McCullough Research

Robert F. McCullough, Jr.
Managing Partner

Date: March 20, 2015

To: McCullough Research Clients

From: Robert McCullough

Subject: Daniel Poneman and the Paducah Transaction

On May 14, 2012, Daniel Poneman, while still Deputy Secretary of the US Department of Energy, wrote to Leo Gerard, International President of the United Steelworkers:

> DOE appreciates your recommendations and interest in DOE establishing a reenrichment program. We have been taking a hard look at the options at Paducah to determine the best manner to protect the taxpayers and the workers in Kentucky. We are continuing to work this issue and expect to be in touch with you on the status in the near future.[1]

The following day, May 15, 2012, Bonneville Power Administration's chief executive, Stephen Wright, signed a highly unusual $700 million contract to purchase years of unneeded nuclear fuel at above market prices. The transaction was so complex that even its participants feared it would be viewed as "smoke and mirrors." [2] The contract's primary beneficiary was the United States Enrichment Corporation (USEC). The primary loser was BPA.

Since the signing date of the contract, the principal component of the transaction – uranium enrichment – has continuously fallen in price. In fact, the current price of $88 per unit is just 57% of the price BPA is obligated to pay under the terms of the contract.[3] Models of the original deal indicated that the transaction would cost BPA's ratepayers $150 million.[4] Thus, in terms of today's prices, the model indicates a loss of $250 million, or a profit margin of negative 28% on the original investment.

How did BPA, a relatively little known federal agency in Portland, Oregon, enter into the high risk world of commodity trading?

[1] Letter from Deputy Energy Secretary Poneman to Leo Gerard, May 14, 2012, page 2.
[2] Email from Greg Delwiche to Stephen Wright and others, March 29, 2012.
[3] Platts Forward Nuclear Indicator, March 2, 2015.
[4] 2015 Paducah Update, March 16, 2015, page 1.

6123 Reed College Place • Portland • Oregon • 97202 • 503-777-4616 • robert@mresearch.com

Under a contract signed in the 1970s, BPA is obligated the full costs of the Hanford, Washington nuclear plant known as the Columbia Generating Station. A more familiar name for this facility is Washington Public Power Supply System Plant #2, or WPPSS #2 for short.

BPA became entangled in the complicated Paducah transaction as a result of a letter sent to the US Department of Energy in January, 2012 by sixteen Congressmen including John Boehner, Speaker of the House of Representatives.[5] The Obama administration was lobbied by US Senators McConnell and Paul.[6]

The DOE Secretary of Energy at the time, Steven Chu, assigned senior staff members including Deputy Secretary Poneman and William Murphie, Manager of the Paducah Project, to complete the proposed transaction. At the beginning of February 2012, the priority of the project was high enough that Stephen Wright, BPA's administrator, was taking calls on Saturday from Energy Northwest's consultant.[7] Calls and emails between BPA and the DOE revealed an uncharacteristic urgency.[8]

The most significant portion of the transaction involved the purchase of some 4,440,000 Separative Work Units (SWUs) from the now-defunct Paducah, Kentucky gaseous diffusion enrichment facility. For a variety of political reasons, DOE had subsidized this aged facility for years, even though newer plants based on centrifuge technology had eliminated the older World War II technology of gaseous diffusion around the world. Centrifuge technology uses 10% of the energy and avoids the significant environmental problems of the Paducah facility – including its role in releasing the majority of an ozone-depleting CFC better known as Freon-114 in the United States.[9] Paducah was the last of the plants using the older technology to

[5] Letter to Secretary of Energy Steven Chu from Representative John Boehner et al., January 12, 2012.
[6] Letter to Secretary of Energy Steven Chu by Senators McConnell and Paul, February 9, 2012.
[7] Steve Wright's Calendar, February 11, 2012.
[8] See, for example, the Paducah Tails Re-enrichment discussion between William Murphie and BPA Administrator Stephen Wright:

> If you could ask respective individuals in your organization to be available for a call Friday afternoon (eastern) with myself, Jim Owendoff from DOE EM HQ, and Bill Szymanski from NE HQ, it would be appreciated. We understand, that there may be a need for BPA to interact with TV A on the potential project and would ask that your office invite anyone from TV A that you believe would be appropriate. Given ENW's role in the plant operations, we would also ask they participate and leave it to you as to who should participate. In the past, we have worked with Paul Bentrup and Eric Rocket successfully. We are looking for someone from NNSA to potentially participate also.

