ASEG Oral History – Bob White

This is a transcription of an oral history interview with **B**ob White, conducted by **S**teve Collins and **K**im Stanton-Cook on January 3rd, 2023.

The interview aimed to record some of Bob's early history, recollections as a geophysicist and his observations of developments in geophysics during his working life.

Summary (from Bob White)

Bob White started at Macquarie University in 1967 to study economics but quickly switched to geology and geophysics, realising that the earth sciences people seem to have a more realistic view of what mattered in life.

After some 7 ½ years at university, armed with a BA, MSc and a good appreciation of red wine, he went to work for Cominco Exploration (later to become Aberfoyle) in Adelaide, who promptly sent him off to the wilds of western Tasmania in search of an airborne EM anomaly that was to become the Que River mine.

In 1977 Bob moved back to Sydney to work for Getty Oil in their minerals division. These were interesting times, working for companies with relatively large budgets for exploration, research and lunches. All good things must come to an end and in 1986 Getty was taken over and 23,000 people laid off.

In 1986 Bob, with fellow geophysicist Phil McSharry and others, decided to have a go at what now would now be called a .COM, ie. start a hardware and software company (15 years ahead of the pack). Unfortunately, the crash of 1987 finished this venture.

In late 1987 Bob got into the contracting and consulting business, in the next 3 years, planning and running surveys all over Australia.

For the last 34 years he has been consulting in geophysics and computing for a large number of companies in Australia and overseas.

Around 2000, Steve Collins and Bob investigated new and more efficient ways of running IP surveys in conjunction with 3D IP and Resistivity Inversion software, resulting in a number of papers.

Recently both Steve and Bob, along with a few others, have been working on a method of looking for sulphides in the presence of black shales and clays. This was a follow on from Bob's MSc., started some 50 years earlier.

Bob has been a member of the ASEG since 1970 and has served on the ASEG Executive Committee a number of times, including two as treasurer.

Interview.

S How did you get to go to Macquarie Uni and how did you end up in geology ?

B I went to enroll in economics, as I was sort of in the stockbroking business. I had some spare subject units when I ran into Prof. Voisey. He was the head of the School of Earth Science at the time. It was towards the late afternoon, and I explained to him that I had a spare subject or two. I thought that geology may be useful so I could better read reports on the stock market. He said " I'm just shutting up here, let's go down to the pub and discuss it." From that moment on I thought that geology seemed more interesting than economics.

I did finish first year at least, doing economics, but I branched out more into geology. I also did a course with Kerry Burns who inspired me into geophysics as well. He ran a first-year course.

One of the interesting things though, was that in 1967, Macquarie University's course structure was designed a bit like the English system, where you could major in some subject, but there were more subjects there to make you think, than there were to educate you into a trade. It meant that you could do a whole series of subjects. I completed my geology degree at Macquarie Uni knowing quite a lot of electronics, math and physics which were not a core part of the geology course.

The other thing that did help me in the long term, were subjects I completed from the economics degree that I started but didn't finish. That economics knowledge allowed me to do ore reserves and financial analysis of projects and mines and the financial analysis bit, sort of supported my career the whole time. Because every time I look at a project, even before we did anything on the ground, I would look at it economically. If we found an X million dollar or an X million tonne ore body that wouldn't make money in its current location, that needs to be recognised. To this day, that's how I look at projects, because if a project can't make money, there's no point in going on with all the other work to find it if it's still not worth it.

S So how did you get into post grad geophysics?

B After I'd finished my geology degree, about 1970, I was looking at going down to Antarctica for a year. Somebody talked me into doing a Master's instead. So, I flipped a coin and instead of going to Antarctica, I started a Masters on a subject which I'm still working on to this day – non linear electrical effects in mineralized rocks. During the Masters, and before, I used to work part time with Kerry Burns company, IMT or something like that, maybe International Mining.

K His company was Mt. Pelion Holdings, named after the mountain in Tasmania, he was working for Millie Phillips. She also gave Roger Hobbs and me a job down in Tasmania.

B Yes, and during my undergraduate and postgraduate years, I did some work for her in

Tasmania and around the place, which helped pay for fees. In those days you had to pay Uni fees up front or you were out. Mr. Whitlam bought in free Uni fees, in the year I finished, which didn't help me.

S. Well, how was the Masters Degree, exciting?

B Yeah, that was interesting.

S It looked exciting to me since I was doing a boring Master's project in the other room. It was the sort of thing I would have much rather been doing.

