnect as many members as possible, and just have fun. The main decisions remaining are whether or not to hold this as a stand-alone event, or have a contest within a contest (work as many TDXS members as possible during TQP, for example), and what date to hold it if a stand-alone event. You'll be hearing more details momentarily.

TDXS Meeting Notes by Bill K5WAF

Date: March 11, 2010
7:00-9:00pm

Location: Tracy Gee Center,
3599 Westcenter
Drive, Houston, TX
77042

Attendance: TDXS Members:
K5WAF, WB5TKI,
W5PR, K5DD, K5UO,
NM5G, WF5W,
N5MT, W5PF, N5ET,
K5LBU, W5KDJ,
W5GCX, N4AL,
N5UR, K5EWJ, W9DX,
W5JWM

Visitors: KD5TIO
(Tom Campbell),
K5STZ (Stan Pollack),
W5UQ (Bob Hardie)
and W5HPQ (Steve
Flanigan)

President [Paul, W5PF]:

Field Day: Field Day is shaping up to be a problem! Several members will not be in town or unavailable, including last years Field Day Coordinators (K5WAF, NM5G & WB5IUU). We need someone to step forward to lead the Field Day activity. The site has been selected, the Tomball Fire Station, and all organizational information is complete and available from K5WAF.

HamCom: The suggestion was made to organize a fund raising event at HamCom this year, however, it may be to late. Inside tables are no longer available and no one has volunteered to lead this activity.

2009 CQ WW WPX SSB Results: C91TX was #1 in the World for DXpeditions! Congratulations to the TDXS C91TX team.

Topp Fund: Support was approved during the last month to 2 DXpeditions: (1) YI9PSE DXpedition where Wayne Rogers, W5KDJ, is a member in a 13 man, international team and (2) the YN2EA DXpedition that just concluded.

Membership: We now have 27 Full and 11 Associate Members. A ballot successful elected another member, but the prospective member was not at the meeting and it will be formally announced the next time he attends – he will be member #175.

Potential Members: Several Potential members were in attendance at the meetings and were introduced, including;

Tom Campbell, KD5TIO: Tom holds an Extra Class license, works for NASA, is an avid sailor with interests in maritime mobile DX'ing (73 countries so far) and contesting (including 300 MM Q's in last weeks contest). This is Tom's 5th TDXS meeting.

Bob Hardie, W5UQ: Bob, who was licensed in 1954, completed a career in TV and Radio broadcasting that started when he was 17 years old. He relocated to Magnolia recently from Florida and is well on his way to setting up his station – watch the reflector for “antenna raising parties”. Bob is a CW operator and DX chaser but most of all he is into radio and equipment repair and tuning. This is Bob's 4th TDXS meeting.

Stan Pollack, K5STZ: Stan was first licensed in 1974 (WN3YSL) but expired as life event took over. But last July he rejoined the hobby and got his General license. He currently has a simple station with

an Yaesu transceiver and an inverted V which he is having a lot of fun in contests. Stan is also big into Satellite activities (which was a tremendous help to TDXS in last years Field Day). This is Stan's 4th TDXS meeting.

Steve Flanigan, W5HPQ: Steve's career is with Compaq/HP and now splits his time between Houston and Santa Fe, NM. Here in Houston he has a small station in a high rise and is active in DXing (137 countries) and some contesting. Steve was first licensed in the mid 1960's (WN9DXQ) and now holds an Advance license. This is Steve's 3rd TDXS meeting.

Secretary/Treasurer [Bill, K5WAF]:

Bank Account and fund balances remain healthy.

3 Ballots sent out and successfully return: new membership, WB5TUF meeting waiver for 2010, YI9PSE DXpedition support.

Contest Chairman [Cookie, K5EWJ]: February was a great month for contesting. Cookie reviewed TDXS participation and results for several contests (10-10. ARRL DX CW, CQWW 160 SSB, ARRL DX SSB, etc).

