Pinedale Anticline Working Group
Air Quality Task Group

Agenda
03 November 2004

Welcome 2:00 – 3:00 PM

- Introductions: Susan
- AQ Task Group goal: Susan
- Meeting ground rules: Susan
- FACA charter review: Ken
- Objectives of this meeting: Ken

AQ Monitoring 3:00 – 4:00 PM

- Draft AQ monitoring plan: Susan (15 minutes)
- John Corra & Cara Casten (WDEQ):
  Wyoming DEQ Ambient AQ Monitoring (45 minutes)

Break 4:00 – 4:15 PM

AQ Monitoring (continued) 4:15 – 5:00 PM

- John Corra & Cara Casten (WDEQ):
  Wyoming DEQ Ambient AQ Monitoring (45 minutes)

Break 5:00 – 5:15 PM

AQ Monitoring (continued) 5:15 – 6:15 PM

- Jim Sewell (Shell): AQ Pinedale Anticline Gas Field (20 minutes)
- Perry Walker: Well Flaring (20 minutes)
- Susan Caplan (BLM): State of the Atmosphere (20 minutes)

Wrap-Up 6:15 – 7:00 PM

- Select AQ Task Group lead
- Schedule next AQ Task Group Meeting
- Public Comments

Adjourn 7:00 PM

Pinedale Anticline Working Group
Air Quality Task Group
November 3, 2004

Attendees: See attached

Susan Caplan welcomed everyone to the 1st Pinedale Anticline Working Group (PAWG) Air Quality (AQ) Task Group meeting and went over the agenda for this meeting.

Introductions:

1. Susan Caplan, BLM, Meteorologist. Susan works at the BLM State Office in Cheyenne, WY. Susan was assigned as the BLM liaison for the task group.
2. Terry Svalberg, USFS, Air Quality Specialist. Terry's interest in the Task Group is in protection of wilderness area from the AQ perspective.
3. Jim Sewell, Shell Exploration & Production Co. Operator on the Pinedale Anticline
4. Rick Hoffman, Sublette County Waste Management, Supervisor, interest is to help out the community.
5. Donna Nye, BLM. Donna was selected by Susan Caplan to do minute recording for the 1st meeting of the task group.
6. Kate Forsting, Energy Labs, Environmental Chemistry background. Kate has worked special interest groups and Oil & Gas industry projects for 15years. Kate's interest in the task group is hoping to interject expertise from a technical standpoint.
7. William Belveal, concerned citizen. William's interest in the task group is to see that we have clean air.
8. Mike Golas, Questar, Environmental/safety matters for market resources.
9. Ken Peacock, BLM. Ken will be the facilitator for only the 1st meeting of the Air Quality Task Group.
10. Cara Casten, WDEQ, Air Quality Engineer. Cara's interest in the task group is as DEQ representative.
11. Perry Walker, Pinedale resident. Perry's interest in the task group is the areas air quality.
12. John Corra, Director WDEQ.
13. Dan Olsen, Administrator, WDEQ AQ division.

Additional AQ Information:

1. Susan has a video tape available on fundamentals of AQ.
2. Guide to the Clean Air Act – EPA website or hard copies are also available.

AQ Task Group goals:

1. Monitoring Plan to submit to the Pinedale Anticline Working Group (PAWG)
   a. Draft monitoring plan

Bike Rack:

1. Ideas or questions that cannot be addressed during a meeting, (info not available)
   a. Questions written on sticky note and added to the bike rack paper to be addressed at a later time.

Meeting Ground Rules:

1. Arrive on time for start of meeting and returning from breaks
2. Courtesy
   a. avoid side conversations
   b. turn off cell phones and pagers
   c. listen to each participant's comments and recommendations
   d. not dominating discussions
   e. recognize and consider all perspectives, input, and recommendations
   f. be task orientated – do not get sidetracked from task at hand.

Ken Peacock – FACA (Federal Advisory Committee Act) 43 CFR (Attached):

1. Subpart 1784 – Advisory Committees
   a. Subpart 1784.0-1 Purpose
   b. Subpart 1784.0-2 Objectives
      i. Task Group represents expert council
         (1) Providing input to the PAWG
            (a) PAWG is a 9 member consensus group appointed by the Secretary of the Interior
   c. Subpart 1784.0-3 Authority
   d. Subpart 1784.0-6 Policy
      i. committee representative of the major citizen and industry interest
   e. Subpart 1784.1-1 Establishment
   f. Subpart 1784.1-2 Duration, termination, and renewal
      i. 2 yr charter – could go 10 -12 years
      ii. rechartered every 2 yrs.
   g. Subpart 1784.2-1 Composition
      i. Representative balanced group – public, industry
   h. Subpart 1784.2-2 Conflict of Interest
      i. See Charter (attached) page 4 - ethics responsibility of members
   i. Subpart 1784.3 Member Service
   j. Subpart 1784.4 Public participation
      i. Task group decides designated times for public input, questions/comments

Ken Peacock – Task Group Objectives (Appendix C (Attached) :