B It was interesting at the Macquarie geophysics lab with people like John Bishop smashing bits of quartz to see if you could see a piezoelectric signal and use it as an exploration technique. Terry Lee was mumbling mathematics which I did not understand at all and Brian Spies was working on his Transient EM project. It was actually quite an interesting time. Roger Henderson and also Steve Webster were there.

It was in fact Steve Webster who offered me a job with Cominco in 1973?. I would have finished my Masters probably a year earlier except that when I had about two weeks to go, I thought I'll take it down to Tasmania and finish writing it up while working with Cominco. Remembering that, in those days, everything had to be done on the typewriter, no computers. But it took me nearly a year because unfortunately, or fortunately, Steve and I went down to follow up an airborne EM anomaly which then became the Que River Mine. So, I stayed there for a lot longer than intended. Hence, writing up the master's took a lot longer than I planned.

S How was exploration geophysics, different then to what it is now?

B Well, when you went into the bush, the equipment was simplistic. In those days it seemed very complex but not compared to today's gear. It was all transistors, none of this digital circuits or ICs and its field reliability was suspect, especially on the West Coast of Tasmania where it was wet all the time. We always carried two receivers because one would last till about lunch time and get moisture into it and about every two days, you'd have to pull the thing apart because something would fail. So, you certainly needed to know a reasonable amount of electronics, just to keep going.

S The same with doing IP. With IP transmitters, you seemed to spend half your life pulling them apart.

K What else with Cominco, Bob. Were you based in Adelaide at that stage?

B Originally I was living in Sydney, but I went to Cominco in Adelaide with Steve Webster. He taught me a huge amount about geophysics, what not to do and what to do. Although I was now based in Adelaide, I worked the first big chunk of my time with Cominco on the west coast of Tasmania. Cominco also had prospects in other parts of Tasmania and all over Australia.

Like most field geophysicists in those days, I spent a lot of the time in the airports travelling. A few days here, a few weeks there. Geophysicists used to complain that they spent the whole time travelling but seeing lots of different projects. Which was really good, because it allowed you to assess one project against another very quickly. You ended up with a lot more experience on different projects than the average project geologist.

S Yeah, I'll agree with that.

B The other thing that's changed, I guess, is that every company had a geophysicist, at least one sometimes two or three, even smaller companies. That appears to have all changed now. They don't even seem to have too many geologists these days either. It's all done under contract so project geologists tend to move around more.

S Highlights from your time with Getty Oil?

B I was quite happy living in Adelaide, it's much more relaxing than Sydney. I was asked, by a friend, Phil McSharry, if I wanted to come and take his place at Getty Oil and Mining, in Sydney.

K Phil McSharry was planning to leave Getty to join a project in Iran looking for uranium.

B And I said, no, I was very happy living in Adelaide. Anyway, he convinced me to come up for lunch. Kim Stanton-Cook had something to do with that too.

S Kim, you were working for Getty too at that stage?

K Yes, Phil was there and we were working on the Maureen Uranium Exploration Project. Phil and Graham Miller, along with Peter Mewkill, had decided to leave Getty to go to Iran looking for uranium with Austirex for Bob Richardson, leaving us without a geophysicist. We needed one and I knew Bob, so Phil and I put the tag on him. I don't know if that was when he met Paul Riddell.

B Meeting Paul Riddell - it was the strangest interview I've ever had, in fact probably the only interview I've ever had. I was taken around the office, very quickly by somebody, Phil or Kim and then into Paul Riddell's office. And he looked up and he shook my hand and said let's go to lunch. After lunch, Paul said, "Well, you've got the job". I said "What are you talking about. You haven't even asked me whether I could do the job". He said, "Oh, I checked all that out before. I just wanted to know whether you got on with the rest of the people in the company. That was more important to me than technical part of it". So, we got on really well, and I took the job in Sydney. Indeed, I'm still in Sydney, 45 years later.

B There were two really interesting projects during my time at Getty. One I had nothing directly to do with - I was sitting in the office at the time, about 11 pm, and that was the days of telexes. A telex came through from South America. All it said was something like 400 at 14. I typed back "is that feet and ppm" – they responded it's metres and percent copper. That was the discovery

of **Escondida**, the first hole! I remember putting the telex on Paul Riddell's desk with a big highlight.

The other big project I worked on was **Jabiluka Uranium**. I did the uranium ore reserves for Jabiluka and Maureen and a lot of other minerals projects as well as financial studies it was quite interesting. I ended up in America, trying to do ore reserves on Getty's computer. It turns out Australia does a much better job on those sort of things than the Americans, despite their bragging.

I actually wrote a system for Getty to do ore reserve calculations using a little digitiser. It allowed the geologist to put in all the boundaries and automated the computations.

