

1 a --

2 THE COURT: Dribbled out.

3 THE WITNESS: Dribbled out over a long period
4 of time.

5 BY MS. SMITH:

6 Q. Right. But it's not multiple injections,
7 it's just one --

8 A. One continuous injection.

9 Q. -- one continuous injection --

10 A. That's correct.

11 Q. -- at 125 millicuries; correct?

12 A. That -- over that whole time, it adds up to
13 125 millicuries.

14 Q. Okay. And the radioactive part of Ir-192 is
15 the iridium --

16 A. Correct.

17 Q. -- once it's been --

18 A. Irradiated.

19 Q. -- irradiated?

20 A. Correct.

21 Q. And it indicates on this proposal that that
22 iridium is going to be injected three separate times in
23 three separate stages; correct? Each at the amount of
24 125 millicuries?

25 A. That's correct.

1 Q. The proposal also indicates that in Stage 1
2 that there will be 100 -- or -- I'm sorry -- 1,171
3 gross of a chemical frac tracer 1100?

4 A. Grams?

5 Q. Is that grams?

6 A. Grams. Yeah.

7 Q. Okay. It had -- the "gr" next to it is
8 grams, not gross?

9 A. Grams.

10 Q. Grams. Okay.

11 And so there would be 1,171 grams of CFT 1100
12 injected into Stage 1 as well; correct?

13 A. Correct.

14 Q. Okay. I'm going to hand you what I've marked
15 as Exhibit 2.

16 (Plaintiffs' Exhibit 2 was marked for
17 identification.)

18 MS. SMITH: May I approach, Your Honor?

19 THE COURT: Yes.

20 BY MS. SMITH:

21 Q. Do you recognize this document, sir?

22 A. I do.

23 Q. What is it?

24 A. It is an invoice.

25 Q. And if you look at it, it's a series of

1 invoices. And I'll represent to you that this is what
2 was given to us by counsel for Core Laboratories/
3 ProTechnics.

4 Are these all of the invoices that
5 ProTechnics and Core Laboratories has for the work or
6 services it provided at the Yeager well site?

7 A. Yes.

8 Q. And it indicates -- if we look at this
9 invoice, and we look specifically at the CFT 1100,
10 which you'll find on the last page.

11 A. I found it.

12 Q. Okay. Or second to the last page. I'm
13 sorry. It indicates that it was in -- what actually
14 was used was 1,144 grams; correct?

15 A. Correct.

16 Q. So that's different than the proposal;
17 correct?

18 A. That is correct.

19 Q. So if we wanted to know, for information in
20 this case, which amount of CFT 1100 was actually used
21 by ProTechnics/Core Laboratories at Yeager 7H, would we
22 go by the invoice, or would we go by the proposal?

23 A. The invoice. I can -- just to help clarify
24 that. We propose jobs when we go to a well site. That
25 would be the proposal. We might pump more or less

1 depending on as they're fracking, if they're going to
2 have any -- the volume they pump changes. And so our
3 engineers know a concentration. There is a target and
4 it's not the total amount. So as the job varies, our
5 personnel on location varies to match it.

6 So it's more a -- ours is a concentration
7 target. Not a volume target.

8 Q. And would that be true for every CFT that is
9 listed in the invoice? The correct amount that was
10 actually used at Yeager would be contained in the
11 invoice, not the proposal?

12 A. Correct.

13 Q. And would that be true, also, of the
14 radioactive tracers? The amounts contained in the
15 invoices, not the proposals, would be the correct
16 amount of the radioactive tracers used at the Yeager
17 site?

18 A. Correct.

19 MR. ARNOLD: Your Honor, I just want to make
20 sure there's no confusion. It's not the correct or
21 incorrect amount. It's the actual versus proposed
22 amount.

23 THE COURT: I understand.

24 MR. ARNOLD: And, again, Your Honor, we're
25 going on and on about this, and it doesn't have

1 anything to do with the discovery dispute.

2 THE COURT: Go ahead, Ms. Smith.

3 BY MS. SMITH:

4 Q. The invoices, when we look at the first page
5 on Exhibit 2, it indicates that the iridium that was
6 utilized in the Yeager frac, that it was used --
7 coupling the invoice and the proposal, that it was used
8 in Stages 1, 4, and 7 at 125 millicuries each; correct?

9 A. You're looking at the invoice?

10 Q. The invoice and the proposal together.

11 A. On -- I lost you. Compare the invoice -- is
12 this a general question or a specific?

13 Q. It's a specific question, and --

14 A. Tell me where to look.

15 Q. So with the invoice, the invoice is going to
16 tell you how much -- right? -- of the iridium that was
17 utilized; correct?

18 A. Yes.

19 Q. And if we look at the proposal, the proposal
20 tells us how many times 125 millicuries was injected;
21 correct?

22 A. The proposal is a financial proposal --
23 engineering financial proposal. It tells you not what
24 we pump, it tells you an estimate of what it would be.
25 if you -- if you run the job per this design, this is

1 what it would cost you. If you change it, you can
2 figure out the rate on the proposal and how that would
3 impact the actual invoice.

4 Q. Okay. So if we look at the proposal, it
5 indicates in there that for Stages 1, 4, and 7, iridium
6 was to be used; right?

7 A. Yes.

8 Q. And then if we look at the proposal, it tells
9 us that scandium, Sc-46, was to be used in Stages 2, 5,
10 and 8, at 125 millicuries per injection; correct?

11 A. Yes.

12 Q. And the proposal tells us that Sb-124, or
13 antimony, was to be injected in Stages 3 and 6, at
14 125 millicuries per injection; correct?

15 A. That is correct.

16 Q. And we discussed this a little bit earlier,
17 but you're aware that the ProTechnics/Core
18 Laboratories' license with the Nuclear Regulatory
19 Commission indicates in it how much of these
20 radioactive tracers ProTechnics/Core Laboratories was
21 permitted to use on the site; correct?

22 A. It only talks about concentration.

23 Q. I'm going to hand you what's being marked as
24 Exhibit 3.

25

1 (Plaintiffs' Exhibit 3 was marked for
2 identification.)

3 MS. SMITH: May I approach, Your Honor?

4 THE COURT: You may.

5 BY MS. SMITH:

6 Q. Do you recognize this document, sir?

7 A. I do.

8 Q. And is this the license to use radioactive
9 material that ProTechnics/Core Laboratories has with
10 the United States Nuclear Regulatory Commission?

11 A. It is.

12 Q. And if we look at the first page, it
13 indicates the three radioactive tracers that
14 ProTechnics/Core Laboratories used at the Yeager site;
15 correct?

16 MR. ARNOLD: Your Honor, I'm going to object
17 to this line of questioning.

18 I think you previously indicated she needed
19 to move on from this. There's no connection to this
20 discovery dispute, and now she's even got the license
21 she says she didn't get. So there's absolutely no
22 prejudice. She's saying now -- she's just using this
23 to further examine my client on subjects that aren't
24 even pertinent to the discovery dispute.

25 THE COURT: This was not scheduled to be a

1 deposition.

2 MS. SMITH: I understand, Your Honor. And
3 I'll move quickly on from this. I just have a couple
4 of questions in here, just to make sure that what we're
5 looking at in the invoices is what was actually used
6 per their license.

7 MR. ARNOLD: Asked and answered. It's been
8 answered already.

9 MS. SMITH: Actually, it hasn't, Your Honor.

10 THE COURT: No, I don't think it has. Go
11 ahead.

12 MS. SMITH: Okay.

13 MR. ARNOLD: Your Honor, what does it have to
14 do with the discovery dispute?

15 MS. SMITH: It goes to the relevancy of why
16 these documents are --

17 MR. ARNOLD: They've been produced.

18 MS. SMITH: This has not been produced. You
19 never produced this license. I went out and found it
20 on my own after hours and hours of research.

21 THE COURT: All right.

22 MR. ARNOLD: Which, Your Honor, we've covered
23 already.

24 MS. SMITH: We have not covered it.

25 THE COURT: Well -- and the license is not

1 specific to the Yeager well.

2 MS. SMITH: This, I believe, is, Your Honor.

3 THE COURT: This is?

4 MS. SMITH: I believe so. That's one of the
5 questions I'm going to ask him.

6 MR. SMITH: It applies to the Yeager well.

7 THE COURT: Okay. You can ask him.

8 BY MS. SMITH:

9 Q. Sir, with this actual license from the US
10 Nuclear Regulatory Commission, was this the license
11 that was in place at the time that radioactive tracers
12 were utilized at the Yeager site?

13 A. This would not be the license that we were
14 operating off of.

15 Q. How do you know?

16 A. Because we would have used some other state's
17 license for reciprocity. Not the NRC.

18 MR. ARNOLD: And, Your Honor, just for
19 counsel here, I mean, the document itself talks about a
20 letter dated July 30, 2012. And this license expired
21 February 28, 2016. So it's after the fact.

22 THE COURT: It would seem to be.

23 MR. ARNOLD: This is an '09 event.

24 MS. SMITH: That's why, Your Honor, it was so
25 important, as part of our request under the subpoena,

1 to get documents like these so we're talking apples and
2 apples. That's why I'm asking him about it. This was
3 never produced to us at all.

4 MR. ARNOLD: It wasn't in their motion. It
5 wasn't in a meet and confer. They never mentioned it.

6 THE WITNESS: Your Honor, I really want to
7 help as much as possible, but our training records for
8 employees, you can go on and on.

9 We truly tried to produce whatever we thought
10 was relevant to this well. I never would have
11 imagined -- I just -- that -- how far you go. I mean,
12 it's everything. I got education for my employees.
13 I've got training records. I got what university they
14 went to. It could all be relevant. I don't know what
15 would be relevant. And I need your help.

16 THE COURT: Okay. Ms. Smith, what do you
17 want to ask him now?

18 BY MS. SMITH:

19 Q. So with regard -- if this isn't the actual
20 license -- well, my question is, in this license, it
21 specifically says and limits ProTechnics/Core
22 Laboratories' use of radioactive tracers, for the three
23 different radioactive tracers that we are talking about
24 in this particular case, for use in tracer studies at
25 oil and gas wells, or to use them as calibration and

1 stabilization in another product that's not yours, or
2 to use as pipe collar markers in oil and gas wells.

3 Is this license that I put before you
4 today -- the state license that you used to operate in
5 Pennsylvania -- did it restrict Core Laboratories/
6 ProTechnics' use of radioactive tracers to the --

7 A. As I said earlier --

8 Q. -- to the tracer studies in oil and gas wells
9 that's delineated in this particular license?

10 A. Yeah, this license is not the license that we
11 would use for the State of Pennsylvania.

12 Q. That's why I'm asking you. The one that you
13 used for the State of Pennsylvania, did it delineate
14 out these specific uses only for the radioactive
15 elements we're talking about right now?

16 A. I am not the radiological supervisor or RSO
17 for the company, so I can't quote that.

18 Q. Does Core Laboratories or ProTechnics have in
19 their possession the actual license that they possessed
20 at the time that they used radioactive tracers at the
21 Yeager site?

22 A. I would expect so.

23 Q. Okay. Yet that wasn't produced here; right?

24 A. That's correct.

25 And I don't think it was requested in

1 discovery.

2 THE COURT: That's okay. Wait for another
3 question.

4 BY MS. SMITH:

5 Q. And under that Pennsylvania license, or the
6 state license that you used to operate in Pennsylvania,
7 did it limit the amount per injection that you could
8 utilize -- ProTechnics/Core Laboratories could utilize
9 as a tracer in their work at the Yeager site?

10 A. I'll just say that I -- I'm not prepared to
11 answer that.

12 Q. But that would be delineated in that license;
13 correct?

14 A. All I understand is picocuries per thousand
15 pounds or something. There's some concentration.
16 That's all I understand from my history.

17 Q. You indicated, also, in paragraph 8 of your
18 affidavit, and testified here today, that you looked
19 for jobsite surveys for the Yeager site that would
20 demonstrate what jobs were performed by ProTechnics and
21 Core Laboratories at the Yeager site; is that correct?

22 A. We provided the jobsite surveys, yes.

23 Q. Okay. And did you do that search to make
24 sure that all of the jobsite surveys that I was given
25 were all the ones that Core Laboratories/ProTechnics

1 has for the Yeager site?

2 A. I personally did that. I provided that.

3 Q. Okay. I'm going to hand you what's being
4 marked as Exhibit 4.

5 (Plaintiffs' Exhibit 4 was marked for
6 identification.)

7 MS. SMITH: May I approach, Your Honor?

8 THE COURT: You may.

9 BY MS. SMITH:

10 Q. And, sir, in Exhibit No. 4, are these all the
11 jobsite survey forms that ProTechnics and Core
12 Laboratories has in its possession related to the
13 Yeager site and the work that was done there?

14 A. Yes.

15 Q. And if we look at Exhibit 4, the second page,
16 it indicates that iridium-192 as a solid radioactive
17 tracer was utilized in the total amount of 125
18 millicuries; correct?

19 A. Correct.

20 Q. And then it says CFT 1100, the liquid tracer,
21 and it doesn't give a total. Why is that?

22 A. I don't know.

23 Q. We went through the invoices and the
24 proposal. The invoice says for CFT 1100 that there was
25 1,144 grams used. Yet on the actual jobsite survey,

1 it's not listed; correct?

2 A. Correct.

3 Q. Is there some other job survey that would
4 have been utilized specifically for the liquid tracer
5 different than the solid tracer that we're looking at
6 right now?

7 A. Not that I'm aware of.

8 Q. And if we look to the other pages listed --
9 for instance, if we go to the next page, Stage 2, where
10 CFT 1200 in liquid form tracer, that 1,144 grams were
11 used, according to the invoice, it lists zero on here
12 as well.

13 And that is the same for every liquid tracer
14 that was utilized on these jobsite survey forms.
15 There's no total amount listed; correct?

16 A. Correct.

17 Q. So these jobsite survey forms are incomplete;
18 is that right?

19 A. The survey forms are incomplete. You can say
20 that.

21 Q. Okay. Does there exist any other
22 documentation at ProTechnics or Core Laboratories that
23 would fill in those blanks in a form like this? Like a
24 jobsite survey form where it was actually written down
25 the total amounts that were used?

1 A. Yeah, the engineer on location has a field
2 receipt that he would have filled out. That would be
3 the ticket showing what was delivered.

4 Q. Did Core Laboratories or ProTechnics, in
5 response to the subpoena, ever produce any field
6 receipts or tickets to demonstrate that?

7 A. To my knowledge, we would have, but I
8 don't --

9 Q. I'm sorry. Did you? I mean, I'll represent
10 to you, I didn't get any.

11 A. I'm just telling you everything that we
12 produced that I'm aware of. I have not reviewed
13 everything that we produced personally.

14 Q. Okay. And so if the --

15 A. Kind of like the same way I missed the
16 invoices.

17 Q. Okay. So if the field receipts or field
18 tickets were not produced to me, ProTechnics or Core
19 Laboratories would have them that would show the CFT
20 amounts that were actually delivered in that ticket;
21 correct?

22 A. Yeah. That's how the invoice is created.

23 Q. Okay. I'm going to hand you what's being
24 marked as Exhibit 5.

25

1 (Plaintiffs' Exhibit 5 was marked for
2 identification.)

3 MS. SMITH: May I approach?

4 THE COURT: You may.

5 BY MS. SMITH:

6 Q. Do you recognize this document, sir?

7 A. I do.

8 Q. What is it?

9 A. This is the Master Service Agreement between
10 Range and ProTechnics Division of Core Laboratories.

11 Q. And you indicated, with regard to this MSA,
12 in paragraph 7 of your affidavit that there were no
13 other contracts or subcontracts for work performed by
14 ProTechnics/Core Laboratories for Range Resources at
15 the Yeager site; correct?

16 A. Correct.

17 Q. Could you show me where in this document,
18 sir, that it tells you Core Laboratories/ProTechnics --
19 what it is that Core Laboratories and ProTechnics is
20 going to do for Range Resources at the Yeager site?

21 MR. ARNOLD: Your Honor, this sounds like a
22 deposition again. I would object.

23 MS. SMITH: Your Honor, with regard to --
24 I've looked up and down, because there is a question in
25 this document -- and you can see some of the documents

1 don't add up -- with regard to this, what exactly was
2 the work that they actually did.

3 They're saying this is the only contract that
4 they have. I've read this whole thing. It doesn't
5 delineate, at least from my reading of it -- and maybe
6 there's something I don't understand -- that says
7 exactly what it is that they were contracted to do at
8 the Yeager site.

9 THE WITNESS: That would be our proposal.

10 MS. SMITH: I'm sorry?

11 MR. ARNOLD: She has the other documents.

12 THE COURT: Well, the -- yeah. I understood
13 this document to be the master service agreement. So
14 if Range is going to deal with -- well, who generates
15 this? Range or ProTechnics?

16 THE WITNESS: It would be a shared -- I mean,
17 probably -- it comes from Range.

18 THE COURT: Okay.

19 THE WITNESS: We would then, if there's some
20 legalese we don't like, change it.

21 THE COURT: So if Range is going to hire
22 somebody to do something, anything, that this is the
23 master agreement. And it's all the standard
24 boilerplate about workers' comp and -- you know.

25 MS. SMITH: Right. And in his affidavit,

1 Your Honor, he said there are no other -- there's no
2 other contracts. So that's my question. How do you
3 know what it is you're supposed to do? What services,
4 specifically, were supposed to be rendered?

5 THE COURT: Okay. That's the question.

6 THE WITNESS: Our proposal.

7 BY MS. SMITH:

8 Q. So the proposal lays out every single thing
9 that you were supposed to do; is that correct?

10 A. Well, the master service agreement also has
11 some information. But with regard to the technical
12 services we're going to provide, our proposal says this
13 is what we're going to do. How we go about doing it
14 would be our procedures and license. Things like that.

15 Q. And based on your proposal, the two things
16 that you were going to do as ProTechnics/Core
17 Laboratories at the Yeager site was to do a
18 radioactive -- or -- I'm sorry -- radioactive tracing
19 and logging that tracing. And then, two, was to use a
20 chemical frac tracer and analyze that through the
21 flowback. Correct?

22 A. Correct.

23 Q. So those were the two jobs you were hired to
24 do? ProTechnics/Core Laboratories. Correct?

25 A. Two services. One job, two -- it had

1 multiple things we did for that job.

2 Q. And you indicated that you're not aware of
3 any written work orders at all?

4 A. No. That's not common practice.

5 Q. Okay.

6 A. Like I said, we received instructions on what
7 they want us to do, what their problems are. We design
8 it, we give them a proposal, they call us out, and we
9 go do it. That's the normal procedure.

10 Q. And so that initial contact, would that have
11 been done in e-mail, where Range said, we would like
12 you to do X, Y, and Z?

13 A. We could have been in their office talking to
14 them. It could have been an e-mail. It could have
15 been a phone call. I don't know.

16 Q. And were you the person in charge of
17 collecting all of the e-mails from ProTechnics/Core
18 Laboratories systemwide to see what was responsive to
19 the subpoena?

20 A. I think our general counsel took the lead on
21 that.

22 Q. Okay. And in the e-mails that were turned
23 over, there are no e-mails that delineate exactly what
24 it is that Core Laboratories/ProTechnics was going to
25 do at the Yeager site. Is that your understanding that

1 there wouldn't be?

2 A. I don't know.

3 Q. In the affidavit that you submitted, it
4 indicated that as part of the job surveys that were
5 turned over, that in Paragraph No. 9 you said
6 ProTechnics was not engaged to log the isotope tracers,
7 and so ProTechnics has no additional responsive
8 documents other than the jobsite surveys.

9 A. Correct.

10 Q. Okay. You just told me that one of the jobs
11 was to use the radioactive tracers to trace and log
12 those radioactive elements.

13 A. That is correct.

14 Q. But you didn't do that?

15 A. That is correct.

16 Q. Why?

17 A. Normally, what happens is when you trace a
18 well, that gives you the alternative to go in and log
19 the well. One of the issues of logging a well is it's
20 costly. You got to run coil tubing in.

21 So there's two things. You got the cost to
22 run it, and you have what is called the risk of well
23 intervention. Getting stuck or problems. Which, you
24 know, you lose the coil tubing, it's very costly,
25 whatever.

1 So the decision at any point in time is, do I
2 need to run this log?

3 I don't know why they didn't run it, but
4 that's not uncommon. Some people run the tracers, they
5 say, for insurance. Just in case one of the fracs
6 didn't go as planned, we can run the log and identify
7 what went wrong.

8 So it's not imperative that you run a log,
9 but you have to run the tracers. Because you can't run
10 a log -- you can't, after the fact, do your well
11 completion and then decide, I would like to run a log
12 to figure out what went on. You need to put the
13 tracers in first as a prerequisite. Then you have the
14 option to log if you want. That's the normal.

15 Q. Okay. And so do you know why it was that the
16 tracing was never done? The logging of the radioactive
17 tracers?

18 A. I do not.

19 Q. Okay. And is it your understanding that no
20 samples were ever taken to sample any fluid from the
21 flowback to see if the radioactive tracers were in it?
22 If they had resurfaced or come back into the flowback?

23 A. Yeah, the tracers are stuck and can't be in
24 the fluid. Can't be washed off. It's integral to a
25 ceramic bead. So getting into the water is not a

1 possibility.

2 Q. Okay. I'm going to hand you what's been
3 marked as Exhibit 5A.

4 (Plaintiffs' Exhibit 5A was marked for
5 identification.)

6 MS. SMITH: May I approach, Your Honor?

7 THE WITNESS: You may.

8 BY MS. SMITH:

9 Q. Do you recognize this document, sir?

10 A. No.

11 Q. These were, I'll represent to you, the
12 e-mails that were given to us in the production for the
13 subpoena and response to the subpoena.

14 If you turn to the second to the last page,
15 at the very bottom it indicates on an e-mail from Range
16 Resources to an individual at ProTechnics and copies to
17 other people on it, "Gentlemen, the Yeager 7H for which
18 we are planning on using your chemical frac tracers and
19 RA tracers has been pushed to Friday, December 11,
20 2009."

21 MR. ARNOLD: Your Honor, just before she goes
22 further, I just want to correct her representation.
23 These are not all the e-mails that were produced. They
24 are some of the e-mails that were produced, but they're
25 not all the e-mails.

1 THE COURT: Okay.

2 MS. SMITH: Thank you. Yes, there was
3 another production.

4 MR. ARNOLD: They were produced. There were
5 more produced. I just wanted to make that clear.

6 MS. SMITH: Yes.

7 BY MS. SMITH:

8 Q. Did I read that correctly, sir?

9 A. I presume so.

10 Q. Okay. And then it indicates back from a
11 Mr. Dick Leonard at Core Laboratories/ProTechnics that
12 asks, "Is the Yeager 7H flowing now? When can we
13 expect some samples to get to Houston for analysis?"

14 Did I read that correctly?

15 And so was the analysis that was being done
16 and the analysis referenced in these e-mails for both
17 the chemical frac tracers and the radioactive tracers?

18 A. No.

19 Q. Was it just for the chemical frac tracers?

20 A. That is correct.

21 Q. And according to your affidavit, sir, in
22 response to the subpoena -- the production to the
23 subpoena, in paragraph 8, you indicated that you
24 provided a current product description of the isotopic
25 tracers used at the Yeager -- the isotopic tracers

1 similar to the ones that were used at Yeager; is that
2 right?

3 A. Correct.

4 Q. So you said that it was current. Have they
5 changed since the tracers that were used at the Yeager
6 site in 2009?

7 A. No. Those are patented -- from the beginning
8 of our patent until now, they have not changed.

9 Q. I'm going to hand you what's being marked as
10 Exhibit 6.

11 (Plaintiffs' Exhibit 6 was marked for
12 identification.)

13 MS. SMITH: May I approach, Your Honor?

14 THE COURT: You may.

15 BY MS. SMITH:

16 Q. Do you recognize this document, sir?

17 A. I do.

18 Q. And this is what was produced as the
19 description of the radioactive tracers?

20 A. Correct.

21 Q. And this particular description, is this the
22 world of description and information about the
23 radioactive tracers used at the Yeager site?

24 A. I think they've been characterized many
25 different ways. This is a pretty concise,

1 comprehensive explanation, I think, that would be,
2 hopefully, most convenient for you.

3 Q. Is this the only literature that exists at
4 ProTechnics/Core Laboratories about the description of
5 the radioactive products that were used at the Yeager
6 site?

7 A. I'm sure there's marketing. I'm sure there's
8 different documentation.

9 Q. So there's more information that exists that
10 have not been produced; correct?

11 A. Not anything that wouldn't be more
12 informative or -- I mean, this is a comprehensive --

13 Q. How about --

14 A. There could be any different flavor. There
15 could be a PowerPoint that somebody did. There could
16 be several documents. But this document covers the
17 request, I believe, that you had.

18 Q. How about studies that were done on the Zero
19 Wash tracers by Texas A&M? Does ProTechnics and Core
20 Laboratories have that in their possession?

21 A. We do.

22 Q. And you did not produce it; correct?

23 A. That is correct.

24 MR. ARNOLD: Your Honor, I'm going to object
25 again.

1 It doesn't have anything to do with their
2 actual motion to compel. They've never asked for a
3 study in the meet and confer. They didn't ask for it
4 in their motion to compel. And they didn't put it in
5 their actual -- paragraph 7 of their motion to compel.

6 We're -- she's doing a sort of mock --
7 attempt at a deposition with a stack of documents,
8 bringing up stuff that doesn't have anything to do with
9 the motion that's before the Court.

10 MS. SMITH: Your Honor, with regard to it, it
11 specifically says, "radioactive material descriptions."

12 I mean, studies that they have done, they're
13 looking at the actual description of the product that
14 was used, how it interacts, whether it will wash off
15 radioactive material or won't wash off radioactive
16 material.

17 They've represented to this Court that no
18 MSDS sheets exist for these documents that would give
19 us that kind of information. And that's why I'm asking
20 these questions.

21 I happened upon a study from Texas A&M that
22 they did not produce.

23 THE COURT: But if you say -- okay. You can
24 ask him, do you know about the Texas A&M study? Well,
25 maybe there's a Texas Tech study. Maybe there's a

1 University of Houston study. Maybe there's an Oklahoma
2 State study.

3 MS. SMITH: Right.

4 THE COURT: And you can't expect him to, you
5 know, round all that stuff up and send it to you in
6 response to your interrogatory. I don't think that's
7 reasonable.

8 MS. SMITH: But, Your Honor, somewhere
9 between all those studies and a single sheet of paper
10 is reasonable. And that's what has not been produced.

11 THE COURT: So say there are studies that
12 show this stuff is deadly. So when we actually get to
13 the trial, isn't that going to be one of your
14 witnesses? The person who wrote the Texas A&M study,
15 or whoever, that says, oh, you can't use this stuff, it
16 will kill you.

17 I mean, is that his job to produce everything
18 that exists in the industry one way or the other?
19 Whether it's --

20 MS. SMITH: Well, what's in their possession.
21 I don't know that they have everything that's been done
22 in the industry and all testing that's been done on
23 their product.

24 THE COURT: But that's what you're asking him
25 right now.

1 MS. SMITH: No. I'm --

2 THE COURT: You're saying, "Do you have the
3 Texas A&M study?"

4 Well, apparently he does. But I don't want
5 you to ask all those other places either.

6 MS. SMITH: No, I'm not going to. I'm just
7 asking what they have in their possession that would be
8 responsive to what we requested. And I just threw that
9 one out there as an example. He could have said, "No,
10 we don't have that study."

11 And if they don't have it, they don't have
12 it.

13 But, clearly, they have that, and they
14 haven't produced it pursuant to the subpoena that would
15 be descriptive of the product. And that's why I was
16 asking the question.

17 THE COURT: Okay.

18 MR. ARNOLD: Your Honor, it's not a
19 reasonable request. My client is a nonparty. They're
20 not a defendant in this case. They have not been
21 accused of anything.

22 THE WITNESS: And, Your Honor, just to clear
23 up, the Texas A&M study shows -- they did a study that
24 proves it can't be washed off.

25 THE COURT: Okay.

1 THE WITNESS: And this is -- what we stated
2 in here, the study supports this. But it simply
3 supports that it is not a Zero Wash. We went to an
4 independent to prove the Zero Wash nature that stays in
5 the bead.

6 Now, these are the properties we're trying to
7 state and provide them. And it's a one-page -- A&M's a
8 one-page deal. I just don't -- you're right.

9 THE COURT: Ms. Smith, I think this is a
10 reasonable response. And, you know, it's -- there has
11 to be -- everything is a balancing test in the law.
12 And we've got to stop someplace. This is what they
13 know about their product. And maybe they know more,
14 but you can say that about everything.

15 MS. SMITH: Okay, Your Honor. I'll move on
16 from that.

17 THE COURT: Please.

18 BY MS. SMITH:

19 Q. With regard to the radioactive tracers, sir,
20 does Core Laboratories or ProTechnics have in their
21 possession any MSDS sheets that would give descriptive
22 information about the radioactive tracers?

23 A. Yeah, the Yeager 7 well, MSDS would have been
24 provided to Range. We do not -- that is not part of
25 our records.

1 Q. Okay. So at the time that they were used in
2 2009, that would have been the MSDS you provided to
3 Range Resources?

4 A. Correct.

5 Q. But ProTechnics and Core Laboratories doesn't
6 have it in their possession right now?

7 A. The Range -- the -- the technician who
8 provided those documents did not store a copy for
9 ourselves.

10 Q. I'm going to hand you what's being marked as
11 Exhibit 7.

12 (Plaintiffs' Exhibit 7 was marked for
13 identification.)

14 MS. SMITH: May I approach, Your Honor?

15 THE COURT: You may.

16 BY MS. SMITH:

17 Q. Sir, do you recognize this document?

18 A. It's not familiar to me.

19 Q. This purports, by its own entity here, that
20 it's a Core Laboratories Material Safety Data Sheet
21 from 2009 for iridium Zero Wash bead tracer; correct?

22 A. Correct.

23 Q. And this is a document that you say Core
24 Laboratories/ProTechnics does not have in its
25 possession; correct?

1 A. What I said is that the documents that were
2 provided to Range associated with the 7H well, we
3 provided you all those documents associated with that
4 well.

5 Q. Sir, I thought that you just testified that
6 ProTechnics, currently, in response to the subpoena,
7 doesn't have any MSDS sheets for the radioactive
8 tracers?

9 A. No. What I said is that the engineer who
10 provided the MSDS, as part of his responsibility to the
11 client, did not retain a copy of what was provided on
12 that day to Range. I don't have what he presented on
13 this well.

14 Q. But -- okay. So -- but, then, Core
15 Laboratories and ProTechnics does have MSDS sheets from
16 2009 for their radioactive --

17 A. I would presume that there would be records
18 somewhere.

19 Q. And you've never produced that; correct?

20 A. We produced all the documents associated with
21 the 7H.

22 Q. Sir, my question is very pointed.

23 ProTechnics and Core Laboratories never
24 produced any MSDS sheets for their radioactive products
25 from 2009; correct?

1 A. That's correct.

2 Q. And were you aware that to this Court it was
3 represented that ProTechnics and Core Laboratories did
4 not have MSDS sheets for their products back in 2009?
5 That they had been destroyed?

6 A. My understanding was that the request scope
7 was to provide all documents associated with the 7H
8 well. And so when we went to the files on the 7H,
9 there were no MSDS sheets. So what was provided to
10 Range, Range would have. We don't have a copy.

11 Q. So when you were looking for documents
12 responsive to the subpoena, all Core Laboratories and
13 ProTechnics did was go to a file that was marked 7H and
14 give whatever was in there?

15 A. We provided everything associated with the
16 7H. And any other questions associated -- e-mails
17 invoices, proposals. Anything associated with the 7H.
18 No other wells.

19 Q. To your knowledge, sir, did anyone at
20 ProTechnics or Core Laboratories indicate to their
21 outside counsel that the MSDS sheets for these
22 products -- the radioactive products -- had been
23 destroyed, and ProTechnics/Core Laboratories did not
24 have them in their possession?

25 A. No. We did not say that.

1 MR. ARNOLD: Your Honor, she wants to get
2 into attorney/client communications. It's
3 objectionable. And she's mischaracterizing all of this
4 event.

5 But it doesn't have anything to do with, you
6 know, if she has the document or not. Okay? If she
7 wants to ask a question about whether we've given them
8 the document, that's fine. We're now getting far
9 afield.

10 THE COURT: Remember why we're here.

11 MS. SMITH: I understand, Your Honor. Part
12 of the reason why I'm asking about the MSDS sheet is
13 because it is the most descriptive of the product. And
14 we asked for that. It was represented here that they
15 were destroyed, and Core Laboratories/ProTechnics
16 doesn't have them. That's simply not true.

17 My problem with this MSDS sheet, as Your
18 Honor can appreciate, at trial I have to deal with the
19 MSDS sheets that were in play at the time. And this is
20 back in 2009. This is a revised edition from April 20,
21 2009. Was this the MSDS sheet of the product that was
22 utilized in that form at the Yeager site at that time?

23 THE WITNESS: I do not know what was provided
24 to Range. I just don't know. I mean, it could have
25 been the guy had one from 2006. I don't know what was

1 provided.

2 BY MS. SMITH:

3 Q. Who would know what was provided at Core
4 Laboratories/ProTechnics?

5 A. No one at this point, other than Range.
6 Because they would be the only ones that are in
7 possession of that file. Because we didn't retain a
8 copy. So I don't know what was provided on the 7H.

9 Q. If you turn to page 2 of this MSDS sheet for
10 iridium-192, it indicates at the very top of the page,
11 under the physical data, it indicates that there is a
12 washoff of the Zero Wash tracer of .00 -- less than
13 .005 percent; correct?

14 A. Yes.

15 Q. So it's not a Zero Wash; correct?

16 A. Well, that's how we market it. Zero Wash.

17 Q. I understand that that's how you market and
18 that's how you market it. But according to your MSDS
19 sheet, there is a wash off; correct?

20 A. That is correct.

21 Q. And we wouldn't know that information unless
22 we got the MSDS sheet, because the descriptive one that
23 you gave doesn't indicate that information, does it?

24 A. Correct.

25 Q. And if we look at that same -- those same

1 MSDS sheets, the next MSDS sheet is for the antimony
2 Zero Wash bead tracer. Antimony-124, or Sb-124, and
3 that is also from 2009; correct?

4 A. Yes.

5 Q. And it indicates on the second page that the
6 washoff percentage for that particular radioactive
7 tracer is less than .1 percent; correct?

8 A. Yes.

9 Q. And if we turn to the next page, it indicates
10 that this is the MSDS sheet of April 20, 2009, for
11 Sc-46, as a radioactive tracer; correct?

12 A. Yes.

13 Q. And it indicates for that radioactive tracer
14 that there's a less than .005 percent washoff; correct?

15 A. Correct.

16 Q. I'm going to hand you what's being marked as
17 Exhibit 8.

18 (Plaintiffs' Exhibit 8 was marked for
19 identification.)

20 MS. SMITH: May I approach, Your Honor?

21 THE COURT: You may.

22 BY MS. SMITH:

23 Q. Do you recognize this document, sir?

24 A. These are not documents that I'm intimate
25 with.

1 Q. Okay. They purport to be MSDS sheets for the
2 radioactive tracers, again, but for this one it's
3 August 24, 2011; correct?

4 A. Correct.

5 Q. So these were revised from the ones that we
6 just looked at; correct?

7 A. Correct.

8 Q. And ProTechnics and Core Laboratories would
9 have these MSDS sheets in their possession; correct?

10 MR. ARNOLD: Your Honor, she just established
11 that these are from 2011. This job was in December of
12 2009. Why are we doing this?

13 THE COURT: Why do we care about 2011?

14 MS. SMITH: To see, Your Honor, if there was
15 a change in the MSDS sheet.

16 THE COURT: And?

17 MS. SMITH: And on these MSDS sheets, the
18 washoff isn't listed at all, as it was in the other
19 ones. And so my question with regard to these MSDS
20 sheets to this witness is, is there any in between
21 these two in 2009, since Yeager was fracked in December
22 of 2009, using these products? Are there any MSDS
23 sheets?

24 THE COURT: You can ask that question.

25

1 BY MS. SMITH:

2 Q. Any MSDS sheets between 2009 and 2011?

3 A. I would not know.

4 Q. I'm sorry?

5 A. I would not know.

6 Q. If they existed, ProTechnics and Core

7 Laboratories would have them; correct?

8 A. You would think so.

9 MS. SMITH: Your Honor, may I approach?

10 THE COURT: You may.

11 MS. SMITH: I'm handing you what's marked as

12 Exhibit 9.

13 (Plaintiffs' Exhibit 9 was marked for
14 identification.)

15 BY MS. SMITH:

16 Q. Do you recognize this document, sir?

17 A. Yes.

18 Q. What is it?

19 A. It's the flowback report for the Yeager Unit

20 7H.

21 Q. And this is what you had referenced earlier;
22 is that right?

23 A. Yes.

24 Q. Okay. And with regard to the flowback
25 report, if we turn to page, I think it's 3 of 7, or it

1 has the ProTechnics Bates number of 15 on it.

2 A. Yes.

3 Q. There's a chart.

4 A. Yes. A table.

5 Q. Yes. And in that table, it indicates from
6 the -- there were 17 samples taken of flowback from the
7 Yeager site.

8 A. There's 16 samples.

9 Q. Sixteen samples and one presample; correct?

10 A. Correct.

11 Q. Okay. Sixteen samples taken. They all have
12 individual lab identifier numbers; correct?

13 A. Correct.

14 Q. So one could reference back to the raw data
15 and to the actual concentration data from those lab
16 numbers; correct?

