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Greetings, I am writing to comment on the Moxa Arch DEIS.

I currently do socioeconomic analysis of natural gas development in Sublette County, and as such, I will be commenting on the socioeconomic sections contained in the DEIS. I am speaking for myself on this matter and not the county.

As we all know, estimating employment and population impacts from natural gas development is tenuous at best. There are a number of different methodologies available, and each of them is proficient in estimating certain aspects of employment and population while tending to ignore other areas. The attempt in Chapter 4 to discuss the pros and cons of different methodologies and the tenuous nature of estimating the potential range of impacts was a surprise and was welcomed.

However, I frankly believe that the socioeconomic section in Chapter 4 needs to be reworked and rewritten. Even as a professional, I find the section extremely confusing and I believe that a number of different factors regarding population and employment are not considered in the analysis. Much of the terminology is contradictory and many of the equations appear to be impenetrable. I have spoken with a number of other people who review federal NEPA analysis on a regular basis and are accustomed to digesting workforce terminology, and I have found no one who finds Chapter 4 easily comprehensible. At the heart of the matter, it seems to me, is the definition of “job”...

Please feel free to contact me if you have any questions.

Thanks.

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## Major Points:

- The definition of “Job” seems to change throughout the document. It is used to describe what is normally called a “worker-year”, and then on page 4-86 this definition is apparently abandoned and “job” is then apparently used to describe “a single activity” performed one time – *severely discounting the number of workers needed.*

- Saying there will be 22,993 jobs during 10 years of drilling is like saying my yard is 6,272,640 square inches in size.

-- Similarly, if you are gonna use IMPLAN, you need to break out which jobs will be local in nature and which jobs will be in an office in the suburbs of Houston. It can be a percentage, or a rough number, or something....otherwise it does little good.

- Many (but not all) of the oil field workers work 183 days per year – not 260 - because they work 12 hour shifts at a time. This means that there are 50% more “jobs” than are stated in the report, greatly discounting the impacts.

-- Similarly, because of this schedule, many of the occupations require a rotating schedule, whereby a worker works 7 days “on”, and then another worker takes his or her place for the 7 days “off”. This means there are really 2 individuals, which for some impacts to the community means there will be twice the strain. There is no discussion of this.

- It is, in fact, relatively easy to calculate the number of “workers” that will be needed to fill the “jobs” available for each alternative, because we know how long the jobs take to do, and we therefore know how many jobs a worker could do in a year, and we know how many jobs there will be available to do each year, for each alternative...thus, we know how many workers we will need.

-- The Summary Impact Table on pages 2-25 and 2-25 doesn’t even correspond with the actual analysis in the document – making the impacts look much smaller than is stated in the report.

-- The vast, overwhelming majority of the long-term Production Workers will be local residents in the community, as is the case in most every natural gas field in the country. Not 30%, as is stated in the report, greatly discounting the impacts.

-- There are at least 4 references in the document that don’t show up in the references section.

## MANY “JOBS” REQUIRE “2 INDIVIDUALS”

One major consideration that is missing from this document is that each of these “days” listed in the Employment Category Table require 12 hour shifts, and these workers have schedules like 7-days on 7-days off (roughnecks work this schedule) or 10 days on 10

days off (completion crews work this schedule). Your table lists 12 roughnecks per rig – in actuality it is 24, because these 12 workers go home for their week off every Sunday and a new crew of 12 takes their place. Same thing for the completion crews and supervisors – in fact many of the supervisors work 24 hour days!

This is a huge discounting of the labor force that will be required. For example, in Sublette County, we might have 45 rigs drilling at the current moment. With 12 roughnecks per rig, we have 480 roughnecks working in the county. However, next week, these workers go home and another 480 roughnecks take their place. While the demand on hamburgers and man-camps stay the same because the overall workforce stays the same, this is an additional 480 individuals that might be looking to relocate and adding to the housing shortages, an additional 480 individuals that have a chance of getting arrested and clogging up the court system, or an additional 480 individuals that might be dealing drugs... For some impacts, it is wise to account of the total number of individuals that are rotating in and out of the community, while other impacts are more related to the workforce that is here at a given time.

To account for this rotating schedule, you need to assume that for many of these job categories, a full year for these workers is actually 183 (half of 365) days per year – not 260! – because they are working 12 hours per day for seven days straight. There are several ways to get at this number: you can assume that “drilling” actually takes the equivalent of 22.5 worker “days” and not 15, because the shifts are 12 hours long and not 8 hours long! Or you can assume that the worker year is 183 days long and not 260 for the same reason. Either method will get you roughly to the point that **there are in fact about 50% more “jobs” than are stated in the report** for most of the categories. The two categories, where this is not the case (as far as I know) is the well-pad and construction and the pipeline construction.