S How long did Getty go for?

K 1985

B Getty fired 23,000 people worldwide after the take over by Texaco.

K Where did you go after Getty folded?

B When Getty folded, I got back with Phil McSharry, who at this stage had decided to start what would these days be called a dot-com company. There were various parts of it. One of them was using Prime computers. Selling and using them and hiring them out. But also, Steve Collins and I had written a lot of software for mineral exploration work. Anything from ore reserves to geophysics and whatever. We put it together. Magnetic packages, geochemical packages, date plotting/display stuff and we were going to put that together to market it within Phil McSharry's corporate framework.

In 1986 we started the work to develop the company. About mid-way through 1987, the company was just about the float. I think Bank America said, yep, they'll supply the finance. "Go ahead and put on sales people". We started, put on sales people and about a week later they rang up and the market crash came in America. They said, we're pulling out of Australia - get rid of everybody, we're not financing it anymore and that was the end of that. It was the first dot-com crash I think in Australia.

S What a great way to have a steady job!

B Yeah, one minute we're about to set the world on fire in the next minute, we're out of a job.

B So in 1987, I decided to start my own consulting company, Tooronga Resources, providing geophysical consulting services to the mineral exploration and environmental industries.

S So, when you were at university, did you have any sense that your career might extend beyond geophysics? If you think back to when you were at university, you look forward. What am I going to do?

B Yes. And it's the same when you get to university. You get a smattering of what's out there. But you really don't know too much about it. And when you get your first job, you just grab it regardless. Some people now specialise so much at university. They go out to do the only thing they can do. But in those days, it was so general, you went out, you got a job. You're expected to do just about anything. I think that has changed in the industry with people going into a niche early and staying in it. It's been a long time since I was in this area so I probably should not comment.

S How specialised is being an expert in IP, in geophysics, in mineral exploration? I'd say that, what we do is pretty specialised, actually.

B It is, but in the early days, you had a go at just about anything.

S That's true.

B I certainly did.

S Both you and I wrote accounting systems for our company and did ore reserve work.

B I happened to do financial analysis and all those sorts of things.

S What would you have done had you not got into geophysics and exploration, do you reckon? Would you have stayed with the economics? Become a stockbroker like your family?

B I probably wouldn't have. I don't know. There's more chance I would have gone into the more economic stuff on the land rather than the city. The cities never really appealed to me.

S And where does the ASEG come into all this for you? I mean, you've been on the executive a few times.

B I joined the ASEG in 1970 when it started.

K Was Lindsay Ingall involved in all that?

B Yes and Dave Johnson. There were a whole bunch of them, a lot of oil people also. I went to the first ICOGEO conference and helped with it.

S The second one was in Sydney because I remember driving to it with you. A couple of things I remember about it. One that I think it was the first conference I'd ever been to.

B I've been a member of ASEG since 1970 and was on the executive two or three times. I was Federal Treasurer in 1982 and then later in 2001/02.

One of these was particularly interesting, I was assistant treasurer and we didn't know if the ASEG was a hundred thousand dollars in debt or they had a hundred thousand dollars in the bank, which bothered us a bit. We had a look at the expenditure and it was running at close to a million dollars a year, so we thought, well, that's really not sustainable. We had real structural problems and spent the next few years getting the accounting done properly, so we knew, at any one time, exactly where we were. The major expenses came from the magazine advertising, or lack of it, and was causing the major problems. Getting that cleaned up and getting the advertisements in up to the stage where, it was at least paying for itself. It became obvious that, because of rising costs, the ASEG Bulletin was not going to pay for itself so had to be financed externally. The major source of income was the conference - it had to make a certain amount of money to keep the ASEG viable. Given that, in those days, the conferences were every two years, meaning that major revenue came in every two years, requiring a diligent approach to the finances.

S What do you reckon are the most dramatic changes that have happened over the 50 years or so that you've been in geophysics? Name two or three things that have just made a radical change.

B I mean, that's dead easy. It's made a radical change to everything. **That's digital electronics**. It's not only geophysics, it has changed everything. It's hard to picture things before digital electronics. Up until the late '70s geophysics had pushed electronics, analogue electronics, to its n'th degree. It was the digital electronics that expanded into all sorts of other things. It's not only the data collection end, but also data processing. Data collection was the first thing that had a huge difference. Things like stacking and intelligent stacking of data or whatever and then came along all the software that allows you to do things that you could previously never dream of.

For instance, people used to ask why we didn't do more pole-dipole IP, given that you get much better signal to noise. The main answer was that you couldn't interpret it. But as soon as you can use inversion software, it allowed you to interpret complex data by machine rather than by eye. So, it expanded what you can do. It made a huge difference.

