AFTER YOUR FRACKING, WOULD YOU DRINK THE WATER? IF SO, CAN WE TURN YOUR HOUSE WATER OFF + BRING YOU TANKERS FILLED WITH INGLEWOOD OIL FIELD WATER AFTER YOU'VE FRACTURED.

IF YOU SPOIL OUR WATER, CAN YOU PAY FOR DECADES ~~UNTIL IT~~ OF FRESH WATER TANKERS TO OUR HOMES UNTIL IT IS CLEAN AGAIN?

[redacted]

Assembly Bill 591 Fracking

(1)

EXACTLY WHAT IS BEING INJECTED INTO THE GROUND BESIDES HIGH-PRESSURE WATER, IF YOU WON'T TELL US, CAN WE TURN-OFF YOUR HOUSE WATER + BRING YOU WATER FROM THE FIELDS (INGLEWOOD FIELDS) IN WATER TANKERS FOR YOU AND YOUR FAMILIES. FROM TOM CAMARELLA

Please explain how ~~the~~ earthquake ~~earthquakes~~ faults in the area will be impacted by fracking?

(2)

03/08/12

How is the settlement going to effect the physically ill in the community, and who determines what each injured party receives?

ruth craft2 @ gmail.com

(3)

Add to Study risk

- migration by any fracture with displacement of >5ft.
- Location of all abandoned wells along entire casing length
- Locations of any suspected abandoned wells - old aerial/surface photos

The data you are examining & study scope was developed & provided by PXP. What additional data did you ask for or should ask for?

(5)

where will tests occur, at the end of your gates? Can the company test air quality and water quality outside the gates?

(6)

Does DOG taken in account the proximity of the wells to the Englewood Fault with regard to the harmful effects of fracking?

Sean Hartley or it is sarah@aol.com

Mona Shapiro - Blair Hills Assn. Historian

[redacted]

1. Need new info - Send Emails to "hank.mgn@ATT.net"

2. Since DOGGR is there to ensure the Safety of residents, and a request by PXP for permission to examine property affected by Oil company, and, this permission is answered with "yes", how come the resident cannot be given a copy of the report resulting - We PAY your Salary To take care of our safety + needs. This is OUTRAGEOUS!!

(8)

What are the components of the fluid used in Fracting?

Where does the fluid go once injected into the ground?

Is there a way to determine if seismicity is "normal" or induced by HF? If so, how?

Is horizontal drilling part of the study? If not, why not? Doesn't horizontal drilling impact seismicity?

Yvonne Ellett Hill
fashunchik@gmail.com

1) Are there plans to do slant hydrolic fracking?
If so, in what direction?
How will the Baldwin Hills Estates be affected?
2) Has PXP tried fracking and are they running studies on their other California properties or are the Baldwin Hills the guinea pigs?
3) How far from PXP boundaries are they going to study? Will they be surveying → (11)

the surrounding communities?

4) What is the new ETA for the "One Big Park" project?
- Or has it been permanently placed on hold? or abandoned?

5) A worst case scenario of a mega-earthquake needs to be included, including the results of liquefaction.
- What, exactly will rise to the top?
- how far will the liquefaction occur beyond PXP boundaries?

What are the "success" parameters of the study? (For example, what if there is minimal ground water contamination? Will they proceed with fracking?) What are the limits of the potential concerns?

Thanks — gayleа@gmail.com

Gayle Archeta (12)

Q: Since glutaraldehyde is a fixative ie. agent that kills cells, why is it OK to use in hydraulic fracturing?

Submitted by kkg4i@sbcglobal.net

President
Culver Crest Neighborhood Association

(13)

1. Human Testing + Effects

2

The conditions in the Inglewood Oil field are extreme:
fault line,
limited water resources,
important watershed,
high density population,
and limited regulation capacity.

The proposed study ~~won't cover so~~ can only predict so much - it is theoretical. Given our conditions, our population & the high stakes of any accident - how can we accept any risk? Why would we? (15)

When was the first fracking in —
- LA County, where, when, API well #
- Inglewood Field when where API Well #
- PXP when, where, API well #

The study as describe DiD not appear to take enough date to comment on the effects of horizonal drilling Please Review the study specifications OR Require a second study before horizonal drilling is Allowed

Romero/Malveaux
retired10@earthlink.net

(17)

Kambara, Rena

From: Linda Shahinian [lindashahinian@ca.rr.com]
Sent: Thursday, March 08, 2012 9:36 PM
To: Kambara, Rena
Subject: Oil Field Study

The study will evaluate the "Potential for Ground Movement or inducement of seismic events." This should include impacts on the adjacent neighborhoods and not merely on the field itself.

Kambara, Rena

From: John Kuechle [jmk@post.harvard.edu]
Sent: Friday, March 09, 2012 11:56 AM
To: Kambara, Rena; John Peirson
Subject: Fracking Study

Rena,

Although I have sent this comment directly to Daniel Tormey, I did want to also get it to you so that it can be included in the official list of requests the County will be passing on to PXP:

I was troubled by John Martini's comment last night that the study would be limited to high volume hydrolic fracking.

It may be true that high volume hydrolic fracking raises more environmental concerns than other processes included under the umbrella term "fracking." If so, it probably makes sense for the study to concentrate on high volume hydrolic fracking. However, this is very different from saying that PXP will study only high volume hydrolic fracking.

It seems clear that such a limitation on the study would violate the terms of the Settlement Agreement, which requires a study of "the types of fracturing operations PXP may conduct in the Oil Field." This language quite clearly requires PXP to look at all types of fracking, ranging from the gravel pack process mentioned by Martini, all the way up to an including high volume hydrolic fracking.

To put it another way, the oil field's neighbors want to know whether the fracturing processes being undertaken (or contemplated) by PXP will cause any environmental problems - and if such problems may occur, we really do not care whether the process causing the problem is high volume, low volume, or any other type or fracking.

Thank you,

John Kuechle

Kambara, Rena

From: tami wedekind [twedek@sbcglobal.net]
Sent: Friday, March 09, 2012 5:18 PM
To: Kambara, Rena
Cc: Judith Martin-Straw
Subject: Question for study

Hello,
I attended the meeting last night and I would like to include this question in the study.

In Ohio the waste water disposal was pumped back into the ground and lubricated a fault line - causing an earthquake.
http://boingboing.net/2012/03/09/fracking-earthquakes.html

What plan will be in place to dispose of the 'fracking liquid' or 'brine'?
Will it be pumped into the ground?

Tami Wedekind
Twichell Studio: architects
10606 Culver Blvd.
Culver City, CA 90232
[redacted]

http://www.twichellstudio.com/

www.tamiwedekindworks.com

Kambara, Rena

From: Linda Shahinian [lindashahinian@ca.rr.com]
Sent: Saturday, March 10, 2012 8:21 AM
To: Kambara, Rena
Subject: Brine injection wells

Is brine injection well essentially the same process that is used in the Inglewood fields? http://www.latimes.com/news/nationworld/nation/la-na-fracking-quake-20120310,0,3295304.story

Earth*quakes* may not occur or be significant, but vibration and ground movement can incrementally be damaging to property. We hope this is seriously considered in the PXP report.

Kambara, Rena

From: Clyde Williams [ctwilliams2012@yahoo.com]
Sent: Monday, March 12, 2012 12:41 PM
To: Kambara, Rena
Subject: Re: CAP Fracking Study Comments and Requests

From: Clyde Williams <ctwilliams2012@yahoo.com>
To: ""Rena Kambara"" <rkambara@planning.lacounty.gov>
Cc: Paul Ferrazzi <razzip1@ca.rr.com>; McPherson Patricia <patriciamcpherson1@verizon.net>; Cardiff Todd Esq. <todd@tcardifflaw.com>; Paul Ferrazzi <razzip1@ca.rr.com>
Sent: Monday, March 12, 2012 12:39 PM
Subject: Re: CAP Fracking Study Comments and Requests

RENA - can we delay the deadline til three days after acessibility of the presentation materials so that we can provide more meaningful comments and recommendations.

Has anyone found the web site for the presentations for the CAP meeting..
I am ready to do more recommendations on Scope and Circulation to submit to "Rena Kambara"
rkambara@planning.lacounty.gov
Dr. Tom Williams
[redacted]
ctwilliams20122@yahoo.com

From: Paul Ferrazzi <razzip1@ca.rr.com>
To: Williams Tom <ctwilliams2012@yahoo.com>; Cardiff Todd Esq. <todd@tcardifflaw.com>; McPherson Patricia <patriciamcpherson1@verizon.net>
Sent: Friday, March 9, 2012 1:39 AM
Subject: Dan Tormey

FYI

Daniel Tormey, PhD, PG - ENTRIX Inc.
email: dtormey@entrix.com
Dr. Tormey is a geologist, geochemist, and engineer with well-developed skills in framing and analyzing environmental issues, and in communicating complex ideas to a wide range of audiences. He has been project manager or technical lead for over one hundred projects requiring fate and transport of chemicals in the environment, including analysis, fate and transport modeling of chemicals in groundwater and surfacewater, study of linked groundwater-surfacewater systems, sediment transport analysis, quantifi cation of adsorption/desorption kinetics, air dispersion modeling, among others. His work with contaminants also includes site assessment, forensic geochemistry, risk assessment, feasibility study, and site remediation. Dr. Tormey has served as a technical expert in fate and transport issues supporting either litigation or agency testimony involving petroleum, solvents, metals, pesticides, and plastic components. In addition, he has been a task manager and technical lead for fl uid injection projects, including water injection, steam injection, and slurry injection in oilfi elds. Dr. Tormey has a B.A. in Civil Engineering and Geology from Stanford University and a Ph.D. in Geology and Geochemistry from MIT.

Daniel Tormey, Ph.D., R.G.
Project Manager
Project Description, Alternatives, Hazards, Geology, Hydrology and Water Quality
Hydrogeologist, Geochemist, and Civil Engineer, ENTRIX, Inc.
Ph.D., Geology and Geochemistry, M.I.T., 1989
B.S., Civil Engineering and Geology, Stanford University, 1983
21 Years of Experience

Kambara, Rena

From: Jon Melvin [jonm@vi-i.com]
Sent: Monday, March 12, 2012 7:38 PM
To: Kambara, Rena
Subject: data analysis from fracking study in Baldwin Hills

Thank you for the meeting last Thursday night. Here are my "questions" (requests) for the study:

Request #1: Please make sure that the independent evaluation of the PXP test fracking includes a summary of the study data including all relevant information about what was measured, how it was measured, the results, and their implications, without reference to external resources.

This is the reason I ask this with great concern:

As a physicist from Caltech I am no stranger to technical and scientific complexities of issues. But I noted that, at the meeting, while a nice general presentation was given (perhaps with the dual motivation of explaining and calming fears), answers to specific audience questions where not given. Data had not been gathered by the technical and administrative experts and officials who were present. The audience was instead instructed to go to various web sites and state agencies to gather and distill the information themselves (e.g, chemicals injected, safe health levels). I understand from a prior CAP member that this happened even though the CAP, in prior meetings, had requested that this not be done. Thus, the audience was being asked to create a synthesis with lay interpretation while the presenters passed on that task, an untenable request. I see this as: (1) not respecting the level of questions from the audience is asking (the audience is asking for actual data, not verbal reassurances); (2) avoiding responsibility for delivering definitive communication about what is being done by PXP.

Request #2: Please clarify the purpose of the study and how it can impact decision making about future fracking. What are the criteria that will permit and the criteria that will prohibit or put restrictions on future fracking. How will this be enforced with PXP in the event data suggests restriction of some profit making activities. In other words, exactly how does this study, required by the CSD, provide protection.

Thank you.
Jonathan D. Melvin, Ph.D.
Blair Hills representative on the CAP committee

Kambara, Rena

From: Kendall Price [kenprice301@aol.com]
Sent: Monday, March 12, 2012 8:48 PM
To: Kambara, Rena

My wife and I live in Culver Crest, but were unable to attend the recent meeting. We are VERY concerned about fracking and want to add our voices to others who were able to be at the meeting. We have lived in this area for about 40 years and feel PXP needs to delay, cut back or stop fracking until national studies are completed on this subject. The LA Times has carried two articles on fracking. In one on 12/9/11 It reported that "the EPA said that hydraulic fracturing. . . . probably contaminated well water in Wyoming.. . ." The article quoted the EPA "However, , even considered together with other lines of evidence, the data indicate likely impact to ground water that can be explained by hydraulic fracturing." That article went on to say "The EPA is conducting a comprehensive study about the possible effect of 'fracking' on water resources, but initial results are not expected until late 2012"
We are aware that the Governor recently replaced Derek Chernow after he had proposed that relaxing rules on fracturing would violate federal laws. So the Governor is no help on this issue
Please take our concerns seriously about shoddy drilling processes. We are concerned for water contamination and for its impact on weakening our hillside during or even helping to cause earth shaking.
PXP has not been a good neighbor. We are aware of past practices that have not helped our neighborhood. Oil from this hill is now being obtained through horizontal drilling and we are concerned. We know there is an oil shortage, but the relatively
minor amount coming out of this area would have no impact on gasoline prices. There are a relatively few jobs impacted and we resent PXP sending employees on paid time to stack public meetings on this issue.
Sincerely,
Drs. Kendall and Deon Price

Kambara, Rena

From: andrea leer [loulou5302@yahoo.com]
Sent: Tuesday, March 13, 2012 9:10 AM
To: Kambara, Rena
Subject: Question about Fracking

Has the government's study, which, is scheduled to be released in 2012, been released?

Fracking could create earthquakes, why would we want to take that chance in our neighborhood?

How might large volume water withdrawals from ground and surface water impact drinking water resources?

What are the possible impacts of releases of flowback and produced water on drinking water resources?

What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?

Fracking has been in the news lately with bad affects, do not sell us out to the big oil companies.

Andrea McKinney

Voltaire's cardinal truth: "People who believe absurdities will soon commit atrocities."

Kambara, Rena

From: Ellen Christensen [edchristensen@yahoo.com]
Sent: Wednesday, March 14, 2012 10:13 AM
To: Kambara, Rena
Subject: BALDWIN HILLS - PXP NO HYDRAULIC FRACTURING!

HELLO,

I AM WRITING TO EXPRESS MY OBJECTION TO PXP'S PLAN FOR HYDRAULIC FRACTURING IN BALDWIN HILLS.