Email from William Murphie to Stephen Wright, February 16, 2012.
[9] Freon 114, under the group of chemicals trademarked by DuPont as Freon, is also a greenhouse gas thousands of times more potent than Carbon Dioxide, as documented by the IPCC at: <
https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html>

close. The graph on page 7 of this document shows the plant's inordinate contribution to the release of this widely banned substance.[10]

The original transaction was designed to produce a year's output at Paducah. Energy Northwest was chosen as a sink for the output with a substantial share destined for TVA. The transaction was complex and poorly understood. BPA's then Senior Vice President for Power Services Gregory Delwiche commented at the time:

> All - I spent the better part of today trying to understand the 'deal' as it was portrayed last weekend, and by mid-day had concluded I was beginning to make some sense of it, but realized I needed to better understand and track the use of SWU to make UEP vs natural uranium (i.e. I needed some sort of input/output tracking of tails, their associated assay, SWU, EUP, natural uranium, MTU of feed, and dollars). But in reading the below attachments, the deal not only seems to have changed again, but the terms of it, as protrayed in both attachments, with all due respect, are incomprehensible. As an example, EN/BPA input costs seem to have gone down from $661M to $596M (a good thing, but without any supporting explanation), and now there's a Russian HEU component that is part of the deal for the first time.
>
> I am fearful that on one hand there is a lot of momentum building behind this deal yet on the other hand, the naturally easier thing to do when one doesn't understand something is to say no to it, and there will be many people that will be faced with making recommendations on something that is very difficult to understand. For us to be able to run this through our risk committees in the next two weeks, the deal is going to have to settle down, and we will need a white paper that is written in a way that is comprehensible for folks who know nothing about uranium enrichment. Bill/Eric - the attachments are a good start but they need to be greatly simplified, otherwise, and with the utmost respect, it looks like a lot of smoke and mirrors. Best regards, Greg

The analysis of the transaction was poorly undertaken, offsetting a major loss from the purchase of the surplus nuclear fuel components with a massive, although spurious, "profit" to be gained by borrowing money. Energy Northwest's own analysis of the original transaction indicated a $150 million dollar loss:[11]

---

[10] http://iaspub.epa.gov/enviro/P2_EF_Query.p2_report?FacilityId=42001PDCHGHOBBS&ChemicalId=000076142&ReportingYear=2001&DocCtrlNum=; http://oaspub.epa.gov/enviro/P2_EF_Query.master_build_sql?Industry_Search=null&Industry_Search=325&Chemical_Search=null&Chemical_Search=000076142&Year_Search=&Year_Search=2001&State_Search=null&database_type=TRI&page_no=1&pRepOption=2

[11] Energy Northwest. *Pre-Meeting Materials Package.* 26 Apr. 2012. Page 37.

