Billings Refinery

November 9, 2014

Dear Council Member:

Please find attached the minutes from our October 14, 2014 CAC meeting. The next CAC meeting will be on **TUESDAY, NOVEMBER 11, 2014** at the Phillips 66 Learning Center. Dinner will be served from 5:00 to 5:30 and the meeting will run from 5:30 to 7:30 p.m.

Sincerely,

Ann L. Clancy, Ph.D.
Meeting Facilitator

Meeting Location: Phillips 66 Learning Center
415 South 24th Street

PHILLIPS 66 BILLINGS REFINERY
CITIZENS ADVISORY COUNCIL
October 14, 2014

MEETING MINUTES

Present: Council members: Keith Beartusk, Bob Carr, Paul Dextras, Bruce MacIntyre, Shirley McDermott, Eileen Morris, Mark Pagano, John Pulasky, Jim Ronquillo, Melanie Schwarz, Emily Shaffer, Andrew Sullivan, Stella Ziegler
Phillips 66 management: Colin Franks, Randall Richert, Mark Hilbert
Facilitator: Ann Clancy

Absent: Ken Ard, Ralph Hanser, Lance Johnson, Joshua Juarez, Melissa Patton, Ray Rigdon, Mike Yakawich, Michelle Zahn

Guests: MSU-B student: Bob Bare
CAC member guests: Norma & Ron Tade; Ziggy Ziegler; Chris Dimock
MSU-B students: Roxsand Reichert, Cody Shelmerdine, Robert Ross, Art Kestner
MSU-B Professor of Engineering: Katey Plymesser

AGENDA

- Welcome/Introductions/Agenda
- Agriculture-Energy Industry Discussion Panel
- Next Meeting: November 11
    - Community ER & Disaster Planning Process
    - Regional Haz-Mat team Concept & Billings Fire Dept.
    - P66 Refinery ER & Disaster Planning Process

WELCOME/INTRODUCTIONS/AGENDA

Colin Franks introduced Shea Dawson who has replaced Travis Sloan as Manager of Finance & Public Affairs at the refinery. General introductions followed.

AGRICULTURE-ENERGY INDUSTRY DISCUSSION PANEL

The discussion panel was pulled together by a subteam of CAC members: Mark Hilbert, John Pulasky, Shirley McDermott and Keith Beartusk. The subteam identified the following theme for the panel discussion: *Link Between Agriculture & Energy Industries - What does the future look like?* John Pulasky introduced the discussion panel topic and Mark Hilbert acted as moderator of the panel.

Oil-Based Ag Products

In his presentation, Howard Butler, Manager at Jupiter Sulphur, talked about the range of oil-based agricultural products. He used the example of a Nature Valley granola bar as a food product which contains and/or was produced using oil based products.

- “Eating Oil”: Oil based products and energy that are essential in every step of modern agriculture
- Traditional agriculture: Land, seed, sun, water, labor produce crops and food stuffs
- Modern additional direct inputs: Diesel to power machinery for plowing and harvesting and applying fertilizer
- Modern additional indirect inputs: Energy and raw material required to manufacture pesticides, herbicides, fertilizers; energy to transport crops and foodstuffs to customers; fertilizers which dramatically increase crop yield from 20-100%.
- Local refineries: Produce both diesel and fertilizer which supply the energy required for local producers to be competitive

He also identified a range of oil derived products:

- The number one oil derived ag product is diesel:
    - Fertilizers can be derived from oil and all crude oil contains some sulfur, varying by 3%
    - Sulfur has to be completely removed from gasoline and diesel
- Sulfur can either be dry or liquid. Jupiter produces liquid THIOSUL.
- Phosphate: most crude oil sulfur is made into sulfuric acid.
- Nitrogen: mostly supplied from ammonia which is made from natural gas.
- Potassium: mostly supplied from potash which is mined around the world.

