Robert Eugene (Gene) Ballay
Robert E Ballay, LLC
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Dr. R. E. (Gene) Ballay is a consulting petrophysicist with 30 years of hands-on domestic – international / operations – research experience, including assignments in Houston (TX), Anchorage (AK), Dallas (TX), Jakarta (Indonesia), Bakersfield (CA) and Dhahran (Saudi Arabia).
At retirement from the Saudi Arabian Oil Company, he was the senior technical petrophysicist in the Reservoir Description Division. He holds a PhD in Theoretical Physics with double minors in Electrical Engineering & Mathematics from Iowa State University, has taught physics in two universities, published numerous technical articles and been designated co-inventor on both American and European patents.
Since retirement from Aramco he has participated in multi-discipline petrophysics projects in Argentina, Ecuador, Mexico, Texas & Malaysia, authored a Technical Review Article (Formation Evaluation: Carbonate versus Sandstone) and developed a Carbonate Petrophysics Course.
He served as a Microwave Repairman in the US Army and as an Electronics Technician in the US Navy, and is a USPA Parachutist and a PADI Dive Master.

Employment History

May 2002 => Present: Petrophysical Consultant, Robert E Ballay, LLC

- Developed Carbonate Petrophysics Course, with accompanying 3200 page manual.
- Authored 19-page Technical Review article: Formation Evaluation, Carbonate versus Sandstone
- Reviewed core and log data in the Oriente Basin, Ecuador to
  - Identify key field-specific formation evaluation issues
  - Developed core calibration within context of available core / log data and implement on select Key Wells
- Reviewed core and log data in the Malay Basin, Malaysia to
  - Identify key field-specific formation evaluation issues
  - Load and merge foot-by-foot core descriptions with wireline data, for comparison to wireline calculations
  - Evaluate routine and special core data to determine reservoir specific attributes such as: XRD mineralogy, phi-perm relation, compaction factors, capillary pressure behavior at reservoir conditions, Archie and Clay Corrected Resistivity Exponents
  - Implemented core calibrated evaluation on select Key Wells
- Reviewed core and log data in the Permian Basin, Texas to
  - Evaluate historical algorithm within context of recently acquired core
  - Identify appropriate core-based methodology for newly cored intervals
- Established core-calibrated porosity & permeability models in recently drilled Burgos Basin shaly sand gas wells, and applied to off-setting non-cored wells.

May 1992 => May 2002: Petrophysical Engineering Consultant, Reservoir Description Division, Saudi Arabian Oil Company, Dhahran, Saudi Arabia. At retirement I was the senior technical petrophysicist in the RDD Unit, responsible for hands-on formation evaluation in all of Saudi Aramco's fields. During my ten years with Aramco I participated directly in the formation evaluation for three multi-billion barrel start-ups (Central Arabia, Shaybah, Qatif), mentored two Saudi Arabs, was designated co-inventor on both American and European patents, and published multiple technical articles.

December 1990 => May 1992: Staff Reservoir Engineer, Atlantic Richfield, Bakersfield, California. Established the core-log calibrations for the Placerita Field, utilized calibrated open-hole log data to build reservoir description grids, and then executed the THERM reservoir simulator to identify the optimum steam flood depletion program.

August 1989 => December 1990: Physics instructor, Southwest Missouri State University, Springfield, Missouri. Taught a variety of classes ranging from Basic Physics for Life Scientists to Thermodynamics to Non-linear Circuit Theory.

May 1986 => May 1989: Staff Petrophysical Engineer, Huffco Indonesia, Jakarta, Indonesia. Served as Huffco's senior Petrophysicist for the Badak and Nilam gas fields in East Kalimantan and mentored two Indonesian Nationals.

June 1982 => May 1986: Director, Reservoir Description, Arco Research Center, Plano, Texas. Supervised a staff of engineers and geologists, conducting integrated formation evaluation on a request basis, in all of Arco's fields. Selected projects include: Prudhoe Bay Alaska Flow Station 3 Tracer Program, Lisburne Alaska Formation Evaluation, West Sak Sand Formation Evaluation, Arco's internal evaluation of Schlumberger's new LDT tool and others.