There is an open comment period for questions, suggestions or topics you want to be covered in the "Hydraulic Fracturing Study" to be conducted by PXP hired consultant, Daniel Tormey, PhD.

Kambara, Rena

From: Naomi Cox [realbrk@att.net]
Sent: Wednesday, March 14, 2012 11:56 AM
To: Kambara, Rena
Subject: include in the fracking study

dear sirs.
there should definitely be water, soil testing, and any possible tests for gases that could be released into the air both ON and OFF THE OIL SITE, in our neighborhoods.

I would like to know the statistics of recent cases of cancers, autism, and any other medical conditions that have arisen in our neighborhoods in the last few years since all this new activity has been started. thank you

Naomi M. Cox

[redacted]

"How far you go in life depends on your being tender with the young, compassionate with the aged, sympathetic with the striving and tolerant of the weak and strong. Because someday in your life you will have been all of these." George Washington Carver

Kambara, Rena

From: Theresa Brady [terriebrady@gmail.com]
Sent: Wednesday, March 14, 2012 1:57 PM
To: Kambara, Rena
Subject: concerns regarding fracking in the baldwin hills

I am concerned about fracking in the Baldwin Hills because of the known effect on ground water: making it flamable and carcinogenic.
This would likely make the la groundwater, which is used in DWP water provided to city residents, toxic. I hope that you will not allow this practice to be approved. If it is it will contaminate the water we all drink. Theresa Brady [redacted]

Kambara, Rena

From: rometha [retired10@earthlink.net]
Sent: Wednesday, March 14, 2012 4:03 PM
To: Kambara, Rena
Subject: Hydraulic Fracturing Study

Please include the following question in the study.

Based upon the data collected, over what lateral distance , inside and outside of the oil field perimeter, can the results of the study be said to apply with accuracy.

Kambara, Rena

From: ywatson @dslextreme.com [ywatson@dslextreme.com]
Sent: Wednesday, March 14, 2012 11:30 PM
To: Kambara, Rena
Subject: Inglewood Fracking Study Questions
Attachments: SPE 90975 Moodie Inglewood Vickers.pdf

Ms. Rene Kambara,

I am a community activist in Montebello and also a Sierra Club member. I have questions about fracking in the Inglewood oil field which would also apply to the Montebello Hills oil field.

I am enclosing a copy of a paper written for the Society of Petroleum Engineers (SPE) entitled, "Multistage Oil-Base Frac-Packing in the Thick Inglewood Field Vickers/Rindge Formation Lends New Life to an Old Producing Field." The paper says it "was prepared for presentation at the SPE Annual Technical Conference and Exhibition held in Houston, Texas, U.S.A., 26–29 September 2004."

According to this paper, in 2003 PXP fracked at least 11 wells using native crude oil as the fracking fluid. PXP was contemplating using this technique on more wells in Inglewood and other locations in Los Angeles. The Montebello Hills are mentioned on page 9.

The following are my questions/concerns for the upcoming study in the Inglewood oil field.

Questions for the PXP Fracking Study:

What specific types of fracking has PXP conducted in the Inglewood oil field? Oil based, water-based, or some other type?

Exactly how many wells have undergone any type of fracking?

How many times have individual wells been fracked?

Where are these fracked wells located?

How close is the nearest fracked well to residential structures?

How close is the nearest fracked well to a known earthquake fault? (Please list depth of well.)

How many "stages" were involved in these frack jobs? [At the Baldwin Hills meeting I heard Mr. John Martini of PXP say the upcoming fracking study would address "single-stage" fracking so what happened to PXP's plans to use "multi-stage" fracking?]

What specific type(s) of fracking (oil, water or other) will be included in the upcoming Inglewood fracking study? (Please give the industry standard name.)

Will any type of fracking be excluded from the study? If so, why?

What is the difference in risk factors between oil-based ,water-based, or other types of fracking? [I've read industry literature stating that oil-based fracking is more hazardous than water-based; one reason is because of the high flash point of crude oil.]

What is the difference in the chemical mixtures used for each type of fracking? (Please list chemicals per type of fracking.)

If possible, I would appreciate the answers to these questions about the Montebello Hills oil field.

Were the proposed fracking experiments mentioned in the SPE paper carried out in the Montebello hills?

Will PXP conduct a public information meeting in Montebello to address the concerns of residents?

At the end of last week's meeting at the Kenneth Hahn State Recreation Area Community Center I was able to speak briefly with Jason Marshall, chief deputy director of the Department of Conservation (DOC). I asked him a few questions about the SPE paper and gave him my contact information.

I appreciate this chance to comment on the upcoming Inglewood oil field fracking study.

Yvonne Watson
Chief Researcher
Save the Montebello Hills Task Force
Sierra Club/Angeles Chapter

SPE 90975

Multistage Oil-Base Frac-Packing in the Thick Inglewood Field Vickers/Rindge Formation Lends New Life to an Old Producing Field

W.H. Moodie, SPE, Plains Exploration & Production, W.A. Minner, SPE, Pinnacle Technologies, Inc, M. Fernandez, D. Lockman, Plains Exploration & Production, W. Burgett, Jr., Weatherford Completion Systems

This paper was prepared for presentation at the SPE Annual Technical Conference and Exhibition held in Houston, Texas, U.S.A., 26–29 September 2004.

Abstract

The Inglewood Field, located along the Newport-Inglewood fault trend in the Los Angeles Basin, was discovered in 1924 and has an estimated ultimate recovery of 400 million barrels of oil. The traditional shallow reservoir production target zones are the Vickers and Rindge formations, which have been waterflooded since 1954. These intervals consist of a 1200'-1800'+ thick sequence of friable turbidite sands in the depth range of 1000'-3000'. Contemporary reservoir development in the complex, faulted reservoir rock has been connected with improved reservoir characterization, leading to infill drilling and waterflood pattern realignment. However, infill well success using conventional water-base cased-hole and openhole gravel packing has been marginal and inconsistent, because the long intervals and large reservoir pressure variations across the completion column make it difficult to complete the wells with an effective gravel pack and without formation damage.

In 2003, a radically different frac pack completion strategy was developed and evaluated. This low-cost frac-packing strategy has the advantages of true wellbore stimulation (or at least skin minimization) and ability to effectively connect across the highly laminated formation layers. Eleven wells were completed with as many as 8 stacked frac pack stages per well, with each stage pumped over a wire-wrapped screen to enable fracturing and gravel packing in one step. In the new wells, a limited entry perforation strategy was used to effectively distribute the fracture treatments across each stage interval. 20° API Inglewood crude was used as both the frac fluid and completion fluid to virtually eliminate formation damage, reduce costs, and simplify completion procedures. Several innovative new downhole tools (based on cementing tool technology) and procedures were developed to enable multiple stages to be performed in a simple yet effective manner, and allow the technique to be applied in both new wells and to remediate existing cased-hole completions.

Average initial production rate from the frac pack wells was 110 BOPD and 1250 BWPD. This response is much better than the rates from cased-hole gravel packs, and on par with open-hole gravel pack wells, but without the risk associated with gravel packing a thick openhole interval in a single step. Stabilized oil cuts have settled in at >5%, which compares favorably to the field average of 3% due to more effective completion of the deeper, lower permeability intervals that have been less swept by the waterflood. In response, additional wells will be completed at Inglewood and several other Los Angeles Basin fields in 2004.

Introduction

In 2002, 10 new Vickers/Rindge formation producing wells were drilled in the Inglewood field. These wells were cased hole completions with very long (1200'-1800') perforated intervals and gravel packed inner liners. The wells were less productive than expected, and the difficulty of gravel packing the long completion intervals led to sand control failures. In 2003 another 10 new producing wells were planned and the decision was made to complete these wells using conventional open hole gravel packs to improve well productivity. However, due to outright failure of one well immediately and difficulty in completing the next two, the decision was made to try another completion technique for the remaining seven wells.

The completion technique chosen featured oil-base frac packing using inner liners and limited entry perforating. This technique was pioneered during 300+ *single*-stage fracture treatments pumped in the Pyramid Hills formation at the Mt Poso field in Kern County from 1999 until 2003. These treatments were pumped down the casing/liner annulus using crude oil as the fracturing fluid. High sand concentrations were successfully placed with very few problems. Very effective completions were achieved and the severe proppant flowback problems experienced at Mt Poso were solved.

In the Inglewood field, the Mt Poso fracturing technique was modified and extended using common, low cost completion tools to enable economic *multiple*-stage frac packing of the long productive intervals. By using native crude oil as the fracturing fluid, treatment costs were significantly reduced, and formation damage was minimized, if not eliminated. Fracture treatment data has also provided

qualitative reservoir information across the completion column, assisting with understanding adjoining waterflood injector conformance and performance.

The production performance of the cased hole frac pack wells has been equal to or better than the open hole wells. Effective and durable sand control has been achieved – the risk of sand control failure has been significantly reduced, compared to both cased hole and open hole conventional gravel packs. Further, completion costs are no greater than for both conventional cased hole and open hole gravel packing.

The application of cased hole frac packs has also been extended to recompletions of existing cased hole gravel packs, to address poor productivity or sand control failure.

Field Setting

As shown in Figure 1, The Inglewood field is located in the northwestern portion of the Los Angeles Basin, ten miles southwest of downtown Los Angeles. The field is at the northern end of the Newport-Inglewood trend. As of January 2004, 1386 wells have been completed, and there are 341 active producers and 155 active injectors. Current field productive area is 1215 acres.

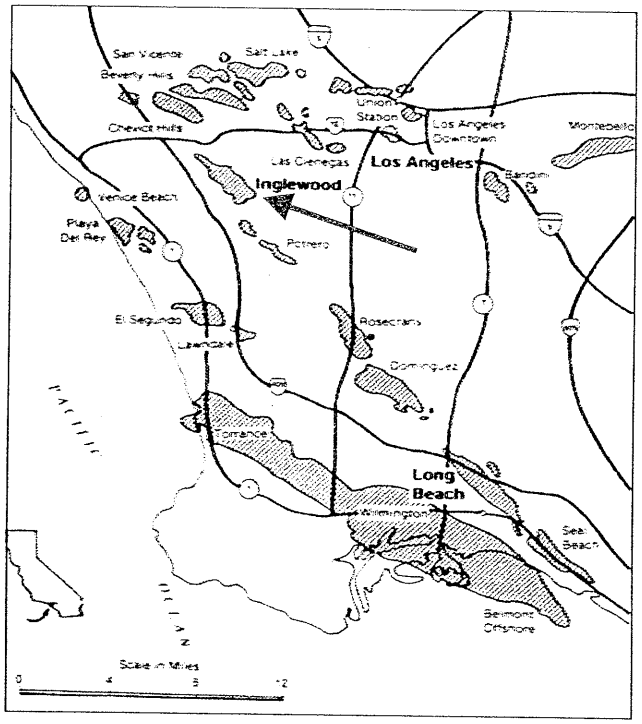

Figure 1. Location of the Inglewood field, Los Angeles, CA.

The field was discovered in 1924 by the Standard oil Company of California. The initial well was completed in the Vickers reservoir and had an initial production of 145 bpd of 19 degree gravity oil. Peak production was reached in 1925 at 18,300 bopd. Six deeper zones were discovered later and also developed. The shallow Vickers and Rindge reservoir zones have been undergoing waterflooding since 1954.

Geologic Description. The producing zones in the Inglewood field are confined from Middle Miocene to Upper Pliocene, approximately 15 million to 2 million years in age (Figure 2). The Vickers and Rindge Zones account for more than 60% of the total cumulative production to date. The Vickers and Rindge reservoir zones are contained within the Pico and Repetto Formations and were deposited during the Middle and Upper Pliocene. The Vickers and Rindge zones were deposited in the middle to outer portion of deep water turbidite fans. These fans spread across the basin floor from a northeast sand source. By the end of Vickers time, the basin had begun to shallow and the basin center shifted to the southwest.

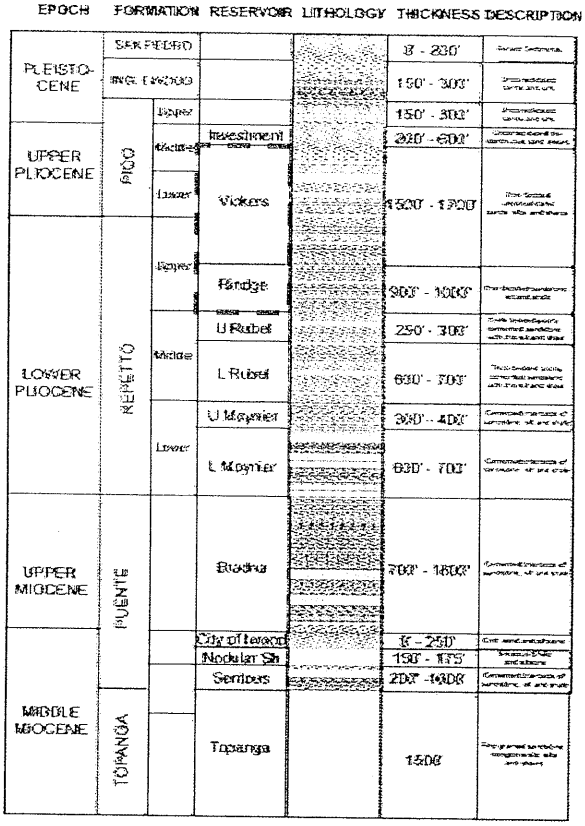

Figure 2. Stratigraphic Section at the Inglewood field.

The Figure 3 type log shows that the sands in the Vickers and Rindge zones are numerous but not individually thick. Lateral continuity of sand packages is good but vertical communication across the laminated intervals is very poor. Permeability is highest at the top of the Vickers at 100+ mD, decreasing with depth to less than 50 mD. Porosities range from 33% in the shallowest sands to 27% in the deeper sands.

The major folding of the Inglewood anticline began during the deposition of the Vickers Zone and peaked towards the end of Pliocene, when the Inglewood formation was being deposited on top of the Vickers zones. The field occupies the crest of an elongated anticline with abundant and complicated normal faulting through the Vickers and Rindge zones. Most of these normal faults act as barriers to fluid flow due to juxtaposition of the sands. Structural dips in these zones are generally less than 20 degrees.

