



# Oregon

Theodore Kulongoski, Governor

## Department of Environmental Quality

Western Region Eugene Office

1102 Lincoln Street, Suite 210

Eugene, OR 97401

(541) 686-7838

FAX (541) 686-7551

TTY (541) 687-5603

January 9, 2007

DEQ

JAN 11 2007

Mr. Steve Pappajohn  
Methane Energy Corporation  
271 N Baxter St  
Coquille, OR 97432

RE: Well Stimulation Activities  
MEC Drilling Program  
Coos County, Oregon

Dear Mr. Pappajohn:

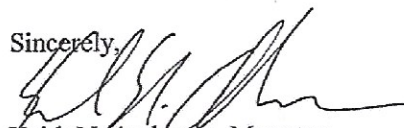
DEQ staff have reviewed the Underground Injection Control (UIC) registration application and additional information you submitted regarding underground injection activities at a series of exploratory coal bed methane wells at multiple locations in Coos County. Your site has been registered in the UIC database as #12915.

As explained in your registration package, you plan to inject nitrogen gas and/or "simulated" groundwater (i.e., water with various types of cations and anions added to it to better match the formation geochemistry) -- in addition to other fluids and proppants commonly used in gas well stimulation and development activities -- into coal beds located at depths ranging from about 700 feet to 5,000 feet below ground surface. The purpose of the injection is to open coal seams to enable methane gas to flow out of the formation to the wells.

The exploration wells you are using employ a system of multiple steel casings and grout seals which isolate the well from potential shallow drinking-water aquifers in the area. Specifically, a solid steel outer casing is typically installed to a depth of 400 feet or more below ground surface, and additional inner casings are used within this solid outer casing. Well construction and development work is done under a permit issued by and under the oversight of the Department of Geology and Mineral Industries.

We conclude that it is unlikely that your injection activities will affect the shallow underground sources of drinking water in the vicinity of the exploration wells listed in your registration application. Please consider this letter as written authorization for well stimulation and development fluid injection activities in the coal bed methane resource at your Coos County sites. Please keep us informed of your progress as we will be evaluating whether a long-term injection permit will be needed if you choose to convert these wells from exploratory purposes to long-term production. Please also be sure to update your UIC registration with the regional office and headquarters as you drill additional wells.

Sincerely,



Keith N. Andersen, Manager  
Regional Environmental Solutions  
Western Region - Eugene

KNA:wrm

cc: Peggy Halferty, MEC, 271 N Baxter St, Coquille, OR 97432  
Mary Sue Gilliland, DEQ-HQ  
Barbara Priest, DEQ-HQ



## **Coos Bay Coal Bed Methane Project Rears Its Head Again**

### **Research Notes, January 2018**

A London-based company—Curzon Energy LLC—is moving forward with plans to resurrect a coal bed methane (CBM) extraction project in the Coos Bay area first initiated early in the Century. Curzon has acquired 100% of Coos Bay Energy, LLC, and long with it, 45,000 acres of CBM leases, drilling permits, a pending DEQ NPDES permit renewal, and necessary mineral rights. The company has an ambitious three-Phase plan with the end goal of further lease acquisition for a total of 400 producing wells that will produce for up to 30 years. Curzon filed a stock offering on the London Stock Exchange last October.

Curzon reports that the initial steps of Phase I—workover and cleanout of five existing wells—are nearly complete and will be soon begin extensive well flow testing. For a dramatic view of this activity, go to : <https://www.youtube.com/watch?feature=youtu.be&v=IX3YodFL1WI&app=desktop>. Phase I also includes drilling two new wells, connecting five to seven wells via gathering lines to the existing Coos County Gas Pipeline, and producing first gas for sale in the 2ndQ of 2018. Curzon reports that it is in negotiations with Northwest Natural, the operator of the Coos County Pipeline, for purchase of the gas, and has approached Coos County for permission to connect via gathering lines. Coos Bay Energy LLC is the local operative.