17 A. No. That would be -- this is the only
18 concentration data that you would be able to get.

19 Q. I mean, if you wanted to look these up on
20 your system --

21 A. Right.

22 Q. -- rather than see it in this chart, you
23 could reference that number and pull up these same
24 concentrations?

25 A. We could get the concentrations from that

1 number, correct.

2 Q. And those same identification numbers that
3 are here would be the same identification numbers on
4 the raw data; correct?

5 A. I believe so.

6 Q. Okay. And it indicates on this flowback
7 chart that there were chemical frac tracer
8 concentrations in parts per billion that are listed;
9 correct?

10 A. Correct.

11 Q. And then there's cation concentrations in
12 parts per million; correct?

13 A. Cation? (Changes pronunciation) Yes.

14 Q. And the cations that are listed here are
15 sodium, potassium, calcium, and magnesium; correct?

16 A. Correct.

17 Q. Do you know, from your work in the
18 laboratory, what other metals or cations were tested
19 for, other than these four?

20 A. That would be all that is tested for.

21 Q. So the calibration of that instrument would
22 have only been for these four metals?

23 A. That's correct. I believe.

24 Q. What is that based on, your belief?

25 A. Because I know we calibrate for those.

1 Q. Okay. Would that be listed in the raw data?
2 That it was calibrated for only these four metals?

3 A. I don't know.

4 Q. We talked about the calibration of the
5 instrument that happens daily; correct?

6 A. Correct.

7 Q. And in the calibration of the instrument, you
8 have to make sure that it's working properly. So you
9 make sure that the mechanical parts of the instrument
10 are working properly?

11 A. Okay. I'm certain that it would only be
12 these four, yes.

13 Q. Okay. And that would be in the raw data. It
14 would show you what it was calibrated to test for;
15 correct?

16 A. No.

17 Q. Where would it show you that?

18 A. The raw data analyzes for whatever is in the
19 water, you might say. Calibration is a separate issue.
20 And what we do is, we'll run a known amount of
21 magnesium, a known amount of calcium, in a different
22 file. And that would tell us what magnesium should
23 look like at this concentration. So it would --

24 Q. And in that separate -- I'm sorry.

25 A. -- not be in the raw data file.

1 Q. So it would be in -- a separate file would
2 tell you what the calibration of that instrument was to
3 test for on that day; correct?

4 A. Several. It would be multiple files to tell
5 you.

6 Q. Okay. And then the actual chemical frac
7 tracer concentrations here, if I'm reading them
8 correctly, and correct me if I'm wrong, they're listed
9 by CFT 1100, CFT 1200, and so forth; correct?

10 A. Right. Yes.

11 Q. And what that CFT is indicating is chemical
12 frac tracer; correct?

13 A. That's correct.

14 Q. And they're delineated by 1000, 1100, 1200,
15 1900, representing that unique chemical that is within
16 that CFT that allows ProTechnics and Core Laboratories
17 to identify which stage of the flowback it's coming
18 from; correct?

19 MR. ARNOLD: Your Honor, are we here for a
20 deposition, or is this about the discovery dispute?
21 Because we just keep going on and on about the
22 individual documents, when they've been produced.

23 And so all she's doing is asking questions to
24 get information that isn't in any way relevant to this
25 discovery dispute. She's just asking for explanations

1 of the documents now.

2 THE COURT: You wanted discovery of the
3 report. You got the report. And now you're asking
4 about the report. Isn't that a deposition?

5 MS. SMITH: I was trying to lay a foundation
6 so I didn't get that objection, but I'll move right to
7 it.

8 THE COURT: Go right to it.

9 MS. SMITH: Okay.

10 BY MS. SMITH:

11 Q. With regard to the CFT 1100 that's listed
12 here, the only way we know what that part per million
13 is testing for is to know what the actual chemical is
14 in that CFT; correct?

15 A. Go ahead and say that again.

16 Q. CFT 1100, I'm using as an example here.

17 A. Yes.

18 Q. You have a parts per billion amount that's
19 here.

20 A. Yes.

21 Q. That amount is the amount of that unique
22 chemical within the CFT; correct?

23 A. Well, the CFT -- chemical frac tracer -- is
24 the tracer. Not within it.

25 Q. What I'm saying, sir, is when you're running

1 these tests, when you're analyzing, the instrumentation
2 you're using to analyze it isn't analyzing CFT 1100.
3 It's analyzing the unique chemical that makes up
4 CFT 1100; correct?

5 A. That -- well, CFT, it's not made up.
6 CFT 1100 is an alias to protect the trade secret. It's
7 an alias for a chemical. So just --

8 Q. Right. So the parts per million measurements
9 that are in this chart are the parts per million of
10 that particular --

11 A. Parts per billion.

12 Q. -- parts per billion of that particular
13 chemical within CFT 1100 -- or that is CFT 1100?

14 A. Yes. CFT 1100 is the tracer that we're
15 analyzing for.

16 Q. So to know whether or not this chemical frac
17 tracer identified as 1100 is in my client's water, I
18 need to know what chemical CFT 1100 is in order to make
19 that connection; correct?

20 MR. ARNOLD: Objection. Argumentative.

21 THE COURT: Sustained.

22 BY MS. SMITH:

23 Q. In order for me to determine from a water
24 analysis done of my client's water whether a
25 ProTechnics or Core Laboratories chemical frac tracer

1 is in that water, I would need to know what the
2 specific chemical is that CFT 1100 is the synonym for;
3 correct?

4 A. Correct.

5 Q. And the only way that I know what chemical
6 CFT 1100 is equivalent to is for ProTechnics or Core
7 Laboratories to tell me; correct?

8 A. Correct.

9 Q. Because that's not provided in this flowback
10 report; correct?

11 A. That's correct.

12 Q. Do you understand or was it explained to you
13 at all that in this case a protective order has been
14 entered so that Core Laboratories and ProTechnics could
15 give that information without it being disseminated?

16 A. I understand there is a protective order.

17 Q. And so even though there's the protective
18 order in place -- well, let me ask you this: What is
19 CFT 1100? What's the chemical equivalent?

20 MR. ARNOLD: Objection, Your Honor.

21 THE WITNESS: That's trade secret.

22 MR. ARNOLD: Proprietary trade secret.

23 THE COURT: Okay.

24 MR. ARNOLD: It's entirely objectionable.

25 She's -- she's trying to --

1 THE COURT: Well, she wanted to put that on
2 the record, and I appreciate that.

3 Okay. He's claiming trade secret. Okay.

4 BY MS. SMITH:

5 Q. And would that be true if I asked you that
6 same question for all of the CFTs used at the Yeager
7 site in Stage 1, 2, 3, 4, 5, 6, 7, and 8?

8 A. Yes.

9 Q. Is there any way else, other than getting
10 this information directly from Core Laboratories and
11 ProTechnics, that I could find out what is -- what the
12 CFT 1100, 1900, 2100, 2000, that was used at the Yeager
13 site, the chemical equivalent is, other than coming
14 from ProTechnics or Core Laboratories?

15 A. No.

16 Q. And that information has not been provided
17 pursuant to the subpoena; correct?

18 A. Correct.

19 Q. And this information about the chemical frac
20 tracer, the parts per billion, the concentrations that
21 are listed here, were they done by GCMS or ion
22 chromatography?

23 A. GCMS.

24 Q. GCMS. So the actual GCMS raw data that would
25 coincide with this chemical frac tracer information

1 would also be listed with the same laboratory ID number
2 that's across from each one of those samples; correct?

3 A. I believe so.

4 Q. And that information has not been provided
5 pursuant to the subpoena; correct?

6 A. Are you talking about the raw data?

7 Q. Yes.

8 A. That is correct.

9 Q. And in that raw data, it would list exactly
10 what chemical equivalent CFT 1100 is; correct?

11 A. It would, I believe, provide the knowledge of
12 what that tracer was.

13 Q. And you understand, sir, do you not, that in
14 this lawsuit that none of the Plaintiffs are any of
15 ProTechnics or Core Laboratories' competitors; correct?

16 A. I understand that that's a possibility.
17 That's a probability.

18 Q. And as part of the testing for the chemical
19 frac tracers, does Core Laboratories/ProTechnics use
20 sodium iodine in the process of identifying the
21 particular salts that are used?

22 MR. ARNOLD: I'm just going to -- I'm going
23 to lodge an objection.

24 I'm not sure whether the witness is
25 hesitating because of the propriety, confidential, and

1 trade secret nature of it.

2 THE WITNESS: Well, whether it's true or not,
3 I don't want to give any -- I would rather -- when it
4 comes to public knowledge about what we do, whether
5 that's true or not, I would rather people guess than
6 for me to eliminate what we do or not.

7 Our trade secrets, what we do, are not
8 something -- you're going in a direction that's
9 starting to narrow down. If I say -- tell you that we
10 don't use that, that's something that a competitor can
11 use. I don't want to provide any information that
12 would provide any competitive advantage.

13 MR. ARNOLD: And, Your Honor, to the extent
14 they're talking about the protective order, she's been
15 going on and on and on this afternoon for, I think,
16 three hours now about these issues in public open
17 court. And so she's not undertaking the protections
18 that we would need.

19 THE COURT: Well --

20 MR. ARNOLD: So this is just sort of more and
21 more --

22 THE COURT: I don't think we've entered that
23 protected area -- or what Mr. Flecker would consider a
24 protected area yet. But we're there. I think I better
25 make a ruling on that before you go any further on what

1 you're going to -- what specific questions you're going
2 to ask him about the composition of these. And I'm not
3 sure I'm prepared to make that ruling now. So I would
4 rather finish up whatever we're doing here today.

5 MS. SMITH: Right. My understanding -- and
6 maybe I can ask it this way, Your Honor.

7 BY MS. SMITH:

8 Q. Sir, my understanding is that if I ask you
9 specifically about the process as to how ProTechnics or
10 Core Laboratories test for the chemical frac tracers
11 that it utilized up at the Yeager site, you would not
12 answer that question and claim a trade secret or it be
13 proprietary; correct?

14 A. That is absolutely correct.

15 Q. Okay.

16 THE COURT: Okay.

17 BY MS. SMITH:

18 Q. And am I correct, sir, that Core Laboratories
19 and ProTechnics have in its possession MSDS sheets for
20 each one of the chemical frac tracers?

21 A. That would be correct.

22 Q. And in those MSDS sheets, would it tell me
23 any more information other than list that it's
24 proprietary in terms of what CFT 1100 is as a chemical?

25 A. I think that we may state -- I know we have

1 before -- that they're sodium salts. That's the only
2 thing, I think, that we've documented on the CFTs in
3 the past.

4 Q. With regard to the CFTs that were utilized up
5 at the Yeager site, did ProTechnics or Core
6 Laboratories ever tell Range Resources the chemical
7 equivalent of CFT 1100? 1200? 1900? Any of the CFTs
8 that were used?

9 A. I can tell you that we've never told any
10 client. That's trade secrets.

11 Q. Did Range Resources ever ask, whether
12 verbally or in writing, from ProTechnics to give that
13 information to them?

14 A. No.

15 Q. In this lawsuit, in and of itself, did Range
16 Resources ever contact ProTechnics or Core Laboratories
17 telling them that they were under court order to obtain
18 all of the chemicals and all of the products that were
19 utilized up at the Yeager site, including these CFTs,
20 so that that information could be released to them?

21 MR. ARNOLD: Your Honor, I'm going to object.
22 This doesn't have anything to do with the
23 motion to compel. Again. Nothing.

24 MS. SMITH: Your Honor, if they provided that
25 information to Range Resources, Range Resources was

1 under court order to get it.

2 If he says that they never asked for that or
3 they never gave them that information, then they're it
4 in terms of getting the information. That is the only
5 source. And so that's what this is trying to identify
6 for Your Honor.

7 THE COURT: Let's move on.

8 MS. SMITH: Okay. Can he answer just that
9 question? If Range --

10 THE COURT: No. Because what's it going
11 to -- I mean, Range is not -- I mean, they're a party
12 to this, but they're not here today.

13 MS. SMITH: I was just asking if they, either
14 in writing or verbally, ever asked -- pursuant to that
15 court order, ever asked them for the information.
16 Wrote them a letter? Said, hey, can you give us this
17 information?

18 Whether they said no or yes, did they ever do
19 that?

20 THE COURT: Okay. You can answer, if you
21 know.

22 MR. ARNOLD: If he knows personally.

23 THE COURT: Yeah. If you know personally.

24 THE WITNESS: I don't know.

25

1 BY MS. SMITH:

2 Q. With regard to Core Laboratories and
3 ProTechnics' work up at the Yeager site, you indicated
4 that with the particular MSDS sheets at the time in
5 2009, that those were given to Range Resources;
6 correct?

7 A. That is our normal practice.

8 Q. Okay. And under your license with the
9 Pennsylvania DEP, did Core Laboratories ever provide to
10 the DEP the MSDS sheets as well, so the Pennsylvania
11 DEP knew what ProTechnics was using?

12 A. With regard to the 7H?

13 Q. Yes.

14 A. I would doubt that.

15 Q. That wasn't the normal course for you-all to
16 give it to the Pennsylvania DEP, even though you had a
17 license with them to use radioactive tracers?

18 A. That would be news to me. I'm not -- I can't
19 really say. I wouldn't expect it, but I don't know.

20 I'm making assumptions. I don't know.

21 Q. I'm going to hand you what's being marked as
22 Exhibit 10.

23 (Plaintiffs' Exhibit 10 was marked for
24 identification.)

25 MS. SMITH: May I approach, Your Honor?

1 THE COURT: You may.

2 BY MS. SMITH:

3 Q. Sir, do you recognize this document?

4 A. No, I do not.

5 Q. Have you ever seen it before?

6 A. I don't know.

7 Q. Do notices of violation go to your
8 department, or do they go to a different department
9 within Core Laboratories/ProTechnics?

10 MR. ARNOLD: Your Honor, I'm going to object
11 to this line of inquiry.

12 The document on its face mentions something
13 occurring in McKean County, Pennsylvania.

14 MS. SMITH: That was where something was
15 transported to. Not where the actual waste came from.

16 THE COURT: Well, do we know where the actual
17 waste came from?

18 MS. SMITH: I'm sorry?

19 MR. ARNOLD: Your Honor, she stated on the
20 record earlier she had no evidence connecting any of
21 this to the Yeager site.

22 MS. SMITH: And I said as part of that, Your
23 Honor, that I would present these documents to him to
24 ask the simple question, with regard to this notice of
25 violation, do you know whether or not this notice of

1 violation issued in 2010 had to do with the Yeager
2 site?

3 THE WITNESS: I know it did not.

4 BY MS. SMITH:

5 Q. How do you know it did not?

6 A. Because I know there were no violations
7 associated with the 7H.

8 MR. ARNOLD: Again, Your Honor --

9 THE COURT: Okay. Well, no. He's answered
10 the question.

11 MS. SMITH: Okay.

12 THE COURT: Let's move on.

13 MS. SMITH: Okay.

14 BY MS. SMITH:

15 Q. I'm going to hand you what's being marked as
16 Exhibit 11.

17 (Plaintiffs' Exhibit 11 was marked for
18 identification.)

19 MS. SMITH: May I approach, Your Honor?

20 THE COURT: You may.

21 BY MS. SMITH:

22 Q. Do you recognize this document, sir?

23 A. No.

24 Q. With regard to this notice of violation
25 issued in 2013, does this notice of violation have to

1 do with the Yeager site?

2 A. No.

3 Q. And if we look back just for a minute to
4 Exhibit 10, on the second page, it indicates in the
5 first paragraph at the top of the page, it says, "Be
6 advised that this is a repeat violation since
7 ProTechnics was previously cited in a notice of
8 violation dated January 29, 2010."

9 Do you know if the January 28, 2010, notice
10 of violation had to do with the Yeager site?

11 A. I know it did not.

12 Q. And, sir, are you aware of whether or not
13 Range Resources ever identified ProTechnics or Core
14 Laboratories products to the DEP as ones being used at
15 the Yeager site?

16 A. I'm not aware.

17 Q. With regard to the use of the radioactive
18 tracers per the license or permit held by
19 ProTechnics/Core Laboratories with the Pennsylvania
20 DEP, would the Pennsylvania DEP have been aware through
21 that license or permit that ProTechnics or Core
22 Laboratories was utilizing radioactive material at the
23 Yeager site?

24 A. I missed the first part of your question.
25 I'm sorry.

1 Q. Sure. So what I'm asking, sir, you indicated
2 that there was a state license. We went over the
3 Nuclear Regulatory Commission license, and you said
4 that wasn't the applicable one. There was a state one
5 for Pennsylvania for the use of the radioactive tracers
6 at the Yeager site; correct?

7 A. Yeah. I said it was either reciprocity from
8 another state or Pennsylvania. I didn't know which
9 one.

10 Q. Okay. But either way, there was some license
11 or permit; correct?

12 A. We always operate with a license, correct.

13 Q. Okay. And so by virtue of that license, that
14 would have been specific to the Yeager site; correct?

15 A. No.

16 Q. So it just would have been a general one?

17 A. Correct.

18 Q. And under that licensure, would you have
19 to -- would ProTechnics/Core Laboratories have to have
20 notified the Pennsylvania DEP of ProTechnics/Core
21 Laboratories' use of radioactive tracers at the Yeager
22 site specifically?

23 A. I do not know.

24 MR. ARNOLD: Your Honor, again, I object.
25 This is more and more of the same. We're going over

1 and over this. She is asking questions that go way
2 beyond what is at issue in the motion to compel.

3 THE COURT: The witness is prepared to
4 answer, and he may.

5 THE WITNESS: Yeah, I think that, again,
6 because I don't have a recollection of the date of how
7 we were operating. Whether it was reciprocity or not.
8 If it was reciprocity, we would have to notify the
9 state. If it was a state license of Pennsylvania, then
10 we don't have to notify.

11 THE COURT: You can do it anywhere in the
12 state?

13 THE WITNESS: Correct.

14 MS. SMITH: Okay.

15 THE WITNESS: And that's my understanding.

16 THE COURT: Okay.

17 MS. SMITH: May I approach, Your Honor?

18 THE COURT: You may.

19 BY MS. SMITH:

20 Q. I'm handing you what's being marked as
21 Exhibit 12.

22 (Plaintiffs' Exhibit 12 was marked for
23 identification.)

24 BY MS. SMITH:

25 Q. Sir, do you recognize this document at all?

1 A. No.

2 Q. Okay. With regard to it, as it suggests,
3 it's a Preparedness Prevention and Contingency Plan --
4 PPC -- for Washington County, filed by Range Resources
5 with the Pennsylvania DEP.

6 If you look to the very back of the document,
7 under Appendix F, it starts at the Bates No. RRA-LK
8 002966.

9 A. Appendix F. I see that.

10 MR. ARNOLD: Your Honor, I'm going to object.

11 MS. SMITH: I didn't even get a question out.

12 MR. ARNOLD: He's indicating he has no -- we
13 had no knowledge of this document. It's a Range
14 Resources document. And it just doesn't have anything
15 to do with the issues.

16 THE COURT: Well, I'll listen to the
17 question.

18 BY MS. SMITH:

19 Q. With regard to this list of materials that
20 were used at the Yeager site, could you look at it and
21 tell me if there are any ProTechnics/Core Laboratories
22 radioactive tracers or chemical frac tracers listed by
23 CFT 1100 or Ir-192 in this list?

24 MR. ARNOLD: Your Honor, there's a complete
25 lack of foundation for that question.

1 THE COURT: The objection is sustained.

2 For one, we would be here for the rest of the
3 evening.

4 For two, this is not his document, and he
5 doesn't know anything about it. He just said he
6 didn't.

7 And for three, what you're doing is, once
8 again, deposing the witness. And that's not what he's
9 here for.

10 MS. SMITH: Your Honor, for purposes of the
11 relevancy of this, this is the list that's provided by
12 Range Resources to the DEP about all of the products
13 that were used at the Yeager site. I have reviewed
14 this, and there is no listing of any ProTechnics'
15 documents.

16 And so what I was asking him to do was to
17 just look at that list to make sure that I'm right.
18 That I'm not reading this wrong in some way to say
19 that, no, it is in here. That's why I was asking him.

20 THE COURT: Okay.

21 MR. ARNOLD: It's not a proper purpose for
22 the question at this hearing today, Your Honor.

23 THE COURT: Sustained. I agree.

24 MS. SMITH: Okay. That's all I have, Your
25 Honor. Thank you.

1 THE COURT: Mr. Arnold, do you have any other
2 questions?

3 MR. ARNOLD: Your Honor, I do not have any
4 redirect.

5 THE COURT: Okay. Mr. Flecker, you may step
6 down.

7 THE WITNESS: Thank you, Your Honor.

8 THE COURT: Did you have another witness?

9 MR. ARNOLD: ProTechnics does not, Your
10 Honor.

11 THE COURT: Okay. I don't suppose you --

12 MS. SMITH: Nothing further, Your Honor.

13 THE COURT: Okay. I'll review all this and
14 enter an appropriate order. I think I understand the
15 issues.

16 Court's in recess.

17 MS. SMITH: Thank you, Your Honor.

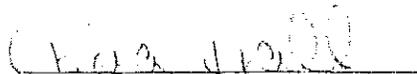
18 MR. ARNOLD: Thank you, Your Honor.

19 (Whereupon, the above-entitled matter was
20 concluded.)
21
22
23
24
25

C E R T I F I C A T E

- - - - -

I hereby certify that the proceedings and evidence are contained fully and accurately in the stenographic notes taken by me of the hearing of the above-cause, and that this is a correct transcript of the same.



Resa Hall

Court Reporter

The foregoing record of the hearing of the above-cause is hereby directed to be filed.

/s/ William R. Nalitz , S.J.

WILLIAM R. NALITZ,

SENIOR JUDGE



Core Laboratories

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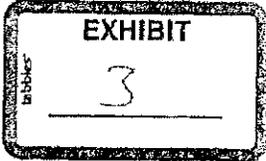
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ProTechnics' global reach spans over more than 21 countries and we are growing every day. ProTechnics not only has the global reach, but the technology and expertise to provide exceptional service to engineers in virtually every major producing basin of the world.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the matter of:

ProTechnics Division of Core Laboratories L.P. : Violations of the Radiation Protection Act of
[REDACTED] : July 10, 1984, P.L. 688, No. 147, 35 P.S. §
: 7110.101 *et seq.*, and 25 Pa. Code § 217 *et seq.*
: License No. [REDACTED]

CONSENT ORDER AND AGREEMENT

This Consent Order and Agreement (COA) is entered into this 2nd day of November, 2010, by and between the Commonwealth of Pennsylvania, Department of Environmental Protection (the "Department"), and ProTechnics Division of Core Laboratories LP ("ProTechnics"), aka ProTechnics, a Core Laboratories Company ("ProTechnics").

Findings

The Department has found and determined the following findings which ProTechnics agrees are true and correct.

- A. The Department is the agency with the duty and authority to administer and enforce the Radiation Protection Act, Act of July 10, 1984, P.L. 688, No. 147, 35 P.S. § 7110.101 *et seq.* ("The Act") and Section 1917-A of the Administrative Code of 1929, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. § 510-17 ("Administrative Code"); and the rules and regulations promulgated thereunder.
- B. ProTechnics conducts business at [REDACTED] is the [REDACTED] of ProTechnics.
- C. ProTechnics is contracted by well owners and/or well operators ("Well Owner/Operator") to inject radioactive material into gas wells, which are intended to extract natural gas from the Marcellus Shale Formation. The injection is necessary to determine the effectiveness of hydraulic fracturing.
- D. On April 1, 2008, the Department granted the Reciprocity General License [REDACTED] to ProTechnics. License [REDACTED] authorized ProTechnics to conduct radioactive tracer studies within Pennsylvania in accordance with Texas Radioactive Material License Number [REDACTED] expired on April 1, 2009.

- E. On April 20, 2009, the Department granted the renewal of Reciprocity General License [REDACTED]. The license remained in effect until April 30, 2010.
- F. On December 10, 2009, ProTechnics injected [REDACTED] containing [REDACTED] at the [REDACTED] well site in [REDACTED]. Following ProTechnics' departure from the [REDACTED] a flow back incident occurred, which produced radioactive residual waste. The radioactive residual waste was transported from the site and directed for disposal by a third party.
- G. On December 22, 2009, Modern Landfill notified the Department that a load of waste had alarmed their radiation monitors. The source was identified as [REDACTED] in residual waste from [REDACTED].
- H. On December 30, 2009, ProTechnics attended a meeting with Department representatives and agreed to apply for a Pennsylvania Radioactive Materials License.
- I. On January 26, 2010, ProTechnics submitted an incident report and affirmed their commitment to obtain a Pennsylvania Radioactive Materials License.
- J. On January 28, 2010, the Department issued a Notice of Violation ("NOV") to ProTechnics for failing to adhere to the terms of Texas Radioactive Material License Number [REDACTED] and reciprocity general license [REDACTED].
- K. Pennsylvania Radioactive Materials License [REDACTED] was issued on February 26, 2010 and remains in full effect through February 26, 2020.
- L. [REDACTED] ("Well Owner/Operator") contracted ProTechnics to inject radioactive tracer into a series of wells located along the [REDACTED] in [REDACTED]. The injections occurred between April 17, 2010 and April 23, 2010.
- M. On April 17, 2010, representatives from the Well Owner/Operator and ProTechnics signed a well tracer agreement for [REDACTED]. The agreement described the necessary actions to be taken in the event of a well flow back/ well reversal and authorized the placing of well returns (containing radioactive tracer material) for decay *In Situ* on Site.
- N. ProTechnics conducted a Site survey on April 23, 2010 prior to their departure.
- O. Between the dates of April 23, 2010 and April 27, 2010, licensed radioactive material returned to the surface or flowed back at [REDACTED] ("flow back incident"). Well returns, containing approximately 0.078% of the injected quantity of [REDACTED], were collected onto a tarped area around the well and allowed to evaporate. The tarp was cut into pieces and directed for disposal by a third party.

- P. On May 21, 2010, Rustick, LLC McKean County Landfill ("McKean County Landfill") notified the Department that a load of waste had alarmed their radiation monitors. The source was identified as [REDACTED] in residual waste, including, but not limited to the tarp from the Site.
- Q. On May 24, 2010, the Well Owner/Operator contacted ProTechnics and advised them of the flow back incident at [REDACTED] and subsequent radiation alarm at McKean County Landfill.
- R. On June 1, 2010, the radioactive residual waste was returned to the Site for decay *In Situ*. ProTechnics posted a sign and placed a fence around the area containing the radioactive residual waste.
- S. ProTechnics violated the regulatory requirements under the Act as follows:
1. ProTechnics failed to transfer radioactive material to an authorized entity that was licensed to handle radioactive material, in violation of 25 Pa. Code § 217.1(a).
 2. ProTechnics failed to only use or store licensed material at temporary job sites in Pennsylvania, as required by [REDACTED] and 25 Pa. Code § 217.1(a).
 3. ProTechnics failed to adhere to the Emergency and Operating Procedures included in License [REDACTED] in violation of License [REDACTED] Condition [REDACTED] and 25 Pa. Code § 217.1(a).
 4. ProTechnics failed to submit a report and a signed agreement from the property owner authorizing storage for *Decay In Situ* within 30-days of an uncontrolled well reversal, in violation of License [REDACTED] Condition [REDACTED] and 25 Pa. Code § 217.1(a).
- T. On June 15, 2010, the Department issued an NOV to ProTechnics, for the violations listed in Paragraph S, above.
- U. On July 12, 2010, an administrative enforcement conference was held between ProTechnics and representatives of the Department. ProTechnics provided the [REDACTED] Site Agreement dated April 17, 2010; a draft of proposed changes to the well site agreement; as well as copies of job site survey forms.
- V. On July 13, 2010, ProTechnics submitted a report to the Department, as well as a description of proposed corrective actions.
- W. On July 23, 2010, the Department sent a deficiency letter requesting a 30-day report, which included all items listed in License [REDACTED] Condition [REDACTED].
- X. On July 28, 2010, ProTechnics provided a response letter; a copy of the April 17, 2010 [REDACTED] site agreement and a copy of ProTechnics' guidelines for radioactive tracers during well stimulations.

Y. The violations described in Paragraph S, above constitute unlawful conduct under Section 307 of the Radiation Protection Act, 35 P.S. § 7110.307, a public nuisance under Section 309(a) of the Radiation Protection Act, 35 P.S. § 7110.309(a), and subjects ProTechnics to civil penalty liability under Section 308(e) of the Radiation Protection Act, 35 P.S. § 7110.308(e).

ORDER

After full and complete negotiation of all matters set forth in this COA and upon mutual exchange of the covenants herein, the parties desiring to avoid litigation and intending to be legally bound, it is hereby ORDERED by the Department and AGREED to by ProTechnics as follows:

1. Authority. This COA is an Order of the Department authorized and issued pursuant to Section 308(e) of the Radiation Protection Act, 35 P.S. § 7110.308(e) and Section 1917-A of the Administrative Code, supra. The failure of ProTechnics to comply with any term or condition of this Consent Order and Agreement shall subject ProTechnics to penalties and remedies provided by those statutes for failing to comply with an order of the Department.
2. Findings.
 - a. ProTechnics agrees that the findings in paragraphs A through Y are true and correct and in any matter or proceeding involving ProTechnics and the Department, ProTechnics shall not challenge the accuracy or validity of these findings.
 - b. The parties do not authorize any other persons to use the findings in the COA in any matter or proceeding.
3. Corrective Actions.
 - a. ProTechnics shall provide a copy of the Radioactive Tracer Well Site Agreement in Attachment A to each Well Owner/Operator who contracts ProTechnics to conduct a radioactive tracer study within Pennsylvania.
 - b. ProTechnics and the Well Owner/Operator shall sign and complete a Radioactive Tracer Well Site Agreement for each well that is traced in Pennsylvania. Within five business days of completing the form, ProTechnics shall submit a copy to the Department.
 - c. Prior to tracing each well, ProTechnics shall provide an instructional session to the Well Owner/Operator which includes, but is not limited to general radiation safety principles, as well as procedures for handling flow back incidents and acceptable methods of disposal. ProTechnics shall document that training was provided and provide copies to the Department upon request.

- d. Within 14 days of the execution of this COA, ProTechnics shall submit a license amendment request to the Department to amend License [REDACTED] as follows:
1. ProTechnics shall request that License [REDACTED], Condition [REDACTED] be amended to exclude the term "Property Owner."
 2. ProTechnics shall request that License [REDACTED] be amended to include the submission of the completed Radioactive Tracer Well Site Agreement within five business days of signature and completion.
 3. ProTechnics shall request that License [REDACTED] be amended to include that ProTechnics make arrangements with the Well Owner/Operator to ensure the stabilization of each earthen barrier containing radioactive residual waste for *In Situ* decay within Pennsylvania. ProTechnics shall conduct a minimum of one inspection per year which shall include, but not be limited to an assessment of the integrity of the area, markings, and fencing; the adequacy of stabilization, an indication of any maintenance that may be required; and documentation that the inspection was completed.
 4. ProTechnics shall request that License [REDACTED] Condition [REDACTED] be amended to include that ProTechnics will provide notification to the Department in accordance with Paragraph 10 of this COA.
 5. ProTechnics shall request that License [REDACTED] be amended to include that ProTechnics will immediately notify the Department upon confirmation that licensed radioactive material is contained within flow back/well returns.
- e. In the event of a flow back incident, ProTechnics shall contain the well reversals containing licensed radioactive material to the on site earthen barrier, in accordance with Section 7 of the Emergency and Operating Procedures included in License [REDACTED] Condition [REDACTED]
- f. Upon confirmation that licensed material has returned to the surface, ProTechnics shall immediately notify the Department in accordance with Paragraph 10 of this COA. This shall apply to all well returns / flow back containing licensed radioactive material regardless if it is controlled or uncontrolled and regardless of the quantity of licensed material that reaches the surface.
- g. ProTechnics shall conduct and document a complete survey and sketch of the area surrounding the well returns / flow back containing licensed material in accordance with Section 7.1.4 of the Emergency and Operating Procedures included in License [REDACTED] Condition [REDACTED]. ProTechnics shall provide copies of the completed survey form to the Department upon request.

h. ProTechnics shall submit a report, which summarizes the events that caused licensed radioactive material to flow back and all actions taken following the incident. The report shall be in accordance with the terms of License [REDACTED], Condition [REDACTED] and shall be submitted within 30 days of the flow back of licensed material.

4. **Civil Penalty Settlement.** Upon signing this COA, ProTechnics shall pay the civil penalty of TWENTY NINE THOUSAND DOLLARS (\$29,000.00). Subject to Paragraph 5, below, this payment is in settlement of the Department's claim for civil penalties for the violations set forth in Paragraph 3, herein. The payment shall be by corporate check or the like, made payable in the following manner and to the referenced parties: (a). Payment in the amount of TWENTY NINE THOUSAND DOLLARS (\$29,000.00) to the "Commonwealth of Pennsylvania, Radiation Protection Fund," and sent c/o Ms. Lisa A. Fomey, Compliance Specialist, DEP Southcentral Region, Radiation Protection Program, 909 Elmerton Avenue, Harrisburg, PA 17110-8200.

5. **Stipulated Civil Penalties.**

a. In the event that ProTechnics fails to comply in a timely manner with the provisions of this COA, ProTechnics shall be in violation of this COA and, in addition to other applicable remedies, shall pay a civil penalty in the amount determined under the following schedule:

1. For any documented violation of Paragraph 3, ProTechnics shall pay of civil penalty of FIVE HUNDRED DOLLARS (\$500.00) per day for each violation.

b. Stipulated civil penalty payments shall be payable monthly on or before the fifteenth day of each succeeding month, and shall be forwarded as described in Paragraph 4, above.

c. Any payment under this paragraph shall neither waive the duty of ProTechnics to meet their obligations under this COA, nor preclude the Department from commencing an action to compel ProTechnics with the terms and conditions of this COA. The payment resolves the liability of ProTechnics only for civil penalties arising from the violation of this COA, for which the payment is made.

d. Stipulated civil penalties shall be due automatically and without notice.

6. **Additional Remedies.**

a. In the event that ProTechnics fails to comply with any provision of this COA, the Department may, in addition to the remedies prescribed herein, pursue any remedy available for a violation of an order of the Department, including any action to enforce this COA.

- b. The remedies provided by this paragraph and paragraph 5 are cumulative and the exercise of one does not preclude the exercise of any other. The failure of the Department to pursue any remedy shall not be deemed to be a waiver of that remedy. The payment of a stipulated penalty, however, shall preclude any further assessment of civil penalties for the violation for which the civil penalty is paid.
7. **Reservation of Rights.** The Department reserves the right to require additional measures to achieve compliance with the applicable law. ProTechnics reserves the right to challenge any action which the Department may take to require those measures.
8. **Liability of Operator.** ProTechnics shall be liable for any violations of the COA, including those caused by, contributed to, or allowed by its officers, agents, employees or contractors. ProTechnics also shall be liable for any violation of this COA caused by, contributed to, or allowed by its successors and assigns.
9. **Transfer of Site.** The duties and obligations under this COA shall not be modified, diminished, terminated, or otherwise altered by the transfer of any legal or equitable interest in any Pennsylvania Site, where ProTechnics is contracted to conduct radioactive tracer studies or any part thereof.
10. **Correspondence with the Department.** All correspondence with the Department concerning this COA shall be addressed to:

Ms. Lisa A. Fomey, Compliance Specialist
DEP, Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110-8200
717-705-4898.
lfomey@state.pa.us

And

Mr. John Chipppo, Radiation Protection Program Supervisor
PA DEP Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17105
717-787-2208
jchipppo@state.pa.us

11. **Correspondence with ProTechnics.** All correspondence with ProTechnics shall be addressed to:


ProTechnics, a Division of Core Laboratories, L.P.


And

General Counsel

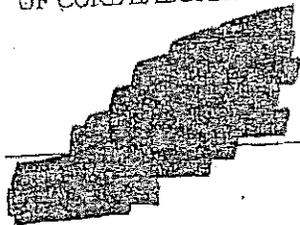

ProTechnics shall notify the Department whenever there is a change in its contact person's name, title or address. Service of any notice or any legal process for any purpose under this COA, including its enforcement, may be made by mailing a copy by first class mail to the above address.

12. **Severability.** The paragraphs of this COA shall be severable and should any part hereof be declared invalid and unenforceable, the remainder shall continue in full force and effect between parties.
13. **Entire Agreement.** This COA shall constitute the entire integrated agreement of the parties. No prior or contemporaneous communications or prior drafts shall be relevant or admissible for purposes of determining the meaning or extent of any provisions herein in any litigation or any other proceeding.
14. **Attorney Fees.** The parties shall bear their representative attorney fees, expenses and other costs in the prosecution or defense of this matter or any related matters, arising prior to the execution of this COA.
15. **Modifications.** No changes, additions, modification or amendments of this COA shall be effective unless they are set out in writing and signed by the parties hereto.
16. **Decisions Under Consent Order.** Any decision which the Department makes under the provisions of this COA shall not be deemed to be a final action of the Department, and shall not be appealable to the Environmental Hearing Board or to any court. Any objection which ProTechnics may have to the decision will be preserved until the Department enforces this COA. At no time, however, may ProTechnics challenge the content or validity of this COA, or challenge the Findings agreed to in this COA.
17. **Titles.** A title used at the beginning of any paragraph of this COA is provided solely for the purposes of identification and shall not be used to interpret that paragraph.
18. **Termination.** The obligations of Paragraphs 1-18 shall terminate when the Department deems that ProTechnics has completed the actions required in Paragraph 3, paid the civil penalty assessed in Paragraph 4, and paid any stipulated penalties due under Paragraph 5, above. Upon the Department's determination that the obligations of Paragraphs 1-19 have been satisfactorily met, the Department shall provide a written statement to conclude this COA.