1. NO_x emissions
2. Monitoring Plan
3. Elect a leader
4. Select a minutes recorder
   a. notes will be posted on the web
   b. hard copies will be kept at the Pinedale FO
5. Set future meetings

Consensus Decision Making (Attached):

1. Looking for 100% consensus
   a. Difficulties in reaching consensus (pg. 2)
      i. Non-blocking

(1) non-support, reservation, stand aside, withdraw

ii. Blocking

(1) Non-consensus opinion

(a) Majority Report recommendation will be given to the PAWG along with a minority report for consideration

Explain PAWG:

1. 9 member consensus group
   a. PAWG Task Groups – outside expert counsel
      i. Task group recommendations to PAWG
         (1) PAWG recommendations to BLM
            (a) BLM accepts or rejects recommendations
2. BLM is not a member of PAWG

Draft AQ Monitoring Plan – Proposal from Susan:

1. Chapter 1 Existing AQ monitoring
   a. How the monitoring will be done
      i. Concentration
         (1) designate component concentration
            (a) mass of material in a given volume of air
      ii. Visibility
         (1) ability to see color shape and texture over a distance
      iii. Atmospheric Deposition
         (1) mass of material deposited on a surface
            (a) Aquatic
            (b) Terrestrial
2. Chapter 2 Emission Sources
   a. what pollutants are emitted
   b. rates of pollutants
3. Chapter 3 AQ Task Group recommendations
   a. AQ components for monitoring
   b. location
   c. who or what agency will operate the site
   d. funding
4. AQ monitoring- toxic- what goes on from there (tape 1A 250)
5. Emission sources – Task group should decide how far out we should go.
   a. Include the Bridger Wilderness area, Fontenelle area, foothills beyond LaBarge?
   b. Pinedale Field Office Area
      i. group chartered under PAPA (Pinedale Anticline Project Area)
      ii. minimum Anticline and Jonah

Dan Olsen – What DEQ now regulates and does not regulate:

1. DEQ's role past and present
   a. State of Wyoming has EPA approved State Implementation Plan (SIP)

i. DEQ information submitted to EPA, which EPA reviewed and agreed that DEQ has the resources, technical ability, and legal ability to enforce the requirements for the Clean Air Act.
ii. DEQ responsible for managing the Air Resources

b. Concepts DEQ employs to manage AQ
   i. Impacts from development
      (1) develop inventory of sources, and emission types that are introducing pollutants into the atmosphere
      (2) be able to monitor the impacts in terms of concentration
         (a) what that impact is on a volume of air in terms of micrograms per cubic meter
      (3) be able to model what might happen as the development continues
   ii. DEQ implements the Clean Air Act
      (1) Standards set by EPA to protect human health
         (a) National Ambient Air Quality standards
            (i) 6 criteria pollutants that have ambient standards
               1. Nitrogen oxide
               2. Sulfuric dioxide
               3. particulate matter
               4. lead
               5. ozone
               6. carbon monoxide
      (2) Increments
         (a) How much concentration of the particular increment consuming pollutant increases from a baseline date to a current date
         (b) only increment consuming pollutants in the Clear Air Act
            (i) Nitrogen oxide
            (ii) Sulfuric dioxide
            (iii)particulate matter
      (3) Visibility
         (a) no standards for visibility
         (b) there is a requirement to keep the air clean
      (4) Managing the Air Resources by:
         (a) permitting program
         (b) monitoring program
         (c) modeling program
         (d) compliance program
      (5) Best Available Control Technology
         (a) best possible control for a particle facility
         (b) control on every type of industrial sources
      (6) Identifying what increasing levels of emissions does relative to:
         (a) health impacts
         (b) welfare impacts like visibility
         (c) minimizing any impacts as identified

c. 1995 – 96 Issue of development in the lower Green River Basin
   i. Concern of the air quality deteriorating due to industrial sources in SW Wyoming

(1) group of industrialists, state, federal land managers, EPA, concerned citizens, and environmental groups got together to figure out the impact of what the development was doing to the Bridger Teton area
(a) No modeling expertise
(b) 1997 Formed the SW Wyoming Technical Air Forum
(i) Plan to define a modeling platform
1. modeling technique used to identify the industrial development impact on the area and the Bridger Tetons
2. Original proposal 9 month task – went for
i. 4 years
3. took a couple of years to get an accurate inventory of emissions from SW Wyoming area – inventory used as a basis for modeling
4. Inventory and modeling domain:
a. SW Wyoming, including north of Jackson and east of Carbon Co.
b. NW Colorado
c. SE Idaho
d. NE Utah, including Salt Lake River Valley
5. Inventoried all sources and all pollutants which were used for modeling analysis
(c) Consensus for Modeling Platform – Cal Puff modeling System
(i) predicted and measured results and compared to monitored results by the Forest Service in the Bridger Teton
(ii) model was able to predict primary pollutants impacting the area
1. sulfur dioxide
2. nitrogen oxide
(iii)did not do well predicting secondary pollutants, which impact visibility
1. nitrates
2. sulfates
(iv)were not able get good comparison between the monitored results and the modeling predictions until it was assumed there was a lot coming from outside domain
(2) Emission Inventory is from 1995, and has not been updated

