
OPA
DRAFT
(Source: NAS)

**NATIONAL ACADEMIES SEEKS NOMINATIONS FOR EXPERTS
TO CONDUCT NRC-SPONSORED CANCER RISK STUDY**

The National Academies are seeking nominations for membership on the "Committee on the Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase I," part of a Nuclear Regulatory Commission-sponsored, state-of-the-art study.

Information on the study background, task and schedule can be found on the Internet at <http://www.nationalacademies.org/cancerriskstudy> . Nominations (including nominee name, contact information, and biographical information if available) will be accepted through September 31, 2010, and can be submitted by email (crs@nas.edu), phone (202-334-3066), or fax (202-334-2077).

Two primary criteria will be used by the National Academies to screen committee nominations. (1) *Technical expertise* – nominees should have expertise and experience in one or more of the following technical disciplines:

- Demography/spatial analysis
- Dosimetry
- Epidemiology (radiation and general)
- Health physics
- Industrial toxicology
- Medicine/oncology
- Nuclear engineering (familiarity with nuclear plant operations)
- Public health
- Radiobiology
- Radionuclide fate and transport and modeling (air and water)
- Risk communication/public communication
- Social science (environmental justice)
- Statistics/Biostatistics.

(2) *Conflict of Interest* – nominees should not have any financial or other interest that would conflict with their service on the committee. The National Academies' conflict of interest guidance applicable to this project can be found on the Internet at <http://dels.nas.edu/global/nrsb/conflictinterest>.

The National Academies project will provide an up-to-date version of the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities" (<http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-facilities>). The NRC uses the NCI report as a primary resource when communicating with the public about cancer mortality risk in counties that contain or are adjacent to nuclear power

facilities. In the new study, the NRC is also interested in having the Academies evaluate cancer diagnosis rates, as well as exploring how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI report.

The NCI report studied more than 900,000 cancer deaths from 1950–1984, using mortality records collected from counties that contain nuclear facilities. The researchers evaluated changes in mortality rates for 16 types of cancer in these counties from 1950 until each facility began operation, up until 1982. *Cancer diagnosis information was only available for four facilities located in Iowa and Connecticut, due to the lack of this type of data being collected.* The NCI report showed no increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities, including all of the nuclear power reactors operational before 1982.

The National Academies is a non-governmental organization chartered by the U.S. Congress to advise the nation on issues of science, technology, and medicine. Through the National Research Council and Institute of Medicine, it carries out studies independently of the government using processes designed to promote transparency, objectivity, and technical rigor. More information on its methods for performing studies is available at <http://www.nationalacademies.org/studycommitteprocess.pdf>.

###

From: [Crowley, Kevin](#)
To: [Burnell, Scott R](#); [Wingo, Erin](#)
Cc: [Case, Sarah](#)
Subject: RE: Call for noms
Date: Monday, August 30, 2010 3:57:49 PM

Hi Scott:

I would suggest two minor edits:

- (1) First sentence of third paragraph: Add "by the National Academies" after "used." "Two primary criteria will be used by the National Academies to screen" This will make it clear that the NAS will be screening nominations, not the NRC.
- (2) First sentence in point 2 (conflict of interest): revise to "nominees should not have any financial or other interests that would conflict with their service ..." This needs to be conditional because not all nominees will serve on the committee.

Kevin

From: Burnell, Scott [mailto:Scott.Burnell@nrc.gov]
Sent: Monday, August 30, 2010 3:42 PM
To: Wingo, Erin
Cc: Case, Sarah; Crowley, Kevin
Subject: RE: Call for noms
Importance: High

Here's my take on it, I'd appreciate your comments:

**National AcADAMIES SEEKS NOMINATIONS FOR EXPERTS
TO CONDUCT NRC-SPONSORED Cancer Risk STUDY**

The National Academies is seeking nominations for membership on the "Committee on the Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 1," part of a Nuclear Regulatory Commission-sponsored, state-of-the-art study.