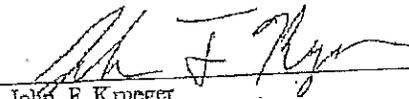
IN WITNESS WHEREOF, the parties have caused the COA to be executed by their duly authorized representatives. The undersigned representatives of ProTechnics certify, under penalty of law, as provided by 18 Pa. C.S. § 4904, that they are authorized to execute this COA on behalf of ProTechnics, that ProTechnics consents to the entry of this COA as an ORDER of the Department, that ProTechnics hereby knowingly waives any right to a hearing under the statutes referenced in this COA, and that ProTechnics knowingly waives their right to appeal this COA and the foregoing Findings, which rights may be available under Section 4 of the Environmental Hearing Board Act, the Act of July 13, 1988, P.L. 530, No. 1988-94, 35 P.S. § 7514; the Administrative Agency Law, 2 Pa. C.S. § 1039a) and Chapters 5A and 7A, or any other provision of law.

FOR PROTECHNICS DIVISION
OF CORE LABORATORIES LP:

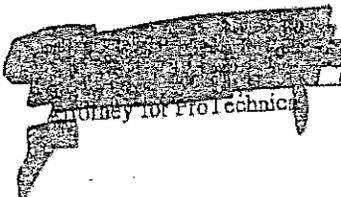
FOR THE COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION:



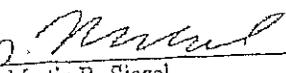
11/1/10
Date


John F. Krueger
Radiation Protection Program

11/2/10
Date


Attorney for ProTechnics

11/1/2010
Date


Martin R. Siegel
Assistant Counsel

11/1/10
Date

Attachment A

RADIOACTIVE TRACER WELL SITE AGREEMENT

By signature below, the parties hereby agree to the requirements set out below for handling well reversal, well returns, or flowback ("Well Returns") containing radioactive tracer material. The Pennsylvania Department of Environmental Protection, Bureau of Radiation Protection ("PA DEP") has approved the placing of Well Returns containing radioactive tracer material in an on-site earthen barrier for decay *in situ* for three years from the date of radioactive tracer material injection. The following steps must be taken when handling Well Returns containing radioactive tracer material.

1. The Well Owner/Operator shall notify ProTechnics [REDACTED] within 24 hours of Well Returns containing any solid materials. ProTechnics shall survey such returns for the presence of radioactive tracer material within 2 business days after notification from the Well Owner/Operator.
2. All Well Returns containing radioactive tracer material shall be diverted to the on-site earthen barrier. If the Well Returns are first diverted to on-site tanks, the tanks must be surveyed prior to removal from the well site. ProTechnics shall survey all equipment, location ground site cover tarps, holding tanks, or anything else that may have come into contact with the Well Returns within 2 days after notification from the Well Owner/Operator and prior to removal from the well site. The Well Owner/Operator shall notify ProTechnics within 24 hours of any such contamination.
3. The earthen barrier will be covered with two feet of stabilized clean soil and stabilized in accordance with 25 Pa. Code § 102.1 *et seq.*, the Site's approved Erosion and Sediment Control Plan, 25 Pa. Code § 78.1 *et seq.*, and the respective Oil and Gas Permit (Oil and Gas Well Permit No. _____).
4. Upon establishment, the earthen barrier shall be identified by GPS coordinates. Access to this area will be restricted by a durable fence.
5. The earthen barrier will be posted with signage: Caution - Radioactive Material - Keep Out - Do Not dig in this area before (Date: _____) - notify ProTechnics [REDACTED] for additional information.
6. This signed agreement between the Well Owner/Operator and ProTechnics for radioactive material decay *in situ* in the earthen barrier will be kept on file by ProTechnics and a copy sent to PA DEP to become incorporated into the ProTechnics' Radioactive Material License for the well location listed below.
7. Both the access control fence and the earthen barrier integrity must be maintained by the Well Owner/Operator for 3 years from the date of tracer material injection or approximately (Date: _____). All associated signage and fences shall be removed within 30 days of the above date.
8. Any failure by the Well Owner / Operator to promptly report solid material Well Returns which contain radioactive materials or to control such radioactive materials onsite may subject both ProTechnics and the Well Owner/Operator to regulatory enforcement by PA DEP.

ProTechnics reserves the right to supervise any necessary decontamination activities should any actions occur that result in the loss of integrity of the earthen barrier.

This agreement will be attached and incorporated into ProTechnics' Radioactive Materials License Number [REDACTED] which is administered by PA DEP, until the date specified in Item #7.

RADIOACTIVE TRACER WELL SITE AGREEMENT (Continued)

Printed Name
Radiation Safety Officer
ProTechnics, Division of Core Laboratories LP

Signature
Radiation Safety Officer
ProTechnics
Division of Core Laboratories LP

Date Signed

Printed Name
Well Owner/ Operator
Representative

Signature
Well Owner/ Operator
Representative

Date Signed

Company Name
Well Owner/Operator

Well Name:

Earthen Barrier / Storage Pit Location
(Approximate GPS Coordinates - Please
Indicate If Not Applicable)

Company Mailing Address
Well Owner/Operator

Attachment B



ProTechnics
A Div. of Core Laboratories LP
[Redacted]
[Redacted]
www.protechnics.com

TRACER WELL SITE AGREEMENT

By signature below, the parties hereby agree to the requirements set out below for handling well returns containing tracer material. The State of Pennsylvania has approved the placing of well returns containing tracer material in an on site earthen barrier for decay in situ. The following steps must be taken when handling well returns containing tracer material.

1. All well returns containing gamma emitting tracer material shall be diverted to the on site earthen barrier.
2. The earthen barrier will be covered with two feet of clean soil.
3. The earthen barrier shall be identified by GPS coordinates. This area will be restricted by the use of a durable barrier.
4. The earthen barrier will posted with signage (Caution - Radioactive Material - Keep Out - Do not dig in this area - notify ProTechnics [Redacted] for additional information.
5. This signed agreement between the Company below and ProTechnics for decay in situ will be kept on file by ProTechnics.
6. Access control of the earthen barrier must be maintained by the well owner/operator until 3 Years. The signs can be removed at this time.

ProTechnics reserves the right to supervise any necessary decontamination activities should any actions occur that result in the loss of integrity of the earthen barrier.

Dated and signed April 17th, 2010

[Redacted Signature]

ProTechnics Division of Core Laboratories LP

[Redacted Signature]

Representative

4/17/10
Date Signed

[Redacted Signature]

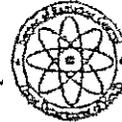
Well Owner/Operator

[Redacted Signature]

Well Name:

Pennsylvania 2/26/2010





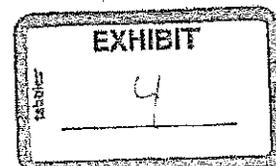
RADIOACTIVE MATERIAL LICENSE

Pursuant to the Texas Radiation Control Act and Texas Health Department regulations on radiation, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Texas Department of Health (Agency) now or hereafter in effect and to any conditions specified below.

LICENSEE		This license is issued in response to a letter	
1. Name	PROTECHNICS DIVISION OF CORE LABORATORIES INC ATTN: WILL C WILLIAMS	Dated: March 3, 2000	
2. Address	1160 DAIRY ASHFORD SUITE 444 HOUSTON TX 77079	Signed by: Larry J. Stephenson	
		3. License Number	Amendment Number
		L03835	37
PREVIOUS AMENDMENTS ARE VOID			
		4. Expiration Date	
		August 31, 2005	

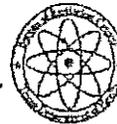
RADIOACTIVE MATERIAL AUTHORIZED			
5. Radioisotope	6. Form of Material	7. Maximum Activity*	8. Authorized Use
A. Any radioactive material with atomic number less than 83 and with a half-life less than 120 days	A. Any (except sealed sources)	A. No single unit quantity to exceed 40 mCi Total activity of any single radioisotope not to exceed 2 Ci.	A. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
B. Ir-192/Ir-194	B. Any (except sealed sources)	B. No single unit quantity to exceed 40 mCi of either isotope Total: 15 Ci	B. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
C. Sc-46	C. Any (except sealed sources)	C. No single unit quantity to exceed 40 mCi Total: 4000 mCi	C. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
D. Sb-124	D. Any (except sealed sources)	D. No single unit quantity to exceed 40 mCi Total: 4000 mCi	D. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
E. Kr-85	E. Any (except sealed sources)	E. No single unit quantity to exceed 20 Ci Total: 40 Ci	E. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
F. Co-60	F. Any (except sealed sources)	F. No single unit quantity to exceed 20 mCi Total: 500 mCi	F. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.

* Ci-Curies mCi-Millicuries μ Ci-Microcuries





Texas Department of Health
BUREAU OF RADIATION CONTROL



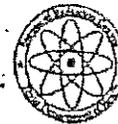
RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

5. Radioisotope (continued)	6. Form of Material (continued)	7. Maximum Activity* (continued)	8. Authorized Use (continued)
G. H-3	G. Any (except sealed sources)	G. No single unit quantity to exceed 20 Ci Total: 300 Ci	G. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
H. C-14	H. Any (except sealed sources)	H. No single unit quantity to exceed 20 mCi Total: 1 Ci	H. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
I. P-32	I. Any (except sealed sources)	I. No single unit quantity to exceed 20 Ci Total: 100 Ci	I. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
I. Cl-36	J. Any (except sealed sources)	J. No single unit quantity to exceed 20 mCi Total: 500 mCi	J. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
K. Fe-55	K. Any (except sealed sources)	K. No single unit quantity to exceed 20 mCi Total: 500 mCi	K. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
L. Co-58	L. Any (except sealed sources)	L. No single unit quantity to exceed 20 mCi Total: 500 Ci	L. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
M. Ni-63	M. Any (except sealed sources)	M. No single unit quantity to exceed 20 mCi Total: 500 mCi	M. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
N. Sr-90	N. Any (except sealed sources)	N. No single unit quantity to exceed 20 mCi Total: 500 mCi	N. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
O. Ir-192, Sb-124, Sc-46	O. Zero Wash* beads	O. No single source to exceed 50 µCi	O. Collar markers in gas and oil wells.



Texas Department of Health
BUREAU OF RADIATION CONTROL



RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

5. Radioisotope (continued)	6. Form of Material (continued)	7. Maximum Activity* (continued)	8. Authorized Use (continued)
P. Co-60	P. Metal Strips	P. No single source to exceed 50 μ Ci	P. Collar markers in gas and oil wells.
Q. Cs-137	Q. Solid	Q. No single source to exceed 50 μ Ci	Q. Collar markers in gas and oil wells.
R. Am-241	R. Sealed source (Gtrn Model AN-HP; GN Model VL-1; BEBIG Model Am.G11)	R. No single source to exceed 250 μ Ci	R. Calibration and stabilization source in Halliburton TSCAN logging tool.
S. Ba-133	S. Sealed source (IPL Model HEG-133)	S. No single source to exceed 2 mCi	S. Calibration/stabilization source in Cedar Bluff Group fluid identification tool.
T. Am-241	T. Sealed source (IPL Model HEG-241)	T. No single source to exceed 250 μ Ci	T. Calibration/stabilization source in Halliburton TSCAN logging tool.

9. The licensee shall comply with the provisions (as amended) of Title 25 Texas Administrative Code (TAC) §289.201, §289.202, §289.203, §289.204, §289.205, §289.252, §289.253 and §289.257.

10. Radioactive material shall only be stored at:

Site Number	Location
004	Kilgore - 2505 Highway 42 North
005	Houston - 1160 Dairy Ashford, Suite 444
006	Alice - 815 Commerce Street
007	Midland - 2001 Commerce Street
008	Houston - 9830 Rosprim

11. The licensee shall limit storage of Ir-192 and Ir-194 to 5000 mCi at all storage locations except the Kilgore, Texas facility which is authorized to maintain no more than 15 Ci of Ir-192 and Ir-194 total. This condition does not supersede the maximum allowable activity as authorized in Part B of Condition 7.

12. The authorized place of use is at temporary sites, in areas not under exclusive Federal jurisdiction, throughout Texas.

13. In addition to the possession limits in Condition 7, the licensee shall further restrict the possession of licensed material to quantities below the limit specified in 25 TAC §289.252(u)(4)(C) for establishing decommissioning financial assurance.

14. Radioactive material shall be used by, or under the direct supervision of, individuals designated by the Radiation Safety Officer (RSO) only after each worker has successfully completed an Agency accepted training course. Documentation verifying the successful completion of the training for each worker shall be maintained by the licensee for inspection by the Agency.



Texas Department of Health
BUREAU OF RADIATION CONTROL



RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

15. The individual designated to perform the functions of RSO for activities covered by this license is Will C. Williams.

16. Radioactive material shall not be stored or used at a permanent site unless that site is specifically authorized on this license. A site is considered permanent if radioactive material is stored and/or used at that location for more than 90 days in any twelve month period.

In accordance with 25 TAC §289.202(o)(1) and §289.202(ddd)(1), the licensee is hereby exempted from limits required in 25 TAC §289.202(ggg)(2) and §289.2029(ggg)(8), when radioactive material is released during a "sandout" or when material must otherwise be reversed out of a gas or oil well. The released material shall be handled and/or disposed in a manner outlined in the procedures submitted with the application dated July 27, 1995, or discarded in the Class II disposal cell for non-hazardous waste.

18. Individuals involved in operations which utilize, during any 24 hour period, more than 50 mCi of I-125 and/or I-131 or unvented laboratory operations involving 10 mCi of I-125 and/or I-131 in a noncontained form shall have bioassays performed within one week or if the use of I-125 and/or I-131 is on a continual basis, bioassays shall be performed once every two weeks. Records of the bioassays shall be maintained for inspection by the Agency and the action points listed below shall be observed.

A. Whenever the thyroid burden at the time of measurement exceeds 0.12 µCi of I-125 or 0.04 µCi of I-131, the following actions shall be taken:

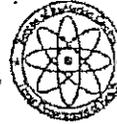
- (1) An investigation of the operations involved, including ventilation surveys shall be carried out to determine the causes of exposure and to evaluate the potential for further exposures.
- (2) If the investigation indicates that further work in the area might result in exposure of a worker to concentrations that are excessive, the licensee shall restrict the worker from further exposure until the source of exposure is discovered and corrected.
- (3) Corrective actions that will eliminate or lower the potential for further exposures shall be implemented.
- (4) A repeat bioassay shall be taken within 1 week of the previous measurement in order to confirm the effectiveness of the corrective action taken or to verify internal radioiodines present.
- (5) Reports or notification shall be provided as required by 25 TAC §289.202(yy) and §289.202(aaa).

B. If the thyroid burden at any time exceeds 0.5 µCi of I-125 or 0.14 µCi of I-131, the following actions shall be taken:

- (1) Prevent the individual from any further handling of I-125 or I-131 until the thyroid burden is below the above limits.
- (2) Carry out all steps described above.
- (3) As soon as possible, refer the case to appropriate medical consultation for recommendations regarding therapeutic procedures that may be carried out to accelerate removal of radioactive iodine from the body. This should be done within two to three hours after exposure when the time of exposure is known so that any prescribed thyroid blocking agent would be effective.
- (4) Carry out repeated measurements at approximately one week intervals at least until the thyroid burden is less than 0.12 µCi of I-125 or 0.04 µCi of I-131.



Texas Department of Health
BUREAU OF RADIATION CONTROL



AUG 3 1999

RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

19. Individuals involved in operations which utilize, at any one time, more than 100 mCi of tritium in a noncontained form, other than metallic foil, shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations.
20. The licensee is authorized to discard all radioactive material authorized in Conditions 5, 6, 7 and 8 and listed in 25 TAC §289.202(ggg)(7), whose half lives do not exceed 300 days, in a Type I municipal solid waste site in accordance with the provisions of 25 TAC §289.202(fff)(4) and procedures submitted with application dated July 27, 1995.
21. The licensee is hereby exempted from the requirements of 25 TAC §289.253(n)(1)(D) only for users of radioactive material authorized in Part R of Conditions 5, 6, 7 and 8. The licensee shall maintain a separate utilization log containing, as a minimum, the make and model number and/or serial number (or if absent, a unique description) of each sealed source authorized by Part R of Conditions 5, 6, 7 and 8 removed from storage, the identity of the logging supervisor receiving the sources of radiation, the locations where used and dates of use. These utilization logs shall be kept available for inspection by the Agency for five years from the date of the recorded event.
22. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material authorized by this license in accordance with statements, representations, and procedures contained in the following:

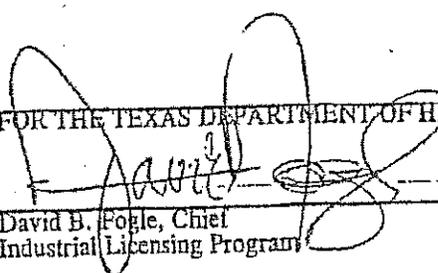
application dated July 27, 1995,
 letters dated September 23, 1995, March 14, 1997, April 28, 1997, June 16, 1997, July 14, 1997,
 January 7, 1998, March 3, 2000, May 23, 2000 and
 letter received September 9, 1998 with attached letter dated November 11, 1994.

Title 25 TAC §289 shall prevail over statements contained in the above documents unless such statements are more restrictive than the regulations.

WPS:da

Date: July 24, 2000

FOR THE TEXAS DEPARTMENT OF HEALTH


 David B. Fogle, Chief
 Industrial Licensing Program

468137

Donald A. Cool

-3-

Remarks:

Region IV Reviewer: Louis C. Carson II, Sr. Health Physicist, DNMS
Region IV Reviewer: Jack E. Whitten, Sr. Materials Analyst, DNMS
Reviewer Code: L83112

Request Needed by: 02/21/03

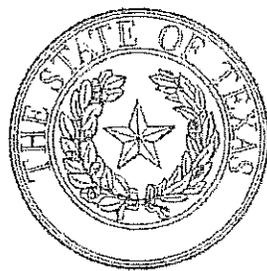
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EWMerschhoff
TPGwynn
KEBrockman
CLCain
JEWhitten, SMA
DACool, NMSS/INMS
JBCarrico, NMSS/INMS/MSIB
SLMerchant, NMSS/INMS/RGB
LCCarsonII
NMLB
FCDB
RIV Nuclear Materials File - 5th Floor

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LCCarsonII <i>ALC</i>	CLCain <i>ALC</i>	JEWhitten <i>ALC</i>	KEBrockman <i>ALC</i>
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**INCIDENT AND COMPLAINT SUMMARIES
FOR THE**

FOURTH QUARTER 2010*

Prepared by:
Art Tucker, Ray Jisha, Annie Backhaus, Chris Moore, Karen Blanchard

Texas Department of State Health Services
Regulatory Services Division
Inspections Unit
Radiation Branch

* Any complaint and/or incidents involving hospitals on or after August 30, 1999 are not releasable under the Texas Public Information Act & the Health and Safety Code Chapter 241.051(d). These summaries will not appear in this report.

**Incident and Complaint Summaries
4th Quarter 2010**

Table of Contents

Incidents Opened in Fourth Quarter 2010	3
Incidents Opened in a Previous Quarter and Closed Fourth Quarter 2010	9
Complaints Opened in Fourth Quarter 2010	15
Complaints Opened in a Previous Quarter and Closed Fourth Quarter 2010	22

Incidents Opened Fourth Quarter 2010

I - 8790 - Medical Event - Baylor Radiosurgery Center - Dallas, Texas

* Health and Safety Code Chapter 241.051(d)

No violations were cited.

File closed.

I - 8791 - Regulatory Violation - Nyla C. Gordon, D.D.S - Brownsville, Texas

On October 7, 2010, the Agency received notice from its remote inspection group that a registrant may have fraudulently prepared documents that were submitted to the Agency for an equipment performance evaluation (EPE) on a dental x-ray unit. An investigation of the service provider who performed the EPE was conducted by the Agency on November 5, 2010. An on-site investigation of the dental office was conducted by the Agency on November 16, 2010. Dates on the EPE documents appeared to have been altered to bring the dental office in compliance with Agency regulations. The dental office stated the changes had been made because the service provider wrote the wrong date on the forms. The investigation could not confirm that the documents had been fraudulently prepared. However, the service provider was cited one violation for failing to maintain records of calibration of radiation detection equipment for inspections.

File closed.

I - 8793 - Transportation Violation - Parhandle Nuclear Rx - Amarillo, Texas

On October 1, 2010, the Agency was notified that the receipt survey of a package received at a Texas hospital exceeded the limits for removable contamination on the external surface. The package had been shipped to the hospital by a nuclear pharmacy licensed by the State of Texas. An on-site investigation was conducted by the Agency on October 7, 2010. The investigation revealed that the nuclear pharmacy technician had packaged and surveyed a shipment of single units for shipment to the hospital and then he drew a bulk sample from a molybdenum generator for the pharmacist. He inadvertently contaminated his left glove while drawing the sample. The technician then picked up the package and transported it to the hospital while still wearing the same gloves he had worn to obtain the bulk sample. This resulted in contamination of the package. The technician waited at the hospital until the package receipt survey was completed. The hospital identified the contamination during the receipt survey and advised the technician. The technician returned to his facility and performed a contamination survey and found his left hand contaminated. He washed his hands and the contamination level of his left hand was significantly reduced, but still above free release limits. The technician's hand was placed in a glove until the radioactive material decayed to less than detectible levels later that same day. A small amount of contamination was found on the steering wheel of the delivery vehicle when surveyed by the licensee; it was decontaminated. The technician's finger ring dosimeter was sent off for processing and the results were 1,538 millirem to his right hand and 1,843 millirem to his left hand. The licensee retrained the technician in contamination control and the proper procedures for handling radioactive material including leaving an area after handling radioactive material. The licensee was cited for the contamination event.

File closed.

Incidents Opened Fourth Quarter 2010

I - 8794 - Gauge Shutter Failure - International Paper Company - Queen City, Texas

On October 21, 2010, the Agency received a "Notice of Reciprocity" from an out-of-state licensee. The notice stated that the out-of-state licensee was replacing two "stuck shutters" for one of the Agency's licensees. The Agency contacted its licensee. The licensee stated that one shutter had failed in the closed position on October 20, 2010. The licensee stated the second shutter scheduled to be repaired had not failed, but it was found to be difficult to operate and the licensee opted to have it replaced along with the shutter that did fail. Repairs were made to the shutters on October 22, 2010. The licensee provided additional training for staff on the performance of routine gauge inspections and shutter checks as corrective action. No violations were cited.

File closed.

I - 8795 - Gauge Shutter Failure - Ticona Polymers, Inc. - Bishop, Texas

On October 25, 2010, the licensee was locking one of its fixed gauges out of service when it discovered that the gauge shutter was stuck in a partially open position. The gauge was an Ohmart Vega model SH-F2-45 gauge containing 0.06 curies of cesium (Cs) - 137. The licensee reported that there was no risk of additional exposures to any personnel. A service provider repaired the gauge shutter on October 26, 2010. The service provider stated that the cause for the failure was excessive build up of bird droppings on the shutter operating mechanism which clogged the mechanism. The licensee stated that they were working with the manufacturer to determine an appropriate action to prevent a recurrence of the problem. No violations were cited.

File closed.

I - 8796 - Transportation Event - FedEx Express - El Paso, Texas

On November 9, 2010, the Agency received a notification from the Radiation Safety Officer (RSO) for a shipper of radioactive materials. The RSO stated that a package received at a nuclear pharmacy in El Paso (Licensee-A) had been crushed during delivery and contamination was found inside the package. The package was originally delivered to another Texas licensee (Licensee-B) on November 6, 2010. According to the courier, the outer package did not appear damaged when it was delivered to Licensee-B. The Type A package contained two indium (In) - 111 vials with a total activity of 10.63 millicuries at the time of shipment on November 5, 2010. During transit, the package had been crushed and one of the vials of In-111 broke inside its thin-walled lead pig. Upon receipt by Licensee-B, a removable contamination survey of the outside of the package was performed and no removable contamination was detected. The package was rejected by Licensee-B and returned to Licensee-A. The transport vehicle was surveyed for removable contamination, but none was detected. No violations were cited.

File closed.

Incidents Opened Fourth Quarter 2010

I - 8797 - Radioactive Material Identified At Landfill - Christus Santa Rosa Hospital, San Antonio, Texas.

* Health and Safety Code Chapter 241.051(d)

No violations were cited.

File closed.

I - 8798 - Radiography Source Disconnect - Team Industrial Services - Alvin, Texas

On November 22, 2010, the Agency received notice from the licensee that it had experienced a radiography source disconnect on November 21, 2010. The equipment was reportedly inspected prior to use and passed all checks including tolerance testing of the connector mechanism on the drive cable. On the 25th exposure, after two and a half hours of work, the drive cable and source assembly failed to retract into the camera. Multiple attempts to retract the source were unsuccessful as evidenced by mechanical indications and radiation surveys. Barriers were established at a 2 mR/hr dose rate, shielding was stacked on the source, and an individual authorized for source retrieval was contacted. The source was retrieved. No exposure limits were exceeded during the event. The radiography camera, guide tube, and cranking device were sent to the manufacturer for inspection, but no cause was determined for the failure. No violations were cited.

File closed.

I-8799 - Source Abandoned Down Hole - Schlumberger Technology Corporation, Sugarland, Texas - Garza County

On November 22, 2010, the Agency was notified of an irretrievable well logging source that had been abandoned downhole at a site in Garza County. Fishing efforts for the source had commenced when the tool string broke leaving one 1.7 curie cesium (Cs) -137 source in the clay formation while another source was safely recovered. The source was abandoned in accordance with Railroad Commission rules. The well was plugged with 200' of red dyed cement to 3,620' topped with an upside down drill bit as a deflection device. The required warning plaque was ordered by the licensee and will be placed at the well head. No violations were cited.

File closed

Incidents Opened Fourth Quarter 2010

I - 8800 - Transportation Event - Protechnics Division of Core Lab - La Salle County, Texas

On November 26, 2010, the Agency was notified that a well-logging truck had been involved in a traffic accident which resulted in the death of the driver. The radioactive material onboard the vehicle included 240 millicuries of Iridium (Ir) - 192, 160 millicuries of scandium (Sc) - 46, and 320 millicuries of antimony (Sb) - 124, stored in DOT Type A containers inside an overpack. The overpack was thrown from the vehicle and the lid opened up several inches. U.S. Border Patrol personnel who responded to the accident performed an initial survey and determined there was no radiation hazard. The licensee responded and verified there had been no release of radioactive material. The licensee transported the material to their licensed facility in Alice, TX. It was determined there had been no threat to public health as a result of the incident. No violations were cited.

File closed.

I - 8801 - Damaged Device Containing Radioactive Material - Bed Bath and Beyond - Austin, Texas

On November 19, 2010, the Agency was contacted by a contractor licensee from California requesting reciprocity to work at a store in Austin to remove and dispose of a tritium exit sign (TES). The store was contacted by the Agency and questioned about the work involving the TES. The store manager stated that the exit sign was mounted on a pole coming down from the ceiling. An employee was working on the top of a storage rack in the area of the sign and knocked it loose from the pole and it fell to the floor. The employee picked the sign up, placed it into plastic bags, took the sign to a storage locker, and locked the door. A contractor was contracted to clean up any contamination and dispose of the sign. The contractor stated that two tubes had broken in the sign. It was estimated that a maximum of 1.5 - 2.0 curies of tritium would have been released. The contractor prepared the sign for shipment and disposal. The contractor surveyed appropriate areas of the store and the highest removable tritium contamination levels found were 214 dpm/100 cm². Bioassay samples were collected from the two store employees involved in the event. Both samples indicated that the committed exposure was less than 1 millirem. The personnel received additional training on the proper handling of TES and a company wide inventory of TES was conducted. No discrepancies were reported. No violations were cited.

Filed close.

I - 8802 - Patient Treatment Error - Oncology Hematology Consultants PA dba Center for Cancer and Blood Disorders - Fort Worth, TX

On December 16, 2010, the Agency was informed by the registrant's Radiation Safety Officer (RSO) that the registrant had inadvertently failed to administer treatment to an intended area. While the disease had been noted on both sides of a specific region in the patient, only one side was treated. The error was caught on a routine follow-up visit and the patient was informed at that time. Although there was no evidence of recurrence, the physician decided to complete treatment of the other side as originally intended. The RSO had all staff review responsibilities for identifying the correct area to be treated for external beam therapy. No violations were cited.

File closed.

Incidents Opened Fourth Quarter 2010

I- 8803 - Equipment Malfunction - H & H X-Ray Services Inc - Flint, Texas

On December 17, 2010, the Agency was notified by the licensee that on December 10, 2010, the locking device on a QSA model 880 camera containing 97 curies of iridium (Ir) - 192 failed to activate. The radiography crew (Crew-A) had completed operations on one location at a site near Lufkin, Texas, and was moving to a new location at the same site. The radiography camera with the cranking device and guide tube still attached were placed in the dark room of the radiographers' truck. The licensee stated that a survey was conducted to verify the source was in the fully-shielded, locked position. As the radiographer was driving to the new location, he passed about 5 feet from another group of radiographers (Crew-B) from the same licensee. As Crew-A passed by Crew-B, Crew-B's alarming dosimeters alarmed. Crew-B stopped Crew-A and told them that their alarms had gone off. Crew-A went to the camera, picked up the crank for the camera, and found that the source had moved from the locked position approximately one quarter of a turn. The radiographer cranked the source back to the fully-shielded position and secured the camera for transportation. The Agency conducted an on-site investigation at the licensee's facility. The investigation determined that the locking device operated for the six days between the event and the day the Radiation Safety Officer for the licensee was informed of the event. The licensee tested the camera and found the locking device to be operating properly. The locking device was dismantled and all parts were found to be in good working order. It was determined that the radiographers had not properly retracted the source to the locked position. The radiographer's dosimetry was processed and neither had exceeded a dose limit. The radiographers were released from their employment with the licensee. The radiographer was cited for four violations.

File closed.

I- 8804 - Missing Equipment Containing Radioactive Material - Lockheed Martin Aeronautics Company - Fort Worth, Texas

On December 22, 2010, the Agency received a written report from the company stating that they could not locate 84 tritium exit signs containing an estimated total of less than 630 curies of tritium. The signs had been boxed in preparation for return shipping to the manufacturer in February 2010, but were being held until they could be repackaged to conform with the manufacturer's packaging requirements. In November 2010 the company decided to repackage and ship the signs but they could not locate them. The company searched its facility and investigated all potential routes by which the signs could have left the premises. During the investigation, the manufacturers/distributors of the signs were contacted by the company for assistance in determining the serial numbers of signs supplied to their facility. Serial numbers were available for only 17 of the signs. It was discovered that there were 23 additional signs that were unaccounted for, thereby raising the total number of missing signs to 107. The current (decay-corrected) total activity of those signs is approximately 625 curies. The company had an evaluation conducted that considered the most likely scenarios—incineration by its hazardous waste disposal vendor, burial in the municipal landfill, or the signs are still on the company's premises. According to the evaluation, no dose exceeding regulatory limits to any member of the public would result from any of these scenarios. The company determined the cause of the incident was lack of communication and handling the signs outside of their normal hazardous waste procedures. The company stated that in the future all hazardous items will be processed through their existing hazardous waste management system with no exceptions. It will notify this Agency if the signs are located. No violations were cited.

File closed.

Incidents Opened Fourth Quarter 2010

I - 8805 - Badge Overexposure - Midwest Inspection Services - Perryton, Texas

On December 28, 2010, the Agency was notified that a radiographer working for the licensee had exceeded an annual exposure limit. The licensee's Radiation Safety Officer (RSO) stated that the exposure was to the badge only. The RSO stated that he had interviewed the radiographer involved. The radiographer stated that he had dropped his badge while conducting radiography at a location and completed an examination of between 20 to 25 welds before he observed his badge on the ground. The RSO stated that the average exposure to the radiographer in the previous 6 months was 343 millirem and that his work load had not significantly changed. The licensee has assigned a dose to the radiographer of 343 millirem. The RSO stated that the radiographer received additional training on the proper location and method of wearing his dosimetry. The RSO stated that the event was discussed with all company radiographers. No violations were cited.

File closed.

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

I - 8749 - Possible Abandoned Radioactive Material - Site Concrete Incorporated - Grand Prairie, Texas

On May 25, 2010, an Agency inspector informed the central office that she had gone to a licensee's facility to perform a routine inspection on May 21, 2010, and found the door locked. The inspector left a note on the door requesting that the licensee contact her to set up a time for the inspection. The inspector returned to the address on May 25, 2010, and found the door was locked, but saw people inside and knocked on the door. She asked for the licensee's Radiation Safety Officer (RSO) and was told that the company she was looking for was no longer at that location. A new company had purchased the facilities in January 2010 and no one could provide any additional contact information for the licensee. A search of the licensee's file revealed a letter from the Agency's licensing program to the licensee, dated June 6, 2009, which outlined the steps necessary to terminate the license. No additional information on the disposition of the gauges was contained in the license file. The licensee had been in possession of two Troxler moisture/density gauges, 3400 model series, each containing 40 millicuries of americium (Am) - 241 and 8 millicuries of cesium (Cs) - 137. Three service providers were contacted to see if they had any records regarding the licensee's gauges. One of the companies had serviced the gauges, but they did not have any information on them after June 2006. Contact information for a previous RSO for the licensee was located and the RSO was contacted by the Agency. The RSO stated that he had left the company in May 2007. He stated that just before he left the company, the new RSO stated that the licensee was going to sell the gauges and terminate their license. The previous RSO could not provide any additional information about the gauges or contact information for any of the individuals he had worked with while serving as the RSO. An e-mail was sent to all Agency radioactive materials inspectors notifying them that the gauges were missing and requesting that they notify the Agency's Incident Investigation Program staff if they discovered any of the gauges during inspections. No violations were cited.

File closed.

I - 8753 - Gauge Shutter Failure - NRG Texas Power LLC - Jewett, TX

On June 11, 2010, the Agency was notified by the licensee that the shutters on six gauges failed in the open position. Three of the gauges were manufactured by Berthold and each contained 30 millicuries (decay corrected to approximately 17 millicuries) of cesium (Cs) - 137. The other three gauges were manufactured by Ohmart/VEGA and each contained 150 millicuries (decay corrected to approximately 86 millicuries) of Cs - 137. The licensee stated that dose rates taken in the area were normal, since the shutters failed in their normal operating positions. The licensee believes the Ohmart gauges failed because they were located in an area that was exposed to an unspecified amount of limestone powder. The licensee reported that the limestone powder concentrated near the shutter mechanism, and combined with moisture to form cementitious material that subsequently caused the gauge to fail. The licensee stated that it appeared that the Berthold shutters stuck because a "corrosive liquid seeped into the source shield along the metal shaft that operates the on/off mechanism." No violations were cited.

File closed.

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

I - 8762 - Overexposure - IBA Molecular North America - Dallas, Texas

On July 16, 2010, the Agency was notified by the licensee that an employee's personal dosimeter had received 4,153 millirem, resulting in a total of 5,809 millirem deep dose equivalent for the year, exceeding the annual dose limit. The licensee stated that the work load for the month of June 2010 was not significantly greater than the previous months, but that they had problems with their cyclotron and had been purchasing bulk units of fluorine (F) - 18 from two providers. During their investigation, the licensee (Licensee-A) discovered that on June 9, 2010, a package of F-18 from another licensee (Licensee-B) had been damaged during shipment. Licensee-A stated that the package was transferred from Licensee-B's transport vehicle to Licensee-A's transport vehicle in Centerville, Texas. No surveys were performed and no shipping papers were obtained by Licensee-A during the transfer. When the package arrived at Licensee-A's facility, the site manager performed an arrival survey. The dose rate at one meter from the package was 47 millirem and the contact reading over-ranged his survey meter. The swipe survey indicated that there was no removable contamination on the package. Licensee-A's site manager stated that when he opened the package to remove the vial of F-18, he found the vial had come out of the shielding and was lying on top of the packaging material. Licensee-A did not report the event to the Agency as required by regulation. The Agency performed on-site investigations at both Licensee-A's and Licensee-B's facilities. During the investigations, both licensees provided conflicting information on the layout of shielding for the vial. It was determined that the package was damaged sometime during the event, but neither licensee could offer an explanation on how the vial separated from the shielding materials. No pictures were taken by the Licensee-A. Through Licensee B's investigation, it was determined that the vial could not separate from the shielding unless the package was opened. Due to the conflicting information from both licensees, the Agency could not determine how the vial separated from the shielding. Licensee-A determined that the overexposure was caused by deficiencies in their procedures for handling bulk vials of F-18, a lack of adequate equipment to handle this type of material, errors in judgment by people handling the bulk vials, and a lack of communication within their company. Corrective actions by Licensee-A included removing the individual receiving the overexposure from any duties involving exposure to additional radiation, no longer receiving bulk F-18 units until new procedures have been put in place, replacing broken vial handling equipment, ordering backup parts, and providing additional training for their personnel. Licensee-A was cited violations for the overexposure, failure to report the transportation event, and failure to obtain shipping papers for the transportation of radioactive materials.

File closed.

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

I - 8765 - Possible Abandoned Radioactive Material - Duncanville Medical Center - Duncanville, Texas

* Health and Safety Code Chapter 241.051(d)

No violations cited.

File closed.