d. Late 2002 – Update the inventory to move it forward to a larger domain
i. new inventory and database system for all the data collected
(1) The Wise System
(a) Inventory major sources
(i) power plants
(ii) storage facilities
(iii)refineries
(b) Inventory minor sources
(i) oil & gas operations
(ii) mobil sources
(iii)fire emission sources

e. 2003 – submitted request for proposals out to about 15 organizations to become contractors
i. Dec 2003 – contract awarded to a firm to develop the database system and inventory

ii. Updated 2002 inventory should be available by Feb 2005

f. What's happening today:
   i. Inventory is statewide
   ii. additional work needs to be done in terms of sources outside the state
   iii. need to understand what the inventory is in the whole state of Wyoming
      (1) Wyoming is a clean state
      (2) concentrations, (ambient standards regarding public health) are well within standards of the state
   iv. Have we consumed the increments?
      (1) Increments –
         (a) congress decided in 1977 that there was a potential, because of the way the regulations were being written and the focus on just the ambient standards, that without some mechanism to keep the amount of emissions in the air down that eventually all areas of the country, even clean areas like Wyoming, would be polluted in terms of concentration up to the level of ambient standards
         (b) congress coined a new regulation – Emissions of Significant Deterioration
            (i) concept to take action in clean areas of the country to keep them clean – example
               1. ambient standards of nitrogen oxide is 100 micrograms per cubic meter on an annual basis – if above that, you are at non attainment of the ambient standards for public health
               2. increments of nitrogen oxide is 25 micrograms per cubic meter
                  a. 1977 - minor source baseline identifier
                     i. point in time in a given state where a major source submits an application to build a major facility, they trigger the baseline for that particulate pollutant.
                     ii. Wyoming the baseline for nitrogen oxide was triggered in 1978(79?)
         (c) What we need to do in regards to Air Resource management
            (i) not allow concentration to grow from where it was in 1979 to 2002 to more than 25 micrograms per cubic meter
               1. baseline in 1978 concentration was 10 micrograms per cubic meter
            (ii) Inventory from 1978 for NO_x sources; calculate what the concentration was in 78; do an inventory from 2002 to calculate what the concentration was and compare the two numbers to see if it is less than 25 micrograms per cubic meter then we have not exceeded the increments; if it is higher than we have exceeded the increments – requires that we go back to all sources, existing as well as new, and establish more rigorous controls or offsets to reduce the concentration back down below the increment level

g. Future:
   i. Increment violation – none now, but close
      (1) look to the future to see what development will add to this down the road
      (2) make pro-active decisions on reducing that particular impact so we don't get into an increment situation
   ii. Models
      (1) Cal Puff modeling is the correct platform to use

(2) models not 100% accurate
(3) do not know what the level of accuracy is

iii. Monitors
(1) know what is actually being measured in the air

iv. Inventory and modeling to help identify how we move forward as development continues

v. Modeling receptor at monitoring location helps understand if the model is able to calculate the atmosphere chemistry and the transfer pollutants accurately

h. Hazardous Air Pollutant Issue:

i. no federal standards

ii. Oil & Gas operations in particular give off VOCs
(1) some hazardous, some not
(2) 186 hazardous air pollutant compounds now identified by EPA that are of concern to public health
(3) EPA currently developing max standards that are limiting emissions at facilities
(4) No standards relative to how much benzene concentrations, for example, represent a significant public health impact

iii. inventory what are hazardous pollutants

iv. monitor what are hazardous

v. inform the public if they present health impacts or not

vi. require industry to put out controls to reduce the numbers on their level of emissions on those type of pollutants

vii. request from industry to DEQ on rule making for flaring – work in progress

viii. Question - DEQ Field Office in the area?
(1) monitoring results are gotten right away
(2) visual
(a) task group can assess and make a recommendation on this
(b) citizen visual monitoring can be reported to DEQ and they will follow up on this
(3) traveling agent?
(a) DEQ has an oil & gas permitting engineer in Casper who does checks in this area
(b) DEQ data revealed 1 man year of time spent in Sublette Co. in 2004
(c) DEQ will consider a proposal if task group can come up with justification for extra man hours for an agent in the area

ix. Concentration of horse power at a site
(1) permit process
(a) operator subjected to an annual on-site visit by DEQ inspector
(b) technical report is written by the inspector

x. Federal Land manager obligations
(1) preserve or enhance air quality related values, which include
(a) flora
(b) fauna
(c) soil
(d) water
(e) cultural aspects

