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The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

Samira Bayramli,[1] a recently promoted finance analyst in the Azerbaijan office of the global oil and gas company, BP,[2] had a lot on her plate. It was November 2014 and Bayramli's office window at Port Baku afforded a picturesque view of the Caspian Sea. Earlier that week, Bayramli's supervisor had asked her to review a proposed structure for a new production sharing agreement (PSA), for which BP aimed to complete negotiations with the State Oil Company of the Azerbaijan Republic (SOCAR) by year end. This contractual agreement would define the cost and profit-sharing scheme between BP and Azerbaijan for the exploration, development, and production of the shallow-water offshore hydrocarbon fields surrounding the Absheron Peninsula (**Exhibit 1**). The contract structure was complex, and Bayramli wanted to understand the project's risks and rewards and how those were to be distributed between BP and the host country.

Production Sharing Agreements

A PSA[3] was a contract in which an oil-producing state granted an international oil company (IOC) the exclusive right to explore and produce hydrocarbons (oil and natural gas) at a defined location called the "contract area." PSAs were used to provide a legal framework for investment in developing countries that lacked the financial or technical capabilities to develop their own hydrocarbon reserves. The IOC bore all the financial, geological, and operational risk associated with the project and was obligated to undertake a minimum exploratory work program (geological/seismic studies and wells). If a commercial discovery occurred, then the IOC paid the full costs of the field's development.

Once the field went into production, the IOC was allowed to recover its operational costs and capital investment from a predetermined percentage of production designated as "cost petroleum." The remaining production, called "profit petroleum," was split between the IOC and the state according to the provisions in the PSA. Often the split was defined on a sliding scale with the state receiving a greater percentage of profit petroleum as more of the IOC's capital costs were recovered. Income taxes, if any, were paid by the IOC to the state as a percentage of profit petroleum.

The PSA typically designated the IOC as the party responsible for hydrocarbon operations and defined the minimum work required during each phase of the contract area's exploration and development, as well as the

[1] Samira Bayramli is a fictitious character used for the purposes of class discussion.
[2] Prior to 1998, BP was known as British Petroleum.
[3] In certain countries, these contracts were called production sharing contracts (PSC). Every PSA could be structured differently, but the description in this section reflects how the contracts were generally structured. For more information on PSAs, see "Guide to Extractive Industries Documents (Oil & Gas)," *Allen & Overy*, September 1, 2013, http://www.allenovery.com/publications/en-gb/Pages/Guide-to-Extractive-Industries.aspx (accessed Feb. 4, 2016).

measures to be taken to protect the facilities and the environment. Additionally, the contract granted certain rights to the contractor for the use, exchange, and repatriation of foreign currency (e.g., U.S. dollars). Most PSAs also required the IOC to meet community-development requirements such as the training or employment of locals, investments in local infrastructure, and preference for local suppliers.

BP in Azerbaijan

BP had a long history of successful hydrocarbon development in the Azerbaijan sector of the Caspian Sea, beginning with the landmark Azeri-Chirag-Gunashli project (ACG). Signed in 1994, a few years after the end of the Soviet Union, the ACG PSA was dubbed the "contract of the century" for the newly independent Azerbaijan Republic. Working under the ACG PSA, a BP-led consortium explored, developed, and in 2014 was still producing oil from the ACG field, one of the world's largest oil formations. The ACG complex included six offshore production platforms and required a total investment of over $30 billion.[4] As of 2013, ACG accounted for approximately 75% of Azerbaijan's total oil production.[5] The ACG PSA was scheduled to expire in 2024, and BP was in negotiations with SOCAR for its extension.[6]

In addition to the ACG project, BP also operated the Shah Deniz (SD) field. Like ACG, SD was located offshore in the Caspian Sea. Discovered in 1999, SD was among the largest gas fields in the world and was one of BP's largest discoveries globally. The first stage, Shah Deniz 1 (SD 1), came online in 2006 and had a capacity of 9 billion cubic meters of natural gas per year. BP and its partners invested over $8 billion in SD 1 and the associated pipeline to Turkey.[7] Shah Deniz 2 (SD 2), slated to come online in 2018, would increase total annual gas production by 16 billion cubic meters. The SD 2 project, which included a new pipeline to deliver Azerbaijan's gas to Europe, would require $28 billion of capital investment.[8]

In October 2010, BP signed a new PSA with Azerbaijan for the offshore contract area of Shafag-Asiman. This agreement "marked the beginning of BP's bilateral cooperation with SOCAR in exploration and development of a new offshore block."[9]