Commodity Transaction					Financial Transaction								
Year	Investment	TVA Revenues	Net Fuel Savings	Total	Year	Bond Proceeds	Interest	Principal	Total		Total	New Fuel Plan Cost	Old Fuel Plan Cost
Source	April 26, 2012 Board Briefing	TVA Contract	2013 Fuel Plan Rev. 0 and 2013 Fuel Plan Rev. 1				April 26, 2012 Board Briefing	April 26, 2012 Board Briefing				2013 Fuel Plan Rev, 1	2013 Fuel Plan Rev, 0
FY 2013	$ (711)	$ -	$ -	$ (711)	FY 2013	$ 711	$ (17)	$ -	$ 694	FY 2013	$ (17)	$ (27)	$ 27
FY 2014		$ -	$ 4	$ 4	FY 2014		$ (17)	$ -	$ (17)	FY 2014	$ (13)	$ (43)	$ 47
FY 2015		$ 70	$ 3	$ 73	FY 2015		$ (17)	$ (70)	$ (87)	FY 2015	$ (14)	$ (26)	$ 29
FY 2016		$ 24	$ 53	$ 77	FY 2016		$ (16)	$ (24)	$ (40)	FY 2016	$ 37	$ -	$ 53
FY 2017		$ 25	$ (7)	$ 18	FY 2017		$ (16)	$ (25)	$ (41)	FY 2017	$ (23)	$ (30)	$ 23
FY 2018		$ 110	$ 37	$ 147	FY 2018		$ (16)	$ (109)	$ (125)	FY 2018	$ 22	$ (18)	$ 55
FY 2019		$ 281	$ -	$ 281	FY 2019		$ (13)	$ (279)	$ (292)	FY 2019	$ (11)	$ (28)	$ 28
FY 2020		$ 26	$ 68	$ 94	FY 2020		$ (6)	$ (26)	$ (32)	FY 2020	$ 62	$ -	$ 68
FY 2021		$ 129	$ 32	$ 161	FY 2021		$ (6)	$ (129)	$ (135)	FY 2021	$ 26	$ -	$ 32
FY 2022		$ 66	$ 29	$ 95	FY 2022		$ (2)	$ (51)	$ (53)	FY 2022	$ 42	$ (42)	$ 71
FY 2023			$ 33	$ 33	FY 2023				$ -	FY 2023	$ 33	$ -	$ 33
FY 2024			$ 35	$ 35	FY 2024				$ -	FY 2024	$ 35	$ (38)	$ 73
FY 2025			$ 35	$ 35	FY 2025				$ -	FY 2025	$ 35	$ -	$ 35
FY 2026			$ 37	$ 37	FY 2026				$ -	FY 2026	$ 37	$ (38)	$ 75
FY 2027			$ 36	$ 36	FY 2027				$ -	FY 2027	$ 36	$ -	$ 36
FY 2028			$ 8	$ 8	FY 2028				$ -	FY 2028	$ 8	$ (67)	$ 75
FY 2012 NPV @ 1%	$ (704)	$ 682	$ 366	$ 344		$ 704	$ (121)	$ (666)	$ (83)		$ 261	$ (328)	$ 693
FY 2012 NPV @ 3%	$ (690)	$ 596	$ 303	$ 209		$ 690	$ (111)	$ (582)	$ (3)		$ 206	$ (279)	$ 582
FY 2012 NPV @ 6%	$ (671)	$ 490	$ 232	$ 52		$ 671	$ (98)	$ (480)	$ 92		$ 144	$ (225)	$ 457
FY 2012 NPV @ 9%	$ (652)	$ 407	$ 181	$ (64)		$ 652	$ (88)	$ (399)	$ 165		$ 101	$ (186)	$ 368
FY 2012 NPV @ 12%	$ (635)	$ 340	$ 144	$ (150)		$ 635	$ (79)	$ (334)	$ 221		$ 71	$ (158)	$ 302

The development of the complex of contracts was presented to Secretary Chu in April 2012. The memo, presented from Deputy Secretary Daniel Poneman's staff specified the following advantages:

> *<u>Benefits of the Proposal</u>*
> The proposed Depleted Uranium Enrichment Project has many benefits to the multiple participants. These include:
>
> To DOE
>
> - Provides NNSA a guaranteed source of US origin-unobligated LEU for TVA tritium production through 2022 and potentially significantly longer if TVA-NNSA cooperation is able to preserve the obligation of the inventory to be produced
> - Provides additional time for EM to prepare for GDP transfer, including requesting additional appropriations and conducting any necessary procurements for GDP surveillance and maintenance
> - Delays reimbursement of severance cost and pressure on DOE to pick up all or part of the 1,200 USEC workforce for one year
> - Reduces DOE depleted uranium conversion project requirements by 482 MTU

- Based on the public's perception that DOE should step in to minimize the impact to the local economy, including workforce reductions, from USEC's decision to shut down the Paducah GDP, the local community will likely see this as DOE supporting the local community and be a positive step for DOE's relationship with the community[12]