(f) visibility

2. Question – what would happen if monitoring shows there is a problem with air quality?
   a. BLM would disclose the information to the agencies and to the public
   b. BLM has limited authority to require anything in air quality mitigation
   c. BLM would consider the effect and analyze the effects of various mitigation measures that could be applied and pass this information along to DEQ and the public
   d. Increments
      i. 3 pollutants that have increment considerations with the amount as to particulate matter
      ii. State is obligated to rectify any increment levels exceeded
      iii. VOCs not an increment consuming pollutant
      iv. 2 problems in this particular area
         (1) NO_x
            (a) comes from compression, flaring, drill rig operations
               (i) DEQ needs to address these issues
         (2) VOCs
            (a) comes from oil well production
            (b) producer to ground level ozone
               (i) ozone does have an ambient standard
            (c) not an increment consuming issue, but is an air quality issue
   e. ROD identifies the Task Group as a feedback mechanism in Adaptive management
      i. what the task group is trying to do is formulate a method that could effect the pace and scope of development
      ii. under the monitoring, the task group will notify what is found; here is our baseline and here is the change over time, and feed it back to the group
      iii. task group monitoring feedback to the BLM; the decision is then made to either change, adapt, or reassess different ways to reduce the emissions

3. Question – will we be using the baseline from 1978?
   a. not sure what this task group will be using
   b. this baseline (1978) is for regulatory increment evaluation
   c. baseline for initial modeling or is it a baseline once we start modeling?
      i. increment consumption – clean air act requirement is to move forward from the baseline that was triggered under PSD (1978); take actual emissions and the concentration of that time and compare to today; plus and minus accounting of emissions from 1978 to 2002; calculation done to determine whether or not the concentration of a particular pollutant has increased over the allowable increment as defined in the clean air act, which is 25 for NO_x
         (1) ie; if the concentration in 1978 was 10 and it is 50 today, then increment has been exceeded
            (a) we have a regulatory outside the BLM ROD or anything else; there is a regulatory legal requirement for the state as promising agency for air quality and implementing the clean air act to reduce that impact back below that level
   d. the baseline this task group may want to use to determine what the emissions growth in this area has been, could be the 1995 Swytap inventory
      i. comprehensive inventory of all the emissions that were in the area at that time

e. task group needs to check on what we are doing to the inventory as the development proceeds according to the plans that have been recommended in the plan development – actual emission inventory of what is on the ground
   i. modifying the permitting process as to what is actually built; not all permits allowed are built

Cara Casten, DEQ - Power Point Presentation – Monitoring in Sublette County – (Attached):

1. Expansion of Wyoming monitoring network
   a. Focus on major areas of energy development – potential impact on public health and the environment
      i. Pinedale area
      ii. NE part of state
      iii. Wamsutter area
   b. Tools in toolbox
      i. monitoring
      ii. compliance with ambient air quality standards referred to as NAAQS
      iii. reality check for models – how are the models predicting, and what are the monitors reading and what is the difference between
      iv. trend analysis – is it going up, going down, staying the same
   c. Focus on Pinedale Area – agreement as part of the ROD
   d. DEQ monitoring sites in the Pinedale area
      i. Why is this just focused on this area and not a larger area and why focused just on energy development?
         (1) DEQ Wise Inventory development system is looking at the entire state
         (2) In terms of permitting – DEQ permits all air emission source in the state – the energy development permits are the majority coming in
      ii. EnCana Site
         (1) NO_x monitor – NO_x combination of NO and NO_2. NO_2 is the criteria pollutant standard that has to be monitored
         (2) Ozone
         (3) PM_{10} TEOM
            (a) which is a continuous PM_{10} monitor
            (b) PM_{10} is particulate matter 10 microns or less
               (i) why is 10 the number used?
                  1. 10 is the inhaleable number which represents the health risks
         (4) 10 meter meteorology station – 10 meters off the ground – measures:
            (a) relative humidity
            (b) wind speed
            (c) wind direction
         (5) Possibly solar radiation at this site
         (6) Camera
            (a) photos every 15 minutes
            (b) fixed camera, on a fixed location
         (7) Anticipate start-up
            (a) camera system running

(b) criteria pollutant monitoring not started yet but slated to start soon

(8) Wyoming visibility website www.wyvisnet.com for camera system images

iii. Site 8 - Shell & AQD (Air Quality Division) - cooperatively funded by

(1) located outside Boulder

(2) Equipment

(a) NO_x

(b) Ozone

(c) PM_{10} TEOM

(d) camera system

(e) Nepholometer – which is an instrument for visibility

(3) Start-up: late 2004

(a) Scene monitoring, camera images on the website and the criteria pollutants data will come up in near real time values; able to see where the NO_x and ozone is at in terms of the levels

(i) data is not archived; contractors maintains the data

iv. Site 7 – BP meteorology station – operating between 1999 and 2003

(1) placed here as a permit condition on one of BP's permits

(2) purpose was to give us a meteorological station to use in modeling for the impact of sources for the permitting process

(3) Windrose – shows wind – large bars show where the wind is coming from – annual average

v. Site 10 – Upwind site – upwind of the Pinedale Anticline and Jonah fields

(1) 5 miles south of Daniel

(2) AQD funded

(3) Equipment

(a) NO_x

(b) Ozone

(c) PM_{10} TEOM

(d) 10m meteorology

(e) Camera System

(4) Start-up: just now beginning the request for proposal (RFP) process – proposal to contractors for bids to see who will run the site

(a) scene and gaseous monitoring on the website

vi. Other monitoring in Pinedale area

(1) WDEQ and operators in Pinedale Anticline and Jonah fields discussed completion flaring