A wealth of more detailed information about the project, including disclosure of identified “risks,” can be found in the company’s Prospectus:

<http://www.curzonenergy.com/~media/Files/C/Curzon-Energy/investor-docs/curzon-energy-plc-prospectus.pdf>

The company website: <http://www.curzonenergy.com/investor-relations/regulatory-news>

Videos re: Stock Exchange listing: <https://www.youtube.com/watch?v=MWnEKu6ccqQ>,  
<https://www.youtube.com/watch?v=S4Yn044CXhw>

### **Coal Bed Methane Extraction Process.**

Coalbed methane is a form of natural gas that is trapped in coal seams. It is extracted by drilling through the cap above the seam and releasing the ancient water. Sometimes a well is “stimulated” with “conditioned” water, meaning water mixed with sand, nitrogen, and/or generally undisclosed chemicals (allowed under 2005 amendments to the Clean Water Act). The mix is forced into the coal seam to help release the gas. That water does flow back out to the surface, but it should be noted that CBM extraction methods are not the same as hydraulic fracturing responsible for the natural gas (and oil) boom from shale. As the “fossil” and conditioned water (together called “produced water”) is pumped to the surface, the pressure in the reservoir drops and the gas follows the water upwards where it is captured and stored or transported via pipeline for sale.

Produced water disposal is a major challenge in CBM development. Thousands of gallons of produced water per day are pumped from each operational well. The ancient water is saline and contaminated with chemicals that may include carcinogenic hydrocarbons such as benzene, toluene, ethyl-benzene and heavy metals including arsenic, cadmium, lead, mercury, and in this case, copper. Radioactivity may also be released in the process. While in some CBM developments, produced water is disposed of by reinjecting it back into the ground, Coos Bay projects have all pursued from DEQ a National Pollutant

Discharge Elimination System (NPDES) permit allowing them to discharge produced water into the Davis Slough five miles south of Coos Bay after it is put through an approved water treatment system.

### **Coos Bay CBM Project History and Regulatory Background.**

Sporadic oil and gas applications in Coos County date as early as 1953 and increased somewhat through the 1980s and 1990s, but a flurry of applications (34) were filed from 2004-06. As part of that, Methane Energy LLC (MEC) of Coquille, a subsidiary of Colorado-based Torrent Energy, leased surface operation and mineral rights on 118,000 acres in Coos County owned by the state, county, and private landowners. MEC hoped to recover 30 percent of an estimated 1,200 billion cubic feet of gas.

[http://blog.oregonlive.com/pdxgreen/2007/11/new\\_energy\\_source\\_bubbles\\_up\\_i.html](http://blog.oregonlive.com/pdxgreen/2007/11/new_energy_source_bubbles_up_i.html)

MEC directionally drilled several 4,000-foot wells into coal seams northwest of Coquille and in 2006, they installed five 2,000-foot wells in the Westport area under a mineral right leased from Rayonier Olympus Corp. At this point, we believe these latter five wells to be the wells currently being worked by Curzon (referred to as 1-21, 9-21, 15-21, 13-15 and 16-16). A press release by Torrent Energy dated July 23, 2007 appears to indicate that wells 16-16 and 9-21 were producing “gas to flare and formation water to storage.” Torrent indicated that they had completed testing of a water treatment system that would allow “for the inexpensive treatment of future frac water and produced water.” They anticipated receipt of the necessary permit within a month. [http://www.marketwired.com/printer\\_friendly?id=753522](http://www.marketwired.com/printer_friendly?id=753522)

In October 2007, DEQ announced a public comment period regarding proposed issuance of a NPDES permit for the MEC project. They stated of the exploratory wells that were being drilled that the groundwater produced resembled dilute seawater. It had been trucked to permitted wastewater treatment plants and discharged from there, but further development and resultant volumes of water would require the company to obtain their own permit to treat and discharge water. The discharge point would be a point in the Davis Slough. The DEQ notice acknowledged potential concerns about contamination of drinking water aquifers, but indicated that EPA studies had shown no evidence that would occur. <http://library.state.or.us/repository/2011/201109010951034/index.pdf> The public comment period yielded that concern, plus the tendency of coal bed methane extraction process to drain shallower aquifers and direct water quality concerns for impacts on soils, plants, and fish. On 11/20/2007, DEQ issued a five-year permit (#102935) allowing discharge of 100,000 gallons of produced and treated water into the Davis Slough. The treatment was to remove dissolved salts, copper, and other substances. The permit would expire on 10/31/2012.