October 1979 => June 1982: Senior Reservoir Engineer, Arco Alaska, Anchorage, Alaska. Served as Chairman of the Porosity Task Force for the Prudhoe Bay Equity Determination, and represented Arco in that Task Force. When the issue went to arbitration, I developed and presented the Arco / Exxon / Sohio / BritPet porosity case to the arbitration panel.

February 1977 => October 1979: Research Physicist, Shell Development, Bellaire, Texas. My final assignment at BRC was the Exploration Petrophysics project.

August 1971 => August 1972: Electronics Technician, US Navy Reserve, Honorably Discharged

July 1966 => July 1969: Microwave Repairman, US Army, Honorably Discharged

Education

PhD in Theoretical Physics with double minors in Electrical Engineering and Mathematics: Iowa State University, Ames, Iowa. 100 % self-supported with final GPA = 3.96 / 4.00

BS Double Major in Physics and Mathematics: Southwest Missouri State University, Springfield, Missouri. 100 % self-supported with final GPA = 3.82 / 4.00.

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Experience

Hands-on petrophysicist with 30 years of experience in research and operations environments, domestic and international locations, clastic and carbonate reservoirs, heavy - light oil and gas, utilizing both conventional wireline and LWD data. Projects have ranged from single well petrophysical analyses of both historical and newly drilled wells to the multi-well Prudhoe Bay, Alaska Hydrocarbon Pore Volume Determination / Arbitration (which spanned four years) to petrophysical re-processing of Ghawar (largest oil field in the world), Saudi Arabia. In all cases, every effort is made to incorporate rock (cuttings and core) data (as available) and geological considerations. I have been designated co-inventor on both American and European patents, and have trained National geologists and engineers during the international assignments.

- Served as Chairman of the Porosity Task Force for the Prudhoe Bay Equity Determination, in addition to representing Atlantic Richfield in that Task Force. Used a 75 cored well database in conjunction with geological considerations to establish the best porosity calculation algorithms for use in the 420 logged wells. When the issue went to arbitration, developed and presented the Arco / Exxon / Sohio / BritPet porosity case to the arbitration panel.
- During Ghawar re-processing, utilized core-log correlations to document an unusually large (and unexplained) light hydrocarbon effect on the Arab D neutron logs from both Schlumberger and Dresser, after which a normalization scheme was developed, documented and published. During this same project, recognized spurious cyclic borehole effects on wireline data and developed a Fourier Transform analysis to 'subtract out' the non-representative portion of the signal: this was also published as an SPE paper.
- Executed internal evaluation of Schlumberger's new HIP (later known as Platform Express) wireline tool in both clastic (Central Arabia) and carbonate (Ghawar) rock, to determine it's acceptability. Found the anhydrite density response to be in need of adjustment (Schlumberger subsequently modified their algorithm and the HIP – PEX became our standard open-hole logging tool for formation evaluation).
- In advance of the $US 3.5 Billion Shaybah (Empty Quarter, Saudi Arabia) development, loaded and analyzed historical 25 cored well database in a multi-well sense to establish the initial formation evaluation algorithms. When drilling of highly

deviated wells commenced, worked with Schlumberger to optimize the Down Data Acquisition Program for pipe-conveyed logging, and published the result as an SPE paper. As LWD techniques advanced, performed detailed examination and comparison of the first 15 LWD jobs in horizontal wells, establishing the strengths and weakness of this mode. The Shaybah work was documented in two publications: 1) Multi-dimensional Petrophysics and 2) In the Driver's Seat with LWD Azimuthal Density Images.

- Collaborated with Aramco Corporate Core Laboratory in development of a core chip pyrolysis technique which could: 1) place the GOC / OWC on rock chips collected 25 years earlier, 2) characterize the quality of oil (light versus tar) on both historically collected, and drill-site collected, rock chips. Designated a co-inventor on both American and European patents and subsequently used a combination of these pyrolysis measurements and visual core descriptions to both place the tar layer per existing data, and characterize the expected open-hole log response across light versus immobile oil intervals for future wells, in the presently drilling Qatif Field (where tar is expected to be a key development issue).

Military Service

- August 1971 => August 1972: Electronics Technician, US Navy Reserve, Honorably Discharged
- July 1966 => July 1969: Microwave Repairman, US Army, Honorably Discharged