(2) Task assigned – determine mechanical monitoring

(a) AQ or AQ related value monitoring with an actual in place mechanical monitoring instrument that measures some aspect of air quality - ambient air quality values, gaseous pollutants and air quality related value monitors - not monitoring the broad sense like modeling or going out and tracking emissions

(b) electronic instruments not taking samples? Air quality related value monitoring does take samples

(c) information on what type of monitoring is out there for this task group – gaseous fluid monitoring, ambient air quality standards, criteria pollutant

monitoring, and air quality related values: ie. visibility, wet and dry deposition of pollutants, and meteorology

(3) Questionnaire sent to BLM, USFS, and Oil & Gas operators
  (a) information received – site summary report and maps attached
  (b) map legend
    (i) CASTNet – Clean Air Status and Trends Network –
      1. samples dry deposition: an air quality related value helps figure out, ie: how much nitrates and sulfates are being deposited in the wilderness areas and how it would affect the lakes; anything dry or falls out of the air is collected and analyzed
    (ii) IMPROVE – Interagency Monitoring of Protected Visual Environment – monitors visibility
      1. visual range – how far you can see
      2. what different components are causing visibility issues
      3. sample 1 every 3 days
      4. aerosol monitoring – basically PM 2.5 or less
        a. carbons
        b. nitrates
        c. sulfates
        d. metals
    (iii) NADP/NTN – National Atmospheric Deposition Program – wet deposition
      1. collects when it rains or snows
      2. analyzes precipitation for types of nitrates and sulfates that are deposited on the land
    (iv) Non Specified – sites 101 and 97
      1. 101 – EnCana; 97 BP Amoco meteorology site
    (v) RAWS – Remote Automated Weather System

2. Question – are the lake bottoms being monitored?
  a. Yes, part of the long term lake monitoring in the mountains, they are looking at the surface, the middle layers and the stratified layer below
    (1) finding a lot of variability, which has to do with temperature changes over time; warm periods lately where we have gotten a lot more mixing of the lakes; you would have an actual stratified zone where you would have a warm layer over a cold layer; over the last 3 or 4 years it has been a uniform cordation of temperature down through there, partially due to warming
      (i) Wind River AQRV – Sites 108 and 109
        1. inside the wilderness boundary and run by the Forest Service (FS)
        2. bulk deposition collectors – both wet and dry deposition; open to the atmosphere and analyze the chemical compounds found in there
        3. Long term lake sites – bulk deposition collectors to see what is coming out of the atmosphere and sample the lake chemistry for a direct cause and effect relationship that we can develop there to reduce the acid deposition coming in – test the inlet, outlet, and the lake itself

4. FS also has 4 other long term lake sites scattered on the Bridger Teton and Shoshone side that is monitored on an annual basis – ongoing since 1986

3. Question – with the 2 additional sites going in, that are not shown on the map, will there be any holes in the network or a wish list, or needs list?
   a. this would be a goal for the task group - will need to discuss where we think there might be holes and how to fill them in
   b. this would be a new perspective from this group - to see if there is something else that needs to be done
4. Susan proposes the format of the monitoring plan, Chapter 1 summary of the existing AQ monitoring plan, to cover the issues: time theory of the data from the stations
5. Depending on budgetary constraints at the state level – it would make sense to create a grid work of measurement stations in order to map the wind and emission histories in a complete and continuous basis. What the spacing would be is yet to be determined; and how many of them would depend on the budget. The 3 sites are a good baseline to start with but will probably not be enough
6. Historically points 106, 107, 108, and 109 have been funded through Industry, as a condition of their permit to operate. DEQ removed that condition to operate. FS is currently negotiating, and working with the state, BLM and EPA, to try to get the money in place for funding of that monitoring.
   a. this is one of the tasks of this group – provide a plan and provide a way to maintain funding for the life of this project
      i. 1st consideration of the task group – how and where we can find the money to keep the stations going
      ii. $120,000 to run the 4 current sites per year – 106, 107, 108, and 109
      iii. Question – how far back does the data go?
         (1) the data goes back to 1984 on some sites
      iv. settling this task group with the task of finding funding – all we can do is look to the Industry members to go to their CEOs and ask for money and the government may be the same thing
         (1) BLM may be able to help with some funding, but this is not for sure
         (2) if this group agrees that these 4 stations should continue - who can we hit up for the money
         (3) the group should recommend a fair way to fund, not exactly who will fund

Jim Sewel, Shell - Power Point Presentation –The Industry: Where our Emission Sources Are – (Attached):

1. Green completions – how wells are completed
2. Emission Inventories – what Shell does internally: not a requirement from the state, but Shell does it as a corporation
3. Air Quality monitoring stations
4. Pinedale Anticline
   a. Shell has wells 2 miles west of town along 191
   b. Field heads off to the SE about 30-35 miles, intersecting Hwy 191 – Shell has 70 wells – the Anticline now has about 200 wells
   c. Shell has 4 drill rigs – consistent for the last 2 years