Information on the study background, task, and schedule can be found on the Internet at <http://www.nationalacademies.org/cancerriskstudy>. Nominations (including nominee name, contact information, and biographical information if available) will be accepted through September 31, 2010, and can be submitted by email (crs@nas.edu), phone (202-334-3066), or fax (202-334-2077).

Two primary criteria will be used to screen committee nominations. (1) *Technical expertise* - nominees should have expertise and experience in one or more of the following technical disciplines:

- Demography/spatial analysis
- Dosimetry
- Epidemiology (radiation and general)
- Health physics
- Industrial toxicology
- Medicine/oncology
- Nuclear engineering (familiarity with nuclear plant operations)
- Public health
- Radiobiology

- Radionuclide fate and transport and modeling (air and water)
- Risk communication/public communication
- Social science (environmental justice)
- Statistics/Biostatistics.

(2) *Conflict of Interest* - nominees should not have any financial or other interest which conflicts with their service on the committee. The National Academies' conflict of interest guidance applicable to this project can be found on the Internet at

<http://dels.nas.edu/global/nrsb/conflictinterest>.

The National Academies project will provide an up-to-date version of the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities" (<http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-facilities>). The NRC uses the NCI report as a primary resource when communicating with the public about cancer mortality risk in counties that contain or are adjacent to nuclear power facilities. In the new study, the NRC is also interested in having the Academies evaluate cancer diagnosis rates, as well as exploring how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI report.

The NCI report studied more than 900,000 cancer deaths from 1950–1984, using mortality records collected from counties that contain nuclear facilities. The researchers evaluated changes in mortality rates for 16 types of cancer in these counties from 1950 until each facility began operation, up until 1982. Cancer diagnosis information was only available for four facilities located in Iowa and Connecticut, due to the lack of this type of data being collected. The NCI report showed no increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities, including all of the nuclear power reactors operational before 1982.

The National Academies is a non-governmental organization chartered by the U.S. Congress to advise the nation on issues of science, technology, and medicine. Through the National Research Council and Institute of Medicine, it carries out studies independently of the government using processes designed to promote transparency, objectivity, and technical rigor. More information on its methods for performing studies is available at <http://www.nationalacademies.org/studycommitteeprocess.pdf>.

From: Wingo, Erin
To: Burnell, Scott B
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch
Date: Monday, August 23, 2010 8:09:51 AM

Understood. I will get it to you as soon as possible!

From: Burnell, Scott [mailto:Scott.Burnell@nrc.gov]
Sent: Monday, August 23, 2010 7:54 AM
To: Wingo, Erin
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch

Good Morning, Erin;

Understood on the USNRC. I'll have to shepherd the release here through several approvals, so the earlier you can get your draft to me, the better. Thanks!
Scott

From: Wingo, Erin [mailto:EWingo@nas.edu]
Sent: Monday, August 23, 2010 7:52 AM
To: Burnell, Scott
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch
Thanks, Scott. I'll go through and deal with the typos. I used USNRC to differentiate between your NRC and my NRC (National Research Council). It's easy for members of the public to get confused between the two. We will be sending out the call for nominations on September 1, so there's a little time. I will send you a draft once we have one ready.
Thanks,
Erin

From: Burnell, Scott [mailto:Scott.Burnell@nrc.gov]
Sent: Sunday, August 22, 2010 6:05 PM
To: Wingo, Erin
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch

Hi Erin;
I checked the page out in Firefox and apart from a few typos and style points (e.g., we just use NRC unless we're speaking to an *international audience*), it looks fine. If you can send along your draft release on the call for nominations, I'll start putting our release together. Thanks.
Scott

From: Wingo, Erin [EWingo@nas.edu]
Sent: Thursday, August 19, 2010 10:01 AM
To: Burnell, Scott
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch

That sounds excellent. I think we're all on the same page that we want to make sure all announcements reach as many people as possible, for the sake of transparency.
Thanks,
Erin

From: Burnell, Scott [mailto:Scott.Burnell@nrc.gov]
Sent: Thursday, August 19, 2010 9:39 AM
To: Wingo, Erin
Subject: RE: NRC Cancer Risk study: Introduction and Webpage launch