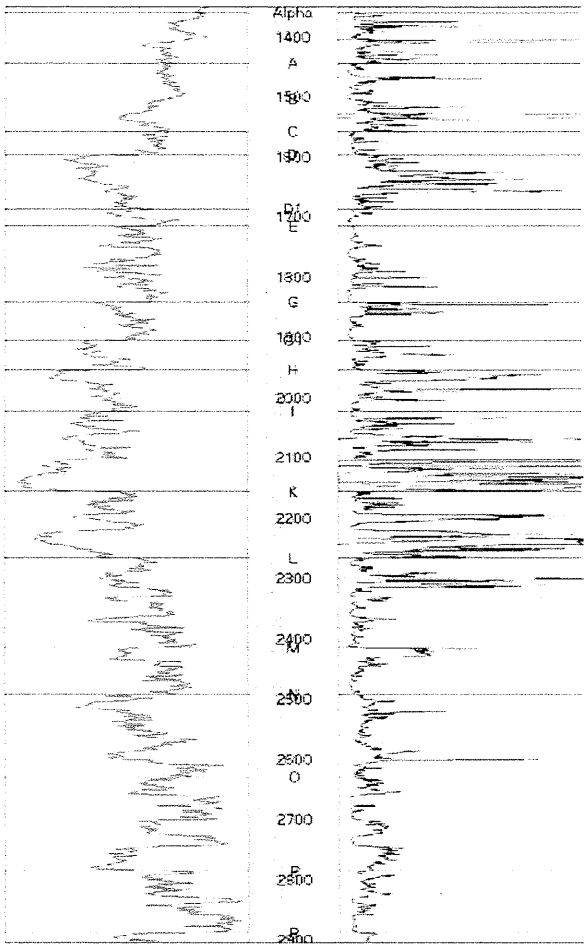

Figure 3. Inglewood Field type log - SP/ induction resistivity, Vickers Zone.

Traditional Completion Techniques

The completion method in the Inglewood field has been driven by the need to produce from the long productive intervals found in these interbedded turbidite sand shale sequences. Early on, wells were produced using slotted liners set in long open hole intervals. Later completions progressed to open hole gravel packing, and then cased hole perforated gravel packs. Each of these methods offered some positive aspects as well as some drawbacks.

The early slotted liners landed in open hole provided some measure of wellbore access to the entire productive interval. This was important considering the highly laminated nature of the sediments and the overall length of the completion interval. It was a simple completion method and generally offered a high rate of success in mechanical deployment. The drawbacks included a total lack of hydraulic isolation, a good chance of formation damage and liner plugging, and a lack of robust formation sand control. Future stimulation and remediation options were also compromised by the lack of hydraulic isolation.

Open hole gravel packing was an advancement on the earlier landed liners in providing for better sand control as the water cut in the field increased. It also provided access to all available reserves from the laminated reservoir. Drawbacks of this completion method were much the same as an open hole completion. Hydraulic isolation and formation damage were still problems. Obtaining an effective gravel pack was problematic due to the long completion interval covering sections with varying permeability, reservoir pressure and borehole diameter. With waterflood maturity and variable injector performance, large differences in pore pressure gradient across the completion column (varying from 0.2 to 0.5 psi/ft) made the gravel packing problems especially acute.

Cased hole gravel packing offered solutions to some to the problems encountered with both open hole methods but also had several significant new drawbacks. Hydraulic isolation to some extent was achieved, depending upon the placement of perforations. Some of the permeability and pressure affects were ameliorated and the problem of varying borehole geometry was completely solved. Due to the laminated formation character and poor perforation effectiveness, wellbore access to the completion column was significantly poorer than from open hole completions – despite huge perforating jobs, with the number of perforations exceeding 6400 in some wells. Obtaining an effective gravel pack was easier but was still a problem due to formation damage, which inhibits packing of the perforation voids. The most serious problems occurred when only one or two perforations connected into an interval overpressured by waterflood injection. The resulting high rate of production through only one or two perforations and gravel pack voids led to high rates of liner failure and loss of sand control. Overall this was the most expensive of all the options, with very long sections of wire wrapped screen required as well as massive perforating jobs. Technically this was also a difficult completion method to deploy.

Given the nature of the production interval and problems associated with the traditional completion methods, a new method of completion was needed that included the advantages of the traditional methods, but solved the problems inherent with each of them. The objectives were to effectively control formation sand, contact all available reserves, mitigate formation damage problems, have a high chance of successful mechanical deployment, offer some hydraulic isolation and be cost effective. After some deliberation a method using frac packing and unconventional tools was devised which would satisfy these requirements.

Key Frac Pack Advantages

Frac packing has solved many of the problems associated with the past methods of completion. Advantages include:

- Selective cased hole completion method – intervals swept by the waterflood may be bypassed if desired.
- Hydraulic isolation – achieved through perforation interval selection and by limiting the number of perforations. The combination of downhole tools used and the pressure drop associated with vertical flow in a sand-packed annulus provides isolation between stages, and even between perforation intervals in the same stage.
- Effective connection of the laminated sand intervals to the wellbore – fracture height growth provides a more effective wellbore connection than is possible using

conventional cased hole perforating, helping to assure that all targeted zones have the ability to produce.

- Good vertical treatment distribution – use of a multiple-cluster limited entry perforation strategy helps assure that the entire treatment stage interval is stimulated.
- True stimulation, or at least skin minimization – near-wellbore damage from drilling and completion operations is bypassed.
- Non-damaging fracture fluid – use of straight crude oil with no polymer minimizes frac face permeability damage and proppant pack damage.
- Completion durability – the limited number of perforations and the 'reservoir' of frac sand outside of each perforation effectively control formation sand production and prevents liner erosion.
- The cluster perforation strategy reduces flow velocity from high pressure overpressured intervals (caused by adjoining waterflood injectors) by spreading the production over multiple perforations, reducing tendency for "blast hole" mechanical liner failure.
- Chances for crossflow problems during completion operations, associated with flow from overpressured to underpressured intervals, are lessened by completing the thick formation interval with multiple stages.

Novel Completion Tools Enable Economical Multi-Stage Strategy

To implement the multiple stage completion technique, downhole tools had to be developed that were cost effective, readily available, simple to use, and needed little or no testing. By using several off the shelf items in new ways the desired objectives were achieved.

Figure 4 presents a schematic of the gravel pack liner and downhole equipment.

With the exception of the first stage in a given well (although it could be used there also) the first item is the drive over adapter, followed by two casing cup sealing elements that look up. These cups seal the outside of the liner section from the previously treated zone below. They also provide some measure of hydraulic isolation between stages after the well is placed on production.

On top of the cups is an upside down cementing float collar. The float collar prevents downward fluid flow during fracturing but allows upward flow while running the liner in the hole. The float collar effectively seals the inside of the liner of the current stage from the previous stage below. Float collars are rated for high differential pressure and are designed to be easily drilled out during final well completion.

The liners used were a combination string consisting of 10'-20' wire wrapped screen sections covering only the perforated intervals, with blank sections in between. In addition, the top of each liner was perforated with 20' of semi perf slots. The specification for the slots was generally 0.020" width, 2" length, and 24 rows on 6" centers. If smaller frac sand was used, slots were cut to 0.012" in width. Size of the liner was an important consideration since fracturing was done down the liner casing annulus. A normal combination for the Inglewood field was 7" base pipe with 9 5/8" 36# casing. Consideration was given to limiting the annular velocity of the fracturing fluid to no more than 40 ft/sec to limit erosion tendency. A lower velocity also lessens chances for annular bridging, which can occur when the carrier fluid takes a shortcut to deeper perfs through the inside of the liner. All liner sections also included centralizing lugs placed above and below the perforated and wire wrapped screen sections to ensure that the liners were properly centralized in the casing.

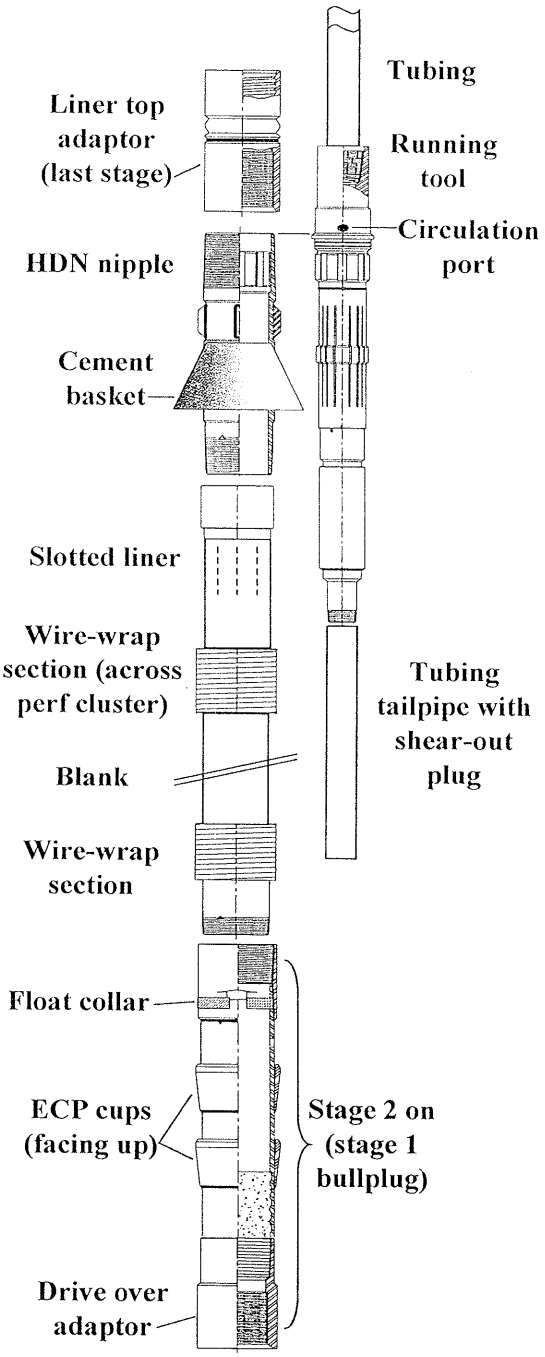

Figure 4. Schematic of gravel pack liner and downhole equipment.

On top of the upper semi-perforated section is another common piece of equipment used in a unique way. A common metal-petal cementing basket was placed upside down to act

as a "proppant check valve". During the prop frac injection down the annulus, the cement basket petals collapse and do not hinder flow. However, with flow back up the annulus (e.g. during annulus pressure bleedoff, or due to an overpressured interval feeding in while preparing for the next stage), the basket expands and bridges off the proppant backflow. Differential pressure is spread across the resulting annular proppant pack rather than just across the cement basket itself. This tool has proven to be very effective in keeping proppant in place after treatment shutdown.

The running tool is the last piece of equipment on the liner. These adapters are referred to as "one step tools", and were developed in the early 90's to drill in liners with welded on underreamers using foam fluids in shallow heavy oil reservoirs. When a liner was drilled in, it was immediately gravel packed in place and then the running tools were released off of the top of the liner using a straight pull release. The liner was circulated clean leaving a well which had been underreamed, gravel packed and prepared for production in one step.

The top of the "one step tool" is simply an adapter with wicker threads on top and splines in the middle. The tool is made up on the adapter, and tubing is run below to act as gravel packing washpipe. The washpipe contains a pump-out plug to prevent oil flow up the tubing while running the liner in the hole. The adapter is either screwed into a collar or welded on to the top of the liner prior to running the liner in the hole. The tool's straight pull release and circulating ports have proven to be extremely useful in deviated holes and for cleaning out the casing in the event that a premature screenout should occur.

Frac Pack Completion Procedure

New Wells. The completion procedure for a typical well starts with selection of the target zones to be stimulated. In a typical Inglewood well the total gross completion interval will range from 1200' to 1800' from top to bottom. In this large interval many sands of varying pressure, permeability, porosity and grain sizing will be distributed in packages ranging from several 10's of feet to 100' or more. Typically these sands will be finely to coarsely laminated. These sands are separated from each other by interbedded shales, silts and claystones, which may or may not be laterally continuous in nature.

The normal practice is to subdivide the total gross interval into subintervals of roughly 200 feet. In this subinterval, normally the 4 points opposite the best looking sand packages in the interval are chosen for perforating. Perforating is done using 4 jspf in a 1 to 2 ft interval. Perforations are at zero degree phasing at each setting. Typical practice in Inglewood is to use select fire guns to accomplish perforating a stage with a single run.

The perforations are chosen and a workover rig is moved on to the well and tubing is run to TD. The well is cleaned out if necessary and the wellbore is completely displaced with oil. The tubing is pulled from the well and bond logs are run to correlate with. After running the logs, the first stage is perforated. The liner is measured and adjusted to center up the 10'-20' screen sections on the perforated intervals. The typical screen in Inglewood is 0.012" wire wrapped screen on a base pipe that is slotted with 0.100" slots. These slots in the base pipe are typically 24 rows, 2" in length and 6" on center. The liner is made up and hung in the slips and then a tubing tail washpipe is made up and run inside the liner. This tubing tail has a sliding sleeve and plug in the bottom of the tubing. The tubing is plugged to prevent oil from flowing up the tubing while the liner assembly is run in the hole. The tubing tail is made up onto the liner running tool, which is in turn made up onto the liner. The entire assembly is then run into the well on tubing.

After setting the liner on bottom a swedge is screwed into the tubing, which is then connected to the rig pump system via a choke manifold. The tubing is pressured up and the sliding sleeve shears open; the tubing is now open into the liner and is used as a dead string during the fracturing treatment. The choke manifold is closed and the well is ready to fracture.

To fracture the well the high pressure pumping equipment is connected to the well through a frac spool underneath the blowout prevention equipment. These connections can be flanged or screwed into collars welded to the spool. Typically at Inglewood the frac spool has collars welded to the spool and two high pressure treating lines are connected using screwed swedges.

The frac lines are pressure tested and the lines are displaced with oil after pressure testing. The wellhead valves are opened and normally one breakdown injection is pumped down the tubing casing annulus consisting of about 125 bbl pumped at 30 bpm. Pressure is monitored on both the high pressure side and on the tubing side during this breakdown. The breakdown injection ends with a rate stepdown, and the pressure decline is monitored until fracture closure has been observed. Fracture entry friction, number of holes open, frac gradient, closure pressure and fluid efficiency are evaluated. A frac model simulation is performed for final pad sizing. The pumping schedule is adjusted if necessary, and then the main treatment is pumped. The tubing string is used throughout the treatment to continuously monitor the bottom hole pressure.