5. Sources of Emissions:
   a. construction – build a location to drill the well on
      i. heavy equipment – graders, scrapers, bulldozers
         (1) these engines emit NO_x type pollutants – particulate matter, black smoke and also dust emissions
   b. drilling – drill rig will drill one well or up to six wells on one location
      i. diesel engines to run the rig
         (1) NO_x emissions, particulate matter, some flaring when raising the pipe up from the production zone
6. Completion – when they fracture the formation
   a. pump liquids down at a high pressure
   b. flow the liquids back and hopefully gas back with this
      i. some emissions with this
         (1) if liquids are flared off – smoky emissions, NO_x emissions
7. Production – gas flowing back along with other liquids, water and condensate
   a. emissions sources through the processing equipment
      i. VOCs
      ii. hazardous air pollutant
   b. Tanks source of flash emissions
      i. from the liquids going from a high pressure environment in the subsurface going through the process equipment then into the tanks – they are at atmospheric pressure and you get flash gas coming off the liquids
         (1) these gases are mainly methane and other VOCs
            (a) these are either vented or vented and controlled through the control devices
8. Shell Emission Inventory
   a. done for internal reasons
   b. focused on greenhouse gases – neither regulated in the US, but tracked by Shell
      i. methane
      ii. CO_2
   c. also track
      i. VOCs
      ii. NO_x
      iii. SO_x
   d. good idea of the different sources of emissions, where they are coming from and the type of magnitude of the emission numbers that they have – sources, types, and amounts
      i. NO_x emissions – comes from the drilling
         (1) burning diesel in the engines
      ii. level of emission – activity level
         (1) function of the types of engines you use; how environmentally friendly they are
         (2) how many drill rigs you have
         (3) how fast you are drilling
   e. main source of VOCs and HAPs – coming off production units
      i. regulations that they have to control at certain thresholds
      ii. minimizes the amount of gas
   f. flaring gets all the attention - what you see and what you hear
      i. should not be focusing on this

9. Well Completions – Shell Green Completions
   a. to get gas from formation you pump water down into the formation at high pressure with sand, which is used to prop open the fractures; then it is flowed back to the surface, with any liquids that are down there, water, chemicals like diesel and methanol; formation liquids like condensate and formation water
   b. traditional way was to run it through a flow back tank and then off to the flare pit where the gas would be burned off, liquids would also go to the flare pit and be ignited and partially combusted; the liquids is where you would get the smoke; some of the operators still do it this old way
   c. Green completions or flareless completions - plan ahead
      i. equipment takes out the sand and puts it in the sand trap
      ii. separate the liquids – condensate and water- from the gas
      iii. the liquids will go to the reserve pit
      iv. the gas will go through a temporary production unit where it is processed, separated more, and dried
      v. this equipment allows them to put the gas into the pipeline instead of into a flare pit
      vi. less emissions
      vii. if flaring is required, then it reduces the amount of time needed to flare
      viii. flaring is reduced by 80% - 100% flareless if everything goes right: plan well, no equipment problems
   d. Benefits:
      i. less gas flared
      ii. less emissions
      iii. more gas into pipeline
      iv. liquids out of the system
   e. Disadvantages:
      i. must have pipeline there
      ii. cost – but this does pay for itself quickly
      iii. can't do everywhere
      iv. safety issues –
         (1) high pressure
         (2) sand cutting through the pipe
10. AQ Monitoring Stations
   a. Cooperative effort between Shell and WDEQ
   b. Boulder Station located between Boulder and the Mesa area
   c. Equipment on the AQ monitoring side
      i. NO_x monitor
      ii. Ozone monitor
      iii. PM_{10} Analyzers – data right away to DEQ website
         (1) real time data – every 15 minutes
         (2) contractor will do quarterly and annual reports on this data
      iv. Meteorological
         (1) wind speed
         (2) wind direction
         (3) temperature
         (4) humidity

v. Visibility
(1) Nephelometer – measures scattering of light in a sample
(a) FS uses a Transomometer - shoots a beam of light 6 kilometers
(2) Digital Camera
(a) real time pictures of what is going on in the field
(b) has a pan option for 5 different views

d. Anticipated start up – December 2004
(1) equipment has been ordered
(2) agreements are being finalized
(3) funding has been finalized – cost split between Shell and DEQ with funding for 3 years
(a) this station initial start up and 1 year of operation is $200,000

11. Visibility
a. Haze – likely from diesel rigs
b. Focus on flaring
c. What Shell is doing
i. 3 of 4 rigs have fuel efficient drilling engines – reduces the amount of diesel being burned
ii. green completions
iii. lowering the VOC and HAP emissions
(1) some regulated with the new guidance which came out the end of July
(2) multiple well locations requires control
(a) biggest polluters are the small, single well facilities
iv. facility changes
(1) multiple well locations
(2) central gathering systems
(3) central processing facilities
v. dust control

12. Question - has anyone locally noticed any flaring events in the past month or two?
a. Perry Walker – hasn't been checking since mid October, but up to that time seeing 3 to 5 flares a week, 35 miles to the north with night vision.