In summary, Howard noted:

- Three main purposes for oil worldwide: food, transportation, and heating
- Agriculture and oil are inextricably linked:
    - Oil based energy powers the modern food complex
    - Diesel power has replaced manpower in agriculture
    - Oil derived fertilizers and herbicides are essential to derive the yield required to feed the planet
- Oil energy inputs are nearly equal to food calories
- Local refineries produce both diesel and fertilizer which enables local farmers and ranchers to be competitive in a world market

Impact of RIN Credits & Ethanol Subsidy on a Montana Refinery

Dave Whisenhunt, Supervisor and head of the economic and planning group at the P66 Billings refinery, gave the purpose of his presentation as outlining the role of renewable fuels, ethanol in particular, in the array of U.S. energy supply options. He briefly reviewed the impact of renewable fuels legislation, especially regarding ethanol, on the Phillips 66 Billings Refinery. In terms of perspective, he showed the U.S. energy consumption trend has steadily increased from 1950 to 2013 and is projected to increase through 2040. This consumption includes coal, oil, natural gas, hydroelectric and nuclear power, and renewables such as biomass, geothermal, solar and wind. He remarked that while energy consumption has increased 2.8 times over that time period, there hasn’t been a great deal of change in the relative amount of energy consumed in each of the major categories. Natural gas and nuclear energy have displaced coal to some extent since 1950. He noted that while hydroelectric power is classified as renewable there is little ongoing effort to expand this sector.

The Renewable Fuel Standard (RFS) was established with the Energy Policy Act of 2005 with the intent to increase the amount of biofuels in gasoline. There was an RFS-1 set in 2005 and a RFS-2 set in 2007. It is administered through the EPA. The mandate was to replace up to 10% of U.S. motor gasoline with ethanol. The mechanisms the EPA uses to implement the RFS program include renewable volume obligations (RVOs) and renewable identification numbers (RINs). RVOs are the volume targets for each refiner or importer of petroleum based gasoline or diesel fuel. The RINs allow for flexibility in compliance. Each gallon of renewable fuel produced has a RIN associated with it. New RINs can only be generated by manufacturing volumes of a compliant biofuel. Surplus RINs are therefore purchased from biofuel producers. Any gap between the RVOs and what is actually blended must be made up with sufficient purchased RINs (aka "credits") to be in compliance. An annual supply of "fresh" RINs sufficient to meet both the consumer demand for motor fuels and the RVOs is necessary for refiners to avoid EPA penalties.

While no commercially viable cellulosic-based fuels process existed in 2007, rapidly increasing quantities of this material were mandated to be blended beginning in 2011-2012. This material was to exceed the amount of corn-based ethanol in the pool by 2022. EPA pinned its hopes primarily on a viable cellulosics technology. The E-10 "blend wall" was effectively reached in 2013 meaning 10% of U.S. gasoline supply has become ethanol. To some extent, therefore, the RFS-2 mandate is considered successful. Projections show, however, that the RFS for cellulosics has fallen well short of expectations. While additional corn-based ethanol could be blended, the manufacturers' warranty prohibits using anything above 10% for many vehicles. In addition there are significant technical and logistical challenges to overcome in going beyond the 10% blends. Proponents argue for the EPA to basically force these issues, but the cost and effort to do so are quite large. Most current efforts appear to be focused on use of patented micro-organisms or enzymes to generate cellulosic-based fuels. Cellulosics appear to be at least 3-5 years behind schedule. Research indicates that biofuels are not expected to make a significant difference in U.S. energy supply within the next 25 years.

The Phillips 66 refinery does not add ethanol to any fuel. The Transportation group operates the terminals and truck racks where ethanol blending is conducted and the pace of that blending is set by capital project cycles. The Billings refinery is just below the 10% ethanol blend wall. Phillips 66 supplemental RINs consumption currently results primarily from diesel fuel sales since gasoline has been 90% covered by corn-based ethanol blending. This could change, however, according to Dave. Blending ethanol can have a mix of both positive and negative impacts on fuel quality, such as a significant increase in octane rating or an increase in blended fuel volatility and evaporative emissions. Even government studies show that while liquid biofuels will gain share it will remain a small source. Dave concluded that the total contribution to U.S. energy supply may be no more than 2% by 2040.