Working with Azerbaijan, however, had not been all smooth sailing for BP. In late 2012, BP came under fire from Azerbaijan President Ilham Aliyev when the ACG field's production fell short of estimates.[10] SOCAR went so far as to threaten to use other "supermajors" (large international oil companies) to assume BP's role in future projects. In response, BP made ACG management personnel changes and invested more capital to raise the field's production to acceptable levels. The signing of the Shallow Water Absheron Peninsula PSA, targeted for year-end 2014, would be a public sign of improved relations between BP and Azerbaijan.[11]

[4] "Azeri-Chirag-Deepwater Gunashli," BP website, http://www.bp.com/en_az/caspian/operationsprojects/ACG.html (accessed Feb. 12, 2016).

[5] "Azerbaijan—International Energy Data and Analysis," U.S. Energy Information Administration, August 1, 2014, http://www.eia.gov/beta/international/analysis.cfm?iso=AZE (accessed Feb. 4, 2016).

[6] Zulfugar Agayev, "BP Negotiating to Extend Azeri ACG Oil Contract Beyond 30 Years," *Bloomberg Business*, Nov 21, 2013, http://www.bloomberg.com/news/articles/2013-11-21/bp-negotiating-to-extend-azeri-acg-oil-contract-beyond-30-years (accessed Feb. 4, 2016).

[7] "Shah Deniz Stage 1," BP website, http://www.bp.com/en_az/caspian/operationsprojects/Shahdeniz/SDstage1.html (accessed Feb. 4, 2016).

[8] "Shah Deniz Stage 2," BP website, http://www.bp.com/en_az/caspian/operationsprojects/Shahdeniz/SDstage2.html (accessed Feb. 4, 2016).

[9] "Shafag-Asiman," BP website, http://www.bp.com/en_az/caspian/operationsprojects/Shafagasiman.html (accessed Feb. 4, 2016).

[10] Matthew Hulbert, "Is BP On Borrowed Time In Azerbaijan? Yes, But So Is Baku," *Forbes*, October 12, 2012, http://www.forbes.com/sites/matthewhulbert/2012/10/12/is-bp-on-borrowed-time-in-azerbaijan-yes-but-so-is-baku/#234e1a414b4d (accessed Feb. 4, 2016).

[11] Stephen Bierman and Zulfagar Agayev, "BP's Latest Battle: Keeping Control of Prize Caspian Field," *Bloomberg Business*, February 19, 2015, http://www.bloomberg.com/news/articles/2015-02-19/bp-s-latest-battle-keeping-control-of-prize-caspian-oil-field (accessed Feb. 4, 2016).

The Absheron PSA

The project-development team had given Bayramli a model of the Absheron economics (**Exhibit 2**), and it was her job to calculate BP's equity financials. Bayramli was already familiar with the production allocation model for Shafag-Asiman PSA (**Exhibit 3**). The proposed Absheron PSA[12] was somewhat similar to Shafag-Asiman and structured as follows:

- The project ownership would be split equally between BP and SOCAR within a joint venture (JV) structure. The two parties would divide capital investment, operating costs, and profits according to their 50%/50% equity.[13]
- The BP/SOCAR JV would be allowed to recover all of its operating costs (not including depreciation or transportation) from the petroleum production.
- After recovery of operating costs, up to 50% of the petroleum production would be available for the BP/SOCAR JV to recover its capital costs, after which all of the remaining production would be defined as profit petroleum. This 50% cap ensured that profit production would be available from start-up, before all capital investment was recovered.
- Similar to the Shafag-Asiman PSA, Absheron profit petroleum would be divided between the BP/SOCAR JV and Azerbaijan based on a sliding scale as defined by an "R-factor" (**Exhibit 4**). The R-factor was designed such that as the JV recovered a greater portion of its cumulative capital investment, a larger share of profit petroleum went to the host country.
- Each party would pay transportation costs on its share of the production.
- The Azerbaijan profit tax would be 20% of profit petroleum, although BP's share of the profit tax would be paid by the host country.
- The project would be entirely equity financed.
- The contract area of 1,900 square kilometers could contain one or more oil or gas prospects (potential fields). In order to attract producers to take the risk of investing in "stranded gas," far from the liquid gas markets of the United States and Europe, it was necessary to agree upon gas volumes and prices with gas buyers at the onset of the project. The expected gas sales contract prices were reflected in the financial model.
- At the end of the PSA (December 31, 2037), all assets and future production would revert to Azerbaijan.