13. Question – in the monitoring project is there anything in the scope about dust from roads?
a. not that anyone is aware of
b. not a trigger level in the ROD
c. it can be looked at where we are at with dust compared to the analysis levels in the document
d. will need to use inventory and monitoring rather that with modeling

14. Questar will be willing to take anyone out to the field; Shell will also do this

Perry Walker – Power Point Presentation – (Attached):

1. Interest in AQ began in 1990
a. as an amateur astronomer started noticing the sky losing its transparency
b. when Jonah and the Anticline started their uptake in activity
c. 1994 possibility of the ozone layer going away – increase in the UV
d. started doing daily index measurements of the UVs
i. in 2002 graphed

(1) UV levels were declining about 10% a year – coincident to the uptake of activity on the Anticline and Jonah
(2) did this have anything to do with the operations – well completions and production activity

e. using infrared instrumentation for diagnosing atmospheric behavior
   i. optical – spectrometer hooked up to a laptop, and a fiber optic that funnels the optical signal through the collection head to the spectrometer; software that collects and analyzes the specimen collected
   ii. flaring was so constant and so smoky that good optical signatures from the activity were received
      (1) four typical examples of flaring – early in the stages flaring
         (a) point where they are the dirtiest - very smoky
         (b) smoke is not just water vapor
         (c) typical spectra from the flares
            (i) narrow spikes - chemical species present in the flares
               1. sodium
               2. potassium
               3. lithium
            (ii) where were these chemicals coming from – not typical in natural gas
               1. Fracking chemistry – chemicals used
                  a. potassium chloride
                  b. sodium persulfat
                  c. sodium tetraborate decahydrate
                  d. lithium hypochlorite
                  e. lithium tetrborate
      (2) cause and effect of flaring
         (a) heavy visible haze
         (b) heavy sodium
   iii. surface wind history
      (1) April 03 to present
      (2) winds to Bridger Wilderness as low as 25%
      (3) Annualize will mask month to month
   iv. emission signatures of combustors
   v. glycol recycling burners
   vi. where next – better equipment
      (1) need more advanced technology
         (a) stand alone ambient air monitoring system - $90,000
         (b) infrared – MIDAC air monitoring station - $75 to $80,000
      (2) more capability needed to be effective
      (3) more capability = more money
      (4) more money = need for $ backing

Susan Caplan – State of the Atmosphere -Power Point Presentation – (Attached):

1. Purpose
   a. Wyoming-wide dispersion modeling effort

i. update emission inventory dispersion periodically
(1) annual reports – website or paper copies available
ii. avoid "piece-meal analysis"
iii. continuity
(1) project to project
iv. efficiency

2. Applications
a. NEPA
i. far-field cumulative AQ impacts
(1) state wide environmental analysis
b. Annual report
i. AQ monitoring data time series
(1) summarized annual report
ii. emission inventory
(1) update emission inventory spreadsheet with AQ data
iii. cumulative impacts
c. Model file archive
i. adaptive environmental management
(1) oil & gas developed well fields
(a) task group will look at these actions to find acceptable or not
(b) modeling files will be available
ii. mitigation scenarios

3. Components
a. AQ Stakeholders
i. Agencies
(1) USFS
(2) NPS
(3) WDEQ-AQD
(4) EPA
b. Emission inventory
i. User choice – web page
(1) geographic extent – boundary – State of Wyoming
(2) time period
(3) pollutants
ii. Emission inventory
(1) EPA developing emission inventory that would be faster and more readily available to the public and industry
c. Dispersion modeling
i. Met data
(1) MM5 database – 3 year, not started yet
(a) meteorological database
(b) CalPuff dispersion modeling
(c) not met station, but grid points
(d) MM – meso meteorological
ii. CalMet
(1) input files

iii. CalPuff
(1) input files
(2) model results

d. Web access
i. emission inventory (spreadsheet format)
ii. MM5 files (.cdf format)
iii. CalMet input files (control format)
iv. CalPuff input files (control format)
v. Model results
(1) binary format
(2) graphics
vi. annual report (.pdf format)

Discussion:
Software interface is a monumental task. How do you develop the inventory – you are going to talk about an inventory that will cover the entire state of Wyoming that is able to accept project specific inventory on a much smaller scale. How do you make those two things mesh - because trying to put enough detail in to be able to talk about project specific items on a statewide basis means it will probably take you a year to run a field program to give you a years worth of information. Inventory work and defining how you locate the inventory, whether you do it by grid spacing, a source category, or however, is a major consideration. The DEQ is determined to build a baseline inventory of what is going on in the state and being able to understand what is going on in the state on a regular basis and that is the project that we have embarked upon. I think it is be operated as an adaptive project - we know what we need to do to get it started and then we can keep fine tuning it until we get what we need. The BLM idea of the SotA was a good way for us to take advantage of the synergy of what they are doing. The possibility for a model that would run on a pc and would look at the state on a 1000 mile grid point, but to go to a 5 mile grid point you would need a supercomputer. This current model is expanded to include areas outside of the state - so there are some concerns about modeling work to show that if something happens in Rocky Mountain National Park then Denver is right next door, but it is not in the domain. Is the inventory for SotA going to be the State inventory? Susan – we hope to be coordinating with the state; the inventory that they produce, (spending more money on their inventory then our project), will be more detailed; we are going to do more estimating; and we hope to find a way to help each other build this inventory. We thought to get the efficiency and continuity and get a view of the whole state was worth a little bit less accuracy. What we are doing now is basically reinventing the wheel. When we get a proposal from Questar or Shell and we have to model the AQ impacts - we have to build the emission inventory and we have to do the modeling; we don't think this is very efficient - cost the companies hundreds of thousands of dollars for the AQ modeling. We hoped that if we took it out of the project EIS level and did it internally with BLM that maybe there might be some benefits to that.