### **Jobs Vs. Workers.**

There needs to be a discussion somewhere in the document (a “glossary”, perhaps) that defines what is exactly meant by a “Job”. On the bottom of page 4-67 it reads “For the purpose of this analysis, a job is defined as 260 worker-days or 1 worker year, and a person-year is 365 days.” **(Definition A)** And there are, apparently, (on page 2-25) expected to be “22,993 jobs during drilling and construction and 4,872 jobs during production.” Saying there will be 22,993 jobs during 10 years of drilling is like saying my yard is 6,272,640 square inches in size.

Yet, there is much discussion in Chapter 4 regarding the relationship between the number of Jobs Vs. Workers. For example, on page 4-68 it is stated “Again the numbers shown reflect total number of jobs, but do not reflect total number of workers in the area because many of the jobs will be filled by one worker moving from one rig to the next to perform similar jobs. Actual jobs do not represent number of workers. On average the actual number of workers is estimated to represent a factor of 60 % of the total jobs or 62 people out of a total of 103 jobs created during the development, production and reclamation phases (Jacquet and Kathol 2007). This number was derived from the fact that many of the jobs take from 2 to 5 days to complete, therefore a single worker can work on up to 4 or 5 rigs per month.” **(Definition B)**

I don't understand this, because I thought a job was basically "one worker year" (Definition A)...and one worker year is one worker year, regardless of how many rigs are involved or the location or anything... Under Definition A, it is impossible for a worker to work more than one "job", because the definition of a "job" is exactly that – how much they can work in a year! However, under Definition B it sounds like a Job is used to describe basically "an activity" such as drilling a well or constructing a well pad.

Then again, on page 4-71: "*Because one worker can hold more than one job, the units of measurement are not the same*".

Then, Again on the title of Table 4-18: **Table 4-18.** Estimated Annual Work Force Requirements for All Alternatives Expressed in Worker Days.<sup>1</sup> Assumes all wells are drilled and completed as producers and that workers represents a specific job, but does not necessarily represent a single worker. One worker can fill many jobs.

To make matters even more confusing, all the values in Table 4-18 are expressed as WORKER YEARS???!!!!!??

And then again, most seriously, under the population impacts for each alternative (starting on page 4-77) "*A more realistic estimate is that actual workers would represent 60 % of the jobs, therefore the population impact could be estimated based on a workforce of 716 vs. 1,193 and the total population impact would be 1,933 vs 3,221.*"

What is going on here? What does this mean? I thought *by definition* (definition A, that is) that only one worker could hold one job!

There needs to be a serious re-write of this section. If you are discounting 40% of the workers and thus 40% of the population impact, it needs to be spelled out a lot more clearly. I don't see where this "job" turns into "an activity" and why 40% of the impacts disappear.

It is insinuated throughout the document that there is not really a good way to determine the number of workers vs. jobs. Again, this doesn't make any sense, since I thought a "job" was, in fact, the limit to what a worker could do in a year.

However, I think there is a pretty good solution, if one knows the range of number of wells that will be drilled per year -which is stated in the document for each alternative. This is because a worker has a limit to the number of "activities" he or she can work per year. I am just going to leave the word "job" out of this...

All you have to do is figure out the total number of wells each employment category could work by considering each well takes x amount of days, and they can work only either 260 days per year or 183 days per year (on average, depending on the occupation). Then divide the *total number of wells that will be drilled that year* by the *maximum number of wells each employment category could possibly work*. For example, 4 workers will work 4 days to do well pad and road construction. Since these workers can work 260 days a year (for our purposes), then the most well pads and roads these 4 workers can

construct per year is 65 well pads and roads per year. If you have 205 well pads/roads per year, then you will need 12.62 workers to construct them. See example table below.

<b>Employment Category</b>	<b>Days</b>	<b>Workers</b>	<b>Number of Wells that can be worked per year</b>	<b># of Workers needed to drill 205 wells per year (Alt. B/C)</b>	<b># of Workers needed to drill 96 wells per year (Alt. A)</b>
Well Pad and Access Road Construction	4	4	65.00	12.62	5.91
Rig Transportation and Set up	4	15	45.75	17.92	8.39
Drilling	15	12	12.20	252.05	118.03
Supervisors	15	9	12.20	252.05	118.03
Etc. Etc....	Etc.	Etc.	Etc.	Etc.	Etc.
<b>Example Total Workers Needed:</b>				<b>534.64</b>	<b>250.37</b>

Note: For this table, I noted that the Rig Transport/Drilling/Supervisors can only work 183 days per year. While the Well Pad/Road construction groups can work 260.