A senior finance advisor had created an analysis with several years of BP's equity cash flows and the IRR and NPV of those cash flows calculated for a hypothetical oil development of 1 billion barrels (**Exhibit 5**). The cash flow model raised a number of questions for Bayramli that she felt were important to her understanding:

- What were the key value drivers for the project from BP's perspective and Azerbaijan's perspective?
- What incentives are created by the "R-factor" sliding scale for profit oil distribution?

[12] The proposed PSA structure is hypothetical and is based on public information about other BP PSAs in Azerbaijan (ACG, SD, and Shafag-Asiman) and the press releases related to the signing of the Shallow Water Absheron Peninsula PSA. For example, see "Parliament Ratifies SOCAR, BP PSA on Shallow Water Absheron," Azerbaijan News Network, April 15, 2015, http://ann.az/en/parliament-ratifies-socar-bp-psa-on-shallow-water-absheron/#.VeCS0_ZVhBc (accessed Feb. 4, 2016).

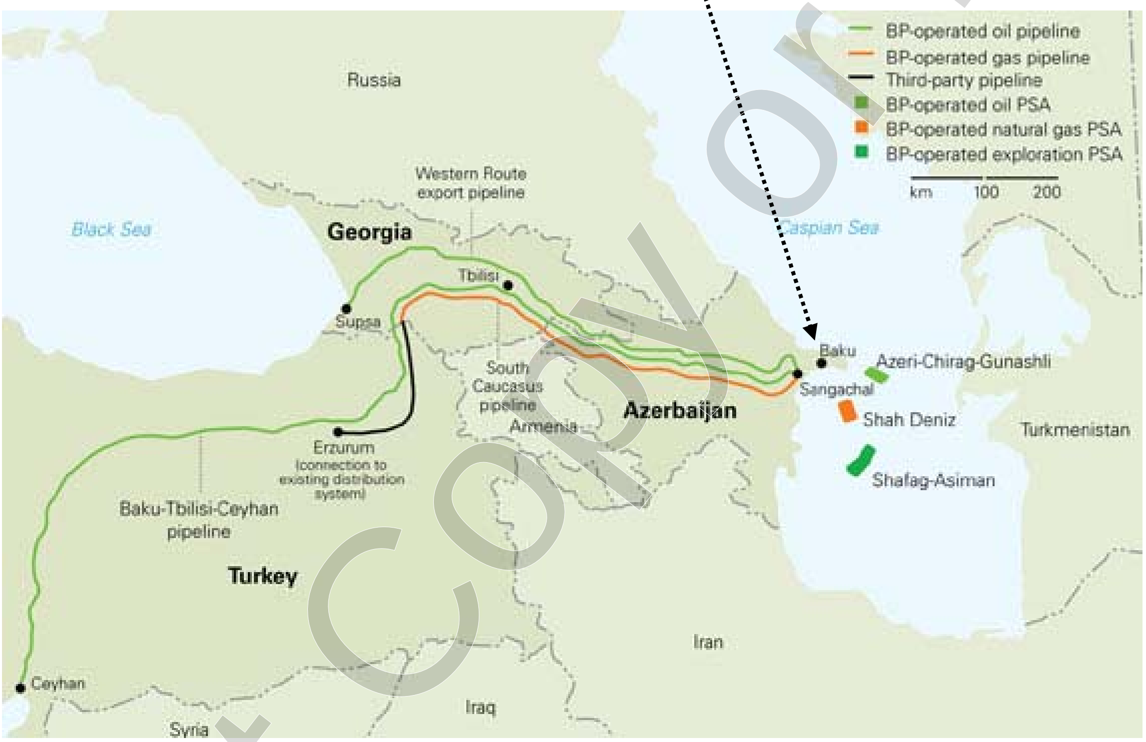
[13] BP's funding of SOCAR's investment in the exploration phase of Shafag-Asiman has been ignored for purposes of simplicity.

- How reliable are the estimates of future oil prices, actual oil production, and the investment amounts required for the project?
- What were the odds of failure (i.e., the chance that no field of commercial value would be found and the project would be abandoned before beginning the development expenditures in 2017)? Likewise, was it possible that the actual oil volume produced would exceed or be less than the 1 billion barrels assumed in the model? If so, how would the economics be impacted by recognizing these possibilities?