I - 8769 - Damaged Device Containing Radioactive Material - Chevron Phillips Chemical Company - Borger, Texas

On August 5, 2010, the Agency received a report from the licensee's Radiation Safety Officer (RSO) stating that a nuclear gauge had been separated from its anchor. The RSO stated that maintenance activities were being performed in the area. During the maintenance, the concrete floor holding the gauge mounting bracket was removed for repair thereby removing the gauge from its original mounted location. The RSO responded to the location and locked the shutter in the closed position. The gauge was placed in a storage location. Radiation surveys taken around the gauge indicated dose rates were normal. While conducting an investigation of the incident, the RSO determined that two of the workers had been exposed to the direct beam of the source during this event. Interviews with the workers indicated that the workers had been within two feet of the unshielded source for less than thirty seconds. The deep dose equivalent to the two workers were calculated to be 10 and 31 millirem for the event. The licensee was cited for allowing the dose rate to exceed 2 millirem in any one hour in an unrestricted area.

File closed.

I - 8773 - Badge Overexposure - Turner Industries Group - Paris, Texas

On August 17, 2010, the Agency was notified by the licensee that a radiographer's badge read 37,064 millirem for the month of July, 2010. The radiographer was sent to a local medical facility to have his blood tested. The test did not indicate any abnormal exposure to radiation. Samples of the individual's blood were sent to Radiation Emergency Assistance Center/Training Site (REAC/TS.) REAC/TS' evaluation indicated no exposure above background had occurred. The licensee has adjusted the radiographer's exposure to 30 millirem for the exposure period based on his pocket dosimeter readings. The licensee believes the badge may have been exposed by another employee, but could not prove it. The licensee has changed its procedures to require the shift supervisor to issue the badges at the start of each shift. No violations were cited.

File closed

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

1 - 8775 - Badge Overexposure - Texas Gamma Ray - Pasadena, Texas

On August 23, 2010, the Agency was notified by the licensee that two of its radiographers had exceeded an annual exposure limit. An on-site investigation was conducted by the Agency on September 14, 2010. The licensee's Radiation Safety Officer (RSO) stated that the two individuals terminated their employment with the company on July 20, 2010, and had left their badges in the glove compartment of the company truck that had been assigned to them. The truck was used as a work bench for other radiographers next to the location where test weld samples were examined. The RSO stated that the radiographer trainer had been injured early in the month of June, 2010, and had not worked since. The radiography trainee had been reassigned to a different trainer until he left their employment. The RSO calculated the dose the badges would have received in the truck based on the daily use logs for that location. The licensee determined that the most conservative dose the badges could have received was 3,123 millirem. The Agency calculated the dose to be between 2,762 millirem for a fully shielded source and 44,202 millirem for an unshielded source. The licensee assigned a dose of 832 millirem to both individuals for the two exposure periods using one twelfth of the annual limit per period. A violation for failure to process individual monitoring devices within 14 days after the exchange date was cited.

File closed.

1 - 8778 - Gauge Shutter Failure - Cryovac Inc. - Iowa Park, Texas

On September 3, 2010, the Agency was notified by the licensee that on September 2, 2010, the shutter on a nuclear gauge failed to fully open during a routine maintenance check. The gauge contains a 150 millicurie americium (Am) - 241 source. The gauge shutter was locked closed. The gauge was removed from the vessel and placed in storage. The dose rate measured at three feet from the gauge was 0.4 millirem/hour and the dose rate at 6 inches from the gauge was measured at 11.8 millirem/hour. The manufacturer was contacted and on September 3, 2010, repaired the gauge. The manufacturer's technician found the failure was caused by the shutter roller assembly. The technician replaced the shutter roller assembly with an assembly of a different design and the gauge operated properly. No radiation exposure exceeding regulatory limits was received by any individual during this event. No violations were cited.

File closed.

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

I - 8782 - Source Leak Test Exceeds Limit - Southwest Research Institute - San Antonio, Texas

On September 7, 2010, the Agency was notified by the licensee that a source leak test had exceeded the limit. The source had been previously checked on July 7, 2010, and found to be leaking, but below the level requiring a report to this Agency. The licensee's Radiation Safety Officer (RSO) requested that it be retested and the results of the second test showed an activity of 0.0106 microcuries. The source was sealed in a plastic bag and the storage area was sealed and properly posted. The licensee stated that they plan to decontaminate the drawer where the source had been stored after providing additional training to the individuals who will perform the decontamination. The RSO stated that the source will be shipped to a licensed service provider for repair or disposal. No violations were cited.

File closed.

I - 8784 - Impersonating a State Employee - Ronald James LeBlanc, Sr. - Orange, Texas

On September 20, 2010, the Agency was notified by a licensee that one of its radiography crews was approached by an individual who identified himself first as an Agency inspector and then as the Radiation Safety Officer for Orange County. The licensee stated that the radiography crew had set up their barricades and was making preparations, but had not yet begun radiographic operations. The individual made statements that the barricades were wrong, told the radiographers that the calibration on the survey meters should be every three months instead of six, and became hostile and began yelling. The individual reached across the barricade and slapped the survey meter off the truck onto the ground. One radiographer notified their main office of the incident. The individual continued to portray himself as a person of authority by asking for the radiographer's state certification card. After the individual left the site, he called the licensee's office. The office manager stated the individual identified himself as the "Orange County RSO" and said there was an x-ray crew that did not have the proper equipment and the licensee needed to do something about it. The licensee stated they did not call local law enforcement because they did not feel the security of the source was compromised. The radiographers identified the individual by a photograph from Agency files. At the time of the incident, the individual held a current radiography certification from the Agency. The individual admitted to an Agency investigator that he had made statements that he was a state inspector and the Orange County Radiation Safety Officer, stating he did so because he observed actions by the radiography crew that he felt posed a serious hazard and he made the claims about his identity to get their attention. The individual's claims concerning the actions of the radiography crew could not be substantiated. No violations were cited against the licensee. One violation was cited against the individual and his industrial radiography certification was revoked.

File closed.

Incidents Opened in a Previous Quarter and Closed in Fourth Quarter 2010

I - 8787 - Transportation Violations - Texas Health Harris Methodist Hospital - Fort Worth, Texas

* Health and Safety Code Chapter 241.051(d)

Two violations were cited against the licensee.

File closed.

I - 8789 - Lost Source of Radioactive Material - Texas Department of State Health Services - Austin, Texas

On September 17, 2010, a routine, semi-annual leak test and inventory of all licensed sealed sources was performed by the licensee. During the course of the inventory, one 17.5 microcurie sealed cobalt (Co) - 60 source was discovered to be missing. The licensee's Radiation Safety Officer rechecked storage/transportation packages, the room where their radioactive material is stored, the vehicle used to transport the package, and the last location where the source had been used. The source was not found. The procedure for inventorying sources after each use has been modified to prevent a recurrence. No violations were cited.

File closed

I - 8792 - Radiation Exposure to Member of General Public - Desert Industrial X-Ray LP - Denton, Texas

On September 23, 2010, the Agency was notified by the licensee of an incident involving a member of the public. The licensee reported that while conducting radiography operations at a temporary job site, a non-radiation worker from another contractor received an exposure to radiation when he entered the area where radiography using a 38 curie Iridium (Ir) - 192 source was being performed. The licensee stated that two of the licensee's radiographers were performing radiography on a water tower. Access to the work area was limited to the use of a man-lift. The radiographers were not trained to use the man-lift, so one of the contractor's employees used the lift and became responsible for changing out the films. A miscommunication occurred while the source was cranked out causing the non-radiation worker to think that the radiographers had instructed him to retrieve the film. The licensee performed dose calculations for the non-radiation worker, and it was determined that he received a whole body dose of 18 millirem for the exposure. The licensee did not exceed the regulatory exposure limit for a member of the public. However, a member of the general public was exposed to a radiation area that was greater than 2 millirems in any one hour. The licensee was cited for the violation.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2282 - Laser Injury - BioDerm Skin Care and Laser Center - Arlington, TX

On October 5, 2010, the Agency received a complaint stating that during a laser hair removal procedure the complainant suffered burns and scarring. The complainant claimed the injury resulted from faulty equipment and the technician trainee administering the laser procedure was inexperienced and improperly supervised. The Agency contacted the complainant for more information and conducted an onsite unannounced investigation on October 14, 2010. The investigation revealed that the complainant had received mild, superficial burns and hyper-pigmentation. The complainant had consulted an independent dermatologist to assess her injury. On October 29, 2010, the complainant requested that the Agency stop the investigation and she did not provide investigators with her dermatologist's name, so further investigation into extent of injury could not be accomplished. Information obtained from the complainant and the facility was that the technician was accompanied/supervised by a more experienced technician. The equipment was current on required service and inspection. The complaint could not be substantiated. One unrelated violation was cited.

File closed.

C - 2283 - Inadequate Credentialing - Alamo Heights Surgicare LP - San Antonio, Texas

On October 6, 2010, the Agency received an allegation that inadequately credentialed registered nurses and/or physician assistants were performing fluoroscopic procedures. The Agency conducted an on-site investigation on October 26, 2010. The investigation revealed that only physicians were performing fluoroscopic procedures. The complaint could not be substantiated. No violations were cited.

File closed.

C - 2284 - Response to Public Concern - Southside Orthopaedic and Rehabilitation - San Antonio, Texas

On October 22, 2010, the Agency received a complaint from an individual concerned that he may have received excessive radiation exposure from a recent x-ray of his foot. The investigation into this complaint revealed that a routine inspection had been conducted by an Agency x-ray inspector on September 22, 2010. The results of the inspection demonstrated that the facility and equipment were in compliance with regulations. A letter was sent to the complainant explaining the recent inspection findings. No violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2285 - Laser Injury - NeoSkin - San Antonio, Texas

On November 4, 2010, the Agency's radiation incident investigators received a complaint that was forwarded to them for investigation from the Agency's drugs and medical devices group. The complaint had been received by them on April 7, 2008. The complaint alleged that a business was using lasers on humans for hair removal and had caused burns to two individuals. The complaint also stated that the business did not have a medical director nor did they have physician oversight of the treatments. Investigation revealed that the company had since gone out of business. The complaint could not be substantiated. No violations were cited.

File closed.

C - 2286 - Unregistered Laser - Clearstone Laser Hair Removal - Houston, Texas

On November 5, 2010, the Agency received an anonymous complaint stating that a provider of laser procedures for hair removal was operating without proper registration with the Agency and without proper posting of warning signs on the laser treatment room. Additionally, the complainant believed they had received excessive burns from treatment at the facility. Follow-up communications with the complainant revealed there had been no medical treatment for the alleged burns and no photographs had been taken. On December 15, 2010, the Agency conducted an on-site investigation. The investigation revealed there were Class 4 lasers in use since January 2010 and the facility was not registered with the Agency. Additionally, the facility was using improper warning signs and four pairs of protective eyewear were cracked. During the investigation, the owner admitted that one patient had received burns on October 5, 2010, that required medical attention from a physician. The owner would not give the Agency records related to the burn during the on-site investigation. The facility filed its injury report with the Agency on January 5, 2011. Portions of the complaint were substantiated. Two violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2287 - Monitoring Not Provided - Banfield Pet Hospital of The Woodlands - Shenandoah, Texas

On November 16, 2010, the Agency received a complaint from a veterinarian that he had not been provided dosimetry while he worked at a veterinary hospital operating an x-ray device. The letter stated that he had requested a badge, but one was never provided. He also stated that other individuals working at the hospital did not always wear their badges when they were in the area of the operating x-ray device. On December 22, 2010, two Agency inspectors performed an unannounced investigation at the registrant's location. A review of the registrant's records confirmed that the complainant had not been monitored for occupational exposure for radiation. The review also found that the registrant did not have personnel monitoring records of occupationally exposed individuals for the last five exposure periods for individuals working at this location. The registrant was cited for the two violations. The complaint was substantiated.

File closed.

C - 2288 - Regulatory Violations - Woodlake Imaging and Diagnostics - Houston, Texas

On November 16, 2010, the Agency received a complaint alleging that a facility was using an unregistered x-ray machine and committing numerous additional violations. An on-site investigation was conducted on December 14, 2010, subsequent to an inspection five days earlier. Neither the inspection nor the investigation could substantiate any of the allegations. No violations were cited.

File closed.

C - 2289 - No Physician Supervision for Laser or Intense Pulsed Light Treatment - Natural Skin Creations Day Spa - Houston, TX

On November 16, 2010, the Agency received an anonymous complaint stating that a provider of laser and intense pulsed light (IPL) procedures for skin treatment and hair removal was operating without proper registration with the Agency, without licensed medical practitioner supervision, without properly trained technicians, and without proper posting of warning signs on the IPL/laser treatment room. The Agency conducted an on-site investigation on December 14, 2010. The investigation revealed the facility did not have a contract with, or supervision by, a licensed practitioner of the healing arts, they did not have hazard warning signs posted as required, and they possessed and used a Class 4 laser for which they were not registered with the Agency. The technicians' training did meet the current training requirements. The complaint was substantiated. Two violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2290 - Response to Public Concern - Private Residence - Houston, Texas

On November 8, 2010, the Agency received notification from its answering service of a message from an individual that stated "Last night, 11/7 there was a sound like a nuclear reactor up the street. There's plutonium." An Agency investigator attempted to contact the individual three times before finally succeeding on November 15, 2010. The individual stated that there had been a plutonium explosion in her neighborhood last week because she heard a noise. She stated that there was no visible fire or explosion, but that she knew it was plutonium because of the sounds she heard and the way the humming noises propagated. The individual stated that when plutonium explodes, it makes a humming sound that comes in waves because the radiological particles react over and over again, and those are the waves that one hears. She also stated that she has had a problem with plutonium contamination in her home. She stated that she removed it herself when she saw it. She stated that the contamination looked "translucent and waxy" in appearance, and that if one were to listen carefully, one would hear the plutonium humming. She stated that people from the "Harris County Radiation Control" performed a survey a few weeks ago at her home. The investigator asked her if she was given any results of the survey that was performed. She stated that those performing the survey had a Geiger counter and that "it was clicking." The individual then stated that she knows people in her neighborhood have been poisoned with plutonium because their faces appeared smashed, like they have been put into a press. She stated that this physical manifestation is characteristic of plutonium poisoning. The investigator tried to assure the individual that plutonium is a highly regulated material, and it was not likely that her home was contaminated with plutonium. The investigator stated that they could perform a survey of her residence to determine if any plutonium was present, and she replied that she would appreciate that. The investigator made several unreturned phone calls to the individual to arrange a date and time to survey her residence. On December 15, 2010, two Agency investigators went to the individual's address, knocked on the door, and no one answered the door. One investigator took a radiation survey of the outside of the house and did not detect any radiation above background. The investigators then moved to a public area approximately two blocks from the individual's home and the investigators took a soil sample from the area. On December 23, 2010, the sample was analyzed; no concentrations of any radionuclides above regulatory limits were revealed. The complaint could not be substantiated. No violations were cited.

File closed.

C-2291 - Uncredentialed Technologists - Rafael De La Fior-Weiss - Spring, Tx

On December 6, 2010, the Agency received a complaint that the office manager and other staff members were performing x-rays at an urgent care center without proper credentials. On December 15, 2010, an unannounced inspection was conducted by an Agency inspector and two investigators. Four staff members were interviewed and records were reviewed. The complaint could not be substantiated. Two unrelated violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2292 - Regulatory Violation - Berry Fabricators - Corpus Christi, Texas

On December 8, 2010, the Agency received a phone call from an individual who stated that he had a friend who worked for the licensee and that the friend had not been issued any personnel monitoring devices, did not have any radiation survey instruments, and that the guide cables were in such bad shape that they were often unable to retract sources into the camera. He stated that when sources did stick, the workers were required to perform source retrievals. An on-site investigation was attempted by the Agency on December 16, 2010. The licensee's Radiation Safety Officer (RSO) was contacted, but he stated he had worked the night shift and would not come in to the plant. There were no individuals at the facility that could provide access to records needed to conduct the investigation. A routine inspection was conducted on February 10, 2011. The RSO stated to the inspector that their records had been boxed up when he moved from one office to another and were inadvertently thrown into the trash. The RSO stated that they would not be doing any radiography work in the near future. The inspection report included 17 violations. On April 2, 2011, the Agency was contacted by an individual who stated that the licensee was conducting radiography operations in an unsafe manner. An on-site investigation was conducted on April 9, 2011, but the allegations could not be substantiated. No additional violations were cited.

File closed.

C - 2293 - Inadequate Credentialing - Emergency Medicine Specialist LLP - Richardson, Texas

On December 14, 2010, the Agency received a complaint stating that individuals performing x-rays for the registrant are not credentialed. The Agency conducted an inspection at the facility on January 11, 2011, and the operators were verified as having proper and current credentials. The complaint was not substantiated. Three non-related violations were cited.

File closed.

C - 2294 - Radiation Exposure to Member of General Public - Houston Medical Clinic - Houston, Texas

On December 15, 2010, the Agency received an anonymous complaint alleging that an individual had received excessive radiation exposure from an x-ray machine located in a room adjacent to her work station. It was alleged that this exposure resulted in two miscarriages. The Agency conducted an on-site investigation. The investigation revealed that the x-ray machine had not been used since approximately October 2010. The investigation also revealed that due to the type of machine and its positioning in the room, the beam could not have been directed toward the area where the individual worked. In addition, distance from the work station and building structure would have reduced any scatter radiation from the use of the machine to levels below regulatory limits. The complaint was not substantiated. No violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2295 - Inadequate Credentialing - Family Medicine Rural Health Clinic PA - Copperas Cove, Texas

On December 16, 2010, the Agency received an anonymous complaint alleging that the registrant was allowing an employee whose license had expired to take x-rays as well as allowing another individual to take x-rays who was not licensed. The Agency conducted an on-site investigation. Required certifications were current for technicians performing x-ray procedures. The complaint was not substantiated. Three violations, unrelated to the complaint, were cited.

File closed.

C - 2296 - Unregistered X-ray Equipment - Integrated Pain Associates - Killeen, Texas

On December 20, 2010, the Agency received a complaint stating the facility was operating a C-Arm machine for exposures on humans without proper registration. An Agency investigator found that an application for a certificate of registration from the facility was received by the Agency on December 31, 2010. An on-site investigation was conducted on March 8, 2011. The investigation revealed that the facility had submitted their request for registration on December 6, 2010. They received the C-Arm device in early January 2011, but had not operated the device until January 13, 2011. The C-Arm was surveyed by a licensed medical physicist on January 17, 2011, and required no adjustments. The area where the machine was used was properly posted and current procedures were available. The complaint was not substantiated. No violations were cited.

File closed.

C-2297 - Inadequate Credentialing - Injury Medical Clinic - El Paso, TX

On December 21, 2010, the Agency received a complaint alleging that staff at a medical clinic was not calibrating their x-ray equipment properly and the staff at the facility was not adequately trained. On January 27, 2011, an Agency inspector performed an on-site inspection at the registrant's facility. The inspector found that the equipment performance evaluations had been completed as required and the inspector was not able to identify any instances where non-credentialed personnel performed a procedure. The complaint could not be substantiated. No violations were cited.

File closed.

Complaints Opened Fourth Quarter 2010

C - 2298 - Regulatory Violations - Wilson Inspection X-Ray Services - Corpus Christi, Texas

On December 15, 2010, the Agency received a complaint alleging that a radiography company was performing radiography work at a temporary job site without setting up proper barriers. On December 16, 2010, two Agency Investigators performed an on-site investigation. The investigators interviewed the complainant and were informed that the radiography crew was no longer performing radiography for them, but were still on site working for a subcontractor. He also stated that he had observed a second crew performing radiography work about a mile from this location. The investigators found the first radiography crew on the east end of the facility. The crew was sitting in their truck and did not appear to have any work to perform in the near future. The inspectors drove to the second location and there they found a second truck from the licensee sitting on the side of the road. As they drove past, they saw two individuals sitting in the cab of the truck and there were drive cables and a radiography camera on the tailgate of the truck. No one had direct control of the camera. The investigators found that neither radiographer had an electronic alarming dosimeter, that both self-reading dosimeters were off scale, the trainee did not have a copy of his credentials, radiation surveys had not been conducted during radiography operations, and the radiographer trainer was not providing supervision of the trainee as required. The original complaint was not substantiated. The radiographer trainer and the licensee were cited for the violations that were observed.

File closed.

C-2299 - Uncredentialed Technologist and Other Regulation Violations - Family Medicine Clinic - Lampasas, TX

On December 16, 2010, the Agency received a complaint alleging that non-certified technicians were being required to take x-rays of minors, that there was no technique chart available for children, and that x-rays were being ordered by not only the doctor and nurse practitioner but also by nurses and medical assistants. The complaint further alleged the exposure to patients was uncertain, the films and cassettes don't match, the exposure settings were being doubled to take x-rays, and the staff was working with three or more technique charts to take x-rays. The agency conducted an on-site investigation. The investigation revealed that a Non-Certified Technologist (NCT) had taken x-rays of a minor that were outside the scope of her certification. It was also found that entrance exposures to the chest exceeded regulatory limits. The issues of films and cassettes not matching, practice of simply doubling settings, and multiple technique charts being in the control room were addressed with the registrant in regard to best practice. The complaint was substantiated. Three violations were cited.

File closed.

Complaints Opened in a Previous Quarter and Closed in Fourth Quarter 2010

C - 2194 - Allegation of Abandoned Radioactive Material - Trace Life Sciences Inc. - Denton, Texas

On April 16, 2009 an email complaint was received by the Agency alleging the licensee had abandoned radioactive material at its facility. An Agency inspector was sent to the facility to determine if there were any potential risks to the health and safety of the public. The inspector found that the facility was adequately secured and ascertained there was no eminent threat to the public. The Agency learned that the licensee has been experiencing financial difficulties and is seeking additional financial investment. After many months of observations and negotiations, a business and decommissioning plan has been submitted with a licensing and fee payment schedule agreed upon. The complaint was not substantiated and no violations were cited.

File closed.

C - 2241 - Regulation Violations - DFW MRI LP - Dallas, Texas

On February 2, 2010, the Agency received a phone call from an anonymous source with a long list of very detailed violations on a variety of radiation producing machines against the registrant. The facility has computerized tomography (CT) and radiographic machines and the complaint was submitted by a person who described himself as a "concerned technologist". According to the complainant, the violations had been occurring since July 2009. On October 10, 2010, the Agency conducted an investigation/inspection at both of the registrant's licensed sites. No violations were cited.

File closed.

C - 2268 - Uncredentialed Technologists - Ulupi A. Choksi, MD - Kingwood, Texas

On July 5, 2010, the Agency received a complaint that a technologist was performing bone density exams without the proper credentials. On September 30, 2010, an Agency inspector performed an announced investigation. The inspector asked the registrant about the technologist allegedly performing bone densitometry exams. The registrant stated that the technologist had performed exams from February 2007 to July 2010. The registrant stated that they discovered the technologist was not credentialed and the technologist's employment was terminated on July 7, 2010. The complaint was substantiated. One violation was cited.

File closed.

Complaints Opened in a Previous Quarter and Closed in Fourth Quarter 2010

C - 2269 - Laser Registration - Beautiful You Laser Spa - Pharr, Texas

On July 8, 2010, the Agency received a complaint alleging that an unregistered individual was commercially performing laser hair removal at a private residence. The complainant had hearsay information that a person had possibly received minor burns. An on-site investigation was performed by the Agency on July 15, 2010. The investigation revealed that an individual had purchased an intense pulsed light (IPL) /radio frequency (RF) system and an RF cavitation unit through eBay directly from a company in China. Neither of the machines had the required Food and Drug Administration labeling showing they were certified as complying with design, labeling, and manufacturing standards. The individual used the IPL device on a human and was not under the supervision of a practitioner of the healing arts. Following the on-site visit, the individual closed her business and, at a later date, disposed of the devices. The information concerning possible burns could not be substantiated. Two violations were cited.

File closed.

C - 2270 - Laser Physician Supervision - Rain Skin and Body - Harker Heights, Texas

On July 26, 2010, the Agency received an anonymous complaint concerning a laser hair removal establishment in Harker Heights, TX. The complaint stated that there was inadequate physician supervision of the use of a laser and intense pulsed light device. The complainant alleged that burns had resulted from hair removal and photo rejuvenation procedures. The Agency conducted an on-site investigation on August 11, 2010. The establishment had one Class 4 laser and one intense pulsed light device and both were being used for hair removal and other procedures. The LSO confirmed that he had a contract with a physician. The complaint concerning lack of supervision by a practitioner of the healing arts could not be substantiated. The investigation was unable to substantiate the complaint of burns as a result of the use of the laser on humans. No violations were cited.

File closed.

C - 2271 - Potential Exposure to Individual - San Benito Animal Hospital - San Benito, Texas

On July 30, 2010, the Agency received an anonymous complaint regarding scatter radiation to employees at a veterinary clinic in San Benito, TX. The complaint alleged that employees' hands could be seen in the outer field/perimeter of the x-rays taken by digital x-ray machine. On September 9, 2010, the Agency conducted an unannounced on-site investigation. A broad sampling of x-rays were inspected and images of human hands holding animals without wearing required protective devices were observed. The investigation also revealed that the owner/veterinarian had purchased the business, including a digital x-ray machine, in July 2010 and had failed to register within 30 days as required. The complaint was substantiated. Two violations were cited.

File closed.

Complaints Opened in a Previous Quarter and Closed in Fourth Quarter 2010

C - 2275 - Regulatory Violations - Gene Gant - Houston, Texas

On August 10, 2010, the Agency received a complaint alleging that a U.S. Food and Drug Administration (FDA) Form 2579 had been fraudulently prepared. The FDA Form 2579 is to be prepared by the person installing a radiation machine, and it is subsequently sent to the Agency. The preliminary investigation determined that an individual who installed the equipment did so without a Certificate of Registration from the Agency as required. The individual was being pursued by the State's Office of the Attorney General (OAG) at that time. Copies of the documents collected were submitted to the OAG and to a representative of the Food and Drug Administration. On October 1, 2010, a determination was made that the x-ray registrant whose machine was installed by an unregistered service provider had violated the rule requiring the use of registered service providers. Therefore, the investigation into this complaint was to be re-opened. On October 25, 2010, the Agency conducted an unannounced investigation at the registrant's facility where the dental machine had been installed. The Agency informed the registrant that the person who installed the equipment was not licensed by the Agency to service x-ray machines. The Agency cited one violation against the registrant for failure to have someone properly licensed by the Agency install the x-ray machine.

File closed.

C - 2277 - Response to Public Concern - Various Auto Painters - Dallas and Houston, Texas

On August 3, 2010, the Agency received an allegation referred to them by the Nuclear Regulatory Commission. It was alleged that a device manufactured by the 3M Company containing radioactive material and designed for use in the auto-painting industry was not being properly controlled in automotive shops located in Houston and Dallas. The Agency contacted the complainant for additional information. The complainant could not provide any specific information on the device, but stated that he believed the device had a radioactive sticker on it and therefore, it contained radioactive material. He stated that he was a paint salesman for DuPont Paint for automotive applications and had encountered several instances in the Dallas and Houston areas where he had observed improper storage or disposal of the devices. The complainant was unable to specifically name locations where he had observed the devices. The Agency contacted several individuals at 3M including the Material Safety Data Sheet coordinator and a member of its Regulatory Affairs Group. None of these individuals knew of any devices manufactured by 3M for use in the automotive paint industry that utilized any type of radiation. Several auto dealers in Dallas, Houston, and Austin were contacted and their automotive paint managers were interviewed. None of these individuals knew of any device that had utilized any source of radiation. A search of 3M's automotive paint application web site did not find any reference to the use of any source of radiation in any painting application. The complaint was not substantiated. No violations were cited.

File closed.

Complaints Opened in a Previous Quarter and Closed in Fourth Quarter 2010

C - 2279 - Laser Registration - Bella Medical Spa - Marble Falls, Texas

On September 17, 2010, the Agency received a complaint from an individual regarding safety practices of a facility using lasers for hair removal at a medical spa in Marble Falls, Texas. The complainant was contacted for more information. Most of the complainant's concerns were outside the scope of Radiation Control's laser regulations. The complainant was informed that he/she could contact the Texas Medical Board concerning those issues. The complainant also stated that the medical spa may not be registered for its laser. An unannounced on-site investigation was conducted on October 13, 2010. The investigation confirmed that there were Class 4 lasers in use and the facility was not registered with the Agency. The complaint was substantiated. One violation was cited.

File closed.

C - 2281 Thorium Oxide for Experiments - Conscious Alchemy, LLC - Spring, TX

On September 28, 2010, the Agency received a call from a distribution company reporting that a customer using a health company name who had previously ordered 250 grams of thorium oxide, a general license product, was now ordering an additional kilogram. The distribution company was concerned that the customer may be using the material in health products. After contacting the customer, it was determined that the powder was used to coat material on a metallic substrate for experiments related to a fuel economy invention. The customer did not expect to need any additional thorium oxide for experiments. The complaint was not substantiated. No violations were cited.

File closed.



Pennsylvania Department of Environmental Protection

909 Elmerton Avenue
Harrisburg, PA 17110-8200
January 28, 2010

Southcentral Regional Office

717-705-4703
FAX - 717-705-4890

NOTICE OF VIOLATION

PRIORITY MAIL DELIVERY CONFIRMATION NO. [REDACTED]

[REDACTED]
Operations Manager
Citrus Energy Corporation
[REDACTED]

Dear Mr. Searfoss:

It is the Department's understanding that Citrus Energy Corporation (Citrus Energy) contracted Core Laboratories, L.P. - ProTechnics Division (ProTechnics) to conduct a radioactive tracer study at [REDACTED] (well site), located along [REDACTED] (Site). On December 10, 2009, ProTechnics injected a gel solution that was comprised of water, sand and [REDACTED] under Pennsylvania Reciprocity License No. [REDACTED] and Texas License [REDACTED]. After the injection of [REDACTED] the ProTechnics' field representative left the well site.

Following ProTechnics' departure from the well site, Citrus Energy pumped sand and water, which were contaminated with [REDACTED] radioactive residual waste), to the surface and contacted Clean Harbors Environmental Services, Inc. (Clean Harbors) to remove the radioactive residual waste from an on-site tank.

On December 21, 2009, Clean Harbors emptied the on-site tank and transported the radioactive residual waste to the Lancaster Oil Company (d/b/a Environmental Recovery Corporation of PA (ERC)).

On December 22, 2009, ERC transported a roll-off container, which included the radioactive residual waste to Modern Landfill for disposal. Upon entering the scale at Modern Landfill, a radiation monitor was alarmed and Modern Landfill notified the Department of this event.

The following violation is noted:

- 25 Pa. Code § 287.54(a)(1) requires the performance of a detailed analysis to fully characterize the physical properties and chemical composition of each type of waste generated.



January 28, 2010

On December 10, 2009, Citrus Energy failed to conduct a proper waste analysis of the radioactive residual waste prior to contacting Clean Harbors to remove the waste.

You are hereby notified of the existence of a violation as well as the need to provide prompt corrective action. Failure to correct the violation may result in legal proceedings under the Radiation Protection Act and the Solid Waste Management Act. Under each Act, each day of violation is considered a distinct and separate offense and will be handled accordingly.

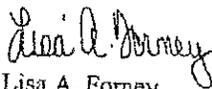
Be advised that the violation described above constitutes a public nuisance under Section 309 of the Radiation Protection Act, 35 P.S. § 7110.309, as well as Section 610 of the Solid Waste Management Act, 35 P.S. § 6018.601. This may subject you, under Section 308(e) of the Radiation Protection Act, 35 P.S. § 7110.308(e) and Section 605 of the Solid Waste Management Act, 35 P.S. § 6018.605 to civil penalty liability of up to (\$25,000) for each violation. Additionally, under the Radiation Protection Act, penalties may be assessed up to (\$5,000) per day for each continuing day of violation.

The Department requests that a written response be sent within 14 days of the receipt of this Notice of Violation. The response should include, but not be limited to a typed letter that provides a detailed description of the actions taken to avoid any future occurrences.

This Notice of Violation is neither an order nor any other final action of the Department. It neither imposes nor waives any enforcement action available to the Department under any of its statutes.

Thank you for your cooperation. If you have any questions, please call me at 717-705-4898.

Sincerely,



Lisa A. Forney
Compliance Specialist
Radiation Protection Program

Citrus Energy Corporation

-3-

January 28, 2010

bcc: CO File
SCRO File
S. Acker
L. Forney

Program Managers' Conference Call

Wednesday, June 16, 2010

9:30 – 11:30 am

MINUTES

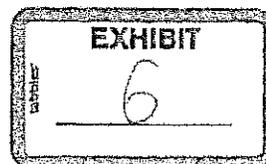
Participants

- CO: Steve Socash, Laura Henry, Joe Sieber, Renee Bartholomew (BWM)
Dave Allard, Jim Barnhart (BRP)
- SE: Joe Feola, Jim Wentzel
- NE: Bill Tomayko, Tracey McGurk
- SC: John Oren, John Spang
- NC: Pat Brennan
- SW: Mike Forbeck, Diane McDaniel
- NW: Todd Carlson, Joel Fair

Topics Discussed

- o Next meeting: Thursday, September 9, 2010, RCSOB 14th floor Large Conference Room; face-to-face meeting directly after the SWANA/PWIA Conference
- o Iridium-192 at Rustick LF & NORM/TENORM Issues (see associated e-mail)
Dave Allard discussed this case and additional NORM/TENORM issues associated with disposal of frac fluid at MWLF's. Rustick had a hit of Iridium-192 in waste generated at an Oil & Gas well in which the drilling was traced by ProTechnics, a company out of Texas that utilizes Iridium-192 beads for tracing the efficiency of a well fracture. ProTechnics is currently the only company utilizing this technology in PA, and the Department has come across some compliance issues concerning disposal of the resulting waste. ProTechnics' license allows for in-situ decay on site with subsequent disposal at a LF; however, it has been discovered that drill cuttings may have been improperly managed. RP is currently seeking to take enforcement action against ProTechnics, and recent WM inspections will probably result in enforcement action by that program as well.

In general, Radium has been an issue; it has also been found in the solid component of the frac waste. It is OK for a MWLF to dispose of this material under a BRP exemption, and Regional WM staff has the ability to approve its disposal. BRP requirements include maintenance of a spreadsheet of loads containing TENORM for tracking purposes. It is important that WM and RP continue to coordinate with each other on these issues (enforcement actions, handling for disposal, etc.) and that WM keeps RP in the loop when it sees new sources of TENORM coming in for disposal.





pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION
RADIATION PROTECTION PROGRAM



December 23, 2013

PRIORITY MAIL DELIVERY CONFIRMATION NO.: [REDACTED]

[REDACTED]
ProTechnics Division of Core Laboratories LP
[REDACTED]

Re: License No. [REDACTED]
November 2, 2010 Consent Order and Agreement

Dear Mr. Flecker:

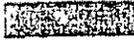
Thank you for participating in the December 18, 2013 conference and for clarifying the events that resulted in the issuance of the November 26, 2013 Notice of Violation. As you know, the Department was represented by: Ms. Lynn E. Langer, Mr. Robert M. Zuccuno, Mr. Joseph H. DeMan, Mr. Richard F. Croll, Ms. Jennifer N. Noll and myself. Mr. Will Williams and Mr. Craig Konieczny were present on behalf of ProTechnics Division of Core Laboratories, LP (ProTechnics). In addition to you, Mr. Larry Stephenson and Mr. Ron Blush participated via telephone.

As a result of the discussions, the following action items were developed and agreed upon by ProTechnics and the Department:

- As a result of violations of the November 2, 2010 Consent Order and Agreement (COA), stipulated civil penalties totaling \$75,000 are due by January 15, 2014. Acceptable forms of payment include cashier's check, certified check and money order. Payment will need to be payable to the "Commonwealth of Pennsylvania, Radiation Protection Fund" and mailed to my attention.
- It is the Department's understanding that the language of the Radioactive Tracer Well Site Agreement (Well Site Agreement) has created many questions from Well Owner/Operators and that revision may be warranted. Please draft revisions to the Radioactive Tracer Well Site Agreement in Attachment A and submit them by January 15, 2014.
- The Department will review any suggested revisions and schedule a conference call in the event that additional discussion is necessary.
- Upon final approval of the Well Site Agreement, the Department will draft an Addendum to the COA, which will then be executed by both parties.

Southcentral Regional Office | 909 Elmerton Avenue | Harrisburg, PA 17110-8200
717.705.4703 | Fax 717.705.4890

www.depweb.state.pa.us



December 23, 2013

- The Addendum will require ProTechnics to submit a License Amendment request within 14 days of the execution of the Addendum. The amendment will request a License Condition requiring the submission of the newly revised Well Site Agreement as specified in the COA.
- The Addendum will also require an annual meeting between representatives of ProTechnics and the Department. The annual meeting will be initiated by ProTechnics and will occur in May of each year.

Thank you for your cooperation. If you have any questions, please feel free to contact me at 717.705.4898.

Sincerely,

Lisa A. Forney, MEPC
Compliance Specialist
Radiation Protection Program

Enclosures

cc: General Counsel



December 23, 2013

[REDACTED]

bcc: SCRO – License No. [REDACTED] - File Via L. Forney
CO File – Via Electronic Filing
L. Forney
R. Zaccano
J. DeMan
S.K. Portman
J. Chippo
J. Melnic
D. Allard
R. Croll - SERO
J.N. Noll - SERO

General Counsel

[REDACTED]

Please send email to [REDACTED] & [REDACTED] with the note:

Enclosed please find a courtesy copy of Department correspondence being sent today. Any questions regarding this document or its contents should be directed to Lisa Forney at 717.705.4898 or lforney@pa.gov.