Presentation: YN2EA DXpedition

The YN2EA DXpedition team (WF5W, K5UO, NM5G and WB5TKI), which just returned on Wednesday, was at the meeting to present pictures and experiences of their participation in ARRL International DX SSB Contest, the really nice accommodations and facilities of YN2N and an overview of Managua, Nicaragua.

Contest Chairman's Report by Cookie Cooke, K5EWJ

March and the first half of April have not been particularly busy contest periods. I made two trips to eastern Oklahoma which gave me an opportunity to try my mobile in a couple of contests.

The 10-10 Mobile contest was held on March 20. I was traveling south that Saturday and listened most of the way. I was not able to hear any 10-10 stations at all. I did hear a number of Central and South American stations working a contest exchanging serial numbers. I worked some of them, but I never found out what contest they were working. Almost all the 10-10 contest entries were from the Atlanta area where several mobiles operated from mountains in the vicinity and worked fixed stations.

Glen, WB5TUF and Scott, K5DD worked the BARTG HF RTTY Contest the week end of March 20 thru 22 and turned in some nice scores. Glen made 391 Qs

for 242,420 points and Scott made 283 Qs for 125,935 points. Way to go guys.

The CQ WW WPX SSB Contest was held March 27 and 28.

Frosty, K5LBU worked 120 Qs for 42,444 points. Chuck Lay used KZ5MM for an 80 meter single band effort with an impressive 824Qs and 780,020 points. Again, I was driving back from Oklahoma on March 28 and worked a few Central and South American stations.

The only US station that I heard was Colin, KU5B. I presume Colin was at his Somerville station. I could hear him from Antlers, OK and pretty consistently as I traveled south. I was able to work him from a hill top just north of Canton. Colin is a young man from Houston that is already a top contender.

A fun activity that is coming up June 5 & 6 is the Museum Ships of the Air activity. It is not exactly a contest or DX, but it is fun and has some nice certificates to go with it. BVARC has

sponsored this activity for the last two years and I have been helping with the CW station. We man the USS Stewart, DE-238 and the USS Cavalla, SS-244 which are located on Pelican Island, across the channel from Galveston. We use the long wire antennas on the Stewart and have a project to connect the long wire on the Cavalla for use during the activity.

The activity is about 50 kHz above the bottom of the CW bands and in the General portion of the Phone Bands. Most stations are using Amateur transceivers as the WWII equipment is not up to modern standards if indeed it is operational. About 60 ships are usually active in the event, including the USS Texas at the San Jacinto Monument and the USS Lexington at Corpus Christi. So far, 25 ships have signed up for this year, but the number will no doubt increase a lot as the event gets closer.

Contests coming up:

All Year	CQ DX Marathon
April 24 & 25	10-10 International Spring CW Contest
May 1 & 2	10-10 International Spring Digital Contest
May 8 & 9	CQ-M International DX Contest (Krenkel Central Radio Club of Russia)
May 29 & 30	CQ-WW WPX Contest, CW

Contest Chairman's Report (cont.)

While BVARC is taking the lead on this activity for the Stewart and Cavalla, other amateurs are welcome to have a look and do some operating. I have been representing TDXS, but others are welcome as well. It is fun and interesting plus we get an opportunity to introduce members of the public to our hobby. We have quite a few visitors, usually more than at Field Day.

Programs, Dxpeditions and Stuff de Cal WF5W

From the V.P., Programs:

You see what's happening at this meeting. From Crystals to Klystrons, what a good topic. Next month will be taken up with our stuff on Field Day with our own Mike Bragassa presiding. Then JUNE Field Day and JULY our own DX traveler Wayne will re-experience his time in Iraq.....that's about it for this next quarter.

From the DXpedition chair:

Back from Nicaragua. What a trip, looks like we may be in the top ten for score!! From the feed back I get looks like Octavio (YN2N) will be having some more of the TDXS gang down there in the near future. And by the way CQWW CW will also be from that shack with four of our members participating. Wayne, K5KDJ, our intrepid traveler, is off to Iraq (Kurdistan) this month. Be sure

and get him on your log. An Historic DXpedition!!