Exhibit 1

The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

Area Map Showing the Absheron Peninsula



Sources: "Aquaterra Energy to Supply Centralisers for BP in Azerbaijan," Subsea World News, November http://subseaworldnews.com/2012/11/02/aquaterra-energy-to-supply-centralisers-for-bp-in-azerbaijan/; and 1Derrick, http://www.1derrick.com/uploads/post/0436437001347261663.jpeg (both accessed Apr. 11, 2016).

Exhibit 2

The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

Project Cash Flow Analysis (all values in millions of dollars, unless otherwise specified)

	2015	2019	2020	2037
Oil production (MMbbl)	-	-	33.33	20.00
Oil price ($/bbl)	75.00	75.00	75.00	75.00
Oil revenue	-	-	$2,500	$1,500
Exploration expenditure	143			
Development expenditure	-	3,563	-	-
Total finding and development exp.	143	3,563	-	-
Proved developed resource (MMBOE)		1,000		
F&D cost ($/BOE)		$9.50		
Maintenance CapEx	-	-	$48	$48
Capital cost balance	$143	$9,500	$8,343	$0
Tax basis	$143	$9,500	$7,173	$0
Operating cost ($/bbl)	2.70	2.70	2.70	2.70
Transportation cost ($/bbl)	5.00	5.00	5.00	5.00
Operating & transportation ($/bbl)	7.70	7.70	7.70	7.70
Production (MMBOE)	-	-	33.33	20.00
Operating and transport cost	$0	$0	$257	$154
Total revenue	-	-	$2,500	$1,500
− Operating and transport costs	-	-	($257)	($154)
− Depreciation	-	-	($2,375)	($307)
Project EBIT	-	-	($132)	$1,039
− Profit tax	-	-	$26	($208)
− Capital expenditures	($143)	($3,563)	($48)	($48)
+ Depreciation	-	-	$2,375	$307
Project free cash flow	($143)	($3,563)	$2,222	$1,091

Project IRR	31.8%
Project NPV	$15,856
Project Payback	7 years

MMbbl: million barrels of oil; one barrel is 42 U.S. gallons
MMBtu: 1 million British thermal units, a measure of energy stored in natural gas
MMBOE: 1 million barrels of oil equivalent—barrels of oil equivalent are used to combine energy produced via oil and natural gas into one quantity

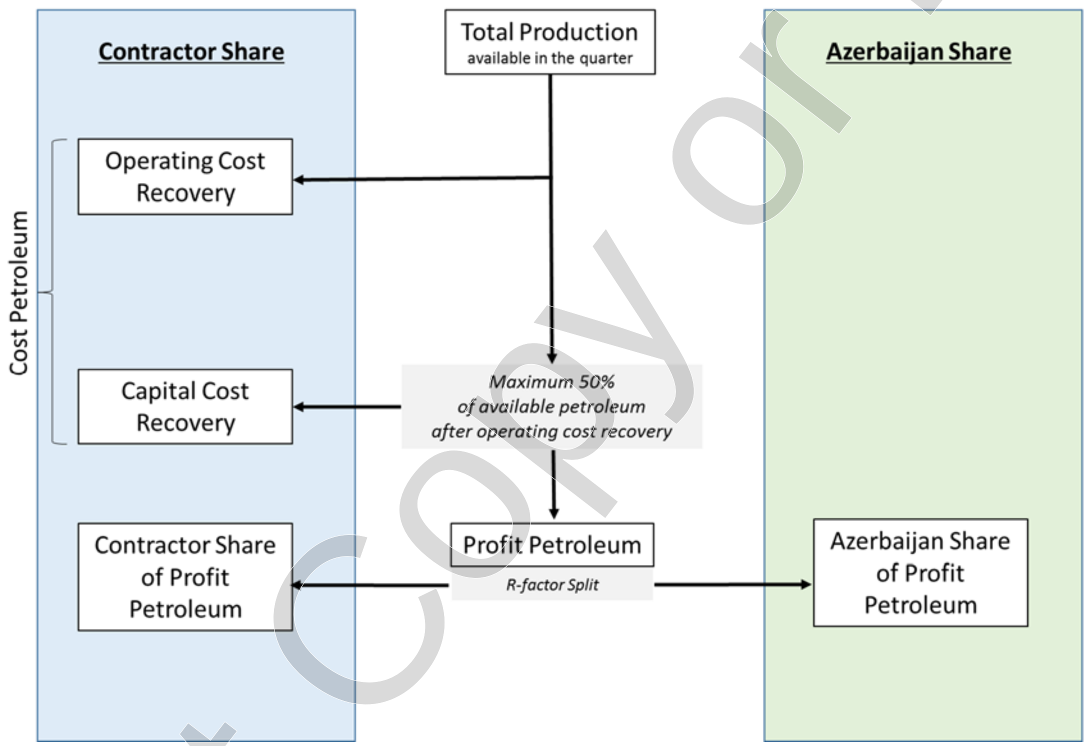
Source: Author estimates. Economics are hypothetical.