Pennsylvania Department of Environmental Protection

909 Elmerton Avenue
Harrisburg, PA 17110-8200
January 28, 2010

Southcentral Regional Office

717-705-4703
FAX - 717-705-4890

NOTICE OF VIOLATION

PRIORITY MAIL DELIVERY CONFIRMATION NO. [REDACTED]

[REDACTED]
Core Laboratories, L.P. - ProTechnics Division
[REDACTED]

Re: License No. [REDACTED]

Dear Mr. Hampton:

The Department is aware that the services of Core Laboratories, L.P. - ProTechnics Division (ProTechnics) were enlisted by [REDACTED] in order to conduct a radioactive tracer study at the [REDACTED] (well site), located along [REDACTED]. On December 10, 2009, ProTechnics injected a gel solution, which was comprised of water, sand and [REDACTED] under Pennsylvania Reciprocity License No. [REDACTED] and Texas License No. [REDACTED]. After the injection of [REDACTED] the ProTechnics' field technician left the well site.

Following ProTechnics' departure from the well site, Citrus Energy pumped sand and water, which were contaminated with [REDACTED] to the surface. Clean Harbors Environmental Services, Inc. (Clean Harbors) removed the radioactive material from an on-site tank on December 21, 2009 and transported the radioactive material to the [REDACTED]. [REDACTED] in turn, transported a roll-off container, which included the radioactive material to Modern Landfill for disposal on December 22, 2009. Upon entering the scale at Modern Landfill, a radiation monitor was alarmed and Modern Landfill notified the Department of this event.

The following violation is noted:

- 25 Pa. Code § 217.1(a) requires that a person may not receive, possess, use, transfer, own or acquire radioactive material except as authorized under a specific license. Specifically, Texas Radioactive Material License [REDACTED] Conditions [REDACTED] and [REDACTED] require that the released radioactive material be possessed, handled and/or disposed in a manner outlined in the procedures submitted with the license application.

ProTechnics failed to ensure proper handling and disposal of the radioactive material after it had been pumped to the surface and sent for disposal at an off-site location.



January 28, 2010

The Department is in receipt of an incident report, which described the corrective actions taken. Be advised that no additional response is necessary at this time.

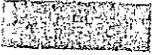
This Notice of Violation is neither an order nor any other final action of the Department. It neither imposes nor waives any enforcement action available to the Department under any of its statutes.

Thank you for your cooperation. If you have any questions, please call me at 717-705-4898.

Sincerely,

Lisa A. Forney
Compliance Specialist
Radiation Protection Program

cc:  Radiation Safety Officer, Core Laboratories, L.P. - Protechnics Division



January 28, 2010

bcc: CO File
SCRO File
S. Acker
L. Forney



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHWEST REGIONAL OFFICE

JRC
Anita Jones
Judd TC

August 4, 2010

Mr. Chester Cheattle
Elk Waste Services, Inc.
134 Sara Road
Saint Marys, PA 15857

Re: Consent Assessment of Civil Penalty

Dear Mr. Cheattle:

Please find enclosed a copy of the executed Consent Assessment of Civil Penalty (CACP) for your records.

Thank you for your cooperation in this matter.

If you have any questions concerning the CACP or any waste related issue please feel free to contact me at 814.332.6829.

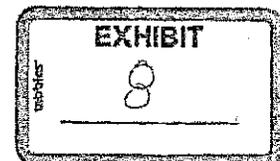
Sincerely,

John R. Crow
Solid Waste Supervisor
Waste Management

Enclosure

cc: NWRO
Enf. File

JRC:jb



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the Matter of:

Elk Waste Services, Inc. : Solid Waste management Act
134 Sara Road :
Saint Marys, PA 15857 :

CONSENT ASSESSMENT OF CIVIL PENALTY

This Consent Assessment of Civil Penalty is entered into this 3rd day of August 2010, by and between the Commonwealth of Pennsylvania, Department of Environmental Protection ("Department") and Elk Waste Services, Inc. ("Elk Waste Services").

The Department has found and determined the following:

- A. The Department is the agency with the duty and authority to administer and enforce the Solid Waste Management Act, Act of July 7, 1980, P.L. 380, *as amended*, 35 P.S. §§6018.101-6018.1003 ("Solid Waste Management Act"); Section 1917-A of the Administrative Code of 1929, Act of April 9, 1929, P.L. 177, *as amended*, 71 P.S. §§510-17 ("Administrative Code"); and the rules and regulations promulgated thereunder ("Regulations").
- B. Elk Waste Services is a "person," as that term is defined in Section 103 of the Solid Waste Management Act, 35 P.S. §6018.103, and is engaged in the collection and/or transportation of Solid Waste within the Commonwealth of Pennsylvania.
- C. On May 21, 2010, Elk Waste Services transported contaminated liner material and other cleanup waste from a gas well drilling site in Shippen Township, Cameron County to McKean County Landfill in Sergeant Township, McKean County, Pennsylvania.
- D. The contaminated liner material and other cleanup waste ("Waste") noted in Paragraph C, above, is "solid waste" and "residual waste" as those terms are defined in Section 103 of the Solid Waste Management Act, 35 P.S. §6018.103, and 25 Pa. Code §287.1.

E. On May 21, 2010, Elk Waste Services transported the Waste to McKean County Landfill for disposal in a vehicle that did not have a contingency plan to minimize and abate a discharge of residual waste in violation of 25 Pa. Code §299.216(d), and the vehicle did not have a daily operational record in violation of 25 Pa. Code §299.219(a).

F. On May 21, 2010, Elk Waste Services transported the Waste to McKean County Landfill without McKean County Landfill having a permit or written approval from the Department that expressly allowed the disposal of the Waste in violation of Section 303(a) of the Solid Waste Management Act, 35 P.S. §6018.303(a), and 25 Pa. Code §299.215(b).

G. On June 14, 2010, the Department issued Elk Waste Services a Notice of Violation for the violations identified in Paragraphs E, and F, above.

H. The violations described in Paragraphs E, and F, above, constitute unlawful conduct under Section 610(4) of the Solid Waste Management Act, 35 P.S. §6018.610(4); and subjects Elk Waste Services to a claim of civil penalties under Section 605 of the Solid Waste Management Act, 35 P.S. §6018.605.

I. As of the date of this Consent Assessment of Civil Penalty, Elk Waste Services has corrected all of the violations identified in Paragraphs E, and F, above.

After full and complete negotiation of all matters set forth in this Consent Assessment of Civil Penalty and upon mutual exchange of the covenants herein, the Parties desiring to avoid litigation and intending to be legally bound, it is hereby ASSESSED by the Department and AGREED to by Elk Waste Services as follows:

1. *Assessment.* In resolution of the Department's claim for civil penalties, which the Department is authorized to pursue under Section 605 of the Solid Waste Management Act, 35 P.S. §6018.605, the Department hereby assesses a civil penalty of \$500, which Elk Waste Services hereby agrees to pay.

2. *Civil Penalty Settlement.* Upon signing this Consent Assessment of Civil Penalty, Elk Waste Services shall pay the civil penalty assessed in Paragraph 1. The payment is in settlement of the Department's claim for civil penalties for the violations set forth in Paragraphs E, and F, above, for the date set forth in Paragraphs E, and F, above. The payment shall be by corporate check or the like, made payable to Commonwealth of Pennsylvania and sent to John Crow, Solid Waste Supervisor, 230 Chestnut Street, Meadville, PA 16335.

3. *Findings.*

(a) Elk Waste Services agrees that the Findings in Paragraphs A through I are true and correct and, in any matter or proceeding involving Elk Waste Services and the Department, Elk Waste Services shall not challenge the accuracy or validity of these Findings.

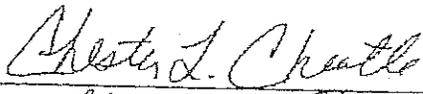
(b) The Parties do not authorize any other persons to use the Findings in this Consent Assessment of Civil Penalty in any matter or proceeding.

4. *Reservation of Rights.* The Department reserves all other rights with respect to any matter addressed by this Consent Assessment of Civil Penalty, including the right to require abatement of any conditions resulting from the events described in the Findings. Elk Waste Services reserves the right to challenge any action which the Department may take, but waives the right to challenge the content or validity of this Consent Assessment of Civil Penalty.

IN WITNESS WHEREOF, the Parties have caused this Consent Assessment of Civil Penalty to be executed by their duly authorized representatives. The undersigned representative of Elk Waste Services certifies, under penalty of law, as provided by 18 Pa.C.S.A. §4904, that they are authorized to execute this Consent Assessment of Civil Penalty on behalf of Elk Waste Services, that Elk Waste Services consents to the entry of this Consent Assessment of Civil Penalty as an ASSESSMENT of the Department; that Elk Waste Services hereby knowingly waives any right to a hearing under the statutes referenced in this Consent Assessment of Civil Penalty; and that Elk Waste Services

knowingly waives their right to appeal this Consent Assessment of Civil Penalty, and to challenge its content or validity, which rights may be available under Section 4 of the Environmental Hearing Board Act, the Act of July 13, 1988, P.L. 530, No. 1988-94, 35 P.S. §7514; the Administrative Agency Law, 2 Pa.C.S.A. §103(a) and Chapters 5A and 7A; or any other provision of law. Signature by Elk Waste Services's attorney certifies only that the assessment has been signed after consulting with counsel.

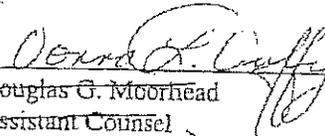
FOR ELK WASTE SERVICES, INC.:


Name Chester L. Cheate
Title PRESIDENT

Name
Attorney For Elk Waste Services, Inc.

FOR THE COMMONWEALTH OF
PENNSYLVANIA, DEPARTMENT OF
ENVIRONMENTAL PROTECTION:


Todd Carlson
Regional Manager
Waste Management Program
Northwest Region


Douglas G. McCorhead
Assistant Counsel
DONNA L. DUFFY
Regional Counsel

Commonwealth of Pennsylvania
230 Chestnut Street
Meadville PA 16335

DATE: July 30, 2010

SUBJECT: Transmittal of Settlement

TO: Jeremy Preston
Regional Business Manager

FROM: Anita Stainbrook
Operations Manager
Waste Management

PENALTY AMOUNT: \$500.00

FUND(S): Solid Waste Abatement Fund: Penalty Amount \$ 500.00

AND/OR

Waste Transportation Safety Account: Penalty Amount \$

VIOLATOR: Elk Waste Services, Inc.

ADDRESS: 134 Sara Road

CITY/STATE/ZIP: Saint Marys, PA 15857

ELK WASTE SERVICES, INC.

C/O CHESTER CHEATLE
134 SARA ROAD
ST. MARYS, PA 15857
(814) 834-6771



60-682/433

16876

DATE

Jul 27, 2010

AMOUNT

\$ *****\$500.00

Memo:

PAY Five Hundred and 00/100 Dollars
TO THE
ORDER
OF:

Commonwealth of Pennsylvania
John Crow, Solid Waste Supervi
230 Chestnut St
Meadville, PA 16335

Chester Cheatle
AUTHORIZED SIGNATURE

⑈048878⑈ ⑈043306826⑈ 0904 450863⑈

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Security features. Details on back.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
811 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

November 4, 2003

Core Laboratories, Inc.
dba ProTechnics Division of Core Laboratories
ATTN: Will C. Williams
Radiation Safety Officer
9830 Rosprim
Houston, TX 77040

SUBJECT: LICENSE AMENDMENT

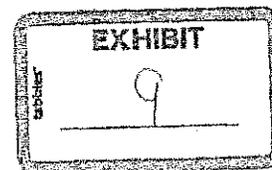
Please find enclosed Amendment No. 30 to License No. 42-26928-01. You should review this license carefully and be sure that you understand all conditions. If you have any questions, you may contact me at (817) 860-8221 or via e-mail lcc1@nrc.gov.

This amendment authorizes an additional disposal alternative pursuant to 10 CFR 20.2002 to inject well returns (sandouts) containing radioactive tracer material with physical half-lives of the material is 120 days or less (sodium-24, scandium-46, chromium-51, rubidium-86, antimony-124, iodide-131, xenon-133, iridium-192, or gold-198) into Class II disposal wells that have been approved to accept non-hazardous oil and gas waste by State agencies.

Attached for your perusal is a copy of the Federal Register (Volume 68, Number 208) dated October 28, 2003, publishing the results of NRC's environmental assessment (EA). The Federal Register indicates that NRC staff completed its assessment of your proposed disposal in Class II wells of sandouts containing radioactive tracer materials. The staff made a finding of no significant impact (FONSI) to the environment.

NRC expects licensees to conduct their programs with meticulous attention to detail and a high standard of compliance. Because of the serious consequences to employees and the public that can result from failure to comply with NRC requirements, you must conduct your radiation safety program according to the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate by NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC in writing of any change in mailing address.



3. By 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license:
 - a. When you decide to terminate all activities involving materials authorized under the license; or
 - b. If you decide not to complete the facility, acquire equipment, or possess and use authorized material.
4. Request and obtain a license amendment before you:
 - a. Change Radiation Safety Officers;
 - b. Order byproduct material more than the amount or form authorized on the license;
 - c. Add or change the areas or address(es) of use identified in the license application or on the license; or
 - d. Change the name or ownership of your organization.
5. Submit a complete renewal application or termination request at least 30 days before the expiration date on your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of radioactive material after your license expires is a violation of NRC regulations.

In addition, please note that NRC Form 313 requires the applicant, by signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

NRC will periodically inspect your radiation safety program. Failure to conduct your program according to NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC may result in enforcement action against you. This could include issuance of a notice of violation; imposition of a civil penalty; or an order suspending, modifying, or revoking your license as specified in the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG 1600.

Core Laboratories, Inc.

-3-

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Thank you for your cooperation.

Sincerely,

/RA/

Louis C. Carson II, Health Physicist
Nuclear Materials Licensing Branch

Docket: 030-30429
License: 42-26928-01
Control: 468137

Enclosures: As stated

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 189 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated August 23, 2000
1. Core Laboratories, Inc. dba ProTechnics Division of Core Laboratories	3. License number 42-26928-01 is amended in its entirety to read as follows:
2. 9830 Rosprim Houston, Texas 77040	4. Expiration date January 31, 2006
	5. Docket No. 030-30429 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Iodine-131	A. Any	A. 500 millicuries
B. Iridium-192	B. Any	B. 5000 millicuries
C. Scandium-46	C. Any	C. 3000 millicuries
D. Gold-198	D. Any	D. 5000 millicuries
E. Zirconium-95	E. Any	E. 500 millicuries
F. Xenon-133	F. Any	F. 500 millicuries
G. Chromium-51	G. Any	G. 1500 millicuries
H. Antimony-124	H. Any	H. 2000 millicuries
I. Rubidium-86	I. Any	I. 3000 millicuries
J. Bromine-82	J. Any	J. 3000 millicuries
K. Hydrogen-3	K. Any	K. 999 millicuries
L. Sodium-24	L. Any	L. 2000 millicuries
M. Americium-241	M. Sealed Source (Gammatron Model AN-HP, Gulf Nuclear Model VL-1)	M. No single source to exceed 250 microcuries, total possession 100 millicuries
N. Americium-241	N. Sealed Source (Isotope Products Model HEG-241 Series, Capsule A-3015)	N. No single source to exceed 50 millicuries
O. Barium-133	O. Sealed Source (Isotope Products Model HEG-133 Series, Capsule A-3015)	O. No single source to exceed 2 millicuries, total possession 200 millicuries

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 30

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
P. Cesium-137	P. Sealed Source (Isotope Products Model HEG-137 Series, Capsule A-3015)	P. No single source to exceed 200 millicuries, total possession 20 curies
Q. Cesium-137	Q. Sealed Source (Isotope Products Model HEG-137 Series, Capsule A-3015)	Q. No single source to exceed 600 millicuries
R. Cesium-137	R. Any	R. 50 microcuries
S. Cobalt-60	S. Any	S. 50 microcuries
T. Iridium-192	T. Any	T. 50 microcuries
U. Scandium-46	U. Any	U. 50 microcuries
V. Antimony-124	V. Any	V. 50 microcuries

9. Authorized use:

- A. through K. For use in tracer studies in oil and gas wells.
- A., J., and L. For use in above ground tracer studies.
- M. and N. For use as a calibration/stabilization source in Halliburton Model TSCAN logging tool for logging tracer material in oil and gas wells.
- O. and P. For use as a calibration/stabilization source in Cedar Bluff Group's Fluid Identification logging tool for logging tracer material in oil and gas wells.
- Q. For use in oil and gas well logging.
- R. through V. For use in pipe collar markers in oil and gas wells.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 30

CONDITIONS

10. Radioactive material shall be used only at the following:

- A. 1930 Elk Street, Rock Springs, Wyoming; Natrona County International Airport, 3857 Dame, Casper, Wyoming; Alaska Department of Natural Resources Deadhorse Tract 57, Spine Road, Prudhoe Bay, Alaska.
- B. License materials may be stored at Shell Offshore, Inc. Gas Well: OSG-C 11553, Well No. 2, Field: Garden Banks Block 602, Offshore Louisiana, in accordance with letter December 16, 1999, pending final abandonment.
- C. Temporary job sites anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.

If the jurisdiction status of a Federal facility within an Agreement State is unknown, the licensee should contact the federal agency controlling the job site in question to determine whether the proposed job site is an area of exclusive Federal jurisdiction. Authorization for use of radioactive materials at job sites in Agreement States not under exclusive Federal jurisdiction shall be obtained from the appropriate state regulatory agency.

- 11. Licensed material identified in Item 6.L. may be temporarily stored in accordance with letter dated August 10, 1998.
- 12. A. Licensed material shall be used by, or under the supervision and in the physical presence of, individuals who have completed the Support Consultants and Associates, Inc., F. L. Clifford Associates, Sharp Radiation Services, W. H. Henkin Industries, Inc., Amersham/Gulf Nuclear, Inc., or ProTechnics Environmental Services, Inc., training courses and have been designated by the Radiation Safety Officer.
 - B. The Radiation Safety Officer for this license is Will C. Williams.
- 13. The licensee shall not vacate or release to unrestricted use a field office or storage location whose address is identified in Condition 10, without prior NRC approval.
- 14. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
- 15. Pursuant to 10 CFR 39.91, the licensee is exempted from the requirements of 10 CFR 39.63(b) for use of remote handling tools. This exemption will remain in effect until formally withdrawn by the NRC.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

16. Notwithstanding the requirements of 10 CFR 39.47 and pursuant to 10 CFR 39.91, and in accordance with the statements, representations and procedures contained in letter dated July 14, 1997, and February 4, 1998, the licensee may use radioactive markers with activities of 50 microcuries or less of iridium-192, scandium-46, antimony-124, cobalt-60, and cesium-137 as pipe collar markers in oil and gas wells.
17. The licensee is authorized to hold radioactive material with a physical half-life of less than 120 days for decay-in-storage before disposal in ordinary trash provided:
- A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.
 - B. Before disposal as ordinary trash, byproduct material shall be surveyed at the container surface with the appropriate meter set on its most sensitive scale and with no interposed shielding to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
 - C. A record of each disposal permitted under this License Condition shall be retained for 3 years. The record must include the date of disposal, the date on which the byproduct material was placed in storage, the radionuclides disposed, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.
18. Notwithstanding the requirements of 10 CFR 20.2007, pursuant to 10 CFR 20.2002, and in accordance with the statements, representations, and procedures contained in correspondence dated August 23, 2000, January 23, 2002, and October 30, 2003, the licensee may release well-logging sandouts and well returns, containing residual radioactive materials, into Class II Disposals Wells provided:
- A. The total radioactive concentration of all isotopes is 1,000 picocuries/gram or less, and the physical half-life of the radioactive material is 120 days or less.
 - B. The residual radioactive tracer material (sodium-24, scandium-46, chromium-51, rubidium-86, antimony-124, iodide-131, xenon-133, iridium-192, or gold-198) being disposed of will be in the form of the patented "Zero-Wash" product in sandouts or well returns.
 - C. The well has been Permitted by the State, Territory, or Federal jurisdiction to accept non-hazardous oil and gas waste regardless of whether the job site is in an area where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.
 - D. The licensee maintains an agreement with the owner or operator to control access to the Class II Disposal Well until the radioactivity has decayed to unrestricted release levels.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated November 15, 1991
- B. Facsimile dated November 25, 1991
- C. Letter dated February 14, 1992
- D. Letter dated March 1, 1993
- E. Letter dated April 12, 1993
- F. Letter dated May 4, 1993
- G. Letter dated October 26, 1993
- H. Letter dated April 20, 1994
- I. Letter dated May 6, 1994
- J. Letter dated May 19, 1994
- K. Letter dated May 26, 1994
- L. Letter dated October 20, 1994
- M. Letter dated January 4, 1995
- N. Letter dated January 11, 1995
- O. Letter dated June 13, 1995, authorization of new facility only.
- P. Letter dated June 13, 1995, authorization to use the Model TSCAN
- Q. Letter dated September 12, 1995
- R. Letter dated September 27, 1995
- S. Letter dated October 26, 1995
- T. Letter dated January 17, 1996
- U. Letter dated February 13, 1996
- V. Letter dated February 24, 1997
- W. Letter dated July 14, 1997
- X. Letter dated November 14, 1997
- Y. Letter dated January 20, 1998
- Z. Letter dated January 27, 1998
- AA. Letter dated February 4, 1998
- BB. Letter received May 20, 1998
- CC. Letter dated July 15, 1998
- DD. Letter dated August 10, 1998
- EE. Letter dated August 31, 1999
- FF. Letter dated December 16, 1999
- GG. E-mail dated February 11, 2000
- HH. Letter dated March 3, 2000
- II. Letter dated June 5, 2000
- JJ. Letter dated June 15, 2000
- KK. Facsimile dated July 6, 2000
- LL. E-mail dated February 14, 2000

MATERIALS LICENSE
SUPPLEMENTARY SHEETLicense Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

19. (Continued)

- MM. Letter dated May 22, 2000
- NN. Letter dated August 22, 2001
- OO. Letter dated November 7, 2001
- PP. Letter dated August 23, 2000

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/

Date November 4, 2003

By _____

Jack E. Whitten, Chief
Division of Nuclear Materials Safety
Region IV
Arlington, Texas 76011

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NRC FORM 374

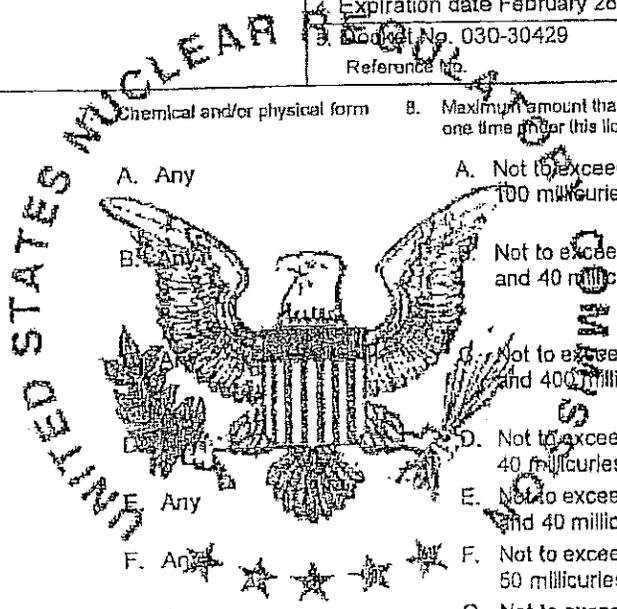
U.S. NUCLEAR REGULATORY COMMISSION

PAGE 1 OF 8 PAGES
Amendment No. 44

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p>Licensee</p> <p>1. Core Laboratories, Inc. dba ProTechnics Division of Core Laboratories</p> <p>2. 6316 Windfern Road Houston, Texas 77040</p>	<p>In accordance with letter dated July 30, 2012</p> <p>3. License number 42-26928-01 is amended in its entirety to read as follows:</p> <p>4. Expiration date February 28, 2016</p> <p>5. Model No. 030-30429 Reference to</p>
<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Hydrogen-3</p> <p>B. Scandium-46</p> <p>C. Bromine-82</p> <p>D. Zirconium-95</p> <p>E. Antimony-124</p> <p>F. Iodine-131</p> <p>G. Iridium-192</p> <p>H. Gold-198</p> <p>I. Bromine-82</p> <p>J. Barium-133</p>	<p>Chemical and/or physical form</p> <p>A. Any</p> <p>B. Any</p> <p>C. Any</p> <p>D. Any</p> <p>E. Any</p> <p>F. Any</p> <p>G. Any</p> <p>H. Any</p> <p>I. Any</p> <p>J. Sealed Source (Isotope Products Labs. Model HEG-133 Series, Capsule A-3015)</p> <p>B. Maximum amount that licensee may possess at any one time under this license</p> <p>A. Not to exceed 999 millicuries total and 100 millicuries per injection</p> <p>B. Not to exceed 8,000 millicuries total and 40 millicuries per injection</p> <p>C. Not to exceed 3,000 millicuries total and 400 millicuries per injection</p> <p>D. Not to exceed 750 millicuries total and 40 millicuries per injection</p> <p>E. Not to exceed 8,000 millicuries total and 40 millicuries per injection</p> <p>F. Not to exceed 200 millicuries total and 50 millicuries per injection</p> <p>G. Not to exceed 12,000 millicuries total and 40 millicuries per injection</p> <p>H. Not to exceed 1,000 millicuries total and 200 millicuries per injection</p> <p>I. Not to exceed 3,000 millicuries total and 400 millicuries per injection</p> <p>J. No single source to exceed 2 millicuries; total possession 40 millicuries</p>



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NRC FORM 374A

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 2 of 6 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 44

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
K. Cesium-137	K. Sealed Source (Isotope Products Model HEG-137 Series, Capsule A-3015)	K. No single source to exceed 500 millicuries; total possession 10 curies
L. Americium-241	L. Sealed Source (Gammatron AN-H, Gulf Nuclear VL-1)	L. No single source to exceed 500 microcuries; 10 millicuries total
M. Americium-241	M. Sealed Source (IPL HEG-241 Series, Capsule A-3015)	M. No single source to exceed 500 microcuries; 10 millicuries total
N. Scandium-46	N. Solid	No single marker to exceed 50 microcuries
O. Cobalt-60	O. Solid	O. No single marker to exceed 50 microcuries
P. Antimony-124	P. Solid	P. No single marker to exceed 50 microcuries
Q. Cesium-137	Q. Solid	No single marker to exceed 100 microcuries
R. Iridium-192	R. Solid	No single marker to exceed 50 microcuries



9. Authorized use:

- A. through H. For use in tracer studies in oil, gas, and geothermal wells.
- I. For use in above-ground tracer studies in process equipment and pipelines.
- J. and K. For use in Cedar Bluff Group Fluid Identification Logging tool.
- L. and M. For use as a calibration/stabilization source in Halliburton Model TSCAN logging tool.
- N. through R. For use in pipe collar markers in oil and gas wells.

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NRG FORM 374A

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 3 of 6 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number

42-26928-01

Docket or Reference Number

030-30429

Amendment No. 44

CONDITIONS

10. Licensed material shall be stored or used only at the following:

- A. i. Alaska Department of Natural Resources, Deadhorse Tract 57, Spine Road, Prudhoe Bay, Alaska
- ii. 1701 Old St. Mary's Pike, Parkersburg, West Virginia
- iii. 570 Jonah Drive, Rock Springs, Wyoming, and
- iv. 1030 Silurian Lane, Sidney, Montana

B. Licensed material may be stored at Shell Offshore Inc. Gas Well: OSG-C 11553, Well No. 2, Field: Garden Banks Block 602, Offshore Louisiana, in accordance with letter December 16, 1999, pending final abandonment

C. Licensed material identified in letter dated March 02, 2006, may be stored at Exxon Mobil Production Company's Gas Well: T10, T65-30G2, Section 30 Township 29N Range 113W, Sublette County Wyoming, API #49-0352369, in accordance with letter dated March 02, 2006, pending final abandonment.

D. Licensed material identified in letter dated May 08, 2006, may be stored at Anadarko Petroleum Company's Well: Green Canyon 548#1 S100BP2, Offshore Gulf of Mexico, OCS-G21801, AP#60-811-40377-02, in accordance with letter dated May 08, 2006, pending final abandonment.

E. Temporary job sites anywhere in the United States where the U.S. Regulatory Commission maintains jurisdiction for regulating the use of licensed material including areas of exclusive Federal jurisdiction within Agreement States.

If the jurisdiction status of a Federal facility within an Agreement State is unknown, the licensee should contact the federal agency controlling the jurisdiction question to determine whether the proposed job site is an area of exclusive Federal jurisdiction. Authorization for use of radioactive materials at job sites in Agreement States not under exclusive Federal jurisdiction shall be obtained from the appropriate state regulatory agency.

11. A. Licensed materials shall be used by or under the supervision and in the physical presence of, or individuals who have been trained as specified in letters dated December 16, 2005 and February 21, 2006.

B. The Radiation Safety Officer for this license is Will C. Williams.

12. The licensee shall not vacate or release to unrestricted use a field office or storage location whose address is identified in Condition 10, without prior U.S. Nuclear Regulatory Commission approval.

13. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transport of Radioactive Material."

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NRC FORM 374A

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 4 of 5 PAGES

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 44

14. Pursuant to 10 CFR 39.91, the licensee is exempted from the requirements of 10 CFR 39.63(b) for use of remote handling tools. This exemption will remain in effect until formally withdrawn by the U.S. Nuclear Regulatory Commission.
15. Notwithstanding the periodic leak test required by 10 CFR 39.35, the requirement does not apply to sources, except sources containing plutonium, that are stored and not being used. The sources exempted from this periodic test shall be tested for leakage before use or transfer to another person. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
16. Notwithstanding the requirements of 10 CFR 39.47 and pursuant to 10 CFR 39.91, and in accordance with the statements, representations and procedures contained in letters dated July 14, 1997 (ML003724357), November 14, 1997 (ML003724575), January 20, 1998 (ML003724684), February 4, 1998 (ML003724694), and February 27, 2004 (ML040580735), the licensee may use radioactive markers with activities of 50 microcuries or less of iridium-192, scandium-46, antimony-124, and cobalt-60, and 100 microcuries or less of cesium-137 as pipe collar markers in oil and gas wells.
17. The licensee is authorized to hold byproduct material with a physical half-life of less than or equal to 120 days for decay-in-storage before disposal without regard to its activity. The licensee:
 - A. Monitors byproduct material at the surface before disposal and determines that its radioactivity cannot be distinguished from the background radiation level with an appropriate radiation detection survey meter set on its most sensitive scale and with no interposed shielding; and
 - B. Removes or obliterates all radiation labels and radiation labels on materials that are within containers and that will be managed as biomedical waste after they have been released from the licensee; and
 - C. Maintains records of the disposal of licensed materials for up to 3 years. The record must include the date of disposal, the survey instrument used, the background radiation level measured at the surface of each waste container, and the name of the individual who performed the disposal.
18. Notwithstanding the requirements of 10 CFR 20.2007, pursuant to 10 CFR 20.2002, and in accordance with the statements, representations, and procedures contained in correspondence dated May 4, 1993 (ML12243A227), April 20, 1994 (ML12243A209), January 17, 1996 (ML12243A188), February 13, 1996 (ML12243A188), and December 16, 2005 (ML060260462), the licensee may release well-logging sandouts and well returns, containing residual radioactive materials, into on-site shallow earthen pit provided that:
 - A. The total radioactive concentration of all isotopes is 1,000 picocuries/gram or less, and the physical half-life of the radioactive material is 120 days or less.
 - B. The residual radioactive tracer material (scandium-46, bromine-82, zirconium-95, antimony-124, iodine-131, iridium-192, or gold-198) being disposed of will be in the form of the patented "Zero-Wash" product in sandouts or well returns.

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NRC FORM 374A

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 5 of 6 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 44

- C. The licensee is required to use well logging beads known as "Zero-Wash", which are insoluble where the radioactivity will not migrate or leach into groundwater, as described in letter dated July 11, 1991 (ML033040193).
- D. The on-site shallow earthen pit disposal method has been permitted by the State, Territory, or Federal jurisdiction regardless of whether the job site is in an area where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.
- E. The licensee is required to maintain access control over the on-site shallow earthen pit until the radioactivity has decayed to unrestricted release levels.
- F. The licensee maintains an agreement with the owner or operator to control access to the on-site shallow earthen pit until the radioactivity has decayed to unrestricted release levels.
- G. The licensee is required to maintain records of disposal in accordance with 10 CFR 20.2108.
19. Notwithstanding the requirements of 10 CFR 20.2007, pursuant to 10 CFR 20.2002, and in accordance with the statements, representations, and procedures contained in correspondence dated August 23, 2000 (ML003758270), January 25, 2002 (ML033070068), and October 30, 2003 (ML033070340), the licensee may release well logging beads and well returns containing residual radioactive materials, into Class II Disposal Wells provided that:
- A. The total radioactive concentration of the waste is 1,000 picocuries/gram or less, and the physical half-life of the radioactive material is 30 years or less.
- B. The residual radioactive trace material is and may be, bromine-82, zirconium-95, antimony-124, iodine-131, iridium-192, or cesium-137 being disposed of in the form of the patented "Zero-Wash" product in sandbouts or well returns.
- C. The licensee is required to use well logging beads known as "Zero-Wash", which are insoluble where the radioactivity will not migrate or leach into groundwater, as described in letter dated July 11, 1991 (ML033040193).
- D. The well has been permitted by the State, Territory, or Federal jurisdiction to accept non-hazardous oil and gas waste regardless of whether the job site is in an area where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.
- E. The licensee is required to maintain access control over the Class II Disposal Well until the radioactivity has decayed to unrestricted release levels.
- F. The licensee maintains an agreement with the owner or operator to control access to the Class II Disposal Well until the radioactivity has decayed to unrestricted release levels.

Official Use Only – Security-Related Information

NRC FORM 374A

U.S. NUCLEAR REGULATORY COMMISSION

PAGE 6 of 8 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
42-26928-01

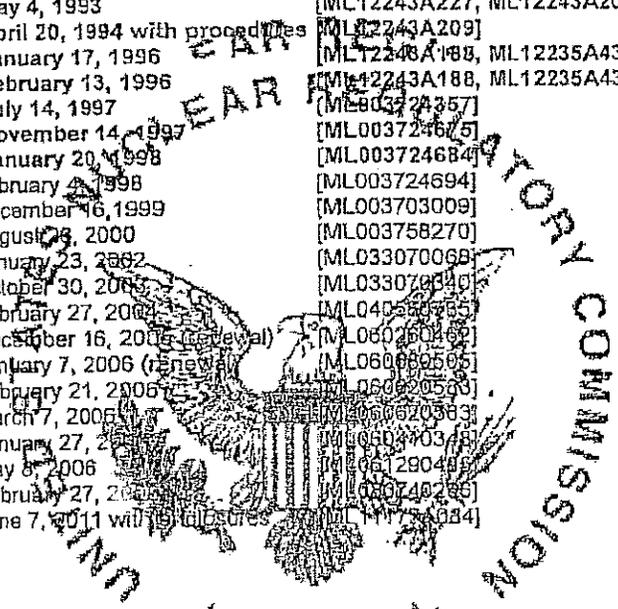
Docket or Reference Number
030-30429

Amendment No. 44

G. The licensee is required to maintain records of disposal in accordance with 10 CFR 20.2108.

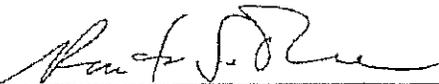
20. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Letter dated May 4, 1993 [ML12243A227, ML12243A209]
- B. Letter dated April 20, 1994 with procedures [ML12243A209]
- C. Letter dated January 17, 1996 [ML12243A188, ML12235A437]
- D. Letter dated February 13, 1996 [ML12243A188, ML12235A437]
- E. Letter dated July 14, 1997 [ML803724357]
- F. Letter dated November 14, 1997 [ML003724675]
- G. Letter dated January 20, 1998 [ML003724684]
- H. Letter dated February 4, 1998 [ML003724694]
- I. Letter dated December 16, 1999 [ML003703009]
- J. Letter dated August 28, 2000 [ML003758270]
- K. Letter dated January 23, 2002 [ML033070068]
- L. Letter dated October 30, 2003 [ML033070040]
- M. Letter dated February 27, 2004 [ML040550355]
- N. Letter dated December 16, 2005 (renewal) [ML060660462]
- O. Letter dated January 7, 2006 (renewal) [ML060660565]
- P. Letter dated February 21, 2006 [ML060660500]
- Q. Letter dated March 7, 2006 [ML060660383]
- R. Letter dated January 27, 2006 [ML060660345]
- S. Letter dated May 8, 2006 [ML061290485]
- T. Letter dated February 27, 2006 [ML060740286]
- U. Letter dated June 7, 2011 with procedures [ML111754024]



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date August 30, 2012

By 

Roberto J. Torres, Senior Health Physicist
Nuclear Materials Safety Branch B
Region IV
Arlington, Texas 76011-4511



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
511 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

File Copy

REGIONAL TECHNICAL ASSISTANCE REQUEST FORM

Date: January 24, 2003

Mail and E-Mail to: Donald A. Cool, Ph.D. (DAC), Director
Division of Industrial and Medical Nuclear Safety, NMSS
For E-Mail, cc: IMNS Secretary

From: Ken E. Brockman, Director *Ken E. Brockman*
Division of Nuclear Materials Safety (DNMS), RIV

Licensee(s): Core Laboratories, Inc. (DBA: ProTechnics Division of Core Laboratories)

License Number(s) 42-26928-01 Docket Number(s): 30-30429

Control Number: 468137

Letter(s) dated:

- August 23, 2000: Core Laboratories' license amendment request (LAR) for an alternate disposal method to allow licensed material in the form of waste returns with radioactive tracer material to be injected in Class II disposal wells.
- November 22, 2002: RIV's Safety & Technical Assessment - Core Laboratories' Request to Inject Well-logging Waste in Class II Disposal Wells

Enforcement Action being held in abeyance: () Yes (X) No

Suggested change in licensing procedure:

Regarding licensing actions, Region IV DNMS Nuclear Materials Licensing Branch (NMLB) requests technical assistance clarifying the following: (1) 10 CFR 51.22(c)(14)(xi) categorical exclusion for using sealed sources and radioactive tracers in well-logging, and (2) Current NRC guidance allowing the Regions to make decisions with appropriate documentation per the May 7, 2001, letter from the Division of Waste Management (DWM) (J.Greeves/M. Wong), "Guidance on the Preparation of Environmental Assessments for Licensing Actions by Regional Offices."