From what we have seen, the shack at YN2N is the best deal going. If any of our crew is thinking about an easy DXpedition, this is the place. 3 1/2 hours from Houston, 1 hour ride to the shack and 30 minutes and you're on the air...its that easy.... AND only 90 bucks a day while there for bed, board (great food) and the shack....

More on the way, Barbados in the spring.

From the deck of the Sea Pumpkin :

Got the new little netbook finally working with the IC 7000. Thanks to Scott Patout, Its all set up for the Pumpkin. Now if the weather would just cooperate. The trip to Red Fish was a wash out with cold wx and high winds and high seas. Did not

work. BUT there will be other times soon....

QRP the new way.....Just finished the Ten Tec 1130 Transceiver kit for 30 meters and made my first QSO on QRP 3 watts to Connecticut. What a wiz that was Haven't had that much fun since.....

This may be the next venture.

More when we see you.

Cal WF5W

My First DXpedition by Doug WB5TKI

I've been a ham since 1964, and have enjoyed many facets of this fascination hobby. But I've never operated outside of the U.S. With a young family, work commitments, and now a daughter in college, I haven't been able to justify going on a DXpedition. Recently, though, Cal White, WF5W, proposed a DXpedition to Nicaragua for the ARRL Worldwide DX SSB contest. Low cost, just a long weekend, hey, I can do this!

So I found myself on a short 3-1/2 hour flight from Houston to Managua, Nicaragua with Cal, Mike, K5UO and Keith, NM5G. We arrived at about 12:30 and were met by a van which took us on a 1 hour ride to Granada. Our hosts were Octavio and Martha Miranda. In a flurry of activity we set up our TS-480 and ALS-600 amp, and Cal was on the air within an hour. Octavio has a wealth of antennas: an A3S tri-bander, 6m. quad, dipoles for 160, 80, 40 and 30 m, 40 m. wire quad, 17 quad, and 15 m. delta loop. Octavio also has an FT-950 with an SB-220 amp and an IC-706. We were going to operate the contest as a single multi-op high power.

Octavio has a spacious home, with 3 bedrooms, a large living room, and a dedicated radio room. The two guest rooms have 2 beds each, and share a bathroom. There is also a large back porch with a comfortable hammock for snoozing.

On Thursday we had both the FT-950 and the TS-480 on the air on CW, SSB and RTTY. We had the problems getting a laptop to talk to the FT-950, eventually swapping out the laptop. Octavio has wireless internet, so we had access to spots. Also, I was able to talk to my wife over Skype from my iPod.

The weather was wonderful, and we left the windows open all of the time, except sometimes at night, when it became cool enough that we had to close the windows. This was the dry season, so the grass was a bit yellow, but the trees looked very healthy. They have lemons, avocados, mangos and plantains. There is no ground water, so during the dry season Octavio gets water delivered several times a week. During the rest of the year he has a cistern to store the abundant rain water.

The contest started at 0000Z on Saturday (UTC). The first rotation was Mike K5UO, Keith NM5G, Cal WF5W and me, WB5TKI. We did 4 hour shifts first, then 2 hour shifts for the rest of the contest. We had a generator staged in case the power went out. We hit 1,000,000 points Saturday night, 2,000,000 points by Sunday morning, with 10 hours still to go. We had strong winds on Saturday, and internet went out in the afternoon. We had sev-

eral power outages on Saturday between 6 p.m. and 4:30 a.m., but the 7.5 KW generators kept us on the air with only brief outages.

One thing that I hadn't really anticipated is the downtime between shifts. Luckily I had brought along a Sony Reader with a book to read. We used the TS-480 for the contest, and couldn't use the FT-950 for the WARC bands because the ICE filters did not cover those bands, and we did not want to interfere with the contest station. Cal had brought along a Kindle. Otherwise it was walk the grounds, snooze, or surf the web.