Exhibit 3

The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

Shafag-Asiman PSA Production Allocation Model

This model depicts the quarterly calculation of production available for cost recovery and profit.



Source: Created by author.

Exhibit 4

The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

Profit-Sharing Model

The R-factor for calendar quarter (n + 1) is based on costs and production values accumulated through the end of the prior quarter n:

$$\text{R-factor}_{(n+1)} = \sum(CCR_n + PP_n)/\sum CC_n$$

where:

CCR_n	Contractor's capital costs *recovered* in the nth quarter
CC_n	Contractor's capital costs *incurred* in the nth quarter
PP_n	Value of contractor's share of profit petroleum lifted in the nth quarter
N	Calendar quarter index
$\sum$	Cumulative sum of the items including quarter n

The R-factor is applied to the profit petroleum to find the percentage split between Azerbaijan and the Contractor for quarter (n+1), according to the table below:

Profit Petroleum–Sharing Table

R-factor Band	Azerbaijan Share (%)	Contractor Share (%)
R < 1	45	55
1 ≤ R < 2	55	45
2 ≤ R < 3	70	30
3 ≤ R < 4	80	20
R ≥ 4	90	10

Note: For the Shallow Water Absheron Project, the Contractor is the BP/SOCAR JV. Azerbaijan benefits from the project both as equity partner (via SOCAR) and as the host country granting the PSA.

Data source: Author simplification of "Agreement on the Exploration, Development and Production Sharing for the Shafag-Asiman Offshore Block in the Azerbaijan Sector of the Caspian Sea," October 7, 2010, http://www.bp.com/content/dam/bp-country/en_az/pdf/legalagreements/PSAs/Shafag_Asiman_PSA.pdf (accessed Feb. 4, 2016).

Exhibit 5

The Absheron Project: BP's Production Sharing Agreement in Azerbaijan

BP Cash Flow Analysis (all values in millions of dollars, unless otherwise specified)

	2015 …	**2019**	**2020**	**2021 …**	**2037**
Oil production (MMbbl)	-	-	33.33	66.67	20.00
Capital expenditure	$143	3,562.50	$48	$48	$48
Cumulative capital expenditure	$143	$9,500	$9,548	$9,595	$10,355
Capital cost balance	$143	$9,500	$8,343	$5,980	$0
BP capital expenditure	$71	$1,781	$24	$24	$24
BP capital cost recovery	-	-	($603)	($1,205)	($48)
BP capital cost balance	$71	$4,750	$4,171	$2,990	$0
Project oil revenue	-	-	$2,500	$5,000	$1,500
− Operating cost recovery	-	-	($90)	($180)	($54)
− Capital cost recovery	-	-	($1,205)	($2,410)	($95)
Profit petroleum for distribution	-	-	$1,205	$2,410	$1,351
Cumulative capital cost recovery	-	-	($1,205)	($3,615)	($10,355)
R-factor		-	-	0.20	3.15
JV % share of profit petroleum	55%	55%	55%	55%	20%
Profit petroleum allocated to JV	-	-	$663	$1,326	$270
Cumulative profit petroleum to JV	-	-	$663	$1,988	$22,434
BP equity percentage	50%	50%	50%	50%	50%
BP operating and capital cost petroleum value	-	-	$648	$1,295	$75
BP profit petroleum value	-	-	$331	$663	$135
BP net production (MMBOE)		-	13	26	3
BP Income	-	-	$979	$1,958	$210
− Operating and transportation costs	-	-	($100)	($201)	($22)
− Depreciation	-	-	($1,188)	($897)	($154)
BP EBIT	$0	$0	($309)	$860	$34
− Azeri profit tax (paid by SOCAR)	-	-	-	-	-
− Capital expenditure	($71)	($1,781)	($24)	($24)	($24)
+ Depreciation	-	-	$1,188	$897	$154
BP free cash flow	($71)	($1,781)	$855	$1,733	$164

BP IRR	23.3%
BP NPV	$3,570
BP Payback	7 years

Source: Author estimates. Economics are hypothetical.