Of course, the drilling schedule might not be evenly distributed throughout the year, and 150 wells might be drilled during the summer, and 55 during the winter --- but this will give you a GOOD AVERAGE number of “workers” that will be created.

TABLE ON PAGE 2-25  
SOCIOECONOMIS AND ENVIRONMENTAL JUSTICE

**Housing Section:**

Under Alternative A (No Action) you state: “Current housing is adequate.”

And then, on pages 3-79 to 3-80 it is stated under “Affected Environment”:

**3.10.4. Housing**

Workforce-related housing is one of the key issues associated with the proposed Moxa Arch Area Infill Gas Development Project. The oil and gas industry’s effect on housing demand has had a significant impact on the availability and cost of both owner-occupied and rental units. Lack of affordable housing has contributed to social problems in the area and has created a transitory workforce whose members have little investment in the local communities.

Then, on page 4-67 it states:

Temporary rental and permanent housing availability is limited for all surrounding towns (Rock Springs, Kemmerer, Evanston, and outlying areas). Existing motel units and RV/mobile home spaces are insufficient to accommodate the in-migrating workforce.

Housing development is rapidly occurring in the Rock Springs area, and supply should be close to meeting demand by 2009 (Robbins 2006; Crandall 2006; Kaumo 2006).

AND

- Increased cost of living, especially increases resulting from housing and rental costs, has flattened the effect of the increased annual income in the study area.

So, which is it?

### **Employment and Income Sections (same table on page 2-25):**

Document states different variations of: “*Would generate up to 7,894 worker years in new employment including 22,993 jobs during drilling and construction and 4,872 jobs during production.*”

On the surface alone, this statement is extremely misleading at best or severely inaccurate at worst. 22,993 jobs is an *incredible* number of workers. This number represents almost 8 times the amount of even the height of construction workers building the Jim Bridger Power Plant (around 3,000). Again, saying 22,9993 jobs is like saying my yard is 6,272,640 square inches in size.

### **Population Section (Same table, p. 2-26)**

The population increases range from *a peak of 174* individuals under the No Action Alternative to *a peak of 283* individuals under Alternative C. In dealing with population increases, it is useful to note that many of these in-migrant workers will bring a family with them. *This family size is not counted in this population table!* If you look on page 4-77, for example under population impacts for the proposed Action, it states that the actual population impact will indeed be closer to 1,933 persons when an average family size of 2.7 is included! This table must be updated to include the actual population increase, not just the increase in workers.

Again, I am not sure how this compares to the 27,000 jobs expected to be generated. Do these 174 - 283 in-migrants include the rotational or “transient” workforces that can be expected to live in man-camps, RVs, and apartments? Surely, there will be thousands of these workers – all of them eating hamburgers and going to the bar after (of before) work, and will undoubtedly be occasionally using local government services such as the police, the county clerk (for titles, and licenses, and what not), the court system, the medical system...are they not considered a population increase?

### 3.10.4. Housing

Housing Vacancy Rates through 2007 are available from the Wyoming Housing Database Partnership. You even disclose as such in the introduction to this section...and then use 2000 Census vacancy rate data throughout the chapter. Please update these vacancy rates.

#### **Population sections for all alternatives (chapter 4):**

It states that on page 4-77 and elsewhere that “*Assuming 30% of these annual production workers live locally, peak population related to 97 local workers would be 262, based on a household size of 2.7.*” However, it is my experience that, unlike development workers, nearly 100% of production workers will be local in nature. These workers tend to work for local offices near the fields!

On page 4-67, it states:

- The majority of the workforce associated with the Project is likely to come from outside the study area (60%). *Transfer of workforce from other job sites to the Project would be minimal.* Why do you assume this? When this new job site is offering 20bucks an hour to wrap pipes in ducttape, you are not going to transfer workforces away from other sectors? There will not be workforce shortages in all the other governmental and private sectors? Costs of labor in the surrounding communities will not increase across the board? Why not?

#### **References:**

(Jacquet and Kathol 2007). Page 4-68 has no reference.

(Jacquet 2007) Page 4-68 has no reference.

(Taylor and Lieske (2002), page 372has no reference.

(Taylor 2007) – page 4-71 has no reference