Hi Erin;
I'm out of the office at the moment, and my gov't laptop only has IE, but I'll check that page as soon as I can. From the NRC's perspective, we were planning on echoing whatever public announcements you make regarding call for nominations, etc, with our own press releases linking to your Web pages. Does that mesh with your plans? Thanks, and I look forward to working with you as well.
Scott Burnell
Public Affairs Officer

Nuclear Regulatory Commission

From: Wingo, Erin [EWingo@nas.edu]
Sent: Thursday, August 19, 2010 9:36 AM
To: Burnell, Scott
Subject: NRC Cancer Risk study: Introduction and Webpage launch

Mr. Burnell,

I first wanted to introduce myself to you. I will be acting as the communications person on the upcoming National Research Council's study, Analysis of Cancer Risks in Populations Near Nuclear Facilities, sponsored by the U.S. NRC. The extent of my role has not been fully defined, but I will most likely be handling all forms of public interface on this project.

I have created a webpage that will act as a point of interface with the public, within our larger board site. We will update it as more information is made available, announce meetings, post our call for nominations, materials submitted to us by the public, etc. Right now the site is in its infantile stages. Technically it is "live" but is not linked from any other part of our site yet, nor has its existence been announced to our interested parties (unfortunately in our current system there is no way to make a "preview" version of the page, so to review a page, it must be made live). That being said, I'd like you to take a look at it and ask if you see any issues with information posted or the format (we're also having problems viewing the page on Internet Explorer, so if possible, please view on another browser):

<http://dels.nas.edu/global/nrsb/CancerRisk>

Thanks so much, and I look forward to working with you in the future.

Kind regards,

Erin Wingo

Erin Wingo
Program Assistant
Nuclear and Radiation Studies Board
(202) 334-3066
ewingo@nas.edu

From: [Garry, Steven](#)
To: [Burnell, Scott B](#); [BROCK, TERRY A](#)
Cc: [Shoop, Undine S](#); [KUHLMANN, JENNY W](#)
Subject: RE: Cancer study
Date: Tuesday, July 06, 2010 11:11:57 AM

That's great, thanks to OCA and OPA for the follow-up.
Steve

From: Burnell, Scott
Sent: Tuesday, July 06, 2010 10:59 AM
To: Brock, Terry; Garry, Steven
Cc: Shoop, Undine; Weil, Jenny
Subject: RE: Cancer study

All;
I'll reply to MOP tomorrow, Steve, since we already have a letter/e-mail template for responding to queries about the study. Thanks.
Scott

From: Brock, Terry
Sent: Tuesday, July 06, 2010 10:07 AM
To: Garry, Steven
Cc: Shoop, Undine; Weil, Jenny; Burnell, Scott
Subject: RE: Cancer study

Steve,
It looks like OCA will communicate with the congressman's office. Scott may want to communicate with MOP. Let's wait to hear back from him—he'll be in the office tomorrow, but has been checking e-mails while out. Regardless, great work on the outreach for the study.

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Weil, Jenny
Sent: Tuesday, July 06, 2010 9:59 AM
To: Brock, Terry; Garry, Steven; Burnell, Scott
Cc: Shoop, Undine
Subject: RE: Cancer study

Hi Terry,
Thanks for passing along this information. I knew that Greg chatted with staff at the meeting about other topics, but didn't know he wanted more information on the cancer study. OCA will respond and provide him with the information he is seeking.
Jenny

From: Brock, Terry
Sent: Tuesday, July 06, 2010 9:48 AM
To: Garry, Steven; Burnell, Scott; Weil, Jenny
Cc: Shoop, Undine
Subject: RE: Cancer study

Steve,
The e-mail looks ok to me. I've included Scott Burnell OPA and Jenny Weil from OCA since you plan on communicating with someone from a congressional office.

Jenny, Do you have any comments?

Terry

From: Garry, Steven

Sent: Tuesday, July 06, 2010 9:41 AM

To: Shoop, Undine; Brock, Terry

Subject: FW: Cancer study

Undine and Terry,

Here is an email chain from Region IV OPA, suggesting that I go ahead and contact the interested members of the public at Diablo Canyon. Would you take a look at the draft email below, and provide me comments or additional detail?