[http://www.deq.state.or.us/wqpr/1757\\_200912150000bCS08.PDF](http://www.deq.state.or.us/wqpr/1757_200912150000bCS08.PDF),

<http://www.deq.state.or.us/permittracker/StatusOfPermitApplicationResults.aspx?facilityID=116710>

Information on subsequent activity is sketchy. Westport Energy LLC acquired Methane Energy in a bankruptcy in 2008. In 2010, Carbonics Capital Corp acquired Westport Energy LLC and renamed itself Westport Energy Holdings, Inc. A spokesperson for the South Coast Development Council verified at that time that the wells were “operational, though suspended.”

[http://theworldlink.com/news/local/company-acquires-westport/article\\_52d730ad-b93c-5d82-8a20-c19444dce862.html](http://theworldlink.com/news/local/company-acquires-westport/article_52d730ad-b93c-5d82-8a20-c19444dce862.html)

With permit expiration coming up, on August 7, 2012, Westport Energy LLC (not Holdings, Inc.) applied to renew the NPDES permit. It was determined to be “complete” on January 1, 2014. Steve Nichols of WQ Point Source, Western Region of DEQ stated that he saw no evidence of a water treatment facility

on a site visit in April 2014. He said that, although a renewal application submitted in a timely way is routinely extended administratively, before any discharge to Davis Slough would be allowed, the company would have to submit plans and set up approved facilities. He reported that at present, processing of the renewal application was not on the list to be written and would be a low priority for processing. (This will conflict with Curzon's timeline, but Steve Nichols said he had not heard of any contacts being made by the company seeking to fast-track the process.) There would be no further opportunity for public comment. (Phone conversation, January 5, 2018)

### **Environmental Issues Related to Coal Bed Methane Extraction.**

- Release of toxic produced water into waterways
- GHG emissions and their impact on climate change
- Lowering/depletion of shallower aquifers and disruption of other beneficial water use
- Emissions of other hazardous air pollutants, e.g., hydrogen sulfide, nitrogen oxides (NOX) and other aromatic hydrocarbons
- Pipeline Rupture, explosions, and wildfires
- Subsidence and earthquakes
- Land and mudslides
- Boom and bust socioeconomic environment
- Noise pollution from compressor stations and flaring
- Subsidence and earthquakes
- Impact on human and animal health associated with CBM extraction
- Heavy vehicle traffic
- Increased fossil fuel dependency and commitment at the expense of green energy development

### **Possible Next Steps**

Regulatory issues that provide an opportunity to surface and highlight the negative impacts of this project need further research, but here are some pertinent factors to date.

- *The renewal of the NPDES permit may offer some entry points, although as noted, issues would need to be raised outside of the process.* Other eyes are needed to look into this, but so far, it seems possible to contend that the permit is deficient and therefore should be revisited before renewal. According to the permit evaluation, it was the first NPDES permit for surface discharge of produced water in Oregon. There were no Effluent Limitations Guidelines (ELG) for controlling CBM water pollution. This, by the way, is still the case. According to the EPA website, they began considering such guidelines in 2010, but admittedly abandoned the project in 2014 because the treatment "technologies are not economically achievable for the CBM industry as a whole." (<https://www.epa.gov/eg/coalbed-methane-extraction-industry>) Moreover, the permit issued in 2007 describes what we read as a troubling, data-deficient process used to determine that the

water status of the Davis Slough was “High Quality” and therefore not subject to 303d conditions. [http://www.deq.state.or.us/wqpr/1757\\_200912150000bCS08.PDF](http://www.deq.state.or.us/wqpr/1757_200912150000bCS08.PDF) (p. 7)

- Research to estimate *the GHG emissions* that can be expected from a project of this type and size needs to be done.
- Both Steve Nichols and Mary Camarata (DEQ) said that there would be *no connection for NEPA purposes between the Curzon Energy project and the Jordan Cove LNG project*. (Email with Mary Camarata, January 8, 2018.) However, the on-the-ground connection is undeniable. Following on the heels of the CBI report on lifecycle GHG emissions of the Jordan Cove Pacific Connector Pipeline project, it should be of great interest to Oregonians to know the additional impact on all state, national, and global climate change goals of this 400- well project expected to remain on line for up to 30 years.
- Because only gathering lines are required to connect any operational wells to the target Coos County Pipeline, *it does not appear that there will be any involvement of the Federal Energy Regulatory Commission (FERC) and NEPA would not apply*.
- We have not yet encountered any regulatory processes relating to the Oregon Division of Fish and Wildlife, even though DEQ mentioned ODFW as an agency with interest in this project.
- Would there be air quality regulations related to this type of project?