Sunday operation was crazy. 15 meters was the money band for us, and we ran it for most of the day. During my last 2 hours I started on 15 and then tried 10 for a bit. I was able to get a few Q's, including Chuck, W5PR. Then I moved to the low end of 20 and all hell broke loose. I got up to a rate of 262 Qs per hour within the last 20 minutes of the contest. Then, with about 8 minutes left in the contest, the power quit. We debated trying to get the generator going, but decided that it wouldn't be on line in time, so we were done. Our final score was over 2.5 million points. A pretty fair score, I think.

My First DXpedition (cont.)

We continued operating on Monday, adding another ~1000 Q's into the logs. Mike satisfied his RTTY habit and Cal did a lot of CW. I did both CW and SSB Q's. Lot of 17 M. SSB with Asia and Europe.

On Monday we decided to play tourist for a few hours. It was another beautiful day, temp in the 60's. We drove through Granada to Lake Nicaragua and took a boat ride among the islands on the northern shore. Lake Nicaragua is, by the way, the only lake with fresh water sharks. The islands were probably formed by an eruption of a volcano to the west of the lake that, Mt. St. Helens-style, blew out a side and deposited ejecta into the lake. Most of the islands are pri-

vately owned, and some have quite grand homes on them. Afterward we went into the heart of Granada to observe the colonial buildings in the city center.

By the way, driving in Nicaragua is an exciting adventure. I'm glad that Octavio was driving. Cars, buses, bicycles, horse and mule drawn carts, and pedestrians were on the roads. The town was very laid-back, however. At noon, the school kids were going home for lunch.

The food was great throughout the visit. Rice dishes with vegetables and meat, fresh fruit, ham and eggs, plantains, yucca, black beans, hamburgers, olive-stuffed cannelloni,

pineapple pie, BBQ beef, huevos rancheros, just wonderful food! Most of the fruit was from their own trees.

On Tuesday the van showed up at 5:30 a.m. to take us to the airport. By noon we were back in the U.S. What a wonderful, exciting, stimulating, exhausting experience! I'm really looking forward to my next DXpedition!



From the left, Cal YN2EA (WF5W), Mike YN2UO (K5UO), Doug YN2TKI (WB5TKI) and Keith YN2NM

The Dryhole Antenna by Bill K2TNO

(Reprinted from the Sept. 1987 Bullsheet)

The collapse of the world petroleum market has hit hard here in Texas. Fortunately, not everything is bad — unbeknownst to the now-destitute drilling wildcatters, they have created a golden opportunity for hams. Why? Because much of the U.S. (and other countries) is punctured by thousands of abandoned oil wells.

A lot of these are what is known as “stripper” wells, holes that only produce about a barrel of oil a day, even with advanced recovery techniques.

Today these wells are not economical to operate. But each consists of a hole thousands of feet deep, and about six inches in diameter lined with steel well casing pipe. This construction prompted the writer to investigate possible uses for these wells for ham radio purposes.

A little thought revealed that such a hole ought to be a perfect location for an image-plane Beverage antenna (1). Since the hole is vertical into the ground, the resulting image antenna will be vertical above the ground, thereby providing low-angle reception.

Furthermore, the near-field electrical environment of the hole is below ground, providing excellent shielding from atmospheric and man-made noise. Just as a normal (above-ground) antenna is dependent upon the characteristics of the earth below it, so too the DRY-HOLE antenna system’s image antenna will reflect the shielding characteristics of the below-ground component.

To recapitulate, the above-ground image antenna will appear electrically to be a vertical shielded electrostatically from stray radiation by the image of the hole around it. The electronics of holes is beyond the scope of this article (2).

Because only the image antenna is above ground, the antenna (of course) requires no support and is invisible. See Figure 1.

FEED-POINT COUPLING

The only critical point of the antenna installation lies in the feedline assembly. In order to feed power to the image (i.e., above-ground) portion of the antenna, the coax line from the shack must be attached as shown in Figure 2.

The idea here is to invert the RF path, by connecting the coax center conductor to the well casing and the shield to the image antenna as shown. This arrangement is, of course, exactly the opposite hookup to that used if a regular above-ground vertical were in use. We tend to forget that the desired RF signal on the coax braid is actually only on the inside surface of the braid.