S What else? What about GPS? Do you think that made a huge difference?

B I think GPS made a huge difference, especially in the airborne game. I remember sitting in the front of airplanes or helicopters with air photos, and a grease pencil. Sort of marking off where the hell we were, and were we weren't. And then going back and locking myself in a bathroom with big tubs of fixer and film and then going through them. This was sort of standard practice for years and years. But as soon as electronic navigation came in, that changed. Before GPS there was other electronic navigation that preceded it. Looking back on it, it didn't last that long, but at the time, it was groundbreaking. There was Loran and range-range and that sort of stuff. And that certainly made a difference but as soon as stuff went digital, it was huge.

There are other things that came about out of all that too. Before modern software, you had

people like Doug Morrison, painstakingly hand contouring up, in nice colours, all your air mag maps or whatever and then photographing them as they were the only original copies made. Then slowly computers took over. First as contour cuts and then, later on, as colour contours, and then images. This technology meant (which annoyed some geophysicists) you could hand a geologist a map that they could understand. Rather than a whole lot of squiggly lines. The geologists loved it, because it made them less dependent on the geophysicists. I don't think that some geophysicists understood that it made geophysics accessible and more popular with geologists, who actually held the cheque-books. So, it worked, it actually worked both ways. I do remember quite a few geophysicists who still didn't like this technology stuff and everything had to be done by hand and projected onto walls. There were a lot of geophysicists, at the time, who didn't like computers either, but I certainly don't know what they're doing today.

S. What's wrong with mineral exploration geophysics today? Do you think there is anything wrong with it, or do you think it's going on a really good path?

B It's not just geophysics, it is science in general, and the way things are being pushed. Geophysics still has a huge impact on what's going on. I'm not sure that it gets the recognition that it deserves.

S Is there something you can see that we're doing fundamentally wrong?

B No, nothing fundamentally wrong. I mean the days of wandering across the paddock and tripping over a gossan or ore body or whatever are getting less and less. Targets are a hundred plus metres down. Geophysics and smart geochemistry are obviously the way to go. I think the whole industry has to become more science oriented than art oriented. I throw geology into the art oriented, but not as a bad thing. But a lot of the geology isn't science oriented to the extent that geophysics has to be.

S It's getting that way though.

B It is. It is more and more, and there's more and more understanding what the rocks they are looking at really mean. It’s not just picking up a bit of rock, but people actually understanding what the rocks exactly are, where they've come from, their composition, what's going on and working out what's going on deep down by looking at the rocks. But I think the geology is actually behind the geophysics in science, pure science terms. Mind you it’s a lot of years since I got really involved in geology and it has probably changed so I shouldn’t comment.

I get worried about geophysics, sometimes. The younger blokes, as a lot of them don't have a lot of field experience. Pulling wires and actually understanding how the data is collected. So, unless you do that, you don't understand what the problems with the data are likely to be.

S I once knew a geologist who said that the geophysical crew were just like drillers. I pointed out that these guys are very highly educated. Better educated than he was.

B Yeah okay. I don't know how widespread that is. But in some geophysical, contracting crews,

the crew members have PhDs! Whereas in the old days there were farmers' sons you know, they picked it up along the way. And I think for a lot of the contracting work, the contractors have changed, and their attitude has changed. They are far more grounded in the science of what's going on than a lot of the earlier crews who were out just collecting data.

S. What is the most exciting or boring or dangerous thing that's happened to you in your career?

B Hmm. I don't get excited by much, I must admit.

S Okay. We'll go to dangerous.

K There was that program that you went on in the Middle East somewhere where the drill stem blew out of the hole.

B It wasn't dangerous, it was interesting. It was controlled, well sort of.

S What was the most boring thing that's ever happened in your career.

B Oh, I don't think I've had a boring moment in geophysics. It's all different, because every day, every job is a science experiment. Which is probably not what the client ever wanted to hear. But what it meant was that I didn't ever go in with any preconceived ideas. About how to do a job or what to do. I certainly didn't believe a lot of what the geologists were telling me and luckily, I had done enough geology could sort it out. So, I never found any job boring, except writing reports.

Even writing accounting systems was different. Everything was different. That's why the job never became boring because every task was different. And even if it looked the same, I guess I made it different by never looking at it like it was the same as before. It was a new experiment. You just wanted to get up each morning and go to work.

S But what about technically exciting? The moment when you went like "Eureka I found something"?

B Well it's like any science experiment. They don't just suddenly happen, despite what you see in cartoons. I mean one of the more interesting things was when Steve Collins and I sat down at the pub up at Waitara, over numerous reds, and decided there were better ways of doing IP.