Industry-Ag-Water-Related Research, Key Stakeholder Interests & Concerns about Yellowstone River

Luke Ward, Professor at Rocky Mountain College, presented the results of a research project that included a team of both Rocky Mountain College and MSU-B researchers who studied stakeholder perspectives on managing the Yellowstone River under conditions of stress. They held scoping meetings in Big Timber, Billings, Forsyth and Glendive which were designed to assess the public's perceptions of the major water-related issues in the basin. The study used a "Q Sort" as a key method of gathering and documenting public inputs rather than the traditional town-hall style meetings. As part of the methodology, 16 statements were distilled from the public participation input that represented key differences in how respondents organized their views regarding management and development issues of Yellowstone River. Five factors

emerged: eco-system orientation, pro-industry/water market orientation, irrigators anti water market orientation, pro water market and reserves/storage orientation and storage. The study results showed a strong basin-wide agreement that management must be more complex, that there is a lack of information, and that preparation needs to be made for future severe drought and precipitation events. Concluding points from the study identified levels of agreement about the conditions of management, disagreement about how to allocate scarce water, and disagreement about best practices for achieving management objectives regarding conservation, water markets, dams/reservoirs, and water transfers. Luke identified the "elephant in the room" as being the measurement question.

Energy Use & Agriculture over Time

Joel Schumacher with the Department of Agriculture Economics & Economics, MSU Extension, focused on how improved technology has resulted in better Montana agriculture fuel use and Montana grain production. From 1964 to 2012, gallons of fuel used in Montana grain production have decreased while total bushels produced has dramatically increased. For example, technology has greatly improved fuel use from 7.92 gallons to 5.25 gallons with John Deere tractors. Nationwide, crop yields per bushel have doubled per acre for soybeans and wheat and corn has more than doubled, far outpacing other crops. According to Joel, this is due to the production of ethanol, which is being driven by government policies, such as renewable fuels standards and government subsidies. He noted that Montana is mostly outside of the high corn production trend taking place elsewhere since corn is hard to grow in Montana's climate. As a result of this shift, U.S. ethanol production has grown from about 2,000 gallons in 2001 to 14,000 in 2014. He pointed out that nitrogen use per acre has greatly increased with the higher level of corn production – 120 pounds per acre compared with just 40 for the production of wheat. It requires more nitrogen to grow certain crops, like corn. Joel concluded with two points. First, agriculture is one of the great success stories in the U.S. and agriculture will continue to have strong incentives to improve productivity. Second, increased productivity may decrease the use of some inputs (labor, liquid fuels) but increase the use of others (fertilizer).

Link Between Ag & Energy Industries

David Mosdal, Montana Sulphur and Chair of the Yellowstone County Conservation Board, distributed a handout of a painting by Clyde Aspevig which he used to illustrate the evolution of the link between agriculture and energy. He believes that agriculture production, which is ultimately dependent on the sun's energy, is heading to a plateau where the different factors of population growth and energy level needs will level out. He pointed out biomimicry as a future growth industry in which polymers found in nature can be used for more than just food production.

Cost of Ethanol to Consumer

Brad Molnar, former Public Service Commissioner, addressed the question of ethanol in terms of who pays and who benefits. He stated that ethanol production was a political decision and was not market driven. Most ethanol in the U.S. is made from corn and there is now a second generation ethanol being produced (cellulosic) made from crop residue, wood chips, grass and other non-food sources. This second generation of ethanol production, while it eliminates the debate that ethanol competes with food for acres, does not reverse the current trend that land is being dedicated to ethanol and to make it more efficient. He compared the cost of carbon dioxide (CO_2) abatement from biofuels (dollars per metric ton of CO_2) to be $754 for corn-based ethanol, $306 for biodiesel and $275 for cellulosic ethanol.