Question – Why is EPA not involved in this task group?
Ken – they are in the PAWG as a non-consensus member

Nominations:

1. William Belveal nominated Perry Walker as leader.
   a. Perry not sure that he could take on the role
      i. concerned that this job would dominate his time
      ii. if this job, as chair, would limit him to speak publicly
      iii. this group is about 1/3 government, 1/3 industry, and the remainder civilians – if government or industry chairs it there would be a question of credibility – which would leave the civilians, who may not have the technical expertise
         i. this group must come to a consensus
         ii. task group lead does not necessarily have to have technical expertise – there is plenty to do without the technical aspects
            (a) need to put together presentations
            (b) setting up meetings
            (c) chair would have the technical expertise on the task group to refer to
   b. Question – what are the duties of the chair?
      i. the leader would basically be the facilitator of the group
         i. keep things on task
         ii. not providing technical input
         iii. getting the group to the end product
         iv. BLM is here in an advisory capacity
      ii. Question – other groups of this kind have hired a facilitator, is this feasible for our task group?
         i. budget is an issue, due to funding that is not feasible
      iii. Question – BLM employee available to facilitate?
         i. that would not be possible
         ii. Ken would be willing to do the Federal Register notices for this group – Federal Register notices must be filed 30 days in advance of meeting dates.
      iv. Question – do conference calls need to be noticed?
         i. Yes, but not sure you could do that because the nature of this group is it needs to be accessible to the public
2. Terry Svalberg would be willing to co-chair with Cara Casten
   a. consensus agrees with nominations
   b. Question – do we need to set a term limit?
      i. in the FACA – task group needs to be re-chartered every 2 years
      ii. chair can also be re-nominated every 2 years
3. Donna Nye nominated as notes recorder
   a. Donna accepted, but needs approval from her supervisor; will let the group leader know as soon as possible if able to continue

PAWG will be meeting November 4, 2004 and we need to notify them of our team leader and when our next meeting will be. When they meet in February 2005, this task group needs to give them a list of recommended Air Quality monitoring measures.

Next scheduled meeting:
Tuesday, November 30, 2004, 10 a.m. to 5 p.m., in Pinedale
If you think you will want a meeting the week or two following this meeting you need to remember that you need a 30 day notice in the Federal Register. If we schedule a meeting can we cancel it? You can, but the cancellation also needs to be noticed.
It doesn't seem possible to come up with the recommendations by the February 2005 meeting. We may only come up with our top 3 recommendations for 2005, doesn't mean that is all we will do. We may do these 3 in 2005 and then come up with other recommendations; that is the adaptive management process.

Question – if we put out work product, can we ask for comments by e-mail from the task group? That would be fine but if you are setting a meeting, because of the FACA charter, you need to put out a notice.

Question – Is there a quorum involved in this? If we schedule a meeting, how many from the task group must be here?
That is a rule that the task group may want to set. You may want to set that you would need at least one member from industry, one from government, and one from the public, but that would be up to the group.

Meeting notes from the November 3, 2004 Pinedale Anticline Working Group / Air Quality Task Group meeting have been reviewed and certified as complete and accurate by the Task Group Co-Chairs.

Cara Casten, Wyoming DEQ / Air Quality Division

Terry Svalberg, USDA Forest Service

MEETING ATTENDANCE FORM

PURPOSE: Pinedale Anticline Air Quality Task Group

TIME: FROM 2pm TO _____ DATE: 11/3/04

NAME	ORGANIZATION	PHONE	E-MAIL ADDRESS
R. Perry Walker	Self	859-8601	rpwalker@wyoming.com
Mike Golas	Questar Market Resources	fax 1-304-2195	Michael.Golas@Questar.com
William Belveal	Concern citizen	367-6286	williambelveal@wyoming.com
Kate Fossing	Energy Labs	258.5348 (CELL)	kfossing@energylabs.com
Donna Nye	BLM	775-6111	Donna_Nye@blm.gov
Rick Hoffman	Sublette County Waste Management	307-276-5792	SCWM@TRIB.COM
Jim Sewell	Shell Exploration + Production Co.	281.544.2807	jim.sewell@shell.com
Terry Svalberg	USFS	307-367-5747	TSvalberg@FS.Fed.us
Susan Caplan	BLM	307-775-6031	Susan_Caplan@blm.gov
Cara Casten	WDEQ - Air Quality	307-777-8684	ccaste@state.wy.us
Ken Peacock	BLM	307-775-6329	Ken_Peacock@blm.gov