The draft briefing to Secretary Chu has a number of unusual elements. BPA's Gregory Delwiche, for example, addressed some of the issues in the original analysis:

> Eric - I understand you are meeting with TVA, DOE and USEC tda. Marcus just briefed me on the current gameplan and it looks to me as though BPA's threshold criteria isn't being met unless we bond for interest in the near term, which goes against the general logic of not borrowing money to buy groceries.
>
> Our criteria are:
>
> 1) -$20M/y in rate relief for each of the next two rate periods (i.e. FY14-15, and FY16-17) [or said slightly differently, net benefits of -$80M between now and the end of FY17, with the $80M roughly split between rate periods],
> 2) at least $50M in NPV,
> 3) valuation of the deal needs to be assessed under the terms of the existing CGS license, and
> 4) a 12% discount rate needs to be assumed (this is our standard practice for uses of capital where there is price uncertainty and/or broad uncertainty about the accuracy of assumptions driving the analysis).
>
> I would also emphasize that borrowing more money now shouldn't be thought of as a viable strategy for improving near term cash flow and meeting the associated rate relief criteria, we simply don't run the business that way. Marcus will be sharing our analysis with all of you shortly. Greg[13]

The Energy Northwest board was informed that the interest would be borrowed in the early years, in order to create the illusion of rate savings. However there is little evidence that this actually occurred. [14]

---

[12] Latest version of the Secretary's briefing memo, Eric Rockett to Scott Praetorius et al., April 18, 2012.
[13] Current status of tailings deal, Gregory Delwiche, April 4, 2012.
[14] Energy Northwest Pre-Meeting Materials Package, May 10, 2012, pages 15 and 19. Please note this is page 6 of the included Bank of America financing summary. Energy Northwest's 2014 Annual Report contains the following passage on pages 46 and 47:

> Capitalized interest costs were $19.1 million. This amount includes an adjustment for a correction of an error which relates to prior periods. The cumulative, net effect of the

The briefing to Secretary Chu continued: "ENW estimates that it could eventually use all of the LEU it is acquiring under the project."[15] Since the sale to TVA was one of the initial components of the transaction, this statement might be interpreted as misleading.[16]

TVA's enthusiasm for the project was limited. On at least one occasion TVA's management questioned the high prices being paid to USEC and the optimistic assumptions about future fuel prices:

> For tails enrichment, I'd think that a $140/SWU price is much more reasonable than $165/SWU as $138/SWU is the spot and $148/SWU the term price. Plus there is significant downward price pressure so even the current spot and term could come down another $10/SWU. The chance of going up exists but is slim at best.[17]

In the end, and apparently unknown to BPA and Energy Northwest, TVA received a "hold harmless" clause from DOE to reimburse it for the high prices in the contract.[18]

The Finding of No Significant Impact (FONSI) on page 10 is particularly troubling. The Paducah facility had one of the worst emissions records in the US, because it was supplied from two nearby vintage coal units. In addition, the obsolete production facility released the majority of Freon-114 in the United States.