In terms of land use, fuel production consumes 40% of the U.S. corn crop – enough to feed half a billion people. He said that to accomplish this the U.S. has removed an area the size of Delaware from conservation programs, drained wet lands and plowed grass lands to accommodate the corn subsidy. Total land disturbance is the size of Indiana. In addition, aquifers are dedicated to growing the subsidized/mandated crop. Historically, the subsidy began in 1980 and in 2004 President Bush changed to a volumetric tax credit (jobs creation act/Stimulus). In 2011, it was switched to a Renewable Fuels Standard which was not opposed by the renewable energy lobby.

In terms of efficiency and who pays, Brad stated that ethanol yields 75% in power per gallon used versus a gallon of gasoline which cost $3.6 billion at the pumps in 2006. He projects it will cost a $770 billion decrease in Gross domestic Product and cost $2700 per household consumption in 2015. In terms of environmental impact, Brad maintains that throughout the production cycle almost as much energy is used as produced. More CO2 and greenhouse gas is produced than saved on irrigated land. Cellulosic production is a little better. Cattle, poultry and other human food stuffs must compete with ethanol production. Brad believes that ethanol subsidies benefit only the most profitable companies (corporate welfare) and quotes the Cato Institute in saying that every dollar of profit that companies like Archers Daniel Midland receive from ethanol costs taxpayers. In conclusion, he believes that the U.S. has an ethanol and government problem, not solution.

Pipelines under Farm Land, Company Investment in Ethanol Facilities

Mark Hilbert, Major Maintenance Superintendent with P66 Pipelines, reported that many pipelines run under farm land and that company investment in ethanol storage exceeds $5 million for locations to receive and blend the ethanol into the gasoline streams. The Billings Division of P66 Pipelines has 119 employees with 48 located in Billings. It runs four pipeline systems that operate 2,246 miles of Department of Transportation pipeline. The division operates 12 terminals and has storage capacity of 3 million barrels.

CAC Member/Guest Comments & Questions

Following the panel presentations, CAC members and guests were given time for questions and comments which are listed below:

- As a restaurant owner, the increase in ethanol production has caused an increase in food costs.
- *Why does farming use primarily diesel fuel?* Diesel is more powerful and produces more torque as a fuel.
- *Why are you not supposed to put ethanol into small engines?* It's ok only if the fuel has no more than 10% ethanol added.
- *Is the U.S. the only country deep into ethanol?* Brazil is very big into ethanol made from sugar cane and cars are now manufactured to run on it. Europe is going to diesel.
- *The RIN – does that sunset?* There is no mandated end. It goes through 2022.
- *Has the national political scene and Congress come to consensus on ethanol?* Because other renewables haven't yet come on line quickly enough, the government has had to revise its targets, especially with the use of cellulosics. We can't make fertilizer fast enough for corn production. Sulphur fertilizer plants are all based on the government mandate.
- *What happens to famers if ethanol goes away*? Farmers have always been and will continue to be adaptable. There are shifts in research and development dollars, e.g., commodity crops over fruits and vegetables. Farmers will adjust. In Montana, there are not large acre shifts. The government would probably go back to conservation programs

and farmers would be subsidized for that. In the short term, the U.S. share of the world market would skyrocket.

- *What impact does fertilizer have on the environment long term?* Not 100% of the fertilizer goes to the crops; a certain percentage goes into the watershed.
- *Where are the water issues on this topic?* There are factors beyond just overproduction of corn and what's needed for the cattle industry. For example, on the West end of Billings, the city has established a wetlands to deal with the excess nitrogen from the surrounding farm land. It is taxpayer dollars that are involved in the over application of fertilizers and not taking into account the impact on the environment. Some solutions include creating some buffers that would handle the potential for runoff.
- *Why does corn grow more easily in North Dakota than in Montan*a? Their heat units and land elevation play a role.

NEXT MEETING: November 11

- Welcome/Introductions/Agenda
- Billings P66 Refinery & Community ER & Disaster Planning Processes
- Refinery & Transportation Updates
- Next Meeting: December 9