(Shirley Weathers, Ph.D.; Walsh & Weathers LLC; 541-690-7779; [walsh.weathers@gmail.com](mailto:walsh.weathers@gmail.com))



# **Coos Bay Coal Bed Methane Project**

## **Research Notes #2, Fracking Issues**

### **April 4, 2018**

#### **Project Overview and Current Status**

Curzon Energy LLC is a new, London-based company that has plans to resurrect a coal bed methane (CBM) project in the Coos Bay area begun in 2004, but ended in bankruptcy in 2008 without reaching production. Curzon has acquired 100% of Coos Bay Energy LLC, including 45,000 acres of CBM leases and associated mineral rights, at least five existing permitted wells, a National Pollutant Discharge Elimination System (NPDES) permit allowing discharge of treated produced water into the Davis Slough. The company has an ambitious three-Phase plan with the end goal of a total of 400 producing wells expected to yield methane gas for up to 30 years.

Curzon Energy is moving forward with activities included in its Phase I, “a \$1.3 million program, [that] consists of re-entry of five existing wells, drilling two new wells, installation of all remaining infrastructure required to establish gas production in the field, and evaluation of the commercial viability of the seven Phase I wells and the larger field-wide, development program.”<sup>1</sup>

Curzon began working five existing wells late last year. As of March 16, 2018, Curzon released the following status report to investment outlets in the UK:

- All five existing wells (1-21, 9-21, 15-21, 13-15 and 16-16) are operational,
- Recording of gas volumes continues with rates expected to increase as per CBM type curve,
- Gas currently being produced is sufficient to power wellhead pumping equipment
- Gas volumes are in line with expectations given the extent of the wells open to the productive horizons
- The Company anticipates gas rates to increase steadily as dewatering continues<sup>2</sup>

#### **Critical Current Issue for Curzon—Reaching Commercially Viable Gas Flow Rates**

As indicated in the above company update, the key issue at this point is gas flow rates on the five existing wells. Without managing to achieve commercially viable rates, Curzon’s business plan cannot be implemented. It is unlikely to be able to attract additional investors. It can discuss a sales contract with Northwest Natural, its intended customer, or an agreement to use the Coos County Pipeline, but nothing can be finalized. It would be premature to install the water treatment system required by the National Pollutant Discharge Elimination System (NPDES) permit obtained from the previous owner, as well as to apply for any of the other permits the project will need to operate. Thus far, gas flow rates are far below the required levels. This paper explores some available sources to understand more about the Coos Bay CBM field and what actions might be expected as Curzon seeks to determine/achieve commercial viability of its investment.

#### **Current Activity**

A Curzon spokesperson indicated to DOGAMI staff during a February 20, 2018 site visit that 1,000 cubic feet of gas/day or less was being produced. The representative said the company will not apply for any additional

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<sup>1</sup> <http://www.curzonenergy.com/~media/Files/C/Curzon-Energy/investor-docs/curzon-energy-plc-prospectus.pdf>, p.5.

<sup>2</sup> <http://www.londonstockexchange.com/exchange/news/market-news/market-news-detail/CZN/13569296.html>

permits, including to drill the two new wells included in their Phase I work plan, unless commercial viability is determined by attaining gas flow rates of 20,000 to 25,000 cf/day.<sup>3</sup>

The situation prompted Curzon to move up a procedure it has previously planned for full production—bridge plug removal in four of the five wells.<sup>4</sup> On March 16, they stated in a press release: “The removal of these bridge plugs will provide the company with access to deeper productive coal seams that were previously isolated due to the location of the bridge plugs. Access to these coal seams will serve to more than double the total “pay zones” that can contribute to gas production. In addition, the removal of these plugs will enable the Company to clean-out the entire well depth. The Company believes that this additional well work, which will allow access to more than twice as many “pay zones,” will shorten the time-frame to commercial gas production and increase overall gas production volumes.”<sup>5</sup>

There is an additional strategy that Curzon could employ to try to bump production of these five wells: hydraulic fracturing. DOGAMI provides the following regarding hydraulic fracturing (AKA fracking):