Thanks

Steve

From: Dricks, Victor

Sent: Tuesday, July 06, 2010 9:00 AM

To: Garry, Steven; Uselding, Lara

Subject: RE: Cancer study

It would be best for you to get back to her. Thanks.

From: Garry, Steven

Sent: Tuesday, July 06, 2010 7:56 AM

To: Dricks, Victor; Uselding, Lara

Cc: Werner, Greg; Carson, Louis; Brock, Terry

Subject: Cancer study

Hi Lara and Victor (Region IV OPA)

It was very nice meeting you, and having the opportunity to work with you (with dinner!).

At the Diablo Canyon EOC poster session, I spoke with 2 different groups that we need to follow-up with:

- 1) Mothers For Peace (primarily Jane Swanson), and
- 2) District Representative Greg Haas. Greg is a technical assistant to the Honorable Lois Capps, California Representative (CA-23). (I've attached his business card.)

They were previously unaware, but are now VERY interested in the upcoming cancer study that the NRC is funding and that the National Academy of Science is going to perform.

They think a cancer study should have been done pre-operational, and as a follow-up study, so "it's about time."

I told them about the NAS web page (see below – NRC contact is Dr. Terry Brock). I promised to send them a link to the NAS web page. As Terry has said, NAS is interested in obtaining any "local" information on cancer rates near any facility. Greg Haas and Jane Swanson want to read about the proposed cancer study, and they may want to submit their local information on cancer rates near Diablo (although they acknowledged they did not have any specific data, just anecdotal information).

I am asking you whether you (OPA) want to get back to them, or if you would like Region IV HPs, or Dr. Brock, or myself to contact them?

Best regards,

Steve Garry

Sr. Health Physicist, NRR/DIRS

301-415-2766

From: Brock, Terry

Sent: Tuesday, June 29, 2010 4:06 PM

To: Garry, Steven

Subject: cancer study contact

Hello Steve,

I'm glad to hear you have received some interest in the cancer study during your meeting at

Diablo Canyon. At this stage of the study we (NRC) are still working on administrative details with the National Academy of Sciences (NAS) to get started later this summer. Once started, the NAS will set-up a web page to receive comments from all stakeholders to be considered by the study committee. In the meanwhile, the NAS has put a web page up for the study here describing our request >>

<http://dels.nas.edu/global/nrsb/NRCAnnouncement> . The NAS study contact is Dr. Kevin Crowley and stakeholders can reach him at KCrowley@nas.edu.

Terry

Terry Brock, Ph.D.

U.S. Nuclear Regulatory Commission

301-251-7487

.....
DRAFT EMAIL BELOW TO GREG HAAS and JANE SWANSON
.....

Mr. Greg Haas, District Representative [Hon. Lois Capps]

Ms. Jane Swanson [Spokesperson Mothers For Peace]

Hi Greg and Jane,

I enjoyed meeting and talking with you at the Diablo Canyon annual assessment meeting on June 29th. Thank you for your interest and excitement in the upcoming cancer study near nuclear power plants. We too are excited to have an independent study performed. We expect that the cancer study will be initiated later this year.

As requested, here is the link to information available to date on the cancer study that will be performed under the direction of the National Academy of Science:

<http://dels.nas.edu/global/nrsb/NRCAnnouncement> .

The NAS study contact is Dr. Kevin Crowley and you can reach him at KCrowley@nas.edu.

Our NRC Project Manager for this study is Dr. Terry Brock.

Terry can be reached at 301-251-7487.

His email address is Terry.Brock@nrc.gov.

You are very welcome to contact Dr. Brock, myself, or anyone else involved in this study, including Dr. Kevin Crowley of the NAS. We appreciate your sincere interest, and look forward to initiating and completing the study.