Antenna currents flowing on the outer surface constitute standing waves, and are typically removed by use of a ferrite RF choke. A few ferrite toroids ($A_L = 800$) slipped over the coax work nicely, for powers up to about 3—5 KW.

Above that level an air-wound RF choke is recommended.

When connected as shown, the hot (center) lead feeds the well casing and the reverse complement of the RF signal feeds the image antenna. The resultant E and H-plane fields thus are also inverted and the power is delivered to the above-ground (imaging component) antenna. Since the SWR is close to 1:1, no additional matching or tuning is required.

The Dryhole Antenna by Bill K2TN0

CONSTRUCTION DETAILS

The image-plane Beverage consists of a wire of length L_1 cut to an exact multiple of one wavelength at the lowest desired operating frequency. It is held in the pipe by a lead weight at the end, and terminates in the matching network described below. Since the well hole is vertical, the antenna does not need to be insulated, because the weight keeps the wire centered in the casing (3). At the ground level, the antenna is connected to a ceramic feed-through insulator attached to the bottom of a 7" x 12" x 2" utility box (4).

MATCHING

The antenna will have a high impedance, typically several thousand ohms. Fortunately, the well construction provides a built-in matching arrangement. Since the antenna is centered in the well casing, the two parts act as a section of coaxial transmission line. The impedance of a coaxial line (Z) is a function of the inside diameter of the outer conductor (the well casing), D , and of the diameter of the inner conductor (the antenna wire), d , according to the following formula:

$$Z = 276 \log D/d + .096$$

It can be seen that for a well about six inches in diameter the impedance of the "coax" will be several thousand ohms. Thus the coupling of the antenna to itself acts as a balun, and a perfect match is achieved.

ON THE AIR TESTS

A dryhole antenna was constructed and tested for 160 M by the author. Several wavelengths of image-antenna were lowered into the hole, and matched and tuned as described. The noise attenuation was fantastic! Practically no atmospheric noise was detectable. Signal levels on transmit were also amazing. Before installing the dryhole device, I had no 160 M antenna at all, due to space limitations. Thus, the dryhole was many S-units better than what I had previously!

The only "problem" that developed turned out to be a blessing in disguise. The hole filled slowly with oil! Due to the change in dielectric constant, some re-tuning was required until the entire hole filled. Once full, the oil served nicely to insulate the wire from the

casing. It also lubricated the antenna, preventing corrosion.

FOOTNOTES

1. Houg, C.-H. and Weisbach, Z. (1934). Trans. Hung. Acad. Geophys. 37, 104-119.
2. Doping of semiconductors to provide excess holes in the substrate is the basis of N-channel devices. Formerly, tunnel diodes used this approach.
3. If the well has been slant-drilled, the antenna will require insulators at 50-foot intervals. The above-ground (image) antenna will then also be slanted, causing some directionality like that seen for a traditional sloper.
4. Be sure the matching box is larger than the hole, otherwise the entire assembly will be pulled into the well.

(Thanks to Steve W9DX for the referral to this classic article)

Texas DX Society Boardmembers

President	Paul Frantz, W5PF	w5pf at cebridge.net	
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DXCC QSL Card Checker	Bob Walworth, N5ET	rwalworth at charter.net	

How to reach US

On the World Wide Web <http://www.tdxs.net> email address: k5dx@tdxs.net

On 2 Meters: 147.96/36 MHz (100 Hz) On 70cm: 447.00/442.00 MHz (103.5 Hz)

DX Cluster—On Packet: Connect to **K5DX** on 145.71 MHz or telnet via IP address 75.148.198.113

TDXS says "HAPPY BIRTHDAY" to these members with birthdays in April

Frank Montgomery - W5JWM

John Cashen - W5UG

Bob Burns - W5SJS

Bob Bradshaw - N5RF

Orville Burg - K5VWW

Sam Neal - N5AF

Wayne Bailey - NX7K

OJ Quarles - K1OJ

Frank Moore - KE4GY

Please notify the Editor if I have missed anyone.