Hydraulic fracturing typically involves injecting water, sand, gas, and/or chemicals under high pressure into a formation via a well. This process creates new fractures in the rock and increases the size and connectivity of existing fractures. Many rock formations have low permeability, which means that the gas, oil or hot water they contain will not flow economically through the rock into the well. The hydraulic fracturing technique is commonly used to increase the permeability of a rock formation, and increase flow into a well. In recent years, technological advances in horizontal drilling and hydraulic fracturing have resulted in dramatically increased oil and gas production in many parts of the United States.<sup>6</sup>

DOGAMI reported in March that, “No hydraulic fracturing, or fracking, is currently taking place as part of the Coos County project . . . [and] the company representative has stated that they do not intend to use hydraulic fracturing.”<sup>7</sup>

Curzon’s statement to DOGAMI that they will not frack is curious because 1) it is common practice across the country and elsewhere in the world to frack CBM fields, and 2) although limited, historic development of CBM in this area seems to indicate that fracking, including as a secondary recovery method, is what has worked in this field to obtain commercially viable gas flow rates. Fracking may well be the only way they could hope to approach their Phase I goal of gas production to sale by the end of the second quarter 2018. The clock is ticking and flow rates are dismal at the end of the first quarter.

## **Fracking History**

In 2005, Methane Energy Corps (subsidiary of Torrent Energy Corporation of Canada), drilled several wells. We do not have access to either the initial drilling procedures or flow behavior for these wells, but it appears that they were unsatisfactory because in March of 2006, Halliburton Energy Services was called in to perform “nitrogen stimulation” (injecting up to 1,020,000 scf of nitrogen gas in the coal formations) on Methane Energy Corp’s Beaver Hill #2, #3, and #5 and Radio Hill #1 pilot wells. A *Business Wire* press release reported that 16

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<sup>3</sup> Oregon DEQ, “Curzon Energy/Coos Bay Energy LLC,” Initial Report, March 7, 2018, p. 2.

<sup>4</sup> <https://www.youtube.com/watch?v=pr8TLo5d5V8>

<sup>5</sup> <http://www.londonstockexchange.com/exchange/news/market-news/market-news-detail/CZN/13569296.html>

<sup>6</sup> Oregon Department of Geology and Mineral Industries, “DOGAMI Fact Sheet Hydraulic Fracturing in Oregon,” March 2018.

<sup>7</sup> Oregon DEQ, Attachment 1 – DOGAMI Status Update, March 5, 2018, p. 3.

total “nitrogen stimulations” were performed, possibly all on four wells.<sup>8</sup> Torrent reported that “breakdown in the formation(s)” was achieved in the four named cases and said their next step would be to “connect the wells to production test facilities currently on location, pump any formation water and test potential gas rates and flowing pressures.”<sup>9</sup> Documentation of the results of that activity have not yet been found, but in an investor presentation in London in early February, a Curzon representative said the previous owner reported flow rates of 200,000-500,000 cf/day on Beaver Hill and Radio Hill wells.<sup>10</sup>

In September 2008, Torrent announced that it had fracked what appear to be the five wells Curzon is currently working. These wells were all permitted in 2006 and, from the press release, it appears that this activity, too, occurred post-drilling to enhance initial marginal production. This time, Halliburton reportedly tested both “nitrogen foam and cross-linked gel fluids as carriers for frac sand.” The activity was reported to be “successful in terms of increasing the productivity of the wells” to rates of 48,000 cf of gas and 356 barrels of water per day.<sup>11</sup>

Financial troubles ended in bankruptcy and takeover and disrupted development at that point. The assets changed hands several times, although the current CEO and CFO of Curzon Energy LLC, Steve Shoepfer, has been in that role since 2010.<sup>12</sup> A 2011 Oregon Public Broadcasting story indicates that there had been no activity since 2008.<sup>13</sup> A Curzon spokesperson refers to positive subsequent gas flow testing on one of the wells (1-21) in 2012, but we have been unable to find corroborating documentation of that.<sup>14</sup> In June 2014, Torrent Energy Corp. was acquired by Embarr Farms, Inc., in a reverse merger transaction, but no details suggesting activity have emerged.<sup>15</sup>

What can be said, though, is that would-be producers attempting to make a go of it with coal bed methane exploitation in the Coos Bay area have reportedly achieved commercially viable gas flow rates in test flows, but only after fracking.