Steve Garry, Certified Health Physicist

Sr. Health Physicist

Nuclear Regulatory Commission

301-415-2766

From: [Weber, Michael](#)
To: [Williams, Kevin](#)
Cc: [BROCK, KATHRYN M](#); [Burnell, Scott B](#); [Powell, Amy](#)
Subject: FYI - Response to Your E-mail to Chairman Jaczko
Date: Monday, May 24, 2010 9:27:13 AM

From: Sheron, Brian
Sent: Monday, May 24, 2010 9:26 AM
To: Weber, Michael
Subject: FW: Response to Your E-mail to Chairman Jaczko

From: Sheron, Brian
Sent: Friday, May 21, 2010 3:22 PM
To: (b)(6)
Cc: 'kcrowley@nas.edu'
Subject: Response to Your E-mail to Chairman Jaczko

Dear Mrs. Sauer,

Chairman Jaczko has asked me to respond to your e-mail to him dated January 25, 2010. If you recall, I met you and your family on April 26th, 2010, during the NRC's meeting with the National Academies' Nuclear and Radiation Studies Board. I understand your concern and belief that living near nuclear facilities, particularly those that have had tritium leaks, may have contributed to not only your daughter's cancer, but also to other cancers in nearby local populations. I also appreciate your comments and interest in the NRC-sponsored study, "Analysis of Cancer Risk in Populations Living Near Nuclear Facilities."

As you are aware, the NRC has requested the National Academy of Sciences (NAS) to conduct the study to provide an up-to-date review of cancer incidence and mortality risk for populations living near past, present, and proposed NRC-licensed nuclear facilities. The proposed study will be performed in two phases: (1) a scoping study to determine the best methodology, the best approach, and the potential limitations for performing the cancer incidence and mortality epidemiology study and, (2) performing the actual study. Our objective is to determine whether the cancer risks to populations living near or adjacent to nuclear facilities are different from the cancer risks to the average population, and if there are differences, can they be attributed to the nuclear facility or to other causes. The study will also evaluate whether the risks are different for various age groups, including children. In response to your comments regarding leaks at the Braidwood and Dresden facilities, we have inspected the magnitude and the extent of the offsite contamination that occurred at these facilities. *There was plant-related tritium contamination detected in one drinking water well immediately adjacent to the Braidwood plant, with tritium levels of approximately 8% of the EPA drinking water standard established under the Safe Drinking Water Act.* We also note that routine discharges of radioactive effluents that do occur from nuclear plants that are strictly controlled within NRC regulatory limits. The NRC regulatory limits are established based on recommendations of national and international radiation protection Commissions and Councils. The NRC limits are established within the U.S. Environmental Protection Agency standards that were established as required by the US Congress. Note: *These same limits apply to all members of the public that may be exposed to radiation from any type of facility; e.g., nuclear plants, hospitals, medical facilities that involve diagnostic and therapeutic services; e.g., CT scans, X-ray facilities, radioactive gauge users, tritium exit signs, etc.* We note that in general, the annual maximum individual radiation dose received by any member of the public from tritium and from nuclear plants is typically less than 1 mrem. This is a very small portion of the average total radiation exposure received by members of the public from all sources, including background radiation (~300 mrem) and other manmade sources (~300 mrem).

In regard to your comments about the 1990 U.S. National Cancer Institute (NCI) study, "Cancer in Populations Living Near Nuclear Power Plants," NRC continues to support the study within the context of the information available at that time. However, we also recognize the limitations of the study in that some nuclear facilities had only been operating for a few years, and that there is a latency period of several years prior to mortality. The NCI continues to reference the report, which is available on their public Web site at <http://www.cancer.gov/cancertopics/factsheet/Risk/nuclearfacilities>.

Since publication of the NCI study, most states have developed cancer incidence databases that were not available during the original study. In addition, advances have been made in geographical information systems used in epidemiology and public health applications. We want to use these advances to include cancer incidence and to reduce the study area around the plant to something smaller than the counties used in the NCI study. Finally, we also want to ensure that ample opportunity exists for public input during the study process. Because you conclude your data and analysis refute the conclusions of the 1990 NCI study, it is important that we understand the reasons for this apparent discrepancy. Therefore, please consider submitting your data and analysis that was used in the summary information on cancer rates provided in your e-mail to the NAS for its consideration. The NAS study contact is Kevin Crowley at kcrowley@nas.edu. Again, I thank you for sharing with us your concerns, and if you have any further questions, please feel free to contact me at 301-251-7400.