Problem/Issue:

On August 23, 2000, Core Laboratories submitted an LAR to RIV for an alternate disposal method that allows licensed material in the form of waste returns with radioactive tracer material to be injected in Class II disposal wells. Based on reviews of NRC guidance, discussions with NMSS (INMS and DWM), and considering the current Core Laboratories license, it was unclear that Region IV's NMLB could approve this LAR or any similar LARs in the future without NMSS reviewing a TAR on this matter.

Action Requested:

Approve the TAR by concurring with Region IV's November 22, 2002, Safety & Technical Assessment (enclosed therein) on Core Laboratories' LAR to inject well-logging radioactive waste into Class II Disposal Wells.

Recommended Action and Alternatives: Approve or Reject

TARs addressing similar issues (subject and date):

December 18, 1995: Division of Waste Management's TAR response approving Core Laboratories (ProTechnics) 1993 request for generic authorization for onsite burial of radioactive materials from well-logging sandouts, flowbacks, or any other form in an earthen pit pursuant to 10 CFR 20.2002.

Background documents:

- November 22, 2002: RIV's Safety & Technical Assessment - Core Laboratories' Request to Inject Well-logging Waste in Class II Disposal Wells
- January 23, 2002: Supplemental information from Core Laboratories
- January 11, 2002: Letter from the Alaska Oil & Gas Conservation Commission (AOGCC) that allowed Marathon Oil Company to inject waste returns with radioactive tracer material in Class II disposal well, Kenai Unit 24-7.
- August 23, 2000: Core Laboratories Inc. license amendment request for alternate disposal of licensed material in Class II wells.
- May 7, 2001: Letter from the Division of Waste Management (J. Greeves/M. Wong), "Guidance on the Preparation of Environmental Assessments for Licensing Actions by Regional Offices"
- May 3, 2000: State of Texas License that allows Core Laboratories to discard well-logging "sandouts" or other materials from oil and gas wells into Class II disposal wells.

SEPARATOR SHEET



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

November 22, 2002

MEMORANDUM TO: Jack E. Whitten, Acting Chief, Nuclear Materials Licensing Branch
(NMLB)

FROM: Louis G. Carson II, Sr. Health Physicist, NMLB *llc* 11/22/02
License Reviewer

SUBJECT: SAFETY & TECHNICAL ASSESSMENT - CORE LABORATORIES'
REQUEST TO INJECT WELL-LOGGING WASTE IN CLASS II
DISPOSAL WELLS

Background and Proposed Action

This memorandum is in reference to a license amendment request (LAR) submitted by Core Laboratories, Incorporated (dba: ProTechnics) dated August 23, 2000. Core Laboratories' LAR requested the allowance of an "Additional Disposal Alternative." Core Laboratories stated that they are allowed to place any well returns (containing radioactive tracer material) from a frac-job in an onsite earthen pit. In addition to this earthen pit disposal method, the licensee seeks approval to allow the well returns to be injected in Class II disposal wells that have been approved to accept non-hazardous oil and gas waste by State agencies.

Safety & Technical Assessment

I have reviewed this LAR and determined that RIV's NMLB could grant this request without a Technical Assistance Request (TAR) or Environmental Assessment (EA) to NMSS for review or approval. I have based this determination on reviews of NRC documents and discussions with NRC staff in RIV and HQ. RIV should grant this LAR based on the following: (1) 10 CFR 51.22(c)(14)(xi) is the categorical exclusion for using sealed sources and radioactive tracers in well-logging, (2) Current NRC guidance allows the Regions to make decisions with appropriate documentation, (3) An existing license condition allows Core Laboratories to dispose in earthen pits, and (4) This proposal to inject well returns down Class II disposal wells is safer than the current practice of placing radioactive waste into shallow earthen pits.

- (1) **10 CFR 51.22(c)(14)(xi)** is the categorical exclusion for using of sealed sources and radioactive tracers in well-logging.

(a) NRC's 10 CFR 51.14

The NRC's 10 CFR 51.14, states that: "Categorical Exclusion" means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which the Commission has found to have no such effect in accordance with procedures set out in §51.22, and for which, therefore, neither an environmental assessment nor an environmental impact statement is required.

(b) EPA's 40 CFR 1508.4

The EPA's 40 CFR 1508.4, states that: "Categorical Exclusion" means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (§ 1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. An agency may decide in its procedures or otherwise, to prepare environmental assessments for the reasons stated in § 1508.9 even though it is not required to do so. Any procedures under this section shall provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect.

(c) Statement of Considerations, March 1984: Categorical Exclusions 10 CFR 51.22(c)(14)

By definition a "Categorical Exclusion" means a category of actions which the NRC has determined do not individually or cumulatively have a significant effect on the human environment. Therefore, the NRC has determined that an EA or EIS is not required and would serve to divert scarce resources from more pressing business.

10 CFR 51.22(c)(14)(xi) categorically excluded the use of sealed sources and radioactive tracers in well-logging procedures. The NRC reviewed 89 well-logging incidents that occurred during the 20 years prior to 1984 in which well-logging sources had been abandoned down wells. An NRC risk assessment showed that only a small radiological risk existed to public health and safety from abandoned radioactive materials. The Commission carefully considered a comment that cited the loss of a 1-Curie americium-beryllium source down a well and subsequent decommissioning efforts. The Commission concluded that the environmental impact of licensing actions authorizing the use of sealed sources and radioactive tracer materials in well-logging procedures was negligible.

The NRC stated that routine safety measures also protect against significant environmental impacts from well-logging activities. Well-logging permits require that gas and oil wells be cased to below potable water aquifers to prevent cross contamination from brine, oil, and gas associated with wells. This requirement also serves to preclude contamination of portable water aquifers when radioactive materials

are used in these cased wells. In the event that radioactive material becomes irretrievable during a well-logging operation, safety requirements are imposed to minimize the escape of radioactivity from the surrounding areas. Additional requirements include mounting a permanent identification plaque at the surface of the well to alert anyone planning to enter the well to the existence of radioactive material. Also, a notification has to be placed in pertinent land records maintained by State oil and gas regulatory agencies to alert against drilling. The radioactive material is in the form of a very low solubility compound. The radioactive materials used as tracers in well-logging have short half-lives, and the quantities involved are small in the low millicurie range. The NRC concluded that using these tracers does not present any environmental impact because of the small quantities which decay to innocuous radioactivity levels in short periods of time.

- (2) Current NRC guidance allows the Regions to make decisions with appropriate documentation.

(a) NUREG-1748, Appendix E Categorical Exclusion Checklist

The NRC's NUREG-1748, Draft Report, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs provides a Categorical Exclusion Checklist in Appendix E. This checklist has been completed by the license reviewer as an enclosure to this document in support of this evaluation process. The answers to all four generic categorical exclusion questions were "No." It was concluded that this LAR for approval of an "Additional Disposal Alternative" is categorically excluded and requires no further environmental review. Additionally, an environmental assessment for this action is not required, since well-logging activities are categorically excluded under 10 CFR 51.22(c)(14)(xi).

(b) Division of Waste Management Guidance

A May 7, 2001, letter from the Division of Waste Management (J. Greeves/M. Wong), "Guidance on the Preparation of Environmental Assessments for Licensing Actions by Regional Offices" states that EAs are required for all licensing actions that are not categorically excluded per 10 CFR 51.22, not covered in an existing Environmental Impact Statement (EIS), and not required to have a prepared EIS. Concerning licensing actions with decommissioning issues, the May 2001 letter states that NRC staff will use categorical exclusions listed in 10 CFR 51.22(c)(20) for sealed sources or small quantities of short-lived radionuclides. The May 7, 2001, letter heavily references the guidance for the use of categorical exclusions contained in Policy and Guidance Directive FC 84-20, Revision 1. Section III of FC 84-20 covers license actions that have been found to be within the safety envelope of previous license actions that qualified under categorical exclusion per 10 CFR 51.22(c)(14)(i) - (xvi).

Section III of FC 84-20 states, in part, that if a previous technical and/or license-based analysis had been performed which bounded the environmental radiological hazards to the public for the specific generic issue, and the Region believes its specific license action is within the safety envelope of the previous analysis, the Region can cite the previous generic analysis, document its rationale for making this assessment, and file copies of the previous analysis and its rationale in the license file. No coordination with NMSS is necessary.

(c) NUREG-1556, Vol. 20, Section 4.10: Licensing Actions Eligible for Categorical Exclusion

NUREG-1556, Vol. 20, Section 4.10.2, states that license actions that clearly qualify for categorical exclusion under the provision of 10 CFR 51.22 are not required to have an EA or documentation in the license file specific to the issue of the EA. Such categorically excluded license actions do not need to be coordinated with NMSS with regard to whether an EA is needed. License actions that qualify for categorical exclusion after the NRC staff has completed additional technical and/or license-based justifications do not need an EA, nor do they need to be coordinated with NMSS with regard to whether an EA is needed. The licensing staff is required to place in the license file, written justification to support the determination that an EA is not needed.

Section 4.10.2, states that license actions not specifically listed in Category 14 of 10 CFR 51.22 will require a TAR. The Regions should perform a technical assessment to justify why the license action qualifies for a categorical exclusion under 10 CFR 51.22(c)(14)(xvi). However, Section 4.10.3 states that the use of tracers in well-logging is specifically covered by the categorical exclusion in 10 CFR 51.22(c)(14)(xi).

(3) **An existing license condition allows Core Laboratories to dispose in earthen pits under a generic authorization to bury radioactive material.**

(a) Core Laboratories' License Condition 17

Core Laboratories' License Condition 17 states, in part, that the licensee is authorized to hold radioactive material with a half-life of less than 120 days for decay-in-storage (DIS) before disposal in ordinary trash. License Condition 17 was added to the license in January 1996 after the Division of Waste Management's (DWM) review of a Technical Assistance Request (TAR) that was written by RIV in June 1993.

(b) Generic Authorization for Radioactive Material Disposal per 10 CFR 20.2002

In 1993 Core Laboratories (ProTechnics) requested a generic authorization to bury radioactive materials from well-logging sandouts, flowbacks, or any other form in an earthen pit pursuant to 10 CFR 20.2002. On December 18, 1995, DWM answered the TAR and approved the licensee's generic 10 CFR 20.2002 onsite burial request under a number of provisions including the following: (1) The licensee is required to assure that the concentration of radioactive material will be less than 1,000 pCi/gram. (2) The half-life of the radioactive material being disposed will be less than 120 days. Frac sands containing Cr-51, Rb-86, I-131, Xe-133, and I-131 had no further restrictions.

(3) For frac sands containing Sc-46, Zr-95, Sb-124, and Ir-192, the licensee is required to maintain access control over the burial site until the radioactivity has decayed to unrestricted release levels. (4) The licensee is required to use well-logging beads known as zero-wash, which are insoluble where the radioactivity will not migrate or leach into groundwater.

(c) Potential Doses to the Public from Onsite Burials

According to the 1995 TAR, the NRC reviewed the licensee's request for onsite burials at multiple locations in accordance with 10 CFR 20.2002. Potential doses to the public are required to be less than 100 millirem/year. In fact, the controls that the NRC set for the licensee assures that doses to the public from the onsite burials will not exceed 15 millirem/year. Also, the licensee is required to maintain records of the burial in accordance with 10 CFR 20.2108(a).

(4) **This proposal to inject well returns down Class II disposal wells is a safer than the current practice of placing radioactive waste into shallow earthen pits.**

(a) Earthen Pit Versus Class II Disposal Well

The licensee places several feet of soil over the disposal pit. There is more of a potential for access to these shallow pits by members of the public than Class II wells. Class II disposal wells must meet structural requirements and can be in excess of 250 feet deep. By regulatory design waste materials are injected into the wells, and only under extraordinary circumstances are waste materials recovered from Class II wells. The oil field owner and the licensee can maintain greater access control over a Class II disposal well. From an ALARA and occupational safety perspective, using Class II disposal wells instead of earthen pits are less risky.

(b) EA of the Radionuclides as Tracers in Enhanced Recovery of Oil & Gas (EOR)

NUREG/CR-3467, EA of the Radionuclides as Tracers In Enhanced Recovery of Oil and Gas (EOR) states that "EOR injection fluids into underground sources of drinking water are extremely unlikely because of strict underground injection control regulations (UIC). EOR operations are designated Class II wells and are subject to stringent construction, operating, monitoring, and reporting requirements."

(c) Class II Wells: EPA regulations 40 CFR 144

Class II Wells are described in EPA regulations under 40 CFR 144.6 as "Wells which inject fluids which are brought to the surface in connection with natural gas storage operations or conventional oil or gas production."

Some of the EPA requirements on Class II disposal well operators are found in 40 CFR 144.28 and include the following: Compliance with the Safe Drinking Water Act; 24-hour reporting of non-compliance; well plugging & abandonment planning, financial

assurance; well casing & cementing; operating & monitoring requirements; records retention; and change of ownership & operational control.

For purposes of this discussion, understand that the EPA defines and classifies three types of waste; Hazardous Waste, Radioactive Waste, and Mixed Waste as follows:

- Hazardous Waste means a hazardous waste as defined in 40 CFR 261.3.
- Radioactive Waste means any waste which contains radioactive material in concentrations which exceed those listed in 10 CFR Part 20, Appendix B, Table II, Column 2.
- Radioactive Mixed Waste: means a waste that contains both Resource Conservation and Recovery Act hazardous waste and source, special nuclear, or byproduct material subject to the Atomic Energy Act of 1954, as amended. Hazardous waste containing radioactive wastes are no longer hazardous waste when it meets the eligibility criteria and conditions of 40 CFR 266, Subpart N.

Note that the licensee [Core Laboratories] proposes to dispose of material into Class II wells with radioactivity concentrations that are less than 30 percent of the levels in 10 CFR Part 20, Appendix B. These levels do not meet the EPA's definition of radioactive waste. In the EPA's classification of wells in 40 CFR 144.6, the disposal of radioactive waste is not addressed in Class II wells, but is addressed in Class I, III, and IV wells.

(d) State of Alaska Class II Disposal Well Requirements

A letter dated January 11, 2002, from the Alaska Oil & Gas Conservation Commission (AOGCC) confirmed that Marathon Oil Company's Class II disposal well, Kenai Unit 24-7 was allowed to inject waste returns with radioactive tracer material. The tracer material was Core Laboratories' "Zero Wash" product. This particular Class II well had been permitted under Disposal Injection Order No. 11 by the AOGCC in November 1996 under the provisions of 40 CFR Part 144. The letter states that the disposal of used tracer material did not qualify as Class II waste, and that Disposal Injection Order No. 11 did not relieve them from obtaining additional authorizations from other federal, state, or local authorities.

I spoke to the AOGCC engineer concerning Class II disposal wells. He explained that only oil and gas material returns (drill fluids including mud, sand, tracer residue, and other solids) are allowed to be injected into Class II disposal wells. The State issued permits for the construction and use of these wells. The user has to file an application, and the well has to meet aquifer, groundwater, and integrity testing requirements. In general, materials are injected into these disposal wells, and nothing is taken out of the wells.

I reviewed the AOGCC's program for the implementation of Class II well and underground injection control. The AOGCC's process includes the following: application, technical review of the permit by petroleum engineers and geologist, confining system determination, casing and cement requirements, integrity monitoring, application meeting between the AOGCC and operator, Commissioners' review, public hearing, and issuance of the injection order.

(e) State of Texas Class II Disposal Well Requirements

Core Laboratories provided the NRC a copy of their State of Texas license that allows them to discard well-logging "sandout" or other materials from oil and gas wells into Class II disposal wells.

I spoke to the Texas Bureau of Radiation Control (TBRC), former chief of Industrial Licensing Program, about the criteria they used for granting this licensed material disposal method. The TBRC representative explained that no specific rationale existed regarding their decision to amend the license for disposals in Class II wells. However, approval to inject radioactive well returns into Class II wells are granted by the Texas Railroad Commission, Environmental Section. I spoke to a representative of the Texas Railroad Commission and reviewed Texas requirements for Class II well disposals. The Texas Railroad Commission process includes the following: application; technical review of the permit; area determination; integrity monitoring and reporting; geological, casing, operating standard equipment, public hearing; and issuance of the permit.

All permit applications for Class II wells and disposal comes to the Environmental Services Section, where they are evaluated and processed. If required, the Environmental Services Section requests that a hearing be scheduled, and the Commission provides notice to all interested persons. After the hearing, the examiners recommend final action to the Commissioners to decide if the permit will be issued. If no protests are received on an application, the Director of Environmental Services may administratively approve the application.

Jack Whitten

-8-

Conclusions

Region IV believes that this LAR for an "Additional Disposal Alternative" for well-logging waste to be injected into Class II disposal wells is within the safety envelope of previous generic safety analyses. Specifically, the safety analysis referenced in the March 1984 Statement of Considerations for the 10 CFR 51.22(c)(14)(xi) well-logging categorical exclusion and DWM's December 1995 approval of Region IV's TAR for allowing a generic onsite disposal of well-logging waste are being cited as generic analyses supporting this determination. Additionally, the use of tracers in well-logging is specifically covered by the categorical exclusion in 10 CFR 51.22(c)(14)(xi). No further environmental review, assessment, or documentation are required based the guidance that is provided in Section 2 of this document and the Categorical Exclusion Checklist enclosed.

Enclosure: As stated

ENCLOSURE

CATX Checklist

Action Name: Core Laboratories (dba: ProTechnics) Lic#42-26928-01

Action Location: N/A

Action Description: Additional Disposal Alternative to place well-logging waste into Class II disposal wells

CATX Category: 10 CFR 51.22(c)(14)(vi)

	YES	No	Need Data
A. Is the action likely to significantly affect any aspect of the natural environment?		X	
B. Is the action likely to significantly affect any aspect of the cultural environment including those that might be related to environmental justice?		X	
C. Is the action likely to generate a great deal of public interest about any environmental issue?		X	
D. Is there a high level of uncertainty about the action's environmental effects?		X	

CONCLUSIONS:

- 1. The action is a CATX and requires no further environmental review.
- 2. The action is a CATX but requires further review under one or more other environmental authorities (list).
- 3. The action requires an EA.
- 4. The action requires an EIS.

Alison B 11/21/02
License Reviewer Date

SEPARATOR SHEET



ProTechnics
6316 Windfern, Room 310
Houston, Texas 77040 USA
Tel: 713-328-2310
Fax: 713-328-2161
www.protechnics.com

TOM HAMPTON
President

FEB - 1 2002

January 23, 2002

Mr. Jack E. Whitten
Senior Health Physicist
Nuclear Materials Licensing Branch
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Re: License No. 42-26928-01

Dear Mr. Whitten:

Enclosed are copies of letters that I e-mailed you about yesterday. For your reference also enclosed is a copy of the original letter sent to you asking for an amendment of our license for disposal into a Class II disposal well.

Please call me at above number as soon as you receive this letter or if you have any questions.

Thank you for your prompt attention in this matter.

Sincerely,

Tom Hampton
President

TH:ym

Enclosure

CLB
NYSE

468137



ProTechnics
6316 Windfern
Houston, Texas 77040 USA
Tel: 713-328-2320
Fax: 713-328-2153
www.protechnics.com

AUG 31 2000

August 23, 2000

Mr. Jack E. Whitten
Senior Health Physicist
Nuclear Materials Licensing Branch
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

RE: License No. 42-26928-01

Dear Mr. Whitten:

The purpose of this letter is to request an amendment to our radioactive material license to allow an additional disposal alternative. Currently, we are allowed to place any well returns (containing radioactive tracer material) from a frac job in the on site earthen pit. In addition to this method, we would like approval to allow the well returns to be disposed of in a Class II Disposal Well permitted to accept non-hazardous oil & gas waste.

We are currently licensed in the State of Texas (copy enclosed) for this method of disposal. The oil customers we work with are requesting this method to save time and expense as they currently dispose of some well work over fluids by this method.

The half-life of the tracer material we will dispose of by this method will be less than 90 days. The maximum concentration of the tracer material in the well returns will be less than 1,000 pCi/gm. The transport of the well returns will be by an enclosed steel frac tank.

In addition, please amend the license to change the mailing address to:

6316 Windfern
Houston, Texas 77040

ADAMS # ML003758270
Template _____
Date 8/23/00 QC'd by _____

CLB
EX-100
NYSE

468137

The post office changed the mailing address. The location of the facility remains the same.

If you have any questions or need additional information, please call.

Sincerely

A handwritten signature in cursive script that reads "Will Williams". The signature is written in black ink and is positioned above the printed name.

Will Williams
Corporate Radiation Safety Officer

Enclosures



Marathon Oil Company

Candace J. Walker
Attorney
Law - Health, Environment & Safety
5555 San Felipe Street (77056-2789)
P. O. Box 4813 (77210-4813)
Houston, Texas USA
Telephone: 713-296-2633
Fax: 713-296-4386
Email: CJWalker@MarathonOil.com

January 22, 2002

By Fax: 713/328-2161
Tom Hampton, President
ProTechnics
A Core Laboratories Company
6316 Windfern, Rm. 310
Houston, Texas 77040

COPY

Re: NRC approval for injection in Non- Agreement States

Dear Mr. Hampton,

Marathon is writing to make a formal request that ProTechnics submit a request to the Nuclear Regulatory Commission (NRC) to allow disposal via injection of ProTechnics' patented radioactive tracers known as "Zero Wash". The NRC approval for injection will assist both Marathon and other ProTechnics customers in obtaining injection approval in affected non-agreement states.

As you know, Marathon submitted an approval for injection packet to the Alaska Oil and Gas Conservation Commission (AOGCC). Pursuant to your earlier discussions with Mark Susich, Marathon Alaska office, attached is a copy of Marathon's AOGCC approval letter for use as a supporting exhibit in your NRC request. Please send me a copy of your NRC approval request via fax at 713-296-4386 or mail to my attention at P. O. Box 4813, Houston, Texas 77210-4813. Also, please inform me when you receive the NRC authorization.

Marathon would like to see ProTechnics take prompt action on this issue. This is an important issue to Marathon. As you know, Marathon is a company dedicated to environmental compliance. Please feel free to contact my office with any questions.

Sincerely,

Candace J. Walker, Esq.

CJW:pph

cc: Mark Susich
Marathon-Anchorage

Mr. Tom Hampton
ProTechnics
January 22, 2002
Page 2 of 2.

cc: By Fax: 713/328-2163
Larry J. Stephenson, P.E., C.P.S.M.
ProTechnics
6316 Windfern
Houston, Texas 77040

Enclosure

STATE OF ALASKA

ALASKA OIL AND GAS CONSERVATION COMMISSION

JAN 15 2002
PATTON BOGGS LLP
TONY KNOWLES, GOVERNOR

333 W. 7TH AVENUE, SUITE 300
ANCHORAGE, ALASKA 99501-3524
PHONE (907) 270-1453
FAX (907) 270-7512

January 11, 2002

Mr. Kyle Parker
Patton Boggs LLP
1031 West Fourth Avenue, Suite 504
Anchorage, AK 99501

COPY

Re: Class II Disposal of Tracer Returns

Dear Mr. Parker:

You have asked the Commission for confirmation that your client, Marathon Oil Company ("Marathon"), is permitted to dispose of certain radioactive tracer returns in the Kenai Unit 24-7 Class II disposal well.

Disposal Injection Order No. 11, issued by the Commission on November 21, 1996, authorizes the operator of the Kenai Unit 24-7 well to inject "Class II oil field fluids" in a specified interval of the well in conformance with 20 AAC 25. The Commission's regulation on underground disposal, 20 AAC 25.252, refers to 40 C.F.R. 144.6(b) for the classification of a Class II well. The latter provision, in turn, describes a Class II well, in relevant part, as a well that injects fluids

that are brought to the surface in connection with . . . conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.

40 C.F.R. 144.3 provides that the term "[h]azardous waste means a hazardous waste as defined in 40 CFR 261.3." The latter regulation excludes the following from the definition of hazardous waste: "Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy." See 40 C.F.R. 261.3(a)(1) and 40 C.F.R. 261.4(b)(5).

Marathon has employed the firm ProTechnics to assist in evaluating well completions using ProTechnics' radioactive tracers known as "Zero Wash." You have informed the Commission that the tracers aid in detailing the completion placement and effectiveness of Marathon's hydraulic fracturing and acidizing treatments. You have also informed the Commission that the use and disposal of the radioactive tracers are regulated by the Nuclear Regulatory Commission.

Mr. Kyle Parker
January 11, 2002
Page 2 of 2

The Commission understands that sands returned to the surface may contain some Zero Wash tracer beads and that it is such sands that Marathon wishes to dispose of in the Kenai Unit 24-7 well. Since this material has been brought to the surface in connection with conventional oil or gas production operations, it appears to qualify as Class II waste. The second criterion listed in 40 C.F.R. 144.3, concerning classification as hazardous waste, may apply only to waste waters from gas plants. However, even if this criterion applies to the Zero Wash tracer returns, they appear to qualify as non-hazardous wastes under the exclusion for "wastes associated with the exploration, development, or production of crude oil [or] natural gas."

It should be noted that the disposal of *unused* tracer material is an entirely different matter. Such material would not appear to qualify as a Class II waste. The Commission understands that the only tracer material Marathon proposed to dispose of in the Kenai Unit 24-7 well is material that has actually been used downhole for bona fide well completion purposes.

Please note further that the Commission's authorization under Disposal Injection Order No. 11 does not relieve the operator from the responsibility to obtain any additional authorizations that may be required from federal, state, or local authorities.

Sincerely,

Carmy Dechli Taylor
Carmy Dechli Taylor
Chair

COT/ljc

SEPARATOR SHEET



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 7, 2001

MEMORANDUM TO: George Pangburn, Director, Region I/DNMS
Douglas M. Collins, Director, Region II/DNMS
Cynthia D. Pederson, Director, Region III/DNMS
Dwight D. Chamberlain, Director, Region IV/DNMS

FROM: John T. Greeves, Director, Division of Waste Management, NMSS

SUBJECT: GUIDANCE ON THE PREPARATION OF ENVIRONMENTAL
ASSESSMENTS FOR LICENSING ACTIONS BY REGIONAL OFFICES

As you may be aware, my Division has lead responsibility for the review of Environmental Assessments (EAs) and the preparation of Environmental Impact Statements (EISs) for the Office of Nuclear Material Safety and Safeguards licensing actions, involving fuel cycle, uranium recovery, decommissioning, low level waste, and spent fuel facilities, to ensure consistency and compliance with the requirements of 10 CFR Part 51. The purpose of this memorandum is to inform staff in the regional offices of the approach that should be used for preparing EAs.

EAs must be prepared for all proposed licensing actions that are:

- not categorically excluded (10 CFR 51.22),
- not covered in an existing EIS, and
- not required to have an EIS prepared (10 CFR 51.20).

Guidance for the use of categorical exclusions is contained in Revision 1, Supplement to Policy and Guidance Directive FC B4-20: "Impact of Revision of 10 CFR Part 51 on Materials License Actions" (attached). That Supplement suggests that 10 CFR 51.22(c)(11) and (c)(14) could be used for decommissioning activities. However, because of a 1997 amendment to Part 51, references to Sections (c)(11) and (c)(14) are no longer appropriate for decommissioning actions. Users of the Supplement are hereby directed to use 10 CFR 51.22(c)(20) for decommissioning actions. The Supplement will be revised or replaced by other guidance documents to be issued within the next 3-4 months.

The categorical exclusion listed in 10 CFR 51.22(c)(20) pertaining to sealed sources or small quantities of short-lived radionuclides is the only categorical exclusion available for residual materials and releases associated with decommissioning. Such radionuclides include Tc-99m and I-131, among others. Written justification to support the use of categorical exclusions should be documented in the license file.

CONTACT: Melanie Wong, NMSS/DWM
(301) 415-6262



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

FEB 9 1994

MEMORANDUM FOR: Those on Attached List

FROM: Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety, NMSS

SUBJECT: REVISION 1, SUPPLEMENT TO POLICY AND GUIDANCE DIRECTIVE
FC 84-20: "IMPACT OF REVISION OF 10 CFR PART 51 ON
MATERIALS LICENSE ACTIONS"

This supplement replaces the supplement to FC 84-20 dated February 19, 1992, and provides guidance on materials license actions that qualify for categorical exclusion under 10 CFR 51.22(c)(14)(i) through (xv), and also guidance for determining when field studies and other materials license actions are eligible for categorical exclusion in accordance with 10 CFR 51.22(c)(14)(xvi).

BACKGROUND:

Licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review include those actions listed in § 51.22(c)(14)(xvi), which states:

(14) Issuance, amendment, or renewal of materials licenses issued pursuant to 10 CFR parts 30, 31, 32, 33, 34, 35, 36, 39, 40 or part 70 authorizing the following types of activities:

(xvi) Any use of source, byproduct, or special nuclear material not listed above which involves quantities and forms of source, byproduct, or special nuclear material similar to those listed in paragraphs (c)(14)(i) through (xv) of this section (Category 14)

If a particular materials license action does not fall under a categorical exclusion in §§ 51.22(c)(14)(i) through (xv), it may still be eligible for exclusion under § 51.22(c)(14)(xvi). However, as stated in the March 1, 1984 memorandum, from the Deputy Director, Office of Nuclear Material Safety and Safeguards (NMSS), (See Attachment to PG&D FC 84-20), the Commission has directed the staff, in a Staff Requirement Memorandum, dated February 28, 1984, to prepare:

"a written memorandum explaining why the action qualifies for the categorical exclusion (emphasis in original) selected. The written memorandum shall include a discussion of the factors listed in the

Attachment

1994

MEMORANDUM FOR: Those on Attached List

C. H. Hehl, Director
Division of Radiation Safety and Safeguards, RI

J. Philip Stohr, Director, Director
Division of Radiation Safety and Safeguards, RII

William L. Axelson, Director
Division of Radiation Safety and Safeguards, RIII

Dwight D. Chamberlain, Acting Director
Division of Radiation Safety and Safeguards, RIV

Ross A. Scarano, Director
Division of Radiation Safety and Safeguards, RV

John E. Glenn, Chief
Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Frederick C. Combs, Chief
Operations Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Robert L. Baer, Chief
Source Containment and Devices Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Charles J. Haughney, Chief
Storage & Transport Systems Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Multiple Addressees

MAR 19 1994

2

selected subsections¹ and shall become part of the permanent docket or record relating to that action."

This written memorandum should be signed by the Director, Division of Industrial and Medical Nuclear Safety (IMNS), NMSS, or his delegate, and should be included in the license file.

As noted in Policy and Guidance Directive (PG&D) FC 84-20, the NRC may prepare an EA or statement in any case as it deems appropriate, regardless (emphasis added) of whether it is covered by a categorical exclusion. The preparation of all EAs or statements for materials license actions needs to be coordinated with NMSS.

GUIDANCE:

Guidance on the use of categorical exclusions is provided below in three sections for convenience: (i) Exclusions under § 51.22(c)(14)(i) through (xv), (ii) Exclusions under § 51.22(c)(14)(xvi), and (iii) Exclusions based on license actions found to be within the safety envelope of previous license actions that qualified under i and ii.

I. License Actions That Qualify for Categorical Exclusion Under §§ 51.22(c)(14)(i) through (xvi)

Since these license actions do not need an EA, coordination with NMSS with regard to an EA normally is not needed. However, in the case of novel or unusual license applications in this category, the regions should consult with NMSS, at an early stage of the review, on the possible need for an EA.

(A) License actions that clearly qualify for categorical exclusion under §§ 51.22(c)(14)(i) through (xv) - Such license actions, except for license termination actions (see Section I.(B)(i) below), do not need an EA or documentation in the license file with regard to the issue of an EA. Nor do such license actions need to be coordinated with NMSS with regard to whether an EA is needed.

(B) License actions that qualify for categorical exclusion under §§ 51.22(c)(14)(i) through (xv) based on additional technical and/or license-based justifications - Such license actions do not need an EA. Nor do such license actions necessarily need to be coordinated with NMSS with regard to whether an EA is needed. Unless otherwise stated below, the licensing staff needs to place, in the license file, written justification to support the determination that an EA is not needed. Examples of license actions which will need either documentation or justification are discussed below.

¹The "selected subsections" are §§ 51.22(c)(9), (c)(11, or (c)(14)(xvi). For materials licensees, the only exclusion that applies is § 51.22(c)(14)(xvi).

(i) All license termination actions - Documentation is required regardless of whether a license termination action clearly qualifies for a categorical exclusion under §§ 51.22(c)(14)(i) through (xv).

(a) For routine license termination actions that clearly qualify for categorical exclusion under §§ 51.22(c)(14)(i) through (xv), the close out survey and the submitted form NRC-314 which certifies the proper disposition of the licensee's radioactive materials, are sufficient documentation. Additional documentation for more complex license termination actions will be determined by the regions on a case-by-case basis. Only complex license termination actions, such as a license action that requires the submittal of a decommissioning plan (e.g., 10 CFR 30.36(c)(2)(i)), will require documentation of the justification to support why an EA is not needed. In many cases, such license actions need to be coordinated with the Division of Low-Level Waste and Decommissioning (LLWM) of NMSS (see Section (c) below). LLWM is responsible for providing the justification for any license termination action the regions has coordinated with LLWM.

(b) For license actions that qualify for categorical exclusion under §§ 51.22(c)(14)(i) through (xv) based on additional technical and/or license-based justification, the licensing staff will need to place in the license file, justification to support a determination that an EA is not needed. License termination actions for this group of licenses, if the justification has already been provided for the license, can follow section (a) above. Otherwise, the necessary justification needs to be placed in the license file.

(c) LLWM will coordinate with NMSS for the determination on whether an EA is needed (see Enclosure C), on those actions which have been referred to them. Unless otherwise noted, the regions can use LLWM's responses to them concerning decommissioning activities as the region's justification to support a determination that an EA is not needed.

(ii) The performance of field studies in which licensed material originating onsite is deliberately released directly into the environment for the purposes of the study - If a research and development or academic institution application proposes to release to the environment radioactive materials that originated onsite (i.e., within the controlled property of the licensee), an EA is normally not needed and is covered under categorical exclusion § 51.22(c)(14)(v) provided:

² Even if a particular license action will meet these criteria, the Region can request NMSS to make a determination on whether a Sholly-type notice should be issued (see footnote 3 below).

(a) All releases, originating onsite, to the environment (e.g., air and liquid effluents, direct radiation from deposition of radioactive materials from the release (e.g., groundshine), etc.) comply with ALARA and Part 20 requirements.

(b) To assist in demonstrating compliance with the requirements of 10 CFR Part 20, the licensee should set ALARA goals for air effluents at a modest fraction of the values in Appendix B, Table 2, Columns 1 and 2, to §§ 20.1001-20.2401. Experience indicates that values of about 10 millirems per year from all of the licensee's radioactive air effluents should be practicable for almost all materials facility licensees (see Regulatory Guide 8.37). Therefore, as a first step toward demonstrating compliance with ALARA for radioactive air effluents, the licensee demonstrates that the nearest member of the general public receives no more than 10 millirems per year from all of the licensee's radioactive air effluents (i.e., licensee demonstrates it meets the Environmental Protection Agency's air emission standard).

(c) All releases onsite comply with all applicable decommissioning requirements (e.g., decommissioning recordkeeping requirements pursuant to 10 CFR 30.35(g), etc.) and current decommissioning policies.

Documentation that supports the licensee's application as meeting the above criteria is sufficient to support why an EA is not needed. For license actions that cannot meet the above criteria, the regions should coordinate with IMNS to determine whether an EA is needed. For example, an EA would be required for discrete sources released to the environment, that originated onsite, and which may not be recovered at the conclusion of the study or decommissioning.

II. License Actions That Qualify For Categorical Exclusion Under § 51.22(c)(14)(xvi)

All license actions that qualify for categorical exclusion under § 51.22(c)(14)(xvi) will require a Technical Assistance Request (TAR) to IMNS. The Director, IMNS, or his delegate, will respond to the TAR with a memorandum to the region that originated the TAR. In addition, the Director, IMNS, or his delegate, may choose to publish a notice in the FEDERAL REGISTER, similar to that required by 10 CFR 50.91(a)³, on the availability, to the public, of the IMNS memorandum. Upon completion of all IMNS actions, the IMNS memorandum is to be included in the official license file.

³ These FR notices are commonly referred to as Sholly Notices, which declare to the public that no significant hazards, based on staff analysis, will result following the approval of such license actions.