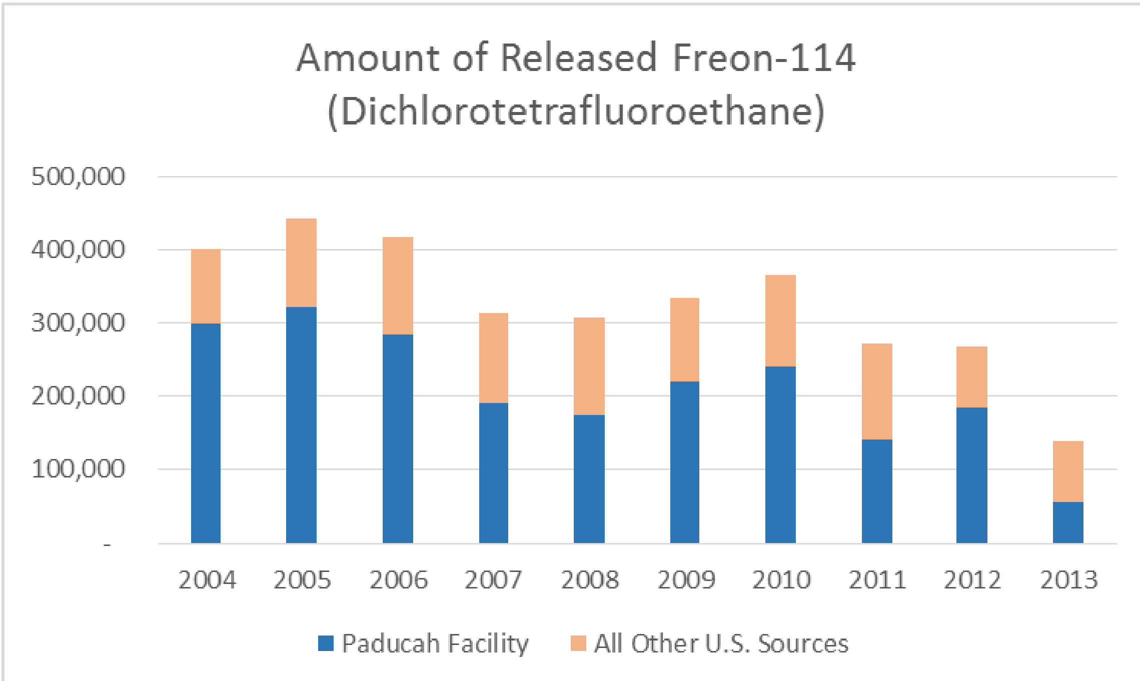
> prior period correction recorded in the current year is $18.7 million, of which $11.7 million has been capitalized to Nuclear Fuel and $7 million to Utility Plant. Capitalized interest relating to fiscal year 2014 is $0.4 million. The correction of the error in the current period is not considered to have a material effect on the fiscal 2014 financial statements.

[15] Latest version of the Secretary's briefing memo, Eric Rockett to Scott Praetorius et al, April 18, 2012, page 5. [16] Email from William Murphie to Stephen Wright, February 16, 2012.

[17] Email from Predrag Mastilovic to Eric Rockett et al, February 23, 2012.

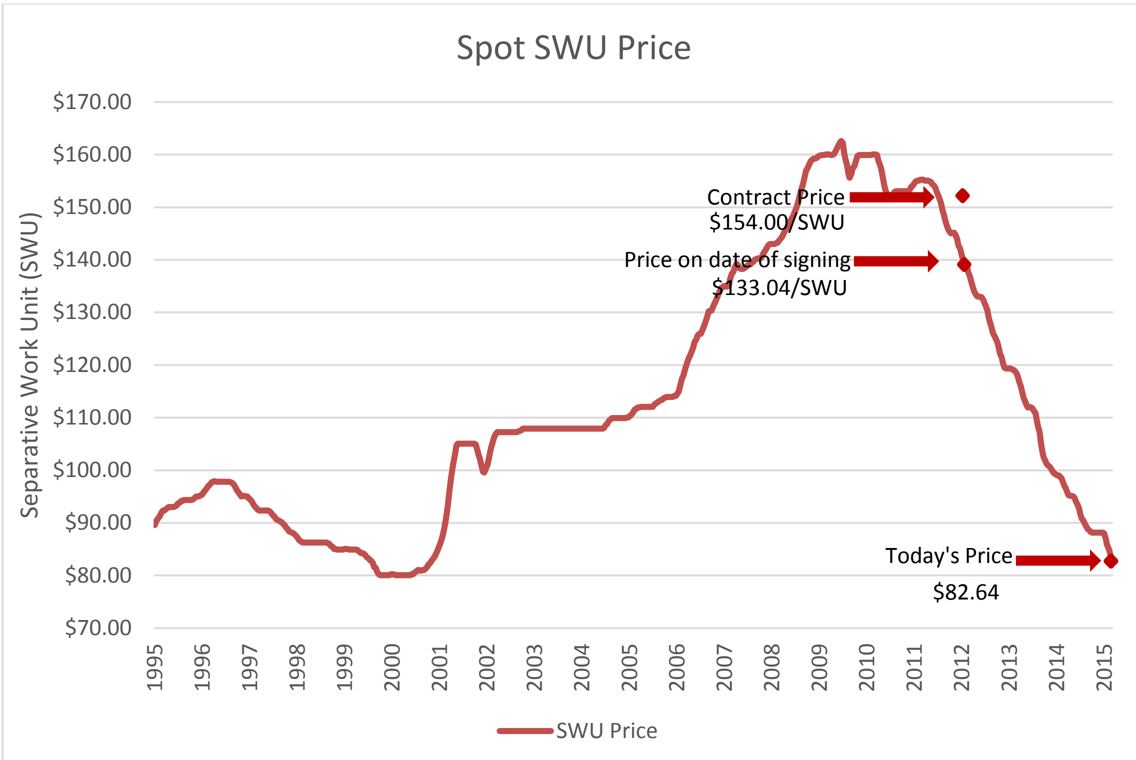
[18] Department of Energy FY 2015 Congressional Budget request/National Nuclear Security Administration, page 129:

> This requires that TVA acquire unobligated low enriched uranium (LEU) fuel and that NNSA pay any difference in the price of unobligated enrichment compared to fuel TVA obtains for its Brown's Ferry reactors on the open market. At present unobligated fuel purchased by TVA will come from Energy Northwest, who entered into an arrangement in May 2012 to have a quantity of DOE's high assay tails (depleted uranium) enriched at the Paducah Gas Diffusion Plant before it was shut down in May 2013. At that time, the enrichment price to TVA was set at $150 per separate work unit (SWU) in FY 2012 dollars, escalated at two percent a year. The subsequent softening of the uranium fuel market after the Fukushima event has caused the enrichment price differential payments to increase significantly in the out-years compared to original estimates.



The entire potential cost of the speculation in forward uranium prices was not mentioned in Secretary Chu's briefing, nor has the issue ever been addressed subsequently by Energy Northwest or BPA.

Notably, the prices agreed to in the Paducah transaction were 10% to 20% higher than the actual market prices in spring 2012. Today, the prices have fallen even further:



Any analysis of winners and losers from the complex Paducah arrangement dramatically favors the United States Enrichment Corporation and its corporate successor, Centrus Energy Corporation. In the end, TVA and Energy Northwest are held harmless by existing contractual arrangements with both DOE and BPA. The net effect has been that BPA's ratepayers have lost $250 million that they could have saved through market purchases of fuel, and USEC received a year's revenues at prices well above the market rate.

On March 5, 2014, USEC filed for Chapter 11 bankruptcy and underwent debt restructuring on its $530 million debt. The firm then emerged from bankruptcy, renamed Centrus Energy Corporation.[19]

Management responsibilities for USEC's American Centrifuge Project demonstration were taken over by the US Department of Energy through its Oak Ridge Tennessee National Laboratory. USEC was kept on as a subcontractor for the project.[20] Two months later, Department of Energy Secretary Ernest Moniz announced that Deputy Secretary Poneman would be leaving DOE in the fall.[21]

[19] http://www.washingtonpost.com/business/capitalbusiness/usec-files-for-chapter-11-bankruptcy-protection-in-investor-approved-plan/2014/03/05/611ef94a-a471-11e3-84d4-e59b1709222c_story.html
[20] http://www.dispatch.com/content/stories/local/2014/04/03/feds-taking-over-piketon-uranium-plant.html
[21] http://uk.reuters.com/article/2014/06/19/usa-energy-poneman-idUKL2N0P00ZO20140619

Centrus Energy Corporation has now hired Daniel Poneman to serve as CEO and President at an annual salary of $1.7 million.[22] He is expected to help the firm seek billions of dollars in federal loan guarantees, pending an improvement in the market for uranium and a forthcoming governmental report reviewing the need for domestic enrichment.[23]

---

[22] http://oakridgetoday.com/2015/03/05/former-doe-deputy-secretary-named-centrus-president-ceo
[23] http://www.eenews.net/stories/1060014618