Sincerely,

Brian W. Sheron, Director
Office of Nuclear Regulatory Research

From: [Brock, Terry](#)
To: [Burnell, Scott R](#)
Subject: RE: NAS_CancerResp_template_tab.doc
Date: Thursday, May 13, 2010 3:00:26 PM

Nah. Pls leave it nuclear facilities

From: Burnell, Scott
Sent: Thursday, May 13, 2010 2:58 PM
To: Brock, Terry
Subject: RE: NAS_CancerResp_template_tab.doc
Ah, but it says "facilities" instead of "reactors." Not general enough?

From: Brock, Terry
Sent: Thursday, May 13, 2010 2:56 PM
To: Burnell, Scott
Subject: RE: NAS_CancerResp_template_tab.doc
I think it is more confusing to limit it to power reactors when we are including some fuel cycle facilities.

From: Burnell, Scott
Sent: Thursday, May 13, 2010 2:54 PM
To: Brock, Terry
Subject: RE: NAS_CancerResp_template_tab.doc
I'm inclined to leave "U.S. nuclear power facilities." to avoid confusion with weapons production, etc.

From: Brock, Terry
Sent: Thursday, May 13, 2010 2:52 PM
To: Burnell, Scott
Subject: FW: NAS_CancerResp_template_tab.doc

From: Brock, Terry
Sent: Thursday, May 13, 2010 1:26 PM
To: Bush-Goddard, Stephanie
Subject: NAS_CancerResp_template_tab.doc
Steph, looks good. My mark-up attached.

T

From: [Bush-Goddard, Stephanie](#)
To: [Powell, Amy](#)
Cc: [BROCK, TERRY A](#); [Burnell, Scott R](#); [SANTIAGO, PATRICIA A](#); [Gibson, Kathy H](#); [ARMSTRONG, KENNETH W](#); [DEMPSEY, HEATHER M](#); [JOHNSON, KEVIN D](#); [Uhle, Jennifer L](#)
Subject: Coordinating EDO request regarding Cancer Study
Date: Friday, May 07, 2010 1:52:15 PM
Attachments: [Tab D 04-21-10 Cuthbert 10-0170.pdf](#)

Amy,

RES is receiving numerous letters/actions on the Cancer Risk study involving congressional and other interest.

The actions vary in length, response and coordination with other offices.

For example, EDO actions say

- 1) "For Appropriate Action," or
- 2) Are lengthy and need other offices and OPA/OCA input, or
- 3) (like the one you sent last week), are perfectly OK to be handled by the OCA Cancer Communication Plan Member, because the answer is in the Communication Plan.

Anticipating current (just received a letter from Senator Casey) and additional actions....I want to come up with a systematic, appropriate and hopefully simple process to coordinate these issues with OCA (and other offices).

I plan to meet with Pat Santiago (RES TA) for her advice on these issues and to see if we can efficiently and effectively coordinate with the EDO and other offices, and Terry Brock, who is the lead Project Manager for the Cancer Risk Study, is working with Scott Burnell in OPA for a similar coordination request.

Please call me at your earliest convenience to discuss and I also left you a voice mail.

Looking forward to hearing from you,

Stephanie

The Alliance For A Clean Environment
1189 Foxview Road
Pottstown, PA 19465

April 21, 2010

Gregory B. Jaczko, Chairman
U.S. Nuclear Regulatory Commission

Mail Stop O-16G4
Washington, DC 20555-0001
Fax: (301) 415-3504
Email: cmriaczko@anrc.-ov

RE: Cancer Study Around U.S. Nuclear Power Plants

Dear Chairman Jaczko,

The Alliance For A Clean Environment is a tri-county grassroots environmental group focused on links between radiation released from Limerick Nuclear Plant since it started operating in 1985 and the alarmingly high rates of cancer in our community, especially in children, (already documented with four cancer studies). *Highly elevated infant and neonatal mortality, and other environmentally related diseases and disabilities are also documented with state data.*

There is no doubt in our minds that Limerick Nuclear Power Plant's routine radiation emissions are a major factor in all of this. For 25 years Limerick Nuclear Power Plant has routinely released a broad range of radionuclides into our air and water. These radionuclides make their way into the soil, food, and people. The long-term synergistic, additive, and cumulative harmful health impacts from all routes of exposure are unknown, but obviously significant.