(A) Field Studies - Supplemental information to the Final Rule (49 CFR, 9352, March 12, 1984,) page 9377, for "use of radioactive materials for research and development and for educational purposes" concerning categorical exclusion § 51.22(c)(14)(v) states:

"This categorical exclusion does not encompass (a) processing or manufacturing, (b) performance of field studies in which licensed material is deliberately released directly into the environment for purposes of the study, or (c) use of radioactive tracers in field flood studies involving secondary and tertiary oil and gas recovery."

Thus, field studies in which licensed material is deliberately released directly into the environment, for purpose of the study, or use of radioactive tracers in field flood studies involving secondary and tertiary oil and gas recovery, cannot, by themselves, qualify for categorical exclusion under § 51.22(c)(14)(v). However, if such studies qualify for categorical exclusion under § 51.22(c)(14)(xvi), an EA will not be needed. Enclosure A gives an example of a field study which did not require an EA.

To expedite the processing of the TAR, the Regions should perform an initial technical assessment, to be enclosed with the TAR, to justify why the field study qualifies for categorical exclusion under § 51.22(c)(14)(xvi). Enclosure B provides the type of information that should be submitted to assist the Director, IMNS, or his delegate, in developing the necessary documentation, to be placed in the licensee's file, as directed by the Commission under categorical exclusion § 51.22(c)(14)(xvi).

(B) Others - Paragraph 51.22(c)(14)(xvi) of 10 CFR Part 51 can also be used for license actions, other than field studies, as justification for not performing an EA. A TAR to IMNS will be needed. The Regions should perform either an initial technical assessment or provide the license-based rationale (i.e., based on the licensing, inspection, and other information) on why the particular license action qualifies for categorical exclusion under § 51.22(c)(14)(xvi). Enclosures C and D give examples of the type of information that should be submitted to the Director, IMNS, or his delegate, in developing the necessary documentation, to be placed in the licensee's file, as directed by the Commission for not performing an EA under categorical exclusion § 51.22(c)(14)(xvi).

III. License Actions That Have Been Found To Be Within The Safety Envelope Of Previous License Actions That Qualified Under Categorical Exclusion §§ 51.22(c)(14)(i) through (xvi)

⁴ The staff interprets these releases to be those that originated offsite.

1994

Multiple Addressees

6

If a previous technical and/or license-based analysis had been performed which bounded the environmental radiological hazards to the public for the specific generic issue and the Region believes its specific license action is within the safety envelope of the previous generic analysis, the Region can cite the previous generic analysis, document its rationale for making this assessment, and file copies of the previous analysis and its rationale in the license file. No coordination with NMSS is necessary. If the previous analysis referenced categorical exclusion § 51.22(c)(14)(xvi), the documentation shall include the original memorandum from the Director, IMNS, or his delegate.



Carl J. Paperiello, Director
Division of Industrial and
Medical Nuclear Safety, NMSS

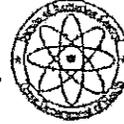
Enclosures:

- A. Memo fm C. Paperiello to R. Bellamy dtd 12/8/93
- B. Note fm D. Howe to File dtd 11/23/93
- C. Memo fm C. Paperiello to W. Axelson dtd 11/16/93
- D. Memo fm C. Paperiello to C. Hehl dtd 10/20/93

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SEPARATOR SHEET



RADIOACTIVE MATERIAL LICENSE

Pursuant to the Texas Radiation Control Act and Texas Health Department regulations on radiation, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Texas Department of Health (Agency) now or hereafter in effect and to any conditions specified below.

LICENSEE		This license is issued in response to a letter	
1. Name	PROTECHNICS DIVISION OF CORE LABORATORIES INC ATTN WILL C WILLIAMS 1160 DAIRY ASHFORD SUITE 444 HOUSTON TX 77079	Dated: March 3, 2000	Signed by: Larry J. Stephenson
2. Address		3. License Number L03835	Amendment Number 37
PREVIOUS AMENDMENTS ARE VOID			
		4. Expiration Date August 31, 2005	

RADIOACTIVE MATERIAL AUTHORIZED			
5. Radioisotope A. Any radioactive material with atomic number less than 83 and with a half-life less than 120 days	6. Form of Material A. Any (except sealed sources)	7. Maximum Activity* A. No single unit quantity to exceed 40 mCi Total activity of any single radioisotope not to exceed 2 Ci.	8. Authorized Use A. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
B. Ir-192/Ir-194	B. Any (except sealed sources)	B. No single unit quantity to exceed 40 mCi of either isotope Total: 15 Ci	B. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
C. Sc-46	C. Any (except sealed sources)	C. No single unit quantity to exceed 40 mCi Total: 4000 mCi	C. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
D. Sb-124	D. Any (except sealed sources)	D. No single unit quantity to exceed 40 mCi Total: 4000 mCi	D. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
E. Kr-85	E. Any (except sealed sources)	E. No single unit quantity to exceed 20 Ci Total: 40 Ci	E. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
F. Co-60	F. Any (except sealed sources)	F. No single unit quantity to exceed 20 mCi Total: 500 mCi	F. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.

* Ci-Curies mCi-Millicuries μ Ci-Microcuries



Texas Department of Health
BUREAU OF RADIATION CONTROL



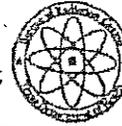
RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

5. Radioisotope (continued)	6. Form of Material (continued)	7. Maximum Activity* (continued)	8. Authorized Use (continued)
G. H-3	G. Any (except sealed sources)	G. No single unit quantity to exceed 20 Ci Total: 300 Ci	G. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
H. C-14	H. Any (except sealed sources)	H. No single unit quantity to exceed 20 mCi Total: 1 Ci	H. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
I. P-32	I. Any (except sealed sources)	I. No single unit quantity to exceed 20 Ci Total: 100 Ci	I. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
J. Cl-36	J. Any (except sealed sources)	J. No single unit quantity to exceed 20 mCi Total: 500 mCi	J. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
K. Fe-55	K. Any (except sealed sources)	K. No single unit quantity to exceed 20 mCi Total: 500 mCi	K. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
L. Co-58	L. Any (except sealed sources)	L. No single unit quantity to exceed 20 mCi Total: 500 Ci	L. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
M. Ni-63	M. Any (except sealed sources)	M. No single unit quantity to exceed 20 mCi Total: 500 mCi	M. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
N. Sr-90	N. Any (except sealed sources)	N. No single unit quantity to exceed 20 mCi Total: 500 mCi	N. Tracer studies in oil, gas and geothermal wells. Field flood studies and inter-well tracer studies.
O. Ir-192, Sb-124, Sc-46	O. Zero Wash ^o beads	O. No single source to exceed 50 μ Ci	O. Collar markers in gas and oil wells.



Texas Department of Health
BUREAU OF RADIATION CONTROL



RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

5. Radioisotope (continued)	6. Form of Material (continued)	7. Maximum Activity* (continued)	8. Authorized Use (continued)
P. Co-60	P. Metal Strips	P. No single source to exceed 50 μ Ci	P. Collar markers in gas and oil wells.
Q. Cs-137	Q. Solid	Q. No single source to exceed 50 μ Ci	Q. Collar markers in gas and oil wells.
R. Am-241	R. Sealed source (Gtrn Model AN-HP; GN Model VL-1; BEBIG Model Am.G11)	R. No single source to exceed 250 μ Ci	R. Calibration and stabilization source in Halliburton TSCAN logging tool.
S. Ba-133	S. Sealed source (IPL Model HEG-133)	S. No single source to exceed 2 mCi	S. Calibration/stabilization source in Cedar Bluff Group fluid identification tool.
T. Am-241	T. Sealed source (IPL Model HEG-241)	T. No single source to exceed 250 μ Ci	T. Calibration/stabilization source in Halliburton TSCAN logging tool.

9. The licensee shall comply with the provisions (as amended) of Title 25 Texas Administrative Code (TAC) §289.201, §289.202, §289.203, §289.204, §289.205, §289.252, §289.253 and §289.257.

10. Radioactive material shall only be stored at:

Site Number	Location
004	Kilgore - 2505 Highway 42 North
005	Houston - 1160 Dairy Ashford, Suite 444
006	Alice - 815 Commerce Street
007	Midland - 2001 Commerce Street
008	Houston - 9830 Rosprim

11. The licensee shall limit storage of Ir-192 and Ir-194 to 5000 mCi at all storage locations except the Kilgore, Texas facility which is authorized to maintain no more than 15 Ci of Ir-192 and Ir-194 total. This condition does not supersede the maximum allowable activity as authorized in Part B of Condition 7.

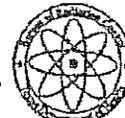
12. The authorized place of use is at temporary sites, in areas not under exclusive Federal jurisdiction, throughout Texas.

13. In addition to the possession limits in Condition 7, the licensee shall further restrict the possession of licensed material to quantities below the limit specified in 25 TAC §289.252(u)(4)(C) for establishing decommissioning financial assurance.

14. Radioactive material shall be used by, or under the direct supervision of, individuals designated by the Radiation Safety Officer (RSO) only after each worker has successfully completed an Agency accepted training course. Documentation verifying the successful completion of the training for each worker shall be maintained by the licensee for inspection by the Agency.



Texas Department of Health
BUREAU OF RADIATION CONTROL



RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

15. The individual designated to perform the functions of RSO for activities covered by this license is **Will C. Williams**.
16. Radioactive material shall not be stored or used at a permanent site unless that site is specifically authorized on this license. A site is considered permanent if radioactive material is stored and/or used at that location for more than 90 days in any twelve month period.

In accordance with 25 TAC §289.202(o)(1) and §289.202(ddd)(1), the licensee is hereby exempted from limits required in 25 TAC §289.202(ggg)(2) and §289.2029(ggg)(3), when radioactive material is released during a "sandout" or when material must otherwise be reversed out of a gas or oil well. The released material shall be handled and/or disposed in a manner outlined in the procedures submitted with the application dated July 27, 1995, or its amended classification approval for non-hazardous waste.

18. Individuals involved in operations which utilize, during any 24 hour period, more than 50 mCi of I-125 and/or I-131 or unvented laboratory operations involving 10 mCi of I-125 and/or I-131 in a noncontained form shall have bioassays performed within one week or if the use of I-125 and/or I-131 is on a continual basis, bioassays shall be performed once every two weeks. Records of the bioassays shall be maintained for inspection by the Agency and the action points listed below shall be observed.

A. Whenever the thyroid burden at the time of measurement exceeds 0.12 μ Ci of I-125 or 0.04 μ Ci of I-131, the following actions shall be taken:

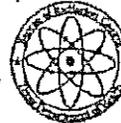
- (1) An investigation of the operations involved, including ventilation surveys shall be carried out to determine the causes of exposure and to evaluate the potential for further exposures.
- (2) If the investigation indicates that further work in the area might result in exposure of a worker to concentrations that are excessive, the licensee shall restrict the worker from further exposure until the source of exposure is discovered and corrected.
- (3) Corrective actions that will eliminate or lower the potential for further exposures shall be implemented.
- (4) A repeat bioassay shall be taken within 1 week of the previous measurement in order to confirm the effectiveness of the corrective action taken or to verify internal radioiodines present.
- (5) Reports or notification shall be provided as required by 25 TAC §289.202(yy) and §289.202(aaa).

B. If the thyroid burden at any time exceeds 0.5 μ Ci of I-125 or 0.14 μ Ci of I-131, the following actions shall be taken:

- (1) Prevent the individual from any further handling of I-125 or I-131 until the thyroid burden is below the above limits.
- (2) Carry out all steps described above.
- (3) As soon as possible, refer the case to appropriate medical consultation for recommendations regarding therapeutic procedures that may be carried out to accelerate removal of radioactive iodine from the body. This should be done within two to three hours after exposure when the time of exposure is known so that any prescribed thyroid blocking agent would be effective.
- (4) Carry out repeated measurements at approximately one week intervals at least until the thyroid burden is less than 0.12 μ Ci of I-125 or 0.04 μ Ci of I-131.



Texas Department of Health
BUREAU OF RADIATION CONTROL



AUG 31 2000

RADIOACTIVE MATERIAL LICENSE

LICENSE NUMBER	AMENDMENT NUMBER
L03835	37

19. Individuals involved in operations which utilize, at any one time, more than 100 mCi of tritium in a noncontained form, other than metallic foil, shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations.
20. The licensee is authorized to discard all radioactive material authorized in Conditions 5, 6, 7 and 8 and listed in 25 TAC §289.202(ggg)(7), whose half lives do not exceed 300 days, in a Type I municipal solid waste site in accordance with the provisions of 25 TAC §289.202(ff)(4) and procedures submitted with application dated July 27, 1995.
21. The licensee is hereby exempted from the requirements of 25 TAC §289.253(n)(1)(D) only for users of radioactive material authorized in Part R of Conditions 5, 6, 7 and 8. The licensee shall maintain a separate utilization log containing, as a minimum, the make and model number and/or serial number (or if absent, a unique description) of each sealed source authorized by Part R of Conditions 5, 6, 7 and 8 removed from storage, the identity of the logging supervisor receiving the sources of radiation, the locations where used and dates of use. These utilization logs shall be kept available for inspection by the Agency for five years from the date of the recorded event.
22. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material authorized by this license in accordance with statements, representations, and procedures contained in the following:

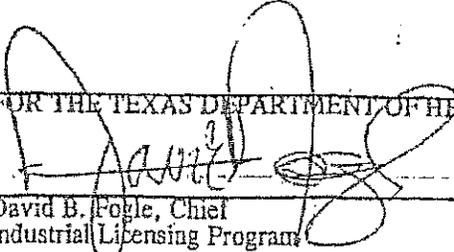
application dated July 27, 1995,
 letters dated September 23, 1995, March 14, 1997, April 28, 1997, June 16, 1997, July 14, 1997,
 January 7, 1998, March 3, 2000, May 23, 2000 and
 letter received September 9, 1998 with attached letter dated November 11, 1994.

Title 25 TAC §289 shall prevail over statements contained in the above documents unless such statements are more restrictive than the regulations.

WPS:da

Date: July 24, 2000

FOR THE TEXAS DEPARTMENT OF HEALTH



David B. Fogle, Chief
Industrial Licensing Program

468137

Donald A. Cool

-3-

Remarks:

Region IV Reviewer: Louis C. Carson II, Sr. Health Physicist, DNMS
Region IV Reviewer: Jack E. Whitten, Sr. Materials Analyst, DNMS
Reviewer Code: L83112

Request Needed by: 02/21/03

bcc:
EWMerschhoff
TPGwynn
KEBrockman
CLCain
JEWhitten, SMA
DACool, NMSS/INMS
JBCarrico, NMSS/INMS/MSIB
SLMerchant, NMSS/INMS/RGB
LCCarsonII
NMLB
FCDB
RIV Nuclear Materials File - 5th Floor

DOCUMENT NAME: S:\DNMS\mml\CC\CORELAB-TAR.wpd

To receive a copy of this document, indicate in the box "C" - Copy without attachment/enclosure "E" - Copy with attachment/enclosure "N" - No Copy

RIV:NMLB	C:NMLB	SMA:DNMS	D:DNMS
LCCarsonII <i>ALZ</i>	CLCain <i>ALZ</i>	JEWhitten <i>ALZ</i>	KEBrockman <i>M</i>
	<i>ALZ</i>	<i>ALZ TELEPHONE 1/21/03</i>	
01/24/03	01/24/03	01/24/03	01/24/03

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
811 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

November 4, 2003

Core Laboratories, Inc.
dba ProTechnics Division of Core Laboratories
ATTN: Will C. Williams
Radiation Safety Officer
9830 Rosprim
Houston, TX 77040

SUBJECT: LICENSE AMENDMENT

Please find enclosed Amendment No. 30 to License No. 42-26928-01. You should review this license carefully and be sure that you understand all conditions. If you have any questions, you may contact me at (817) 860-8221 or via e-mail lcc1@nrc.gov.

This amendment authorizes an additional disposal alternative pursuant to 10 CFR 20.2002 to inject well returns (sandouts) containing radioactive tracer material with physical half-lives of the material is 120 days or less (sodium-24, scandium-46, chromium-51, rubidium-86, antimony-124, iodide-131, xenon-133, iridium-192, or gold-198) into Class II disposal wells that have been approved to accept non-hazardous oil and gas waste by State agencies.

Attached for your perusal is a copy of the Federal Register (Volume 68, Number 208) dated October 28, 2003, publishing the results of NRC's environmental assessment (EA). The Federal Register indicates that NRC staff completed its assessment of your proposed disposal in Class II wells of sandouts containing radioactive tracer materials. The staff made a finding of no significant impact (FONSI) to the environment.

NRC expects licensees to conduct their programs with meticulous attention to detail and a high standard of compliance. Because of the serious consequences to employees and the public that can result from failure to comply with NRC requirements, you must conduct your radiation safety program according to the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate by NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC in writing of any change in mailing address.

3. By 10 CFR 30.36(b) and/or license condition, notify NRC, promptly, in writing, and request termination of the license:
 - a. When you decide to terminate all activities involving materials authorized under the license; or
 - b. If you decide not to complete the facility, acquire equipment, or possess and use authorized material.
4. Request and obtain a license amendment before you:
 - a. Change Radiation Safety Officers;
 - b. Order byproduct material more than the amount or form authorized on the license;
 - c. Add or change the areas or address(es) of use identified in the license application or on the license; or
 - d. Change the name or ownership of your organization.
5. Submit a complete renewal application or termination request at least 30 days before the expiration date on your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of radioactive material after your license expires is a violation of NRC regulations.

In addition, please note that NRC Form 313 requires the applicant, by signature, to verify that the applicant understands that all statements contained in the application are true and correct to the best of the applicant's knowledge. The signatory for the application should be the licensee or certifying official rather than a consultant.

NRC will periodically inspect your radiation safety program. Failure to conduct your program according to NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC may result in enforcement action against you. This could include issuance of a notice of violation; imposition of a civil penalty; or an order suspending, modifying, or revoking your license as specified in the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG 1600.

Core Laboratories, Inc.

-3-

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Thank you for your cooperation.

Sincerely,

/RAI

Louis C. Carson II, Health Physicist
Nuclear Materials Licensing Branch

Docket: 030-30429
License: 42-26928-01
Control: 468137

Enclosures: As stated

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. Core Laboratories, Inc. dba ProTechnics Division of Core Laboratories</p> <p>2. 9830 Rosprim Houston, Texas 77040</p>	<p>In accordance with letter dated August 23, 2000</p> <p>3. License number 42-26928-01 is amended in its entirety to read as follows:</p> <p>4. Expiration date January 31, 2006</p> <p>5. Docket No. 030-30429 Reference No.</p>
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6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Iodine-131	A. Any	A. 500 millicuries
B. Iridium-192	B. Any	B. 5000 millicuries
C. Scandium-46	C. Any	C. 3000 millicuries
D. Gold-198	D. Any	D. 5000 millicuries
E. Zirconium-95	E. Any	E. 500 millicuries
F. Xenon-133	F. Any	F. 500 millicuries
G. Chromium-51	G. Any	G. 1500 millicuries
H. Antimony-124	H. Any	H. 2000 millicuries
I. Rubidium-86	I. Any	I. 3000 millicuries
J. Bromine-82	J. Any	J. 3000 millicuries
K. Hydrogen-3	K. Any	K. 999 millicuries
L. Sodium-24	L. Any	L. 2000 millicuries
M. Americium-241	M. Sealed Source (Gammatron Model AN-HP, Gulf Nuclear Model VL-1)	M. No single source to exceed 250 microcuries, total possession 100 millicuries
N. Americium-241	N. Sealed Source (Isotope Products Model HEG-241 Series, Capsule A-3015)	N. No single source to exceed 50 millicuries
O. Barium-133	O. Sealed Source (Isotope Products Model HEG-133 Series, Capsule A-3015)	O. No single source to exceed 2 millicuries, total possession 200 millicuries

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
42-26928-01

Docket or Reference Number
030-30429

Amendment No. 30

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
P. Cesium-137	P. Sealed Source (Isotope Products Model HEG-137 Series, Capsule A-3015)	P. No single source to exceed 200 millicuries, total possession 20 curies
Q. Cesium-137	Q. Sealed Source (Isotope Products Model HEG-137 Series, Capsule A-3015)	Q. No single source to exceed 600 millicuries
R. Cesium-137	R. Any	R. 50 microcuries
S. Cobalt-60	S. Any	S. 50 microcuries
T. Iridium-192	T. Any	T. 50 microcuries
U. Scandium-46	U. Any	U. 50 microcuries
V. Antimony-124	V. Any	V. 50 microcuries

9. Authorized use:

- A. through K. For use in tracer studies in oil and gas wells.
- A., J., and L. For use in above ground tracer studies.
- M. and N. For use as a calibration/stabilization source in Halliburton Model TSCAN logging tool for logging tracer material in oil and gas wells.
- O. and P. For use as a calibration/stabilization source in Cedar Bluff Group's Fluid Identification logging tool for logging tracer material in oil and gas wells.
- Q. For use in oil and gas well logging.
- R. through V. For use in pipe collar markers in oil and gas wells.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

CONDITIONS

10. Radioactive material shall be used only at the following:

- A. 1930 Elk Street, Rock Springs, Wyoming; Natrona County International Airport, 3857 Dame, Casper, Wyoming; Alaska Department of Natural Resources Deadhorse Tract 57, Spine Road, Prudhoe Bay, Alaska.
- B. License materials may be stored at Shell Offshore, Inc. Gas Well: OSG-C 11553, Well No. 2, Field: Garden Banks Block 602, Offshore Louisiana, in accordance with letter December 16, 1999, pending final abandonment.
- C. Temporary job sites anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.

If the jurisdiction status of a Federal facility within an Agreement State is unknown, the licensee should contact the federal agency controlling the job site in question to determine whether the proposed job site is an area of exclusive Federal jurisdiction. Authorization for use of radioactive materials at job sites in Agreement States not under exclusive Federal jurisdiction shall be obtained from the appropriate state regulatory agency.

11. Licensed material identified in Item 6.L. may be temporarily stored in accordance with letter dated August 10, 1998.
12. A. Licensed material shall be used by, or under the supervision and in the physical presence of, individuals who have completed the Support Consultants and Associates, Inc., F. L. Clifford Associates, Sharp Radiation Services, W. H. Henkin Industries, Inc., Amersham/Gulf Nuclear, Inc., or ProTechnics Environmental Services, Inc., training courses and have been designated by the Radiation Safety Officer.
- B. The Radiation Safety Officer for this license is Will C. Williams.
13. The licensee shall not vacate or release to unrestricted use a field office or storage location whose address is identified in Condition 10, without prior NRC approval.
14. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
15. Pursuant to 10 CFR 39.91, the licensee is exempted from the requirements of 10 CFR 39.63(b) for use of remote handling tools. This exemption will remain in effect until formally withdrawn by the NRC.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

16. Notwithstanding the requirements of 10 CFR 39.47 and pursuant to 10 CFR 39.91, and in accordance with the statements, representations and procedures contained in letter dated July 14, 1997, and February 4, 1998, the licensee may use radioactive markers with activities of 50 microcuries or less of iridium-192, scandium-46, antimony-124, cobalt-60, and cesium-137 as pipe collar markers in oil and gas wells.
17. The licensee is authorized to hold radioactive material with a physical half-life of less than 120 days for decay-in-storage before disposal in ordinary trash provided:
- A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.
 - B. Before disposal as ordinary trash, byproduct material shall be surveyed at the container surface with the appropriate meter set on its most sensitive scale and with no interposed shielding to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
 - C. A record of each disposal permitted under this License Condition shall be retained for 3 years. The record must include the date of disposal, the date on which the byproduct material was placed in storage, the radionuclides disposed, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.
18. Notwithstanding the requirements of 10 CFR 20.2007, pursuant to 10 CFR 20.2002, and in accordance with the statements, representations, and procedures contained in correspondence dated August 23, 2000, January 23, 2002, and October 30, 2003, the licensee may release well-logging sandouts and well returns, containing residual radioactive materials, into Class II Disposal Wells provided:
- A. The total radioactive concentration of all isotopes is 1,000 picocuries/gram or less, and the physical half-life of the radioactive material is 120 days or less.
 - B. The residual radioactive tracer material (sodium-24, scandium-46, chromium-51, rubidium-86, antimony-124, iodide-131, xenon-133, iridium-192, or gold-198) being disposed of will be in the form of the patented "Zero-Wash" product in sandouts or well returns.
 - C. The well has been Permitted by the State, Territory, or Federal jurisdiction to accept non-hazardous oil and gas waste regardless of whether the job site is in an area where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating licensed material, including areas of exclusive Federal jurisdiction within Agreement States.
 - D. The licensee maintains an agreement with the owner or operator to control access to the Class II Disposal Well until the radioactivity has decayed to unrestricted release levels.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated November 15, 1991
- B. Facsimile dated November 25, 1991
- C. Letter dated February 14, 1992
- D. Letter dated March 1, 1993
- E. Letter dated April 12, 1993
- F. Letter dated May 4, 1993
- G. Letter dated October 26, 1993
- H. Letter dated April 20, 1994
- I. Letter dated May 6, 1994
- J. Letter dated May 19, 1994
- K. Letter dated May 26, 1994
- L. Letter dated October 20, 1994
- M. Letter dated January 4, 1995
- N. Letter dated January 11, 1995
- O. Letter dated June 13, 1995, authorization of new facility only.
- P. Letter dated June 13, 1995, authorization to use the Model TSCAN
- Q. Letter dated September 12, 1995
- R. Letter dated September 27, 1995
- S. Letter dated October 26, 1995
- T. Letter dated January 17, 1996
- U. Letter dated February 13, 1996
- V. Letter dated February 24, 1997
- W. Letter dated July 14, 1997
- X. Letter dated November 14, 1997
- Y. Letter dated January 20, 1998
- Z. Letter dated January 27, 1998
- AA. Letter dated February 4, 1998
- BB. Letter received May 20, 1998
- CC. Letter dated July 15, 1998
- DD. Letter dated August 10, 1998
- EE. Letter dated August 31, 1999
- FF. Letter dated December 16, 1999
- GG. E-mail dated February 11, 2000
- HH. Letter dated March 3, 2000
- II. Letter dated June 5, 2000
- JJ. Letter dated June 15, 2000
- KK. Facsimile dated July 6, 2000
- LL. E-mail dated February 14, 2000

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**License Number
42-26928-01Docket or Reference Number
030-30429

Amendment No. 30

19. (Continued)

- MM. Letter dated May 22, 2000
- NN. Letter dated August 22, 2001
- OO. Letter dated November 7, 2001
- PP. Letter dated August 23, 2000

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date November 4, 2003By IRA

Jack E. Whitten, Chief
Division of Nuclear Materials Safety
Region IV
Arlington, Texas 76011

Carlson, Todd

From: Carlson, Todd
Sent: Tuesday, November 16, 2010 9:57 AM
To: Burch, Kelly; Gustafson, Staci; Lobins, Craig
Cc: Wozniak, Gary
Subject: FW: Protechnics COA
Attachments: ① ProTechnics COA.pdf

I'm sending this to let you know that our Rad Protection folks signed a CO&A with ProTechnics over the incident at Rustick landfill this spring that set off their rad meter. The CO&A was for \$29,000. The event was initiated with a flowback event which brought the radioactive tracer beads to the surface and the eventual transfer of the radioactive material to McKean County Landfill. ProTechnics is the company licensed to use the radioactive material at well sites. This sounds like a potential source of exposure for our well inspectors at the well sites. Maybe Gary and Craig will want to include something related to this in the 8 hour refresher...at least for O&G staff(?).

-----Original Message-----

From: Stainbrook, Anita
Sent: Tuesday, November 16, 2010 9:10 AM
To: Crow, John; Sheriff, Richard
Cc: Carlson, Todd; Fair, Joel
Subject: FW: Protechnics COA

Fyi. Rad followed through on penalty with ProTechnics.

-----Original Message-----

From: Forney, Lisa
Sent: Monday, November 15, 2010 10:12 AM
To: Brennan, Patrick; Stainbrook, Anita
Cc: Yusko, James (DEP); Derstine, Terry; Brown, Donald P.; Craig, Bridget; Leskosky, John; Cooley, Marc B; Means, Jennifer; Forney, Lisa; Deman, Joseph
Subject: Protechnics COA

I would like to share of copy of our executed COA with ProTechnics. If you have any questions or wish to discuss, please let me know.

As a side note to Pat....

The efforts to date are getting attention in the industry. I just received a phone call from ProTechnics. They are very concerned that the well owner/operator (JW Operating) was held accountable. I told them that NW's Waste Program also collected a penalty from the transporter. I reminded them that when this occurred previously we issued an NOV. However, it happened again..... further action was warranted. I guess that they will get used to it and hopefully do a better job in the future. Just out of curiosity, would you be willing to share a copy of your CACP?

Lisa A. Forney | Environmental Protection Compliance Specialist
Department of Environmental Protection
Southcentral Regional Office
909 Elmerton Avenue | Harrisburg, PA 17110.8200
Phone: 717.705.4898 | Fax: 717.705.4710
www.depweb.state.pa.us



USPTO PATENT FULL-TEXT AND IMAGE DATABASE



(1 of 1)

United States Patent
Bandy, et al.

5,182,051
January 26, 1993

Radioactive tracing with particles

Abstract

There is provided radioactive particles having a ceramic matrix and an element which can be bombarded with neutrons to produce a gamma ray-emitting isotope. The particles are manufactured by mixing the ceramic components and the element, forming particles, sintering the particles, and the particles are subsequently made radioactive by bombardment with neutrons. Particles injected into wells or flow apparatus are traced by adding the radioactive particles and detecting the radioactive particles with gamma ray-sensitive instruments. Particles containing different elements are detected by spectral analysis of gamma rays.

Inventors: Bandy; Thomas R. (Katy, TX), Read; Donna A. (Houston, TX), Wallace; Edward S. (Englewood, CO)

Assignee: ProTechnics International, Inc. (Houston, TX)

Family ID: 27041585

Appl. No.: 07/666,044

Filed: March 7, 1991

Related U.S. Patent Documents

<u>Application Number</u>	<u>Filing Date</u>	<u>Patent Number</u>	<u>Issue Date</u>
466238	Jan 17, 1990		

Current U.S. Class: 252/645; 250/260; 252/965; 376/162; 501/152; 501/55; 501/68; 850/63

Current CPC Class: C09K 8/80 (20130101); E21B 43/267 (20130101); E21B 47/1015 (20130101); G21G 4/04 (20130101); E21B 47/0005 (20130101); Y10S 252/965 (20130101)

Current International Class:

C09K 8/60 (20060101); C09K 8/80 (20060101); E21B 43/25 (20060101); E21B 47/10 (20060101); E21B 43/267 (20060101); E21B 47/00 (20060101); G21G 4/00 (20060101); G21G 4/04 (20060101); G21G 004/04 ()

Field of Search:

;252/644,645,965 ;250/260,303,308,356.2 ;S01/55,68,152 ;376/162

References Cited [Referenced By]

U.S. Patent Documents

<u>2943045</u>	June 1960	Hull et al.
<u>2955088</u>	October 1960	Beerbower et al.
<u>3019341</u>	January 1962	Monaghan
<u>3340202</u>	September 1967	Olombel et al.
<u>3492147</u>	January 1970	Young
<u>3772200</u>	November 1973	Livesay
<u>3796883</u>	March 1974	Smith et al.
<u>3954655</u>	May 1976	Case et al.
<u>4068718</u>	January 1978	Cooke et al.
<u>4087375</u>	May 1978	Tanno
<u>4547468</u>	October 1985	Jones et al.
<u>4555493</u>	November 1985	Watson et al.
<u>4668645</u>	May 1987	Khaund
<u>4713203</u>	December 1987	Andrews
<u>4731531</u>	March 1988	Handke
<u>4789501</u>	December 1988	Day et al.
<u>4996192</u>	February 1991	Fleischer
<u>5011677</u>	April 1991	Day et al.

Other References

Brochure "Tracerscan Service".
 Article "Tracer Technology Finds Expanding Applications".
 Brochure "Macrolite Ceramic Spheres".
 Article "Tracers Can Improve Hydraulic Fracturing".
 Article "Improved Evaluation Techniques for Multiple Radioactive Tracer Applications".

Primary Examiner: Walsh; Donald P.

Assistant Examiner: Mai; Ngoclan T.

Attorney, Agent or Firm: Pravel, Gambrell, Hewitt, Kimball & Krieger

Parent Case Text

SPECIFICATION

This is a continuation-in-part of U.S. Ser. No. 7/466,238, filed Jan. 17, 1990, now abandoned.

Claims

What we claim is:

1. A non-radioactive particle comprising a sintered ceramic material having embedded therein a target element wherein the target element is either iridium or scandium.
2. The non-radioactive particle of claim 1 wherein the target element is present in the particle at a concentration in the range of about 0.2 per cent to about 4.0 per cent by weight.
3. The non-radioactive particle of claim 1 wherein the target element is present in the particle at a concentration in the range of about 0.2 per cent to about 0.5 per cent by weight.
4. A radioactive particle comprising a sintered ceramic material having embedded therein a target element, said target element being made radioactive by bombardment with neutrons.
5. The particle of claim 4 wherein the sintered ceramic material has a size less than about 25 microns before sintering.
6. The particle of claim 4 wherein the ceramic material comprises a mixture of silica and alumina.
7. The particle of claim 4 wherein the ceramic material comprises at least 30 per cent by weight alumina.
8. The particle of claim 4 wherein the target element is selected from the group of elements consisting of gold, iodine, iridium, scandium, antimony, silver, hafnium, zirconium, rubidium, chromium, iron, strontium, cobalt and zinc.
9. The particle of claim 4 wherein the target element is either iridium or scandium.
10. The particle of claim 4 wherein the target element is present as an oxide or salt compound.
11. The particle of claim 4 wherein the target element is present in the particle at a concentration in the range from a detectable amount to about 5 per cent by weight.
12. The particle of claim 4 wherein the target element is present in the particle at a concentration in the range from a detectable amount to about 0.5 per cent by weight.
13. The particle of claim 4 wherein the particle is in the size range from about 8 mesh to about 400 mesh.
14. The particle of claim 4 wherein the specific gravity is in the range from about 0.5 gm/cc to about 3.9 gm cc.

15. The particle of claim 4 wherein the target element is present in the particle at a concentration in the range from a detectable amount to the concentration which results in an ineffective amount of strength of the particle.
16. The particle of claim 4 wherein the target element is present in the particle at a concentration in the range from a detectable amount to the concentration which results in an ineffective value of specific gravity of the particle.
17. A non-radioactive particle comprising a sintered ceramic material having embedded therein a target element wherein the target element is selected from the group consisting of antimony, silver, hafnium, chromium and gold.
18. The particle of claim 4 wherein the target element is selected from the group consisting of antimony, silver, hafnium, chromium and gold.

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to radioactive isotope tracers and methods for their use and manufacture. In one aspect, sintered ceramic particles containing an element having the capability to be made radioactive are provided. In another aspect, radioactive sintered ceramic particles are provided. In still another aspect, a method of manufacturing radioactive particles is provided. In still another aspect, a method of using radioactive particles to locate particles in a wellbore or other piping system with negligible contamination of the system with radioactivity is disclosed.

2. Description of Related Art

Radioactive elements are commonly used for tracing the flow of liquids and solids in flow streams. The elements can be present as a soluble compound in a liquid, as insoluble or slightly soluble particles of the element or a compound of the element suspended in the flow stream, or as a soluble or insoluble compound attached to particles of other material which are suspended in a liquid or gas.

Slurries of particles are pumped into wells drilled through subterranean formations for several reasons. One reason is in connection with hydraulic fracturing of wells. The particles are called "proppant," and such particles function to fill the fracture created in the earth around a well and thereby to allow greater fluid flow rate into or out of the well. It is desirable to know after a well has been fractured the vertical extent of the proppant particles that have been placed around the well-- particularly, whether the proppant is located in a zone of the well containing hydrocarbons or whether the proppant has been transported to another zone above or below the hydrocarbon-containing zone. It is common for radioactive particles to be added to the proppant as it is injected into the well. After the fracturing operation is complete, a logging tool is run into the well and the location of the proppant-radioactive particle mixture is located.

Slurries are also used in a well for cementing the casing in the well. The cement slurry is pumped into the well through the casing and flows upward outside the casing. It is important to know where the cement is located outside the casing in the well after it sets. Radioactive tracers are sometimes added to the cement slurry as it is pumped into a well. After the cement has set, a logging tool which measures gamma ray radiation is run into the well and the level of radiation is measured at different depths in the casing of the well. Different radioisotopes may be added to different portions of the cement slurry and the logging tool may be used to measure the location of the different tracers outside the casing. A spectral log may be used to indicate the distance of the tracer from the wellbore.

Another use of slurries in wells is in the process of gravel packing of wells. In this process particles, called "gravel," are placed near the wellbore and in the wellbore outside a screen to prevent formation solids from entering the wellbore or plugging the screen. It is important to know whether the gravel pack is continuous and how far it extends vertically in the well. Radioactive particles are added to the gravel as it is pumped into the well and a logging tool is run into the well after the gravel packing operations are complete to determine the location of the gravel.

Radioactive tracers are used in many other flow systems for measuring flow rates, flow patterns and other phenomena associated with movement of fluids or solids in industry or science. In many of these applications the radioactive tracers are placed directly in a liquid. There is often difficulty from the radioactive material plating on to surfaces or being disseminated through the flow system to contaminate the system with radioactivity.