At the end of a typical propped frac treatment, the rate is stepped down with 30 bbls left to displace. The normal procedure is to step down from 30 bpm to 20 bpm at 30 bbls and then to 15 bpm with 20 bbls left and then to 5 bpm with 15 bbls left. At this point valves on the tubing manifold are opened into the tank and pressure on the deadstring is noted. With about 10 bbls left and 14 ppg sand in the annulus, the choke is slowly opened to drop the tubing pressure by 150 to 200 psi. A portion of the injected fluid now is directed away from the perforations and the sand slurry attempts to flow through the screen and up the tubing, resulting in the screen packing off. As the packoff occurs the pressure in the tubing will continue to drop as more screen area is packed off and pressure differential builds across the remaining screen interval. When the entire screen is packed off the injection pressure spikes in the annulus. When injection pressure increases by 500 psi, the displacement of the frac is shut down. Normally 2 to 5 bbls of sand slurry is left above the liner top. After shutdown of the treatment, the sandpack surrounding the screens is allowed to dehydrate further for a few minutes and then the tubing is shut in. At this point, normal post-frac leakoff takes over. The pressure is then monitored for post-frac leakoff calibration.

After fracture closure has occurred, the tubing is again opened to the tank and the well is allowed to bleed down as quickly as possible. After the tubing TIW valve is closed, a liner release 'dart' is placed on top of the TIW valve and the hose to the manifold is reconnected. The TIW is opened to allow the dart to fall. The normal fall rate for the dart is about 200 to 300 ft/min in the 20° API crude. After waiting for the dart to fall to the liner top, the rig pump is used to pressure up the dart in the liner setting tool, releasing the tool and tubing string from the top of the liner. A valve at the liner top is also opened. At this point the frac pumps are used to reverse circulate the sand left in the annulus (above the liner top) to the surface where shakers separate the sand from the oil. The sand is dumped into a steel pit that is cleaned out later. Circulation with the frac pumps is continued until the returns are clear of sand. The pumps are shut down and the tubing is allowed to bleed off if there is any pressure. The blowout preventer is then opened and the tubing is pulled from the well, leaving the well ready to be perforated for the next stage.

For the next stage the steps are the same. The well is perforated, the liner is made up and the tools are made up to the liner. The liner is then run into the well. The difference between the first stage and subsequent stages occurs when the liner reaches bottom. For subsequent stages the liner is not merely rested on bottom (bottom now being the top of the liner from the previous stage) but is driven on to the top of the previous stage's liner using a drive over adapter on the bottom of the subsequent stage's liner. If it is the last stage to be pumped into the well, a liner top adapter is run into the well and driven over the top of the liner stub. This adapter is typically a steel seal adapter, which does not form a hydraulic seal, but holds the liner top in place and prevents the gravel pack from being produced up the annulus.

With an early morning start, two stages can generally be performed on the first day, then one on day 2, two on day 3, one on day 4, etc.

Frac Pack Treatment Design

Staging Strategy. Stage and perforation strategy are key to successful stimulation of the thick Vickers/Rindge target formation intervals. The average total completion interval length for the 11 wells completed to date has been very large at 1460 feet. These completion intervals were each divided into 5 to 8 stage intervals with an average gross thickness of 225 feet.

A multiple-cluster limited entry perforation strategy was used to vertically distribute the fracture treatments across each stage interval. In most cases, each stage interval was perforated with 4 clusters of 4 holes, for a total of 16 holes. The number of perf clusters was occasionally varied from 3 to 5, depending upon the target sand layout and stage thickness, while keeping the total number of holes at about 16. Average total perf interval per stage has been 155 feet, resulting in an average perf cluster spacing of about 50 feet. Note that the goal is to create an independent fracture from each perf cluster setting, to avoid the fracture coalescence that can occur with hydraulic perf cluster linkup outside of the casing.

Each 4-hole perforation cluster was shot at 0° phasing over a 1 to 2 ft interval. A phasing of 0° is believed to be advantageous because it encourages all holes to break down once one hole breaks down. The fracture also tends to initiate as a single plane, improving the wellbore-to-fracture connection. Although it is unlikely that the fracture initiation direction is aligned with preferred fracture orientation, the rock is soft enough that erosion smoothes the transition into preferred fracture orientation.

With a perforation diameter of 0.42" and 16 holes, the theoretical perforation pressure drop was 430 psi at 30 bpm.

Frac Fluid. The frac fluid used was 20° API Inglewood crude oil. This oil has a viscosity of about 80 cp at surface conditions and 20-30 cp at the average reservoir temperature of 120° F.

Advantages of using Inglewood crude oil include a) low cost – the oil is simply 'borrowed' for fracturing use, b) non-reactive character with formation clays, c) no polymer residue to damage the fracture face or proppant pack, and d) operational ease of use, with no quality control (base gel viscosity, crosslinking or breaking) concerns.

While it is possible that the oil may be slightly damaging to formation permeability due to precipitated asphaltene and wax particulates, no evidence for this has been observed.

Disadvantages of using the oil include safety and on-site housekeeping. Reid vapor pressure is low enough to not be a concern. The moderately low flashpoint is addressed by several standard precautions, and procedures were developed to minimize on-site leakage and spills.

Initial concerns regarding excessive leakoff in the 100 mD rock and possible proppant transport deficiencies proved to be unfounded. Based on observed leakoff behavior, prop frac slurry efficiencies were estimated to be on the order of 35%, allowing for reasonable pad fractions. Proppant transport appears to be excellent, based on the general lack of downhole reactions to prop loadings as high as 14 ppg, and experience with restarting injection after unexpected treatment shutdowns and with reversing the wellbore clean after monitoring the prop frac pressure decline.

Proppant. Both 20/40 mesh and 16/30 mesh sand have been used for conventional gravel packing of the Inglewood Vickers/Rindge formation.

The initial frac pack treatments used 20/40 mesh Ottawa sand to be conservative from a proppant transport and bridging standpoint.

Proppant size was increased to 16/30 mesh and then 12/20 mesh Brady sand during later treatments to increase fracture conductivity. After some bridging sensitivity was experienced with 12/20 mesh sand, proppant size was standardized at 16/30 mesh.

In the wells completed to date, there does not appear to be any correlation between well productivity and proppant size. Thus, there is no evidence for conductivity restriction from the smaller sand sizes. For example, there are several wells treated with 20/40 mesh sand that gross more than 2000 bpd with a significant fluid level over the pump. Productivity is likely a stronger function of local formation properties and reservoir pressure (waterflood impact).

Tip Screenout Design. Tip screenout (TSO) initiation occurs when the initial clean pad volume is depleted and proppant reaches the fracture tip. Further pumping then serves to 'inflate' fracture width and pack the fracture with proppant. The larger fracture width increases fracture conductivity, increasing flow capacity and lessening non-darcy and multiphase flow pressure drop. Many frac pack treatments are designed to *maximize* TSO pressure rise. However, in the Inglewood Vickers/Rindge formation, the goal was to achieve a *moderate* TSO pressure rise, on the order of several hundred psi or less. An *aggressive* TSO limits fracture dimensions, including both half-length and height. A *limited* TSO pressure rise thus enables greater fracture height growth, which is key for creating an effective connection across the laminated formation layers with the multiple-cluster limited entry perforation strategy employed.

A typical treatment pumping schedule is shown in Table 1, consisting of 100,000 lbs 16/30 Brady sand proppant pumped in 715 bbl slurry at 30 bpm. Maximum proppant loading is relatively high at 14 ppg to assist with creating effective fracture conductivity.

Table 1. General Inglewood Vickers/Rindge hydraulic fracture treatment design

Fracture Fluid	20° API Inglewood Crude
Injection Rate, bpm	30
Breakdown Injection, Bbl	125
Pad volume, mgal	10.5
1 ppg, clean mgal	2
2 ppg, clean mgal	2
4 ppg, clean mgal	2
6 ppg, clean mgal	2
8 ppg, clean mgal	2
10 ppg, clean mgal	2
12 ppg, clean mgal	2
14 ppg, clean mgal	1
Proppant Type	16/30 Brady
Total Proppant, Mlbs	100
Pad Fraction, %	35%
Total Clean Volume, bbl	610
Total Dirty Volume, bbl	715

TSO pressure rise is controlled by pad fraction. With relatively high oil leakoff and the desire to limit TSO pressure rise, the base case pad fraction is relatively large at 35% of total dirty volume. Note that because the wellbore is initially full of frac fluid (Inglewood oil), the pipe displacement volume of 100-200 bbl counts as pad, and thus the actual surface pad volume pumped is reduced by wellbore volume.

Rigorous fracture modeling is not feasible due to the complexities associated with the highly layered formation, an unknown pore pressure distribution, and the multiple cluster limited entry perforation strategy. Simplified modeling suggests that created propped half-lengths are on the order of 50 feet, with 3 psf prop concentration. General prop frac shutdown fluid efficiency is estimated to be in the range of 30% to 35%.

Frac Pack Treatment Behavior

Frac Pack Example. Stage 4 of well LAI1-412 (Vickers D-E interval) is used to illustrate typical frac pack behavior.

The perforations, consisting of 4 perf clusters of 4 holes each, were broken down with 125 bbl crude oil. Figure 5 shows an easy breakdown with little character. The rate stepdown at the end of the injection showed unexpectedly low perforation friction of 170 psi. Near-wellbore friction, a measure of fracture initiation complexity, was very low at 55 psi.

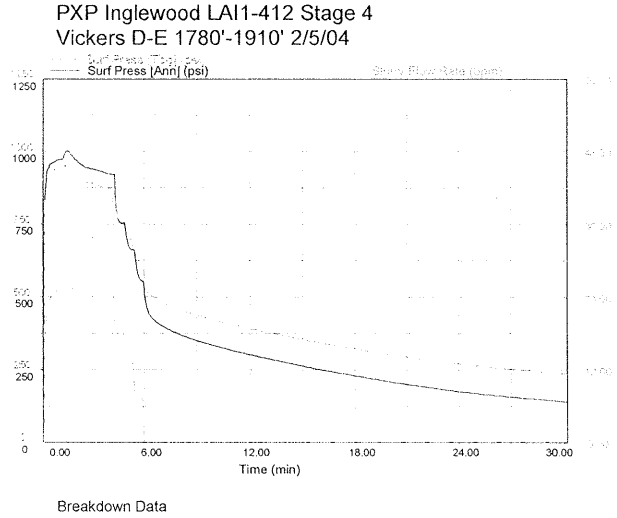

Figure 5. Breakdown injection data from LAI1-412 stage 4.

Fracture closure pressure was identified from the G-function plot shown in Figure 6. The fracture closure gradient of 0.59 psi/ft is about average for the Vickers, indicating neither significant pore pressure depletion or charging in this stage. Breakdown efficiency of 50% was somewhat greater than average. A pad fraction of 35% was planned.

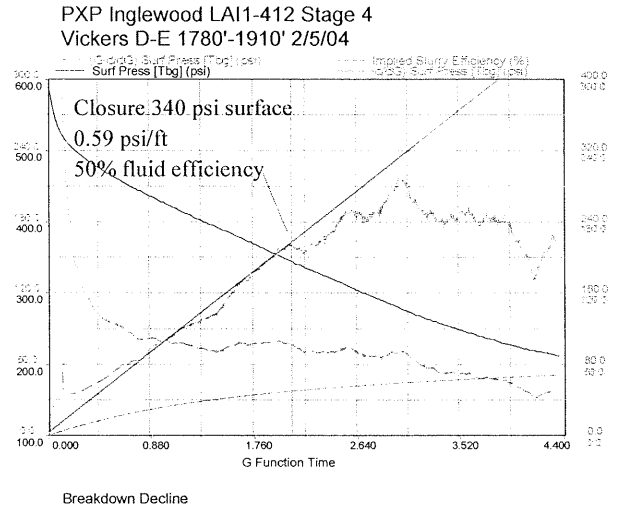

Figure 6. Pressure decline following the breakdown injection plotted against the dimensionless fluid loss function G to identify fracture closure.

The propped fracture treatment is shown in Figure 7. With injection down the 9-5/8" x 3-1/2" annulus, the static tubing pressure shows bottom hole pressure behavior. An inverted

hydrostatic curve shows how annulus injection pressure changes relative to changes in hydrostatic. Injection rate is reduced to 5 bpm at 10 bbl before the end of the flush, and the tubing is opened to gravel pack the liner. The resulting sharp injection pressure increase at shutdown shows that a good liner pack-off was achieved. The planned treatment of 100,000 lbs 12/20 Brady sand at a maximum loading of 14 ppg was successfully placed.

The static string tubing pressure shows the impact of tip screenout. Net pressure increased from 200 psi after the breakdown to 385 psi at propped frac shutdown.

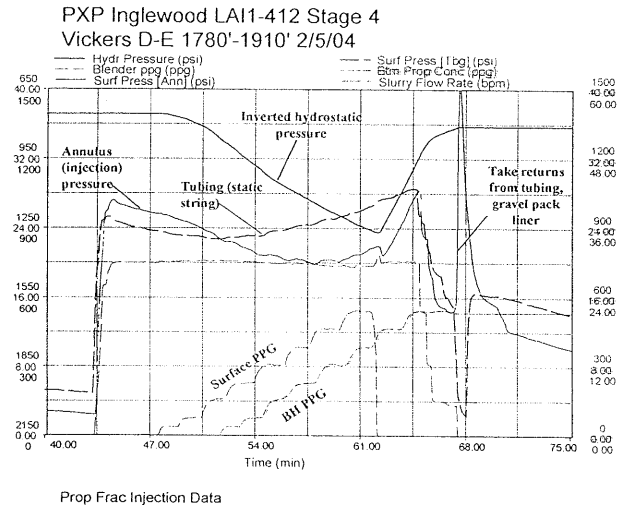

Figure 7. Basic prop frac injection data for LAI1-412 stage 4.