If the protocol for this proposed cancer study is not designed to identify and disclose the whole truth, we believe the potential outcome can result in increasing cancers and a broad range of other environmentally related diseases and disabilities in future generations in our region and around other nuclear plants trying to get their licenses extended and approval for uprates. It could also insure increased cancers where new nuclear plants are being proposed.

We are extremely concerned that NRC's involvement in a cancer study around nuclear plants will not lead to full and unbiased disclosure, due to NRC's undeniable preconceived bias. During our 10-year investigation on Limerick Nuclear Plant's links to our health crisis, NRC officials repeatedly and publically made unsubstantiated, indefensible, and illogical public claims that radiation emissions from nuclear plants are too small to cause harm. These unsubstantiated and irresponsible NRC comments (confirmed with video) show NRC's predetermined industry bias in such a study. *NRC blindly defends the nuclear industry and their own policies with nothing more than calculations, estimations, and partial monitoring on radiation releases from nuclear plants, which are all reported and controlled by the nuclear industry that has a vested interest in the outcome.*

How can NRC be considered objective in a cancer study around nuclear plants? NRC is the agency, condoning and defending unknown amounts of routine and accidental radionuclide emissions into the air, from the nation's 104 nuclear reactors. The radiation released doesn't magically disappear. Those radionuclides gets into the soil, food, and people yet NRC illogically claims there is no harm. With minimal oversight, NRC allows the nuclear industry to monitor and report on only a fraction of the radionuclides that could be in nuclear plant discharges into rivers and other waterways. Without independent data and documentation from all routes of exposures, ranking NRC officials dismiss harms from nuclear plant radiation exposure. NRC never had comprehensive, reliable or defensible data to make any credible conclusion on actual harms from nuclear plant radiation, yet NRC irresponsibly continues to deny harm to this day.

4/26...To EDO for Appropriate Action...Cpy to: RF...10-0170

NRC's conflict of interest in this cancer study and motives to deny harm are obvious to many of us.

1. NRC is complicit in the harm, promulgating and overseeing regulations for "permissible" radiation exposures to the public.
2. Many top NRC officials have an industry bias and mentality, since they come from the nuclear industry.
3. 90% of NRC funding comes from nuclear power reactor licensing fees. NRC stands to gain from reactor license extensions and new reactor construction.

We have no confidence in NRC's objectivity and therefore strongly OPPOSE having NRC fund and oversee a health study, which would clearly be a direct conflict of interest. It is not credible for NRC to assess how well its own regulations and oversight are performing. A reliable cancer study protocol must be comprehensively designed, thoroughly conducted, and fully funded by a completely independent agency and that is clearly not NRC.

- **NRC should not be directly involved in defining or conducting a health study related to nuclear plants for reasons listed above and many others. Why would anyone believe NRC would sign off on a study conclusion that reveals they have been negligent in their unsubstantiated conclusions about radiation from nuclear plants after all these years?**

The nation cannot afford another "inconclusive by design" study, especially one about the harmful impacts of radiation emissions from nuclear power plants. If NRC controls or remains involved in this study in any way, that will hurt, rather than help, communities already impacted by nuclear plant radiation emissions as well as those where new nuclear plants are proposed. We, and likely many other communities, will consider the study to be industry biased and can have no confidence that it will provide full and accurate disclosure of harms. We believe a study involving NRC will attempt to refute all the previous cancer studies already suggesting obvious links between radiation released from nuclear power plants and cancer.