U.S. Pat. No. 3,492,147 discloses a process for production of resin-coated solids, the resin coating incorporating radioactive materials. U.S. Pat. No. 4,731,531 discloses the use of particulate material which is non-radioactive until it is irradiated by neutrons at the surface of a well immediately before it is injected into the well or after it has been deposited in the formation around the well. The non-radioactive isotope is contained in an infusible resin coated on the surface of the particles. Radioactive particles having an infusible resin on the surface were sold by Halliburton Company under the trademark RAYFRAC.RTM.. Other radioactive particles sold for use in the oil industry are believed to be manufactured by simply immersing sand particles in a radioactive solution and drying the particles, the radioactivity then being trapped within natural cracks existing in the sand particles.

Techniques for detecting and measuring radioactivity are well known. A device such as a Geiger Counter will measure total radioactivity. Techniques for measuring the amount of radiation as a function of the energy of the gamma ray are also well known. Each radioactive isotope emits a characteristic spectrum of energies of radiation. Spectral analysis of the gamma rays from a radioactive isotope of an element used in the laboratory and surface facilities is well-known. In recent years, tools have been developed and made available for measuring the spectral analysis of gamma rays in wells. Spectral analysis makes possible use of multiple radioactive tracers in a flow system or well at the same time. In addition, technology has been developed to determine the relative distance from the detecting tool of different tracers, based on the phenomenon of Compton scattering of the gamma rays. One system for use in wells is sold by Halliburton Logging Services, Inc. under the trademark TRACERSCAN. This same detection technology could be used in other flow systems. The spectral log in a well makes possible both the vertical and radial distribution of tracers used in evaluating the effectiveness of hydraulic fracturing, cementing, and gravel packing operations. The article "Tracer Technology Finds Expanding Applications," *Petroleum Engineer International*, Jun., 1989, pp. 31-36, and references cited therein describe the new spectral analysis technology and its application to wells.

In the application of radiotracers in wells, preferably no tracers are left inside the casing, since only tagged material outside the casing contributes useful information regarding material placement within the formation. A severe limitation in using prior art radioactive particles which are initially radioactive or which are made radioactive by neutron bombardment before injection into a well or piping system is that radioactive material washes off particles or is abraded or is broken from the surface of the particles as they are pumped in a flow stream. This loss of radioactivity from the particles creates a background radiation at certain locations or throughout the well or piping system. The extraneous source of radiation can be a severe limitation in subsequent radioactive logging of wells and greatly diminishes the accuracy of measurements intended to be indicative of conditions outside the wellbore. In piping systems on the surface of the earth, radioactive contamination can be hazardous and can interfere with other operations.

Therefore, there is a great need for particles that can be made radioactive and particles that are radioactive which can be pumped into wells or other flow streams without loss of radioactivity and contamination of the flow stream. Further, a method of manufacturing such particles which allows incorporation of a variety of elements which can produce distinctive radioactive spectra is needed, and a method of employing these particles to locate slurries which have been injected into wells or other piping systems is needed.

SUMMARY OF THE INVENTION

In one embodiment of this invention, sintered ceramic particles which are a precursor to radioactive particles, comprising an element which can be bombarded with neutrons to form an isotope which emits gamma rays, are provided. In another embodiment, radioactive particles are provided. In another embodiment, a method of manufacturing particles specially suited for tracing flow in a fluid or slurry is disclosed. The manufacturing process comprises the steps of mixing in powder form ceramic components and an element which, when bombarded by neutrons forms a radioactive isotope, forming the powder mixture into particles, sintering the particles to produce an effective amount of strength and irradiating the sintered particles with neutrons.

In yet another embodiment, sintered radioactive particles produced by mixing ceramic components and an isotope which can be made radioactive by neutron radiation, which are irradiated by neutrons before use, are added to a non-radioactive slurry as it is pumped into a well. The well is then logged with an instrument which measures the level of radioactivity from the gamma ray emission of the particles. Gamma ray spectra are measured to differentiate tracers when particles containing different elements are injected into the stream at different times. In still another embodiment, particles in surface piping systems are traced using radioactivity measurements. In another embodiment, the precursor particles are bombarded with neutrons after their injection into a well or other flow system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The particles which can be made radioactive of the present invention are particles which contain a target element which is embedded in a sintered ceramic matrix.

The radioactive isotope particles of the present invention are ceramic particles that emit gamma rays to allow their detection by instruments. The particles are made of sintered ceramic components and an element which has been bombarded with neutrons to become a gamma ray-emitting isotope.

The ceramic components are common oxides, normally silica or alumina, but other oxides used in the

ceramic art may be used. In the mixtures comprising predominantly silica and alumina, a range of mixtures from pure alumina to predominantly silica can be used. Mixed crystalline materials of silica and alumina such as mullite may be used. The ceramic components are first finely divided or powdered and mixed with the target element. By this technique, the target element can be uniformly distributed through the particle. The structure of the powdered starting materials may still be present in the finished particles, but the particles will have an effective amount of strength resulting from bonding of the original powder of ceramic components which has occurred during the sintering process. Other components may be added to aid sintering and to substantially lower the sintering temperature, such components being well known in the ceramics art.

The sintered matrix of the particles should have sufficient strength to resist breaking when the particles are pumped in a stream of fluid. The amount of strength needed will depend upon their application. If the particles are to be pumped at high flow rates in a slurry, such as in hydraulic fracturing treatments in wells, the particles should be strong enough to prevent breaking at high stress, substantially like the ceramic particles now provided as proppant for this application. For added strength, particles having an alumina content above 30 percent by weight are preferred. Also, sintered particles made from very finely divided powder are higher in strength. Powder less than 25 microns in size is preferred. If the radioactive particles are to be incorporated into a flow stream moving at a low speed and without abrasive conditions, much lower strength ceramic particles are acceptable, although high strength will not be a disadvantage. In addition to strength, density and size may be important properties of the ceramic particles to be considered in each application.

The target element added to emit gamma rays is embedded in the matrix of the ceramic materials before sintering. The element is selected based upon several variables. One of the important characteristics is the half-life of the radioactive isotope produced by neutron bombardment. This property is selected based on the measurements to be made and does not limit this invention. Half-lives of from about two days to about 250 days are commonly used. The energies of the gamma rays emitted by the isotope are also an important factor in selecting the element. This is especially true when two or more radioactive isotopes are to be used in the same flow stream, when it is desirable that the energy spectra of the different isotopes not excessively overlap. It is preferred that the energy spectrum of the gamma rays of the different isotopes not overlap such that the intensity of the gamma rays from each element can be more accurately measured. Thereby, the concentration of each individual isotope can be measured by spectral analysis of the gamma rays.

The cost and availability of the target element embedded in the ceramic particles is one consideration in the selection of which element to use in a particle. Target elements suitable for use in the particles of this invention include gold, iodine, iridium, scandium, antimony, silver, hafnium, zirconium, rubidium, chromium, iron, strontium, cobalt, and zinc. Preferred target elements are antimony, iridium, scandium, silver, and hafnium. Most preferred are iridium and scandium.

The target element may be present in its elemental form or as a compound. Compounds of elements useful in this invention are commonly salts or oxides. Iridium oxide is available as a black powder known as "iridium black." Hafnium oxide is available in pure form. Antimony bromide is available in very pure form as crystals. Other compounds of the element may be used, but oxides and salts are readily available. The compound should be stable at the high temperature of processing of the ceramic particle, such that sublimation does not deplete the particles of the compound. The temperature of sintering the particles will normally be above the melting point of the compound of the element.

The concentration of the element in the ceramic particle will depend on the application of the

particles, but an effective amount will be less than 5 per cent of the weight of the particle, preferably less than 1 per cent and most preferably less than 0.5 per cent by weight.

Sizes of the particles will normally range from about 8 mesh to about 400 mesh. Particles of a wide range of sizes can be separated into desired sizes by sieving or other particle size separation techniques.

Specific gravity of the particles will range from about 0.5 gm/cc to about 3.9 gm/cc. Particles of different densities can be made and separated by density using well known particle separation techniques.

Radioactive ceramic particles may be manufactured by methods known in the ceramic industry for manufacturing proppants for use in hydraulic fracturing of wells or for manufacturing synthetic gravel for use in gravel packing of wells. Such ceramic particles for proppants are manufactured and used for their strength, their density and their sphericity. U.S. Pat. 4,668,645 discloses a particle for use as a proppant and a method of manufacturing such particles. U.S. Pat. No. 4,068,718 discloses the use of high strength and high density bauxite-containing particles for use as a proppant in wells and describes the methods of manufacture of such particles. The two aforesaid U.S. patents are incorporated herein for all purposes.

Other methods for manufacturing sintered ceramic particles from powder, employing a variety of grinding, mixing, pelletizing and sintering techniques can be used. Ceramic particles of various densities and strengths can be made by mixtures of the oxides of aluminum, silicon, iron, magnesium and other minerals. Ceramic particles made for use as proppants or in gravel packing are manufactured by grinding the ceramic components to fine particle sizes, preferably less than 25 micron particle size, forming a paste of the finely ground material, forming the paste into rounded particles with pelletizing equipment and then sintering the particles. Such particles are sold by Norton Alcoa Proppants of Dallas, TX and by Carbo Ceramics Company of Dallas, TX. We have discovered that the ceramic components of such particles can be mixed with an element which, when bombarded with neutrons, forms a gamma ray emitting isotope, to produce a radioactive particle which has essentially the properties of the ceramic particle not containing the element. Such particles have high strength and resistance to crushing, and can be pumped into a variety of fluid streams without loss of radioactive material to the fluid stream and the conduits for the stream.

MACROLITE.RTM. ceramic spheres sold by 3M Company of St. Paul, MN are made from a ceramic powder to have void spaces and specific gravities as low as about 0.58 gm/cc. The particles of this invention can be manufactured by incorporating a target element into the ceramic materials of MACROLITE.RTM. ceramic spheres before they are formed.

It is advantageous to use elements which are not radioactive during formation of the particles, so that health hazards from radioactive materials are avoided during manufacture of the particles. This is an important feature of our invention.

After the particles to be made radioactive, i.e. the precursor radioactive particles, are formed and sintered, the particles may be injected into a flow system or the particles may be transported to a nuclear reactor and radiated with neutrons such that the element present forms a radioactive isotope of that element. The equation given below describes the level of activity resulting from neutron radiation:

where:

A.times.Activity in millicuries

$N_{sub.L} \cdot 6.022 \cdot 10^{sup.23}$

h=Isotopic Abundance

$X_{sub.sect}$ =Neutron Capture Cross Section

g=Target element mass in grams

$t_{sub.1/2}$ =Half life of produced nuclide in seconds

$N_{sub.f}$ =Neutron flux (neutron cm sec

M=Target nuclide atomic weight in grams

t=Neutron bombardment time in seconds.

Activity produced is directly proportional to neutron bombardment time, neutron flux and target element mass. Once an element has been selected for its half-life of radioactivity and its desirable gamma ray spectrum, the concentration of the element needed to seed the particles and the neutron bombardment time can be calculated for a certain location in a certain nuclear reactor having a known neutron flux rate at different locations. The costs of the element and the neutron irradiation are selected to minimize the total cost of producing particles having an effective level of radioactivity.

The selected amount of the target element is added to a suitable amount of ceramic powder which is to be formed into particles, such that the amount of powder to be irradiated, stored and injected into a stream is convenient for the irradiation facility, storage facilities and pumping equipment available for injecting the radioactive powder.

Twenty millicuries of radioactivity is a common amount of radioactivity to transport in one batch. Therefore, this amount of radioactivity will be used as an example. Other amounts, for example 40 millicuries, are often used and the same principles are applicable. The equation above shows, for example, that if 20 millicuries of radioactivity from iridium-192 is to be produced, and the nuclear reactor produces a flux in the cans to be used in the reactor of $5 \cdot 10^{sup.12}$ neutrons $cm^{sup.-2}$ $sec^{sup.-1}$, 11.5 milligrams of iridium is needed for a bombardment time of 96 hours. This amount of iridium in the form of iridium black is added to a measured amount of ceramic powder, thoroughly mixed and blended, and formed into particles which are then sintered in accord with known techniques for producing sintered particles. The equation shows that if the amount of target element is doubled the amount of bombardment time can be halved. Therefore, the cost of producing particles having differing amounts of target elements can readily be determined, depending on the cost of the element and the cost of irradiation time. For many elements to be made radioactive, the lowest cost of radioactivity will be obtained with the largest amount of the target element in the ceramic particles. Then the highest limiting concentration of the element is determined by that concentration which changes the physical properties of strength or specific gravity of the ceramic particles into an unacceptable range of the property. Tests should be performed to determine the maximum acceptable concentration of target element by mixing various concentrations of element and ceramic

components, sintering the particles and measuring the desired property. Specific gravity of particles may be measured by well known methods. Strength may be measured by crush tests of packed beds of particles or by individual particles strength tests which are well known for testing proppant particles.

For some applications, only a small amount of particles is needed to contain 20 millicuries of radioactivity. But, it is possible to vary the concentration of target element in the ceramic over a wide range of concentrations. The lowest practical level of concentration will normally be determined by the volume available in the reactor used for irradiation or by the pump used to meter the particles into the stream where they will be used. For particles to be used in hydraulic fracturing, 20 millicuries of activity will preferably be contained in a volume of particles in the range from about 5 milliliters to about 100 milliliters of particles. Much larger amounts of particles could be used to contain the radioactivity, but the minimum concentration of target element in the ceramic will usually be determined by the pumping apparatus used to add the particles to a stream and the volume limitations of the reactor used for irradiation of the particles. Small volumes of particles can be used when accurate means are available for metering small amounts of particles into a stream. Radioactivity levels in the range from about 0.02 to about 20.0 millicuries per milliliter of particles are suitable. Preferably, the radioactivity level is in the range from about 0.2 to about 4.0 millicuries per milliliter of particles.

After the particles are radiated with neutrons, their manufacture is complete. The particles must then be handled as radioactive sources. Well known techniques are used for protecting personnel from exposure to gamma rays emitted from the particles.

Radioactive particles are added to a fluid which is being pumped into a well or are added to a fluid passing through surface piping or equipment for other applications by first mixing the radioactive particles with fluid to form a concentrated slurry. The liquid of the slurry may be viscosified by polymers. The slurry of radioactive particles is stored in a small closed radioactive materials reservoir. The reservoir may contain an agitator to keep the radioactive particles in suspension. The slurry is pumped from the reservoir into the low-pressure section of the flow stream to be traced with a low pressure pump such as a peristaltic pump. A high-pressure positive displacement pump can be used when the particles are injected into a high-pressure stream. The concentration of radioactive particles in the concentrated slurry or radioactive particles is usually in the range of about 10 grams to about 1000 grams per gallon of slurry.

For most applications in wells, the slurry of radioactive particles is pumped out of the reservoir and into the stream at a rate such that 20 millicuries is used to trace from about 10,000 to about 100,000 pounds of solid particles or about 10,000 to about 100,000 gallons of fluid. The activity level may vary in the range from about 0.1 to about 10 millicuries per thousand gallons of fluid or thousand pounds of solids. This amount of radioactivity is preferably contained in a volume of particles from about 5 cc to about 100 cc, but much larger volumes of particles may be used with a suitable pump for pumping the slurry of radioactive particles. If this amount of radioactivity is contained in a larger volume of particles, the radioactive particles will either contain a proportionately lower concentration of target element or the particles will be irradiated with neutrons for a proportionately smaller time.

Preferably, the radioactive particles have about the same size and specific gravity as the non-radioactive particles in the flow stream when applied to tracing the particles in hydraulic fracturing and gravel packing operations. The particles should be small enough to produce low settling rates when used in cement slurries. For other types of fluids, the size and specific gravity will be selected to accomplish the purpose of the tracing application. For example, particles less than a certain size may

be sieved from a mixture of sizes and added to a flow stream to determine the size of constrictions in the flow stream. Other applications dependent on size and specific gravity will be obvious to users of the particles.

Specific gravity of the particles can be varied to be compatible with the application. The ceramic particles produced for hydraulic fracturing of wells vary in specific gravity from about 2.6 gm/cc to about 3.8 gm/cc. The density of these particles will not be significantly changed when the element to be made radioactive is embedded into the particles. Preferably, radioactive particles will be made to have approximately the same density as the non-radioactive particles with which they are used. Particles sold by 3M Company under the trademark MACROLITE.RTM. may have a specific gravity as low as 0.58 gm/cc. Again, preferably the radioactive particles will be made to approximately match the density of the non-radioactive particles. Strength of the particles will also vary with specific gravity, but even the relatively low strength of these low specific gravity particles will be adequate for gravel packing applications. Other applications not requiring high-strength can also use the low specific gravity particles. To avoid breaking and abrasion of particles, which can lead to loss of radioactivity from the particles, strength is preferably as high as consistent with other properties of the particles.

After the radioactive particles are pumped into a well and out of the casing of the well so that they are no longer in the wellbore, a logging instrument is lowered into the well which is capable of detecting the gamma rays emitted by the isotope of the element. The gamma rays are capable of penetrating at least several inches of the earth surrounding the well and of penetrating the casing in the well. The gamma rays specific to the isotope of the element may be detected by performing an analysis of the energy of the gamma rays detected by the logging tool. A spectrum of energy of gamma rays characteristic of each radioactive element present is obtained. Techniques are used for determining, based on differing attenuation by Compton scattering of gamma rays having differing energy levels, the amount of gamma radiation coming from inside the wellbore, which would result from radioactive material lost from the particles during flow down the wellbore.

Ceramic particles containing different target elements may be used at the same time or at different times in the pumping operation, may have different specific gravity or may have different size. The locations of the particles having different target elements are then determined with the gamma ray detector.

In gravel packing operations, the radioactive particles may be inside the casing and outside a screen or other type filter in the wellbore. In this application, also, the logging tool is surrounded by the radioactive particles.

In a flow stream or other surface apparatus, the gamma ray detection instrument is located in the vicinity of the radioactive particles to detect the gamma rays. Particle location of particles containing different target elements, which may also have different sizes and specific gravities, can be determined by spectral analysis of the gamma rays.

The applications described above assumed that the particles had been irradiated by neutrons before injection into the well or flow stream. It should be understood that the precursor particles, obtained after sintering and before irradiation with neutrons, can be used in all applications if a neutron source is applied to the particles after they are in the flow stream or well. The particles of this invention will be stable to their environment of use, and can be irradiated or re-irradiated long after the time they are injected into a flow stream or well.

EXAMPLE

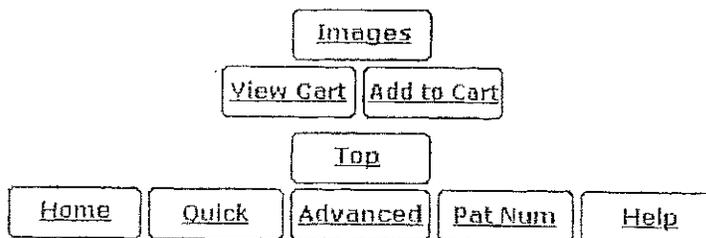
Ceramic particles containing iridium were manufactured. The procedures normally used for manufacturing a ceramic proppant particle containing primarily alumina and silica and smaller amounts of other oxide minerals were used. The ceramic materials were finely ground. About 20 grams of iridium black, available from Aldrich Chemical Company, was thoroughly mixed with 30,418 grams of the ceramic powder. The powdered mixture was then formed into a paste containing chemical binders. The paste was formed into approximately spherical particles. The ceramic materials are said to be "green" at this stage. The green ceramic particles were then sintered by firing in an oven at a temperature in the range of about 1400.degree. to 1500.degree. C. The particles containing the iridium were essentially the same density and crush resistance as the particles of high strength ceramic material without the iridium. The size range of the particles was from about 20 mesh to about 40 mesh.

A portion of the particles containing iridium was then placed in a nuclear reactor for a period of 42 hours. A volume of 15 milliliters of particles was irradiated at a neutron flux of 9×10^{12} neutrons $\text{cm}^{-2} \text{sec}^{-1}$. At the end of irradiation, the activity of the particles was measured to be about 20 millicuries. The activity calculated from the above equation was 20.7 millicuries.

The radioactive particles was transported to a well where hydraulic fracturing operations was performed. Fracturing fluid is pumped down the casing of the well and through perforations. Sand in the size range 20-40 mesh is used as proppant. Radioactive ceramic particles manufactured according to the methods described herein are added to the fluid along with the sand at an appropriate time. The ceramic radioactive particles have about the density of sand and are 20-40 mesh size. After these fracturing operations are complete, the well is logged with the TRACERSCAN system. Results of the log show that gamma ray radiation from iridium is present only near the perforations. The very low level of radioactivity in the wellbore above the perforations shows that loss of radioactive iridium material from the particles during the operations is negligible.

The invention has been described with reference to its preferred embodiments. Those of ordinary skill in the art may, upon reading this disclosure, appreciate changes or modifications which do not depart from the scope and spirit of the invention as described above or claimed hereafter.

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Research Article

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Study and application of ZeroWash tracer fracture monitoring

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ABSTRACT

Hydraulic fracturing is an effective technique for increasing the productivity of wells producing from low permeability formations. Tracer fracture monitoring technique is near-wellbore zone fractures direct test method that can monitor the height and width of hydraulic fractures in the near-wellbore section. ZeroWash Tracer uses a medium strength ceramic proppant which is mainly used in fracturing process. It can make three different energy levels of tracer into the fracturing fluid and pump into formation, to monitor wellbore proppant distribution and identify fracture height. The application of ZeroWash Tracer in Changqing oilfield has been a great success. ZeroWash Tracer is used to monitor wellbore proppant distribution and evaluate fracturing effects in Hydraulic Fracturing.

Keywords: Tracer; low permeability; fracture monitoring technique; ZeroWash Tracer; hydraulic fracturing.

INTRODUCTION

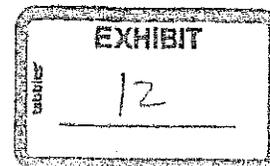
The oilfield tracer technology has been carried out since 1950s, and it has experienced four stages of development, i.e. Chemical tracer, radioactive isotope tracer, non-radioactive isotope tracer and micro-matter tracer[1].

Currently/Generally the chemical tracers used in oilfield tests were sodium bromide, potassium iodide, isopropyl alcohol, etc. The main disadvantages of them were large amount, high cost and significant detection-error. Radioactive isotope tracer, which mainly is tritiated compounds, can be used as tracers of water, oil tracer gas tracer or tracers water allocation, and it is commonly used in oilfield tests[2,3]. Non-radioactive isotope tracer are those that no radioactive isotope tracer, such as ¹²C, ¹³C, ¹⁵N, ¹⁸O, etc. Compared to the former, the latter has no high temperature conversion, no radioactive hazard, less dosage, convenient operation, and high measurement precision, etc[4]. Micro-matter tracer technology is to inject tracer into the well according to the rule to sampling[5], and then using inductively coupled plasma mass spectrometry to analyze the sample, and draw out the production curve of each well. Reservoir parameters are analyzed by the characteristics of production curve. Finally, the study of reservoir heterogeneity and distribution was studied through a comprehensive analysis of mathematical models and interpretation.

ZeroWash Tracer technology is an advanced technology developed by American Corelab company, and it is mainly used in fracturing process. It can join three different energy levels of tracer to the fracturing fluid and pumped into formation, to monitor wellbore proppant distribution and identify fracture height, in order to evaluate fracturing effects.

EXPERIMENTAL SECTION

2.1. Principle and Characteristic



ZeroWash Tracer using a medium strength ceramic proppant, and in the production of the proppant, non-radioactive heavy metal (such as antimony oxide or iridium, or scandium oxide) will be injected. Standard hybrid technology are used to mix metal salt and clay, add water in the mixture made spherical as figure 1, and then baked in the kiln, cooled and sieved, graded according to size, cleaned and polished to remove traces of dust. After sieving again, using neutron bombardment to activate the heavy metal material, it can be put into application after packaging.

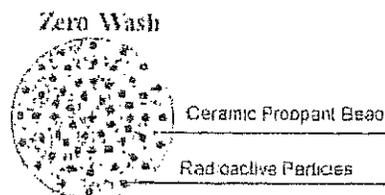


Fig. 1. Zero Wash Coating tracer structure diagram

NaI scintillation detector is used by Tracer imaging technology to detect gamma radiation, and electron multiplier photo tube to measure gamma and to send it to the download multiband analyzer, which can store and sort according to different energy level. According to tracer particles distance and isotope infusion concentration, the amount of proppant can be determined within the scope of detecting. According to the theory of cylindrical around wellbore and the number of proppant and size of cylinder, the assuming proppant is limited to a certain crack, and fracture proppant concentration inside can be calculated. The dimension of the theory cylinder was determined by the vertical resolution of test-tool and depth of detection. Detection of the depth was in proportion to isotope radiation energy level.

In the fracturing process, prepad fluid and carrying fluid are pumped in the first half and second half, with three different kinds of tracers to pump into the formation. After fracturing and flowback, in order to determine the fracture height and width, test system of monitoring tools are used to measure tracer radioactivity.

2.2. ZeroWash Tracer Fracture Monitoring design

ZeroWash Tracer fracture monitoring technology use low pressure creep displacement pump to inject, the principle and characteristics are as follows: using the roller axial of low pressure creep displacement pump to move along the pipe and drive the fluid in the tube. The main advantage of this pump is the fluid could not contact the pump body, and the pump would not be polluted, and there is no risk of dismantling the pump, time delay and cost waste when pump components are needed to be replaced. What's more, low pressure injection can eliminate various danger of high pressure injection during injection, it can be more flexible to change or increase the tracer.

In the fracturing process, three different radioactive tracers are pumped in three different stages, and different tracers are marked with different colors on the logging map, Sb-124 in blue, Sc-46 in yellow, Ir-192 in red. The injection procedure design is as table 1 showed.

Table 1. The tracer injection procedure design

Stage	Liquid type	Output value m ³ /min	Liquid volume m ³	Concentration of proppant kg/m ³	tracer	Concentration of tracer mCi	Cumulative time Min/Sec
prepad fluid	slite/water	0.1-0.5	8.2				
Packer	slite/water	0.5-1.6	1.5				
Pad fluid	Crosslinked guar gum	1.6	16.0		Sb-124	5	10.13
	Crosslinked guar gum	1.6	8.0	243	Sc-46	5	15.42
	Crosslinked guar gum	1.6	12.0	405	Sc-46	5	24.25
	Crosslinked guar gum	1.8	23.0	486	Ir-192	15	39.41
	Crosslinked guar gum	1.8	14.0	567	Ir-192	10	49.14
Displacement fluid	Crosslinked guar gum	1.8	18.0	648	Ir-192	10	56.14
	guar gum based fluid	1.6	6.0				59.59

RESULTS AND DISCUSSION

3.1. Test Results

The well is a production well located in a structure of Changqing Oilfield. The fractured layer is CL3, and its thickness is 9.0 m. The reservoir porosity is 8%, and the permeability is 0.04 mD. Sand fracturing technology was

applied in this well. The perforation interval was from 2017.0m to 2020.0 m, and 40m³ quartz sand was pumped into the well with a pump rate of 2.4 m³/min. Fig.2 shows the result of tracer fracture monitoring technique used in this well. Different colours represent different gamma values of the tracers. The tracer which was pumped at the end of the injection always exists in the near wellbore place. As a result, there may be one, two or three tracer curves, and it depends on how many kinds of tracers were used in this well. The picture in the left shows the logging data, perforation interval, formation, and tracer profiles along the wellbore. The right one is a mirror symmetry picture showing a double wings fracture system. The fracture height is about 11m from the monitoring result.

3.2. Discussion

Analysis of fracturing tracer test result as following:

- (1) The mud shale from 2010m to 2015m makes the fracture cannot be further extended upward.
- (2) The radioactivity of tracers in pad fluid between 2016m and 2019m is very strong. It means that large number of fracturing fluid leaked into the formation or the fracture near wellbore distorted.
- (3) The distribution of proppant changes over time shows that the placement of proppant in early time is the same as that in late time.
- (4) The fracture height: from 2015m to 2026m.
- (5) At 2030 m, the fracture extends down only at the preflush stage. It indicates that cement channeling occurred in that place.
- (6) In general, the perforated layer has been fully fractured.

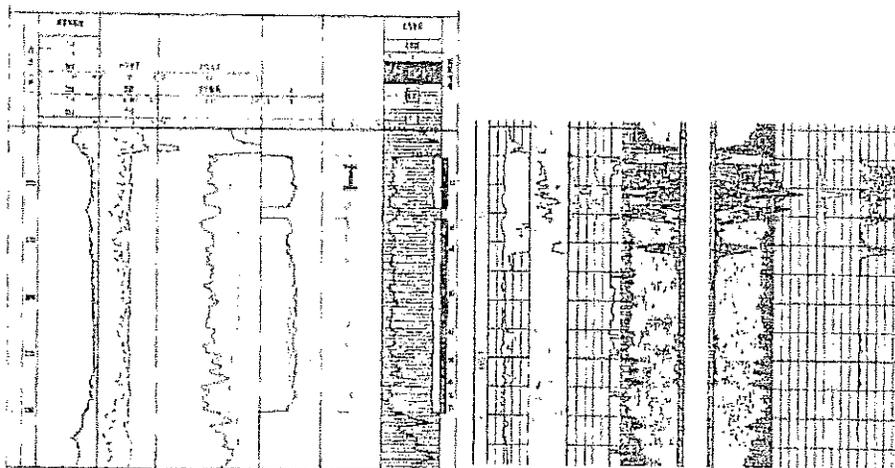


Fig.2. Integrated logging curve and diagnostic chart of tracer tests

CONCLUSION

- (1) ZeroWash Tracer is helpful to recognize the fracture geometry and distribution, and to identify the scale of fracturing. It is benefit to optimize the fracturing design and fracturing process improvement.
- (2) ZeroWash Tracer diagnostics is helpful to optimize reservoir parameters and to build a stimulation model. It is the foundation to improve the effectiveness of fracturing.
- (3) Field application proved that ZeroWash Tracer technology was an effective diagnostic technique for well fracturing.

Acknowledgements

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- [2] (The United States) B. Zemel forward, *Oilfield Tracer Techniques*; Petroleum Industry Press: Beijing, 2005, 50-60
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- [5] Xu Jinxin, *Well Testing*, 2008, Vol.12, No.4, 20-22,



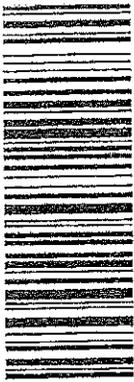
pennsylvania
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 PROTECTION

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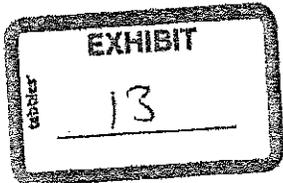


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Sostar, Janelle K

From: Kendra L. Smith <klsmith@smithbutzlaw.com>
Sent: Tuesday, March 29, 2016 10:52 PM
To: DC, OpenRecords
Subject: Right to Know Law Appeal 4500-16-018(SW)- Part 1 of 3
Attachments: Appeal Application.pdf; Position Statement - Southwest Region.pdf; Attachments Part I.pdf; Attachments Part II.pdf

Dear Sir/Madame,

Please find attached a Right to Know Law Appeal of Denial for request 4500-16-018 (SW). Please contact me if you have any questions.

Thank you.

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Attachments: Attachments Part III.pdf; Attachments Part IV.pdf

Dear Sir/Madame,

Please find attached a Right to Know Law Appeal of Denial for request 4500-16-018 (SW). Please contact me if you have any questions.

Thank you.

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Sostar, Janelle K

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Sent: Tuesday, March 29, 2016 10:54 PM
To: DC, OpenRecords
Subject: Right to Know Law Appeal 4500-16-018(SW)- Part 3 of 3
Attachments: Attachments Part V.pdf

Dear Sir/Madame,

Please find attached a Right to Know Law Appeal of Denial for request 4500-16-018 (SW). Please contact me if you have any questions.

Thank you.

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Exhibit E

2



March 30, 2016

Via E-Mail only:

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PA Dept. of Environmental Protection
Rachel Carson State Office Bldg.
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Harrisburg, PA 17105
EP-DEP-RTK@pa.gov

RE: OFFICIAL NOTICE OF APPEAL – DOCKET #AP 2016-0605

Dear Parties:

Please review this information carefully as it affects your legal rights.

The Office of Open Records (“OOR”) received this appeal under the Right-to-Know Law (“RTKL”), 65 P.S. §§ 67.101, *et seq.* on March 29, 2016. This letter describes the appeal process. A binding Final Determination will be issued pursuant to the timeline required by the RTKL. In most cases, that means within 30 calendar days.

OOR Mediation: This is a voluntary, informal process to help parties reach a mutually agreeable settlement on records disputes before the OOR. To participate in mediation, both parties must agree in writing. If mediation is unsuccessful, both parties will be able to make submissions to the OOR, and the OOR will have 30 calendar days from the conclusion of the mediation process to issue a Final Determination.

Note to Parties: Statements of fact must be supported by an affidavit or attestation made under penalty of perjury by a person with actual knowledge. Any factual statements or allegations submitted without an affidavit will not be considered. The agency has the burden of proving that records are exempt from public access (*see* 65 P.S. § 67.708(a)(1)). **To meet this burden, the agency must provide evidence to the OOR.** The law requires the agency position to be supported by sufficient facts *and* citation to all relevant sections of the RTKL, case law, and OOR Final Determinations. An affidavit or attestation is required to show that records do not exist. Blank sample affidavits are available on the OOR’s website.

Submissions to OOR: Both parties may submit information and legal argument to support their positions by **11:59:59 p.m. seven (7) business days from the date of this letter.** *Submissions sent via postal mail and received after 5:00 p.m. will be treated as having been received the next business day.* The agency may assert exemptions on appeal even if it did not assert them when the request was denied (*Levy v. Senate of Pa.*, 65 A.3d 361 (Pa. 2013)).

Include the docket number above on all submissions related to this appeal. Also, any information you provide to the OOR must be provided to all parties involved in this appeal. Information shared with the OOR that is not also shared with all parties will not be considered.

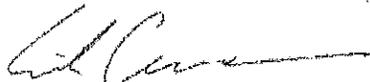
Agency Must Notify Third Parties: If records affect a legal or security interest of an employee of the agency; contain confidential, proprietary or trademarked records of a person or business entity; or are held by a contractor or vendor, **the agency must notify such parties of this appeal immediately and provide proof of that notice to the OOR within seven (7) business days from the date on this letter.** Such notice must be made by (1) providing a copy of all documents included with this letter; and (2) advising that interested persons may request to participate in this appeal (*see* 65 P.S. § 67.1101(c)).

Commonwealth Court has held that “the burden [is] on third-party contractors ... to prove by a preponderance of the evidence that the [requested] records are exempt.” (*Allegheny County Dep’t of Admin. Servs. v. A Second Chance, Inc.*, 13 A.3d 1025, 1042 (Pa. Commw. Ct. 2011)). **Failure of a third-party contractor to participate in an appeal before the OOR may be construed as a waiver of objections regarding release of the requested records.**

Law Enforcement Records of Local Agencies: District Attorneys must appoint Appeals Officers to hear appeals regarding criminal investigative records in the possession of a local law enforcement agency. If access to records was denied in part on that basis, the Requester should consider filing a concurrent appeal with the District Attorney of the relevant county.

If you have any questions about the appeal process, please contact the assigned Appeals Officer (contact information is enclosed) – and be sure to provide a copy of any correspondence to all other parties involved in this appeal.

Sincerely,



Erik Arneson
Executive Director

Enc.: Assigned Appeals Officer contact information
Entire appeal as filed with OOR

REQUEST TO PARTICIPATE BEFORE THE OOR

Please accept this as a Request to Participate in a currently pending appeal before the Office of Open Records. The statements made herein and in any attachments are true and correct to the best of my knowledge, information and belief. I understand this statement is made subject to the penalties of 18 Pa.C.S. § 4904, relating to unsworn falsifications to authorities.

NOTE: The requester filing the appeal with the OOR is a named party in the proceeding and is NOT required to complete this form.

OOR Docket No: _____

Today's date: _____

Name: _____

IF YOU ARE OBJECTING TO THE DISCLOSURE OF YOUR HOME ADDRESS, DO NOT PROVIDE THE OFFICE OF OPEN RECORDS WITH YOUR HOME ADDRESS. PROVIDE AN ALTERNATE ADDRESS IF YOU DO NOT HAVE ACCESS TO E-MAIL.

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Fax Number: _____

Name of Requester: _____

Address/City/State/Zip _____

Telephone/Fax Number: _____ / _____

E-mail _____

Name of Agency: _____

Address/City/State/Zip _____

Telephone/Fax Number: _____ / _____

E-mail _____

Record at issue: _____

I have a direct interest in the record(s) at issue as (check all that apply):

- An employee of the agency
- The owner of a record containing confidential or proprietary information or trademarked records
- A contractor or vendor
- Other: (attach additional pages if necessary) _____

I have attached a copy of all evidence and arguments I wish to submit in support of my position.

Respectfully submitted, _____ (must be signed)

Please submit this form to the Appeals Officer assigned to the appeal. Remember to copy all parties on this correspondence. The Office of Open Records will not consider direct interest filings submitted after a Final Determination has been issued in the appeal.



pennsylvania

OFFICE OF OPEN RECORDS

APPEALS OFFICER:

Kathleen Higgins, Esquire

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KaHiggins@pa.gov

**Preferred method of contact
and submission of information:**

EMAIL

Please direct submissions and correspondence related to this appeal to the above Appeals Officer. Please include the case name and docket number on all submissions.

You must copy the other party on everything you submit to the OOR.

The OOR website, <http://openrecords.pa.gov>, is searchable and both parties are encouraged to review prior final determinations involving similar records and fees that may impact this appeal.