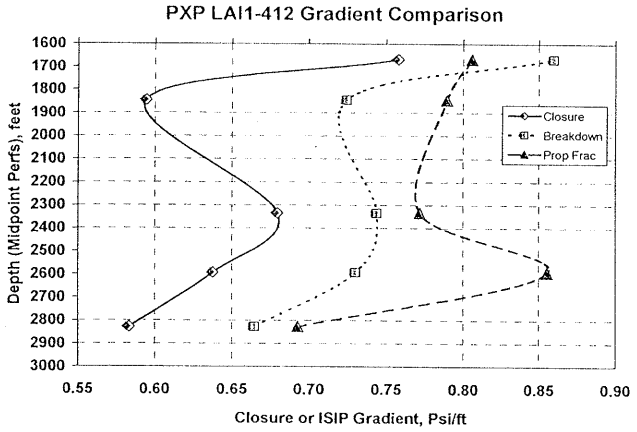

Figure 8. LAI1-412 fracture closure and ISIP gradient comparison.

Figure 8 compares fracture closure and ISIP gradients across the completion interval in well LAI1-412. This type of comparison plot provides from useful qualitative comparisons across the completion column and from well to well.

Fracture closure gradient provides an indirect indication of pore pressure gradient and thus waterflood support effectiveness. From simple plain strain analysis, fracture closure gradient changes by about two-thirds of the change in pore pressure gradient. Overall, fracture closure gradient was elevated in this well, indicating significant waterflood support (or overpressure) from adjoining injectors. Pore pressure appears to be especially charged in the top stage 5 (Vickers Alpha-C), which has the highest permeability and is the shallowest interval waterflooded. Note that the prop frac ISIP was lower than the breakdown ISIP for the top stage – indicating that net pressure dropped over the course of this treatment. Thus, it appears that the stage 5 fracture grew vertically or laterally into lower stress during the treatment.

Treatment Behavior Summary. Table 2 summarizes the fracture pressure analysis results from 53 fracture stages in 11 wells. Several observations can be made:

- The average fracture closure gradient is 0.58 psi/ft, with quite a large range from 0.46-0.76 psi/ft. Assuming that the initial undisturbed fracture closure gradient was uniform, this range implies a variation in pore pressure gradient of 0.45 psi/ft.
- The average observed perforation friction of 500 psi is close to the design value of 430 psi, suggesting that perforation effectiveness and vertical treatment distribution has been good.
- Average near-wellbore friction, a measure of fracture initiation complexity, is low at 105 psi. Consistent with this finding, significant bridging sensitivity was encountered only during several stages. Only one screenout attributable to formation bridging has occurred during about 60 stages, during a treatment with the coarser 12/20 proppant. The relatively viscous crude oil frac fluid has likely played a role in the apparent forgiving fracturing behavior.
- The average breakdown fluid efficiency of 40% is relatively high, likely due to the viscosity of the oil and relatively high reservoir pressure.
- The average net pressure rise from the breakdown to the prop frac is relatively modest at 120 psi. Thus, the pad fraction could likely be reduced from the average of 35%. However, the pad sizing strategy appears to be appropriate considering the goal of creating fracture height growth across the highly laminated formation, and the observed high productivity of the frac pack wells.

Table 2. Fracture pressure analysis results summary, based on data from 53 stages in 11 wells.

Parameter	Average	Range
Fracture Closure Gradient, psi/ft	0.58	0.46 – 0.76
Breakdown ISIP Gradient, psi/ft	0.70	0.57 – 0.86
Prop frac ISIP Gradient, psi/ft	0.75	0.54 – 0.87
Perforation Friction (30 bpm), psi	500	90 – 2300
Near-Wellbore Friction (30 bpm), psi	105	0 – 520
Breakdown Efficiency, %	40%	20% - 60%
Pad Fraction, %	35%	25% - 50%
Breakdown Net Pressure, psi	220	70 – 400
Prop Frac Net Pressure, psi	340	20 – 770

Frac Pack Well Production Performance

Compared with conventional cased hole gravel pack wells, the nine new frac pack wells have had greater well productivity, lower production decline rate, and larger reserves. Two

remedial frac pack recompletions have more than doubled previous cased hole gravel pack well productivity.

After frac fluid (crude oil) load recovery, the average first month production from the nine new frac pack wells was 92 bopd + 1001 bwpd. For 2002 conventional cased hole gravel pack wells with similar geology and properties, the average was 45 bpod + 499 bwpd. Thus, the frac pack wells have been approximately twice as productive as the cased hole gravel pack wells. This productivity improvement was achieved despite limiting the frac pack completion intervals to about two-thirds of the cased hole gravel pack intervals, leaving the remaining interval for future addpay completions.

The production decline rates from the new frac pack wells have been significantly lower than observed from cased hole gravel pack completions. Cased hole gravel pack wells typically experience significant production decline and require HF acidizing stimulation as often as once a year, due to fines invasion into inefficiently packed perforation tunnels. The frac pack wells have proven to be resistant to this type of damage due to the much larger contact area between the formation sand and proppant.

The frac pack wells access greater oil reserves due to a more effective connection across the full completion column. In a cased hole gravel pack, access to the full pay column is limited by perforation economics and by limited perforation effectiveness. It is not economically or technically feasible to perforate many of the smaller sand laminations across the pay column. However, fracture height growth can effectively connect the fine laminations to the wellbore. Booked reserves have averaged 170,000 Bbl oil for the frac pack completions, compared with 95,000 Bbl oil for the cased hole gravel packs.

Two frac pack recompletions have been performed to date. One cased hole gravel pack had severe production decline to 25 bopd + 285 bwpd in two months, followed by liner failure and no production. After a remedial frac pack recompletion, stabilized production increased to 66 bopd + 550 bwpd. A second recompletion of a poorly performing cased hole gravel pack increased production rate from 18 bopd + 45 bwpd to 40 bopd + 167 bwpd.

To put these production rates in perspective, the current average production rate per well in the Inglewood field is 22 bopd + 692 bwpd.

Future Plans

Several new Vickers/Rindge wells have already been completed in 2004, and there are a number of addpay intervals in the 2003 wells that will also be completed. Adding fracture stages to an existing well is easily performed by simply latching a new completion stage liner on top of the existing liner.

Two recompletions have been successfully performed in cased hole gravel pack wells that had failed liners and/or poor productivity. With the current development strategy, the number of new infill well locations left at Inglewood is limited. Thus, if the current spacing strategy is not changed, the frac pack focus will likely shift from new wells to recompletions. There will also be a limited number of new wells drilled to replace wells that are too damaged to recomplete.

The frac pack recompletions of two wells in the Montebello field are currently in the planning stages. The zones targeted are at a similar depth to the Vickers/Rindge, and suffer from the same formation damage restrictions, and thus the technique has good potential at Montebello.

Finally, the frac pack completion of deeper formation intervals at Inglewood and at several urban drillsites is being evaluated.

Conclusions

- Frac packing in the Inglewood field provides the productivity of an open-hole completion without the high risk of gravel pack failure and loss of completion selectivity associated with conventional open hole gravel packing.
- Frac packing takes advantage of the wellbore stability and completion selectivity benefits of a cased hole completion, while avoiding the drawbacks of poor productivity, gravel pack failure risk, and high cost associated with conventional cased hole gravel packing.
- Compared with conventional cased hole gravel pack completions, the frac pack completions have twice the productivity, greater reserves, and significantly lower production decline rates.
- The novel use of simple downhole tools and straight crude oil fracture fluid allows multiple fracture stages to be performed economically, a key requirement for completing the thick Vickers/Rindge completion column.
- Completion costs using the multi-stage frac packing technique are on par with conventional open hole gravel packing and less than conventional cased hole gravel packing.
- Using crude oil as the fracture fluid minimizes or eliminates formation and proppant pack damage, makes fluid quality control simple, and has significant cost advantages over water-based crosslinked fluids.
- The multiple-cluster limited entry perforation strategy in combination with fracture height growth appears to effectively connect the highly laminated Vickers/Rindge formation to the wellbore.
- With several modifications to tools and procedures, the frac packing technique can be successfully used to recomplete conventional cased hole gravel pack completions with poor productivity or failed liners.

Acknowledgements

The authors would like to thank Plains Exploration and Production for permission to publish the presented data.

SI Metric Conversion Factors

in × 2.54*	E-03 = m
ft × 3.048*	E-01 = m
bbl × 1.589 872	E-01 = m^3
psi × 6.894 759	E-02 = bar

*Conversion factor is exact.

Kambara, Rena

From: patricia mc pherson [patriciamcpherson1@verizon.net]
Sent: Thursday, March 15, 2012 10:54 AM
To: Kambara, Rena
Subject: Comments on PXP Fracturing Study

Rena Kambara, Planner, "RenaKambara" <rkambara@planning.lacounty.gov>

Zoning Enforcement West Section, Department of Regional Planning

Los Angeles County, 320 W. Temple Street, Los Angeles, CA 90012

213-974-6453

Subject: LACo-Regional Planning, Baldwin Hills Community Standards District

RE: Comments on PXP Fracturing Study

Dear Ms. Kambara,

Grassroots Coalition (GC) requests the following items, 1-7, provided by Tom Williams, PhD, be added to the scope of the Fracturing Study to be prepared by the PXP consultant and reviewed by an independent reviewer.

(Tom Williams, PhD, [redacted], etwilliams2012@yahoo.com)

Additionally, GC also requests A-F as cited below:

A. Provide and correlate any and all soil gas studies , including but not limited to, studies performed by GeoScience Analytical in the Inglewood Field.
B. Provide and correlate any and all remediation information, reports, recommendations / action(s) performed, subsequent to soil gas studies performed in the Inglewood Field- including but not limited to same from GeoScience Analytical.

C. Provide and correlate any and all PXP soil gas migration information in the Inglewood Field.

D. Include as part of the Fracturing Study--tiered soil gas monitoring at the 4' depth through 20' depth. The soil gas monitoring should be fixed for base line monitoring through completion of the study for periodic testing throughout the study time frame. The soil gas sampling to be analyzed in a fixed laboratory and not a mobile lab. The samples should be analyzed for a complete VOC analysis and H2S analysis. Isotopic lab analysis should be included.

E. Include and correlate gas sampling in flowback water and, water table sampling for both gas constituents and other contaminants that are part of the injected fracking water.

- Include and correlate sampling for identification of any and all possible migration of gas and all fracking water chemicals in local Baldwin Hills water reservoirs.

F. The methodology for sampling soil gas and water should be the highest quality available within the oilfield industry and provide for the best available means to detect lowest volumes of migrating gases and tracking chemicals.

1. Types and Characteristics of Hydraulic Fracturing (Fracking and Fracked)

1.1 List All types of Hydraulic Fracturing Used or Proposed for Use in Inglewood Field (IW Field) by All Operators

1.2 List All types of Hydraulic Fracturing Used by PXP in California (Beyond the IW Field)

1.3 Characteristics of Fracturing - Provide the following for all IW Field Fracked Wells:

Perforations and Plugging positions

Hydraulic Gradients (adjusted as needed for salinity), Formation pressures, and Rock Fracture Gradient

Typical Fracturing Pressure Application Graph - Time/Pressure/Liquid Injection Rates

Typical Flowback Graph - Time/Pressure/Liquid Flowback Rates

Flowback vs Produced Water (Produced water = all waters after first 1000 bbl of oil production)

2. Seismicity and Vibration

2.1 List all Seismic/Vibration Studies/Surveys conducted in IW Field since first Fracturing

2.2 List/Provide all seismic/vibration monitoring/survey reports related to any Fracturing, Gravel Packing, and Injection Wells

2.3 Correlate all recordable seismic events with known/projected fault planes within the IW Field and within 2500ft of any well toe outside of the surface boundaries of the IW Field

2.4 Correlate seismic tremors with injection of any liquids within the IW Field

3. Migration Routes/Pathways

3.1 List/Locate/Provide all information regarding known or expected plugged and unplugged abandoned and idle wells

3.2 List/Locate/Provide all historic aerial photos and satellite images, especially those before 1955

Using GIS programs, locate/list/provide coordinates for all IW Field wells from aerial photos and confirm their correspondence with known abandoned wells

3.3 List/Locate/Provide all well information regarding fault planes within the IW Field and Intersections of Any Wells with Known Fault Planes

3.4 List/Locate/Provide surface traces of projected fault planes to the ground surface, except as known to be terminated in the subsurface of the IW Field

4. Water Resources -

4.1 List/Locate/Provide all information for groundwater in the alluvial deposits and the Shallow, Mid, and Deep Formations/Zones (any units of >20ft), including:

Groundwater: Water with TDS <30,000ppm and suitable for Reverse Osmosis Treatment

Formation Groundwater: content exceeding 10% of estimated formation porosity

4.2 Provide a most probable Fracturing Water Budget for ≥100,000gal for any one well, including:

Sources of Water for Fracturing

Transportation methods

Site Storage - Treatment - Uses

Site Collection and Storage/Retention

Site Treatment and Conveyance

Water and Sludge Dispositions

5. Characteristics of Fractured (and Gravel Packed) Wells

5.1 List and Provide well designs and reports for all fractured and gravel-packed (>10 cu yd of gravel) wells, including:

Locations within IW Field - well heads, casing routes, and toes

Heads/Toes and Distances from Public, Sensitive, and Non-Producing Areas

5.2 List and Provide recordings and reports for Monitoring, Testing, Surveys/Logs, Casing/Cement and Plug Integrities for all fractured and gravel-packed (>10 cu yd of gravel) wells

6. Characteristics of Fracked/Frackable Formations in Inglewood Field (Shallow, Mid, and Deep Zone), e.g., Nodular Shale and Sentous

6.1 List and Provide Formation Permeability, Density/Porosity,

6.2 List Additional deep zone testing needed to produce a comprehensive analysis

7. Review of Current/Expected 2012 Public Participation Schedules/Opportunities in Fracturing Applications, Notices of Intent, and Permitting

If you require any clarifications or greater specifications on any issues above, please discuss with Tom Williams, PhD, [redacted] ctwilliams2012@yahoo.com

We wish to receive copies of drafts submitted for peer review and provide appropriate comments, plus later drafts submitted two weeks prior to public presentation in order to provide meaningful quality comments for the Study.

Respectfully,

Patricia McPherson, Grassroots Coalition
[redacted]

Kambara, Rena

From: Joe Bowers [jowilbo2@aol.com]
Sent: Thursday, March 15, 2012 1:11 PM
To: Kambara, Rena
Subject: County Hydraulic Fracturing Comment Submission

I am an ex-Exxon Engineer, I worked at their Engineering and Research Company back east, and I am familiar with the dangers associated with drilling oil and processing it into products. I am familiar with community outreach that oil companies conduct and while it is a good idea, it can be poorly executed. Your meeting was an example of poor execution. These panels lack credibility when the drilling company is already engaged in the issue being discussed. People don't understand that it happens all the time that the oil company can go about its business while having public meetings and when the public finds out they are skeptical and upset. The way to deal with this is to be transparent with the public. By telling us what PXP is thinking (not doing), we can react accordingly and progress can be made. People asking questions, like are you doing this test or why are you doing that test, wastes everyone's time. Give us a base line of information.