In the old days, to run an IP survey, they had to be interpretable, which is reasonable, but they had to be interpretable by eye. So, if you made the array complex, you couldn't understand what was going on. There are too many variables and the whole thing was asymmetric. It was bad enough with a symmetric array. If you had an asymmetric anomaly, it meant the thing was either dipping or was slightly offset from the electrodes. But if you had an asymmetric array, you had no chance of working out dips and other parameters.

2D and 3D modelling and inversion software introduced in the 1990s and further developed in the 2000s freed us from that constraint.

Steve and I sat down in the early 2000s to design a new way of IP surveying with improved electrode arrays. We realized that we no longer needed to put the transmitter and receiver on the same line, which would get around a lot of problems.

We came up with the offset pole-dipole array which we first presented in 2003 at the ASEG Conference in Adelaide and later published in the journal (White, Collins and Loke. Resistivity and IP arrays, optimized for data collection and inversion, *Exploration Geophysics* Vol 34, pp229-232)

What about retirement - how's that.

B Retirement's wonderful and I don't play golf.

K Well he's still working on the Heterodyne exploration method.

B The only change is that the financial rewards suddenly disappeared. Steve and I hadn't retired but we were slowing down and certainly not looking for any new clients. Steve suggested that we start to investigate where I had left off with my Master's degree, which was "A Study of Non-Linear Effects in Mineralized Rocks".

S Now my memory of that was that I said something like now you're retiring have you got any regrets or something and you said I can't believe nobody has followed up what I started for the Master's degree.

B Yes. Some 50 years earlier. And anyway, later, we decided we'd have a look at seeing if it was feasible to continue the project for field application. I mean that anybody who hasn't read what I'd done, there are papers on it in Exploration Geophysics, or the ASEG bulletins. It's a different way of looking for sulfides that doesn't pick up clays and water and other conductors and graphitic shales mainly. It only responds to sulfides and it looks at the non-linear characteristics of sulfides. I did a Master's from 1970 to '74. I looked at the phenomenon in the lab and it definitely appears to be there, it's theoretically possible. The Russians, back in the '60s, had looked at the same thing, but they couldn't get it to work with field current densities you are likely to do encounter with normal ground surveys. They possibly got it to work a bit in downhole surveys, where they could up the current densities. But basically, they said it was useless for ground surveys.

Anyway, I spent a long time in the lab during my Masters, in the middle of the night mainly because the electrical noise was much quieter and hopefully prove that it did work, it didn't pick up graphitic shales or graphite. CSIRO, at the time, wanted me to continue on, doing a PhD at Macquarie to extend the research.

I said, well, there's not much point because the electronics, at the time wouldn't allow you to use

it in the field. I had already reverted away from transistors back to valves because they're much more linear than transistors. But when Steve and I got together, we decided that electronics has come a long way in 40 or 50 years. Let's have a look at it. Let's see if it's possible. I guess that was 2016.

S It was seven years, I think, so far.

B In 2016, we approached Keith Leslie at CSIRO and had to talk to him about it. Keith being much more up on the latest electronics.

S I think Andrew Sloot was first, wasn't it? And then Andrew said, you've got to speak to Keith. He's the guy with the electronics.

B Well, we needed somebody who would sort of give us a base/lab and maybe help with a bit of money.

S And trucks and wires.

B Well, we hadn't actually thought about the trucks and wires at that stage, because we were actually just thinking about, you know, is it possible with the current electronics? But it was actually very good that we got a hold with Andrew, because then we had all this logistical backup as well. We spoke to Keith and he got excited about it and got a few more people at CSIRO excited. And we have been working on it ever since. And we're nearly there. We go one step forward, two steps back.

Bob and Steve contemplating another research project.

S Okay, one last question before we end up. If somebody's coming into university or through university at the moment, would you recommend them to do geophysics, and why? Mineral exploration geophysics?

B Yeah, why not?

It has been a great lifestyle. I have travelled Australia; I've travelled the world.

B I can't think of any reason not to do geophysics, but it's one of these things you've got to embrace and if you've got to understand, it's not a city type lifestyle.

You have got to be prepared to suddenly move. If you're working for a company, you might be moving somewhere permanently for a while. If you're consulting or contracting, you've got to be prepared to get up in the morning thinking, I'm just going down to the office and next day find myself in Brazil or somewhere, because some clients told you to get on a plane. But I mean, hey! A lot of people pay a lot of money for that sort of travel experience.

S Yeah, fair enough. Thanks very much. That's great.

K Thanks Bob.