### **Frack Now?**

Curzon’s Prospectus contains the only mention of fracking we have seen in materials reviewed so far:

Hydraulic fracturing is currently allowed in the State of Oregon. Efforts at the federal, state, or local level to increase regulation of, and/or prohibit, hydraulic fracturing may occur. For example, a bill now pending in the Oregon Legislature would impose a moratorium on hydraulic fracturing (proposed to be broadly defined as “the drilling technique of expanding existing fractures or creating new fractures in rock by injecting water, with or without chemicals, sand or other substances, into or underneath the surface of the rock for the purpose of stimulating oil or gas production”) until the end of 2027, but

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<sup>8</sup> Wells by these names are numbered 36-011-00038 through 36-011-00042 and all have “closed” status in DOGAMI’s database (in the interactive mapping tool, they show as “permitted.”)

<sup>9</sup> <https://www.businesswire.com/news/home/20060316005296/en/Torrent-Energy-Update-Nitrogen-Stimulation-Program-Pilot>

<sup>10</sup> <https://www.youtube.com/watch?v=pr8TL05d5V8>

<sup>11</sup> <https://www.oilandgasinvestor.com/torrent-completes-frac-program-coos-bay-cbm-project-447791>

<sup>12</sup> <https://www.businesswire.com/news/home/20100819006292/en/Carbonics-Capital-Corporation-Announces-Acquisition-Westport-Energy>

<sup>13</sup> <https://www.opb.org/news/article/coal-bed-methane-creates-coos-bay-challenges/>

<sup>14</sup> <http://www.proactiveinvestors.co.uk/companies/stocktube/8612/curzon-energy-excited-about-well-tests-at-coos-bay-project-8612.html>

<sup>15</sup> <https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=721917>



CBM extraction wells in existence on the effective date of the bill, if enacted, would be exempt from the proposed moratorium.<sup>16</sup>

The referenced bill, HB 2711, did not pass so the field is currently open for fracking to be used for any of the up to 400 wells Curzon has planned.

Curzon may hope to avoid fracking, not only because of the expense when they apparently have limited resources, but knowing that it is an increasing controversial practice and that the Oregon community has already shown intense commitment to limiting new fossil fuel development. On the other hand, the clock is ticking towards Curzon's Phase I goal of gas for sale by the second quarter of 2018, a goal they continue to stress in investor presentations that they are on-track to reach. DEQ's report seems to indicate that the regulatory processes that will need to be completed by themselves make gas for sale by June or July unlikely, but the company will be motivated to meet its goal.

To return to HB 2711, Rep. Ken Helm introduced it in 2017, at a time when Oregon had only experienced a handful of occasions of fracking over a decade ago and there were no proposals for more fracking anywhere in the state. He sought to provide time for careful consideration of the great number of complexities and environmental concerns related to hydraulic fracturing that have confronted other states and often defied solution. Due to a lack of bipartisan support, the bill died in the Senate. Now suddenly, we believe the prospects of fracking are on the verge of changing.

If our concern that Curzon will ultimately decide to frack these wells, we are uncertain at this point if they would be able to proceed under their current permits. We are checking to see if new Underground Injection Certificates (UIC) will be needed or if those issued in 2007 will still apply. In a shale gas situation, the volumes of water to inject as well as the means to dispose of the produced water that comes back out would likely produce a barrier, but typical CBM fracking methods require and produce far less water, so it may be able to be stored in existing onsite tanks and trucked away.

In any case, even considering these five existing wells, DEQ and DOGAMI are likely to be required to respond on short notice to an activity that hasn't occurred in a decade and then only on nine wells. The fracking industry has advanced substantially since 2005-06 when the agencies were last called upon to permit the activity and monitor the various risks involved. Likewise, understanding the depth and breadth of those risks has advanced such that the EPA in December 2016 acknowledges the conditions and potential for aquifer contamination. The opposite was true in 2007 when the NPDES permit was issued. Once fracking is initiated in this field, the door will open to many more issues.

(Shirley Weathers, Ph.D.; Walsh & Weathers LLC; 541-690-7779; walsh.weathers@gmail.com)

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<sup>16</sup> Curzon, "Prospectus," p. 60.