My questions for the PXP are:

How dangerous do you think fracking in the Inglewood Oil Field can be? I would like PXP's opinion, not general statistics.

What are the dangers or issues they are considering? I know they have a list of concerns.

How are you (PXP) planning to deal with those dangers while fracking operation are in progress?

If something goes wrong, what are your plans to address it?

Is there anything that you are not sure of as you develop your fracking plans that you may not be able to answer?

Finally, I know that many productions companies contract the drilling to other companies. Often the job goes to the lowest bidder. PXP can make all the promises they want, how do we know the contract drilling company (if they are using one) can be trusted to do want they say will be done?

Kambara, Rena

From: Sally Hampton [sallyhampton11@gmail.com]
Sent: Thursday, March 15, 2012 1:44 PM
To: Kambara, Rena
Cc: View Park Hills - Windsor
Subject: Comments on PXP Fracturing Study

Dear Ms. Kambara,

On behalf of the residents of Windsor Hills-View Park (WHVP Neighbors – www.whvp.org) I respectfully request that the items submitted to you by Tom Williams, PhD, and by Grassroots Coalition, via Patricia McPherson, be added to the scope of the Fracturing Study to be prepared by the PXP consultant and reviewed by an independent reviewer. (Both lists of items are pasted below.

In addition, we have learned that the estimates that the oil and gas companies give are based on BEST case scenarios (e.g. the bedrock never breaks) but we have to prepare for WORST case scenario because the safety of the water supply and the public health is at stake. We request that the county ensure that all possible scenarios - including worst cases resulting from either natural disaster and/or human error be examined carefully.

We also request that copies of drafts submitted for peer review be submitted to Ms. McPherson and Dr. Williams with sufficient time and notice given so they may make appropriate comments, and any later drafts, at least, two weeks prior to public presentation in order to provide them able time to provide meaningful quality comments for the Study.

Sincerely,

Sally Hampton – Windsor Hills Resident

[redacted]

Items provided by Grassroots Coalition to be added:

A. Provide and correlate any and all soil gas studies , including but not limited to, studies performed by GeoScience Analytical in the Inglewood Field.

B. Provide and correlate any and all remediation information, reports, recommendations / action(s) performed, subsequent to soil gas studies performed in the Inglewood Field- including but not limited to same from GeoScience Analytical.

C. Provide and correlate any and all PXP soil gas migration information in the Inglewood Field.

D. Include as part of the Fracturing Study--tiered soil gas monitoring at the 4' depth through 20' depth. The soil gas monitoring should be fixed for base line monitoring through completion of the study for periodic testing throughout the study time frame. The soil gas sampling to be analyzed in a fixed laboratory and not a mobile lab. The samples should be analyzed for a complete VOC analysis and H2S analysis. Isotopic lab analysis should be included.

E. Include and correlate gas sampling in flowback water and, water table sampling for both gas constituents and other contaminants that are part of the injected fracking water.

- Include and correlate sampling for identification of any and all possible migration of gas and all fracking water chemicals in local Baldwin Hills water reservoirs.

F. The methodology for sampling soil gas and water should be the highest quality available within the oilfield industry and provide for the best available means to detect lowest volumes of migrating gases and tracking chemicals.

Items provided by Tom Williams, PhD to be added:

1. Types and Characteristics of Hydraulic Fracturing (Fracking and Fracked)

1.1 List All types of Hydraulic Fracturing Used or Proposed for Use in Inglewood Field (IW Field) by All Operators

1.2 List All types of Hydraulic Fracturing Used by PXP in California (Beyond the IW Field)

1.3 Characteristics of Fracturing - Provide the following for all IW Field Fracked Wells:

Perforations and Plugging positions

Hydraulic Gradients (adjusted as needed for salinity), Formation pressures, and Rock Fracture Gradient

Typical Fracturing Pressure Application Graph - Time/Pressure/Liquid Injection Rates

Typical Flowback Graph - Time/Pressure/Liquid Flowback Rates

Flowback vs Produced Water (Produced water = all waters after first 1000 bbl of oil production)

2. Seismicity and Vibration

2.1 List all Seismic/Vibration Studies/Surveys conducted in IW Field since first Fracturing

2.2 List/Provide all seismic/vibration monitoring/survey reports related to any Fracturing, Gravel Packing, and Injection Wells

2.3 Correlate all recordable seismic events with known/projected fault planes within the IW Field and within 2500ft of any well toe outside of the surface boundaries of the IW Field

2.4 Correlate seismic tremors with injection of any liquids within the IW Field

3. Migration Routes/Pathways

3.1 List/Locate/Provide all information regarding known or expected plugged and unplugged abandoned and idle wells

3.2 List/Locate/Provide all historic aerial photos and satellite images, especially those before 1955

Using GIS programs, locate/list/provide coordinates for all IW Field wells from aerial photos and confirm their correspondence with known abandoned wells

3.3 List/Locate/Provide all well information regarding fault planes within the IW Field and Intersections of

Any Wells with Known Fault Planes

3.4 List/Locate/Provide surface traces of projected fault planes to the ground surface, except as known to be terminated in the subsurface of the IW Field

4. Water Resources -

4.1 List/Locate/Provide all information for groundwater in the alluvial deposits and the Shallow, Mid, and Deep Formations/Zones (any units of >20ft), including:

Groundwater: Water with TDS <30,000ppm and suitable for Reverse Osmosis Treatment

Formation Groundwater: content exceeding 10% of estimated formation porosity

4.2 Provide a most probable Fracturing Water Budget for ≥100,000gal for any one well, including:

Sources of Water for Fracturing

Transportation methods

Site Storage - Treatment - Uses

Site Collection and Storage/Retention

Site Treatment and Conveyance

Water and Sludge Dispositions

5. Characteristics of Fractured (and Gravel Packed) Wells

5.1 List and Provide well designs and reports for all fractured and gravel-packed (>10 cu yd of gravel) wells, including:

Locations within IW Field - well heads, casing routes, and toes

Heads/Toes and Distances from Public, Sensitive, and Non-Producing Areas

5.2 List and Provide recordings and reports for Monitoring, Testing, Surveys/Logs, Casing/Cement and Plug Integrities for all fractured and gravel-packed (>10 cu yd of gravel) wells

6. Characteristics of Fracked/Frackable Formations in Inglewood Field (Shallow, Mid, and Deep Zone), e.g., Nodular Shale and Sentous

6.1 List and Provide Formation Permeability, Density/Porosity,

6.2 List Additional deep zone testing needed to produce a comprehensive analysis

7. Review of Current/Expected 2012 Public Participation Schedules/Opportunities in Fracturing Applications, Notices of Intent, and Permitting

Kambara, Rena

From: Jim Stewart [drjimstewart@gmail.com]
Sent: Thursday, March 15, 2012 1:54 PM
To: Kambara, Rena
Cc: Tom Williams
Subject: Sierra Club Comments on PXP Fracturing Study attached
Attachments: Sierra Club Comments on the LACo-PXP CSD- Fracturing Study.pdf

SIERRA CLUB
FOUNDED 1892

Sierra Club Angeles Chapter
3435 Wilshire Boulevard, Suite 320
Los Angeles, CA 90010-1904
213-387-4287
www.Angeles.SierraClub.org

March 14, 2012

Rena Kambara, Planner, <rkambara@planning.lacounty.gov>
Zoning Enforcement West Section, Department of Regional Planning
Los Angeles County, 320 W. Temple Street, Los Angeles, CA 90012

Subject: LACo-Regional Planning, Baldwin Hills Community Standards District
RE: Sierra Club Comments on PXP Fracturing Study

Dear Ms. Kambara,

The Sierra Club has reviewed the proposed scope for the Fracturing Study and found it inadequate and incomplete for the study of Fracturing in the Inglewood Field. The Sierra Club requests that the following items be added to the current scope of Fracturing Study to be prepared by the PXP consultant and reviewed by an independent reviewer:

1. Types and Characteristics of Hydraulic Fracturing (Fracking and Fracked)

1.1 List All types of Hydraulic Fracturing Used or Proposed for Use in Inglewood Field (IW Field) by All Operators

1.2 List All types of Hydraulic Fracturing Used by PXP in California (Beyond the IW Field, including steam, diesel, and/or gelled propane)

1.3 Provide Characterization of Fracturing for all IW Field Fracked Wells:
- Perforations and Plugging positions
- Hydraulic Gradients (adjusted as needed for salinity), Formation pressures, and Rock Fracture Gradient
- Typical Fracturing Pressure Application Graph - Time/Pressure/Liquid Injection Rates
- Typical Flowback Graph - Time/Pressure/Liquid Flowback Rates
- Flowback vs. Produced Water (Produced water = all waters after first 1000 bbl of oil production)

1.4 List of all injected fracking and packing chemicals and concentrations for injection and returning throughout the flowback period and initiation of production

1.5 List of all injected fracking and packing radioactive materials and concentrations/levels for injection and returning throughout the flowback period and initiation of production

2. Seismicity and Vibration

2.1 List all Seismic/Vibration Studies/Surveys conducted in IW Field since first fracturing

2.2 List/Provide all seismic/vibration monitoring/survey reports related to any Fracturing, Gravel Packing, and Injection Wells

2.3 Correlate all recordable seismic events with known/projected fault planes within the IW Field and within 2500ft of any well toe outside of the surface boundaries of the IW Field

2.4 Correlate seismic tremors with injection of any liquids within the IW Field

3. Migration Routes/Pathways

3.1 List/Locate/Provide all information regarding known or expected plugged and unplugged abandoned and idle wells

3.2 List/Locate/Provide all historic aerial photos and satellite images, especially those before 1955

Using GIS programs, locate/list/provide coordinates for all IW Field wells from aerial photos and confirm their correspondence with known abandoned wells

3.3 List/Locate/Provide all well information regarding fault planes within the IW Field and Intersections of Any Wells with Known Fault Planes, including 3D models/modeling of all faults, fractures, fissures and folds

3.4 List/Locate/Provide all wells that perforate faults , fractures, fissures of greater than 10 ft displacement and 100 ft dip-length

3.5 List/Locate/Provide surface traces of projected fault planes to the ground surface, except as known to be terminated in the subsurface of the IW Field

4. Water Resources -

4.1 List/Locate/Provide all information for groundwater in the alluvial deposits and the Shallow, Mid, and Deep Formations/Zones (any units of >20 ft), including:
Groundwater: Water with TDS <30,000 ppm and suitable for Reverse Osmosis Treatment
Formation Groundwater: content exceeding 10% of estimated formation porosity

4.2 Provide a most probable Fracturing Water Budget for ≥100,000 gal for any one well, including:
Sources of Water for Fracturing
Transportation methods
Site Storage - Treatment - Uses
Site Collection and Storage/Retention
Site Treatment and Conveyance
Water and Sludge Dispositions

4.3 Provide a list/maps/sections/logs for any groundwater containing detectable total petroleum hydrocarbons and detectible PAHs (=BTEX) in upper zone formations (<3000 ft) and alluvial materials (<1000 ft)

5. Characteristics of Fractured (and Gravel Packed) Wells

5.1 List and Provide well designs, maps, sections, and reports for all fractured and gravel-packed (>10 cu yd of gravel) wells, including:
Locations within IW Field - well heads, casing routes, and toes
Heads/Toes and Distances from Public, Sensitive, and Non-Producing Areas
Routes of all existing well casing paths (from well head to well toe and perforated portions)

5.2 List and Provide recordings and reports for Monitoring, Testing, Surveys/Logs, Casing/Cement and Plug Integrities for all fractured and gravel-packed (>10 cu yd of gravel) wells

5.3 List and Provide specifications for cement, muds, cementing and steel casings for fractured/unfractured wells

5.4 List and Provide specifications and materials for perforating fractured/unfractured well casings, including use military-grade explosives and depleted-uranium projectiles

6. Characteristics of Fracked/Frackable Formations in Inglewood Field (Shallow, Mid, and Deep Zone), e.g., Nodular Shale and Sentous

6.1 List and Provide Formation Permeability, Density/Porosity,

6.2 List Additional deep zone testing needed to produce a comprehensive analysis

7. Review/Report of Current/Expected 2012 Public Participation Schedules/Opportunities in Fracturing Applications, Notices of Intent, and Permitting

If you require any clarifications or greater specifications on any issues above, please discuss with Tom Williams, PhD, [redacted] ctwilliams2012@yahoo.com.

The Sierra Club, Angeles Chapter, has an active program reviewing fracturing throughout California and Nevada and coordinates with nationwide Sierra Club programs. As Sierra Club has access to oil/gas field specialists, we wish to receive copies of drafts submitted for peer review and provide appropriate comments, plus later drafts submitted two weeks prior to public presentation in order to provide meaningful quality comments for the Study.

Thank you for the opportunity to submit these comments, although the PXP/Tormey slides were not made available until Wednesday morning. Other issues are also being reviewed and additional comments may be submitted later.

Please acknowledge receipt by simple reply by 4:30 pm PDST or a second submittal may be sent.

Respectfully Submitted,

Jim Stewart

Jim Stewart, PhD, Chair, [redacted]
Sierra Club Angeles Chapter Global Warming, Energy & Air Quality Committee

Tom Williams, PhD, [redacted] ctwilliams2012@yahoo.com
Co-Coordinator of the Sierra Club California Fracking Team

Kambara, Rena

From: Sally Hampton [sallyhampton11@gmail.com]
Sent: Thursday, March 15, 2012 2:58 PM
To: Kambara, Rena
Subject: Re: Comments on PXP Fracturing Study

Need to correct the web url. Sorry about that.
www.whvp.info

On Mar 15, 2012, at 2:35 PM, "Kambara, Rena" <rkambara@planning.lacounty.gov> wrote:

> Comment received, thank you.
>
> Rena Kambara
> Planner
> Zoning Enforcement West Section
> Department of Regional Planning
> 320 W. Temple Street
> Los Angeles, CA 90012
> http://planning.lacounty.gov
> 213-974-6453
>
> <logo_county.gif>
>
>
>
> **From:** Sally Hampton [mailto:sallyhampton11@gmail.com]
> **Sent:** Thursday, March 15, 2012 1:44 PM
> **To:** Kambara, Rena
> **Cc:** View Park Hills - Windsor
> **Subject:** Comments on PXP Fracturing Study
>
> Dear Ms. Kambara,
> On behalf of the residents of Windsor Hills-View Park (WHVP Neighbors – www.whvp.org) I respectfully request that the items submitted to you by Tom Williams, PhD, and by Grassroots Coalition, via Patricia McPherson, be added to the scope of the Fracturing Study to be prepared by the PXP consultant and reviewed by an independent reviewer. (Both lists of items are pasted below.
> **In addition, we have learned that the estimates that the oil and gas companies give are based on BEST case scenarios (e.g. the bedrock never breaks) but we have to prepare for WORST case scenario because the safety of the water supply and the public health is at stake. We request that the county ensure that all possible scenarios - including worst cases resulting from either natural disaster and/or human error be examined carefully.**

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Sincerely,

Sally Hampton – Windsor Hills Resident

[redacted]

Items provided by Grassroots Coalition to be added:

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B. Provide and correlate any and all remediation information, reports, recommendations / action(s) performed, subsequent to soil gas studies performed in the Inglewood Field- including but not limited to same from GeoScience Analytical.

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- Include and correlate sampling for identification of any and all possible migration of gas and all fracking water chemicals in local Baldwin Hills water reservoirs.

F. The methodology for sampling soil gas and water should be the highest quality available within the oilfield industry and provide for the best available means to detect lowest volumes of migrating gases and tracking chemicals.

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Flowback vs Produced Water (Produced water = all waters after first 1000 bbl of oil production)

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Sources of Water for Fracturing

Transportation methods

Site Storage - Treatment - Uses

Site Collection and Storage/Retention

Site Treatment and Conveyance

Water and Sludge Dispositions

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Locations within IW Field - well heads, casing routes, and toes

Heads/Toes and Distances from Public, Sensitive, and Non-Producing Areas

5.2 List and Provide recordings and reports for Monitoring, Testing, Surveys/Logs, Casing/Cement and Plug Integrities for all fractured and gravel-packed (>10 cu yd of gravel) wells

6. Characteristics of Fracked/Frackable Formations in Inglewood Field (Shallow, Mid, and Deep Zone), e.g., Nodular Shale and Sentous

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6.2 List Additional deep zone testing needed to produce a comprehensive analysis

7. Review of Current/Expected 2012 Public Participation Schedules/Opportunities in Fracturing Applications, Notices of Intent, and Permitting

Kambara, Rena

From: Adnan Siddiqui [asiddiqui@waterboards.ca.gov]
Sent: Thursday, March 15, 2012 4:17 PM
To: Kambara, Rena
Cc: Arthur Heath; Paula Rasmussen
Subject: Fracturing Study Questions
Attachments: Water Quality concerns for Baldwin Hills oil field.docx

Hi Ms. Kambara,
I am sending you questions and concerns related to water quality we would like to be addressed in the hydraulic fracturing study. Please feel free to contact me if you have any questions or you may contact my supervisor Dr. Arthur Heath at [redacted] Thank you.
Adnan

Adnan Siddiqui, P.G., C.HG.
Senior Engineering Geologist

Phone: [redacted]
Fax: (213)576-6717

Impacts to Surface and Groundwater Quality Concerns

1. List the chemicals being used in the fracking process

2. How is produced water (extracted groundwater from the oil producing formation) stored at the site?
   a) Are you required to have permits to store the produced water on-site?
   b) Volume of produced water being stored at the site at any given time
   c) What procedures or preventive measures are required or being followed to prevent any of the produced water being released from the site to the surface and groundwater?

3. Identify all the regulatory agencies overseeing the project.

4. What is the depth of injection?

5. How much is the vertical separation between the bottom of the known drinking water aquifers such as Gage, Silverado, Sunnyside, etc.)?.

6. Is injection depth below the base of the fresh water?

7. What is the vertical and horizontal radius of influence of the injected fluid?

8. Are there potential for preferential pathways for the injected fluid? There are named and un-named faults in the area.

Kambara, Rena

From:	Paul [razzip1@aol.com]
Sent:	Thursday, March 15, 2012 4:45 PM
To:	Kambara, Rena; Burke Yvonne; Bruckner, Richard; Hachiya, Pat
Cc:	Senator.Price@senate.ca.gov; Rebecca.Bernal@sen.ca.gov Bernal; Assemblymember.Mitchell@assembly.ca.gov
Subject:	Hydraulic Fracturing Study Comments
Attachments:	CCFASC_Frack.pdf
Importance:	High

Rena,

Here are the comments from the Citizens Coalition for a Safe Community on the scope of the Cardno Hydraulic Fracturing Study.
Thank You.

Sincerely

Paul V. Ferrazzi

CITIZENS COALITION FOR A SAFE COMMUNITY

March 15, 2012
4209 Jackson Avenue
Culver City, CA 90232

Rena Kambara
Zoning Enforcement West Section
Los Angeles County
Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

Comments on Scope of PXP/Cardno Hydraulic Fracturing Study

Dear Ms. Rena Kambara,

The Citizens Coalition for a Safe Community request that the following specific items be considered and added to the current scope of the Cardno Hydraulic Fracturing Study as detailed at the March 8th, 2012 Community Advisory Panel meeting presentation.

1. Types and Characteristics of Hydraulic Fracturing (Fracking and Fracked)

1.1

Lists of and detailed explanations of all types of Hydraulic Fracturing used or proposed for use in Inglewood Field by the operator and all well drilling and completion contractors and sub-contractors

1.2

Lists and detailed explanations all types of hydraulic fracturing used by PXP in California beyond the Inglewood Field { Las Cienegas, Montebello, Packard, San Joaquin Basin properties, San Vicente, Cymric, Midway Sunset and South Belridge Fields, Arroyo Grande Field, Point Arguello, Lompoc and Point Pedernales.}

1.3

Characteristics of Fracturing - Provide the following for all Inglewood Field fractured wells:

a. Perforations and plugging positions

b. Hydraulic Gradients (adjusted as needed for salinity), formation pressures, and rock fracture gradient
c. Typical Fracturing Pressure Application Graph - Time/Pressure/Liquid Injection Rates
d. Typical Flow-back Graph - Time/Pressure/Liquid Flow-back Rates
e. Flow-back vs. Produced Water (Produced water = all waters after first 1000 bbl of oil production)
f. The fracturing pressures to be use in each formation

1.4

Well bore locations, zones, fracture stage intervals and associated depths slated for hydraulic fracturing;

2. Seismicity and Vibration

2.1

List all Seismic/Vibration Studies/Surveys conducted in Inglewood Field since first well fracturing

2.2

List/Provide all seismic/vibration monitoring/survey reports related to any fracturing, gravel packing, and injection wells

2.3

Correlate all recordable seismic events with known/projected fault planes within the Inglewood Field and within 2500ft of any well toe outside of the surface boundaries of the Inglewood Field

2.4

Correlate seismic tremors with any liquid injection process within the Inglewood Field

3. Migration Routes/Pathways

3.1

List/Locate/Provide all information regarding known or expected plugged and unplugged abandoned and idle wells including type of cementing

3.2

List/Locate/Provide all historic aerial photos and satellite images, especially those before 1955 using GIS programs, locate/list/provide coordinates for all Inglewood Field wells from aerial photos and confirm their correspondence with known abandoned wells

3.3

List/Locate/Provide all well information regarding fault planes within the Inglewood Field and intersections of any wells paths within/through known fault planes

3.4

List/Locate/Provide surface traces of projected fault planes to the ground surface, except as known to be terminated in the subsurface of the Inglewood Field

3.5 PXP shall provide access to all available computer 3D modeling of the Inglewood Field faults, fractures, fissures and folds to consultant and peer reviewer

3.6 PXP shall provide all well path maps for top and bottom-hole locations of all injection, producing, idled, exploratory, and plugged abandoned wells to the consultant and peer reviewer

4. Water Resources

4.1 List/Locate/Provide all information for groundwater in the alluvial deposits and the Shallow, Mid, and Deep Formations/Zones (any units of >20ft), including: Groundwater: Water with TDS <30,000ppm and suitable for Reverse Osmosis Treatment Formation Groundwater: content exceeding 10% of estimated formation porosity

4.2 Provide a most probable fracturing water budget for ≥100,000gal for any one well, including:
a. Sources of water and amounts used for well fracturing
b. Transportation methods-wastewater, fresh water
c. Site storage - treatment - uses
d. Site collection and storage/retention, tank volumes
e. Site treatment and conveyance
f. Water and sludge dispositions

4.3 List all known well/oil field contamination of fresh water sands in Inglewood Field

4.4 The name brands and quantities of the fluids to be injected in any fracturing operations;
The chemical make-up of the injection fluids;
The quantity of water to be injected in any fracturing operations;
The quantity of fluids or other material to be injected in any fracturing operations and injection fluid recovery rate.
The water quality within 100 feet of the well prior to hydraulic fracturing
Water quality monitoring surrounding previously fractured wells
Source and amounts of water used and quantification of agricultural and potable water depletion

5. Characteristics of Fractured (and Gravel Packed) Wells

5.1 List and provide well designs and reports for all fractured and gravel-packed (>10 cu yd of gravel) wells, including:
a. Locations within IW Field - well heads, casing routes, and toes
b. Heads/Toes and Distances from Public, Sensitive, and Non-Producing Areas

5.2

List and Provide recordings and reports for monitoring, testing, surveys/logs, casing/cement and plug integrities for all fractured and gravel-packed (>10 cu yd of gravel) wells

6. Characteristics of Fracked/Frackable Formations in Inglewood Field (Shallow, Mid, and Deep Zone), e.g., Nodular Shale and Sentous

6.1

List and Provide Formation Permeability, Density/Porosity,

6.2

List Additional deep zone testing needed to produce a comprehensive analysis

7. Soil Gas and Gas Migration Studies

7.1

Provide and correlate any and all soil gas studies , including but not limited to, studies performed by GeoScience Analytical or other consultants in the Inglewood Field.

7.2

Provide and correlate any and all remediation information, reports, recommendations / action(s) performed, subsequent to soil gas studies performed in the Inglewood Field- including but not limited to same from GeoScience Analytical or other consultants .

7.3

Provide and correlate any and all historical soil gas migration information in the Inglewood Field.

7.4

Include as part of the Fracturing Study--tiered soil gas monitoring at the 4' depth through 20' depth. The soil gas monitoring should be fixed for base line monitoring through completion of the study for periodic testing throughout the study time frame. The soil gas sampling shall be analyzed in a fixed laboratory and not a mobile lab. The samples should be analyzed for a complete dissolved solids, methane,VOC analysis and H2S analysis. Isotopic lab analysis should be included.

7.5

Include and correlate gas sampling in flowback water and, water table sampling for both gas constituents and other contaminants that are part of the injected fracking water. Include and correlate sampling for identification of any and all possible migration of gas and all fracking water chemicals in local Baldwin Hills water reservoirs.

7.6

The methodology for sampling soil gas and water should be the highest quality available within the oilfield industry and provide for the best available means to detect lowest volumes of migrating gases and tracking chemicals.

8. Review of 2012 Public Participation Meeting Schedules/Opportunities in Fracturing Applications, Notices of Intent, and Permitting

Citizens Coalition for a Safe Community wishes to receive copies of all drafts submitted for peer review and the ability to provide appropriate comments, in addition copies all later drafts submitted at least two weeks prior to any public presentation in order to provide meaningful comments on the Cardno Hydraulic Fracturing Study.

Sincerely,

Gary Gless
President
Citizens Coalition for a Safe Community

Kambara, Rena

From:	Nagami, Damon [dnagami@nrdc.org]
Sent:	Thursday, March 15, 2012 4:50 PM
To:	Bruckner, Richard; srusch@pxp.com
Cc:	elise.gyore@asm.ca.gov; senator.price@sen.ca.gov; Bernal, Rebecca; Westbrooks, James; jason.marshall@conservation.ca.gov; tim.kustic@conservation.ca.gov; seconddistrict@bos.lacounty.gov; Katona, Karly; Kambara, Rena; Hachiya, Pat; Martini, John; CSalway@pxp.com; LPaillet@pxp.com; daniel.tormey@cardno.com; john.peirson@mrsenv.com; luis.perez@mrsenv.com; John Kuechle; Lark Galloway-Gilliam; Ken Kutcher; david.mcneill@bhc.ca.gov; Mark Glassock; Gwendolyn Flynn
Subject:	Inglewood Oil Field - GBHA's List of Questions/Issues For PXP's Fracking Study
Attachments:	GBHA letter post-mtg incl list of fracking issues 3.15.12.pdf

March 15, 2012

Mr. Richard J. Bruckner
Los Angeles County Department of Regional Planning ("DRP")
320 West Temple Street, 13th Floor
Los Angeles, California 90012

Mr. Steven P. Rusch
Vice President of Environmental Health, Safety, and Government Affairs
Plains Exploration and Production Company ("PXP")
5640 S. Fairfax Ave.
Los Angeles, CA 90056

Re: List of Questions/Issues For PXP's Fracking Study

Dear Director Bruckner and Mr. Rusch,

On behalf of the Greater Baldwin Hills Alliance ("GBHA"), thank you for responding to our request and facilitating a community update on PXP's fracking activities at last Thursday's Community Advisory Panel ("CAP") meeting. As demonstrated by the turnout of over 100 concerned citizens who packed the meeting room at the Kenneth Hahn State Recreation Area Community Center, this is an extremely important matter to the communities surrounding the Inglewood Oil Field, and we greatly appreciate your continued attention to these issues.

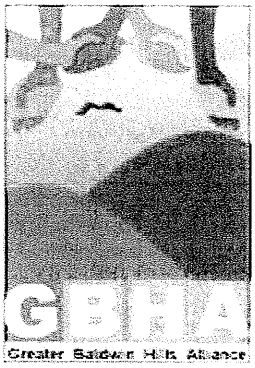
We also appreciate DRP's commitment to accept questions from the public on what they would like to see addressed and included in the scope of PXP's fracking study. In that regard, we respectfully submit the attached list of questions, which attempts to reflect questions that were raised at the CAP meeting as well as comments from the community that arose after the CAP meeting. We note that in addition to questions specific to the scope of the study, the list also includes other questions for DRP that were prompted by the community update, which we would be happy to discuss on a conference call or in an in-person meeting.

Finally, we wanted to reiterate a request a member of the public made at the CAP meeting that the public's questions and input on the scope of the study, and answers to those questions, be made available as part of the study and on PXP's Web site. We agree that this would be helpful to keeping the public informed and achieving transparency with respect to the fracking study.

As always, thank you for your cooperation and assistance on this issue. A hard copy of this letter will follow by U.S. mail. If you have any questions, please feel free to contact me at the number listed below.

Best regards,

Damon Nagami
Staff Attorney
Natural Resources Defense Council
1314 Second Street
Santa Monica, CA 90401
[redacted]
Fax (310) 434-2399



Via Email and U.S. Mail (rkambara@planning.lacounty.gov)

March 15, 2012

Mr. Richard J. Bruckner
Los Angeles County Department of Regional Planning ("DRP")
320 West Temple Street, 13th Floor
Los Angeles, California 90012

Mr. Steven P. Rusch
Vice President of Environmental Health, Safety, and Government Affairs
Plains Exploration and Production Company ("PXP")
5640 S. Fairfax Ave.
Los Angeles, CA 90056

Re: List of Questions/Issues For PXP's Fracking Study

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GBHA Steering Committee:

Natural Resources Defense Council
1314 Second Street
Santa Monica, CA 90401
310-434-2300

Community Health Councils
3731 Stocker St., Suite 201
Los Angeles, CA 90008
323-295-9372

questions, be made available as part of the study and on PXP's Web site. We agree that this would be helpful to keeping the public informed and achieving transparency with respect to the fracking study.

As always, thank you for your cooperation and assistance on this issue. If you have any questions, please feel free to contact Damon Nagami at [redacted] or dnagami@nrdc.org.

Very truly yours,

Damon Nagami
Staff Attorney
Natural Resources Defense Council

Lark Galloway-Gilliam
Executive Director
Community Health Councils

Attachment

Cc: Senator Curren Price
Assemblymember Holly Mitchell
Mr. Jason Marshall, Department of Conservation
Mr. Tim Kustic, DOGGR
Supervisor Mark Ridley Thomas, County of Los Angeles, Second District
Ms. Karly Katona, Office of Supervisor Ridley-Thomas
Ms. Rena Kambara, DRP
Ms. Pat Hachiya, DRP
Mr. John Martini, PXP
Ms. Candace Salway, PXP
Ms. Lisa Paillet, PXP
Mr. Daniel Tormey, Cardno ENTRIX
Mr. John Peirson, Marine Research Specialists
Mr. Luis Perez, Marine Research Specialists
Mr. John Kuechle, Chair, Community Advisory Panel
Mr. David McNeill, Baldwin Hills Conservancy

Greater Baldwin Hills Alliance – March 15, 2012

Questions for the Fracking Study

Process:

1. What are the study's goals and expectations?
2. After the fracking study is complete, what is the mechanism for determining whether fracking can be conducted without increased community impact per the CSD, Settlement Agreement, and city, county, regional, state and federal standards? At the current time, it is unclear whether data will be evaluated to approve or deny future fracking activity.
3. How were the test wells chosen? What attributes, parameters and/or criteria were considered when selecting the test wells? Can the community and the County be assured that the fracking study's analysis of data from these particular test wells will lead to reliable conclusions about the impacts of fracking on community health and the environment?
4. As to what is not included in "supporting non-proprietary material" that will be forwarded to LA County, CAP, DOGGR, RWQCB, settling parties, and the public, who will make this determination and how?

Water:

1. For the wells currently in use (as well as future wells), if a well casing failure occurs at any depth, what is the likelihood of fracking fluids contaminating groundwater? Please explain.
2. Is there any current monitoring or testing of water quality before fracking occurs in order to create a baseline? What water testing or monitoring will be conducted if and when new fracking operations are initiated?
3. How will PXP best ensure against surface water and groundwater contamination resulting from fracking? What steps will PXP take if fracking activities end up contaminating residents' drinking water?
4. How much additional water will be needed to support fracking activities? Are sufficient infrastructure and resources available to handle these increases? Will PXP's operational demand outstrip the current publicly financed water system's capacity?
5. Where does injected water come from? How will produced water be managed?
6. Should off-site groundwater be tested as part of this study?
7. Has PXP trained fracking consultants in accordance with the August 2011 Stormwater Pollution Prevention Plan to create Best Management Practices to prevent water, silica, and chemicals from entering the public storm water system that leads to Ballona Creek?
8. Does PXP's Stormwater Pollution Prevention Plan include measures to identify fracking chemicals in retention basins and run-off? If so, what are they?

Fracking Fluids:

1. Are the lists of additives posted on fracfocus.org for wells VIC 1-330 and VIC 1-635, PXP's two test wells, complete? Is anything missing from either of those lists, and if so, what is missing?
2. PXP has explained that the majority of its current drilling uses a technique called "gravel packing," which will be addressed in the study.
    a. It's our understanding that gravel packing involves the use of fluids that contain additives. Is this accurate? If so, can the public have a list of those additives? Are they added to the fluid on-site? How much of each additive is used for each frack job? How are the fluids and/or additives transported to the site? What safety measures are in place to prevent spill or leakage of fluids and/or additives in transport as well as in use?
    b. How are these fluids and/or additives different from those used in hydraulic fracturing?
3. What safety measures are in place to prevent spill or leakage of fracking fluids in transport as well as in use?

Horizontal Drilling:

1. At the public meeting, PXP indicated that the results from the two vertical test wells are capable of being translated to horizontal hydraulic fracturing wells.
    a. What is the reasoning behind this conclusion?
    b. It is our understanding that horizontal drilling requires more extensive drilling, heavy industry for the higher pressures needed, and a greater volume of water for the longer pipes. Is this accurate for any proposed horizontal drilling in the Inglewood Oil Field? If so, how will the vertical wells be able to account for these differences?
    c. Will the hydraulic fracturing study consider and analyze the possible consequential effects of horizontal drilling, such as the need for more extensive drilling, more heavy industry, greater volumes of water, and a greater capacity to handle and safely dispose of wastewater?
    d. Horizontal wells also allow for a greater degree of uncertainty, as it is impossible to predict where the water will travel when conducting hydraulic fracturing through horizontal wells. How will the vertical testing wells account for that difference?
2. PXP stated that it currently has horizontal drilling in its drilling plan, but will not drill those wells until the hydraulic fracturing study is complete.
    a. What is the desired payload for these horizontal wells? And why are horizontal wells necessary for accessing that resource?
    b. At what depth(s) would PXP drill horizontal wells?
    c. Approximately how far would such wells be drilled horizontally (*i.e.*, what distance from the vertical well shaft)?

Public Health:

1. Publicly available results from the two test wells appeared to show that the majority of the payload was gas rather than oil.
    a. PXP stated at the meeting that its drilling focus for the field was oil. Is PXP considering drilling to target gas in the future?
    b. What are the differences between hydraulic fracturing for oil and hydraulic fracturing for gas?
    c. Do these test results mean that fracking a well ordinarily produces more gas than conventional drilling? Are these results specific to the Inglewood Oil Field? Will the study cover the potential impacts of increased gas production on the environment and public health?
2. Does PXP use radioactive tracers? If so, are they dangerous to public health? If not, please explain.

Other Questions for the County

1. Will current studies and proposals to monitor provisions in the CSD and settlement (including Air Quality and Community Health) integrate findings from the fracking study to reach a comprehensive and accurate assessment of oil field impacts?
2. How will data from the EIR, EQAP Audit, and fracking study be comprehensively and jointly assessed to determine oil field impacts?
3. Was fracking considered as part of the 2008 EIR? If not, was it because (i) PXP indicated it had no intentions of doing so in 2006 when the EIR's scope was established, and/or (ii) the County regarded fracking as a below-ground activity that generally falls within DOGGR's jurisdiction?
4. Who is responsible for cleanup and remediation if chemicals from fracking are found to enter groundwater, surface water, dust, or stormwater?

Kambara, Rena

From:	Suzanne DeBenedittis [suzanne.debenedittis@gmail.com]
Sent:	Thursday, March 15, 2012 4:55 PM
To:	Kambara, Rena
Cc:	Supervisor Mark Ridley-Thomas; Danie.Tormey@Cardno.com; Mehaul O'Leary; Christopher Armenta; Jeff.Cooper@CulverCity.org; Andrew.Weissman@CulverCity.org; Culver City Manager; Martin Cole; City Attorney; Sherry Jordan; Christine Parra; diamondline@earthlink.net; Anna Taylor; Margrit Cheeseboro; ccna-boardplus@googlegroups.com
Subject:	PXP Fracturing Study & Need for Disaster Safety Preparedness Program

Rena Kambara, LA County Planner, Zoning Enforcement West Section

Los Angeles County Department of Regional Planning

320 W. Temple Street, Los Angeles, CA 90012

213-974-6453 <rkambara@planning.lacounty.gov>

RE: PXP Fracturing Study & Need for Disaster Safety Preparedness Program

The CSD and Settlement and the upcoming Fracturing Study omit a vital need.

With more and more reports of earthquakes being triggered throughout the United Sates due to disposal wells and/or other procedures involved in hydraulic fracturing, it is imperative that the densely populated neighborhoods surrounding the Inglewood Oil Field be adequately prepared in the face of disaster.

Given that their operations may trigger "the Big One" PXP should fund the County and cities of Los Angeles and Culver City to develop Community Disaster Safety Plans that include preparedness training for the residents and visitors in the areas contiguous to the fields.

For example in Culver City, these critical areas include Culver Crest (with an assisted care facility that abuts the oil field), WLAC College, Lakeside, Tara Hill, Raintree, Carlson Park and Blair Hills.

Another example is Baldwin Village with over 28,000 people, mostly children, families and older people residing in a ½ square mile apartment community downwind of the oil field.

FE MA has shown that communities that are prepared to face disaster fare significantly better than those that aren't. Therefore I propose that the Fracking Study also include preparation of the Community beyond a seismometer to Caltech and PXP calling our Fire Departments.

We need organization and training at the neighborhood level that puts in place a realistic Preparedness Safety Plan. Given that PXP is putting our lives and property at risk, PXP should be funding this community education, practice and preparedness effort. Such a program needs to include:

- How to shelter in place or evacuate

- How we will be signaled/contacted
- Evacuation routes
- Designated community shelters
- And other essentials, such as Community Stations with First Aid supplies and equipment, walkie-talkies, etc.

Essentially, the Disaster Safety Plan needs to include the development of active Neighborhood Emergency Response Teams (NERTS) that are part of CERT (Community Emergency Response Teams). The Lindbergh Park Neighborhood Watch in Culver City, under the leadership of Dr. Ira Diamond, provides a good example of a truly prepared NERT. Christine Parra. Emergency Preparedness Coordinator with the Culver City Fire Department has acclaimed this Program and supports it becoming the norm for Disaster Safety Preparedness.

Please contact me if you would like more information on oil production related earthquakes, NERTS, or contacts to support my request. Know that I am willing to help in any way I can to put this critically needed safety measure in place.

Respectfully,

Suzanne De Benedittis, PhD

Suzanne.debenedittis@gmail.com

[redacted] or [redacted]

cc:
Supervisor Mark Ridley Thomas
Daniel R. Tormey, PhD, P.G.
Mehaul O'Leary, Mayor, Culver City

Christopher Armenta, Culver City Council Member

Jeff Cooper, Culver City Council Member

Andrew Weissman, Culver City Council Member

John Nachbar, Culver City, City Manager

Martin Cole, Culver City, Assistant City Manager

Carol Schwab, Culver City, City Attorney

Sherry Jordan, Culver City, City Planner

Christine Parra, Emergency Preparedness Coordinator, Culver City Fire Department

Dr Ira Diamond, Lindbergh Park Neighborhood Watch

Culver Crest Neighborhood Association

Anna Taylor, Receptionist, Marycrest Manor

Margrit Cheesebro, Apartment Owner, Baldwin Village

Kambara, Rena

From: CCNLA@aol.com
Sent: Thursday, March 15, 2012 5:03 PM
To: Kambara, Rena
Subject: Fracking Study

Rena Kambara:

Will the review of the fracturing study be made available to the public before the public meeting in the Fall of 2012?

Catherine Cottles

Kambara, Rena

From: McDonald, Heidi [Heidi.McDonald@conservation.ca.gov]
Sent: Friday, March 16, 2012 12:52 PM
To: Kambara, Rena
Cc: Martini, John
Subject: Inglewood Oil Field Fracturing Study
Attachments: Kambara_InglewoodFrackStudy.pdf

Please see attached letter from Tim Kustic, State Oil and Gas Supervisor. Thank you.

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

Division of Oil, Gas, & Geothermal Resources

801 K STREET • MS 20-20 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 445-9686 • **FAX** 916 / 323-0424 • **TDD** 916 / 324-2555 • **WEB SITE** conservation.ca.gov

March 16, 2012

Rena Kambara
Regional Planning Assistant
County of Los Angeles
rkambara@planning.lacounty.gov

Dear Ms Kambara:

Inglewood Oil Field Fracturing Study

The Division of Oil, Gas, and Geothermal Resources (Division) has reviewed the Inglewood Oil Field Hydraulic Fracturing (HF) Study Outline, dated March 2012. In addition to the items identified in the Outline, we suggest the study also include the following items summarized below:

1. The fracture modeling and testing part of the report should discuss if the predicted fractures were attained.

2. The study should described fracture geometry and vertical and lateral lengths.

3. Although the tests have been completed, a discussion of the theoretical radius of influence of the fracking operations should be included with an inventory of the wells, if any, within the radius of influence. Data on the wellbore integrity of these wells should be presented, including any tests done after the HF operations.

4. The proximity of the nearest USDW zone to the fracked target zone.

5. An analysis (characteristics and properties) of the confining layer, capping mechanism or trap above the fracturing target zone.

6. The method of fluid waste disposal.

The Division recognizes the proprietary nature for certain operator data and, if requested, can hold such data confidential pursuant to California Code of Regulations Title 14, Section 1997.4.

If you have any questions regarding these items, please contact Mr. Jerry Salera of our Underground Injection Control Program at [redacted]. Thank you.

Sincerely,

Tim R. Kustic
State Oil and Gas Supervisor

cc: John Martini, PXP Company