NRC's objectivity is not only in question. We question NRC's motive for requesting a cancer study at this time. Based on previous experience in this community, we suspect this could be another politically driven cancer study, this time with an objective of muddying the waters to assist efforts for a "nuclear renaissance" and to defend what we think is the obviously dangerous practice of re-licensing old nuclear plants.

The design of the cancer study protocol will determine the outcome. If those paying for the study and designing the protocol have a preconceived political and biased agenda, the study outcome can be manipulated in many ways to reflect preconceived conclusions, in spite of the facts. A previous politically driven cancer study in our community has taught us a great deal about the politics of cancer studies. An elected state official attempted to defend her denial of harm to protect polluters, by wasting \$295,000 of taxpayer money on a 5th cancer study on our community, even though four previous studies already documented alarming elevated cancers. The PA Health Department's politically driven cancer study on behalf of a biased state official, violated ethical breaches toward this community under the International Guidelines for Ethical Review of Epidemiological Studies (IGERES). The PA Health Department manipulated data to hide results and made inaccurate and misleading conclusions.

Many studies already show elevated cancers around nuclear plants. We suspect NRC's request to do a cancer study is an attempt to refute cancer studies in Europe and the U.S. already showing high rates of cancer around nuclear plants, especially in children. Germany decided to close their nuclear plants by the early 2020s to protect their children as a result of a cancer study around German nuclear plants. Yet, despite so many cancer studies showing elevations of cancer around nuclear plants, U.S. politicians are attempting to build as many as 100 more. We believe NRC's cancer study could be a planned tactic to be used as a tool in the arsenal of the nuclear industry and politicians to deny harm and to achieve their agenda for public support on approval for new nuclear plants and re-licensing.

The only way to use limited funding wisely to credibly address the link between nuclear power plant radiation releases and elevated cancers is to delegate and award complete control of the study protocol

and funding to a totally unbiased agency, with the agreement that there be a process totally open to the public with full and fair public participation. Our suggestion is the National Institute of Environmental Health Sciences (NIEHS), that we believe is capable of producing an independent peer reviewed study. We believe an independent study should be comprehensive and expanded to include all health effects associated with living near nuclear power plants. The mission should be "to reduce the burden of environmentally associated diseases and disabilities by defining how environmental exposures affect health, how individuals differ in their susceptibility to these exposures, and how these susceptibilities change over time. That would begin to assess nuclear plant radiation impacts on health.

The NCI 1990 study's methodology was broadly and professionally criticized as significantly flawed. We, like others, are opposed to the NRC study being replicated. A new health study should not incorporate the same NCI mistakes.

Without comprehensive, independent, continuous year-long monitoring data from routine air and water releases of all radionuclides, it is impossible to know how much health harm is done by the synergistic, additive, and cumulative radiation exposures resulting from the routine and accidental radiation releases from nuclear plants. Without this data routine and accidental spikes go unaddressed. This lead to inaccurate conclusions about risks. Risk cannot accurately be determined without including synergistic, additive, and cumulative harmful impacts from all routes of nuclear plant radiation exposures, including air, water, soil, and food. To accurately draw a conclusion about links, you first need to determine exactly how much of each radionuclide was released into the air and water over an extended period of time.

NRC has never required comprehensive, independent, continuous monitoring data for each of over 100 radionuclides from each source that nuclear plants can be releasing into the air around nuclear plants.

- To accurately assess related health risks, one year of continuous, comprehensive monitoring needs to be done for each radionuclide associated with nuclear power production from each source at the nuclear plant. Risks cannot be determined by calculations or estimations, especially when done by the nuclear industry, with a vested interest in the outcome.

There is no comprehensive, independent, continuous monitoring data for all radionuclides likely to be in the radioactive discharges to river or other waterways.

- Accurate risks cannot be accurately determined with all monitoring, testing, and reporting controlled by the nuclear industry, with a vested interest in the outcome. Monitoring results can easily be manipulated with use of arbitrary detection limits being set at high levels, then only reporting on radionuclide levels above the high arbitrary limits. All monitoring data should be reported with limits starting at zero. Given the extreme threat from any level of radiation exposure, all detection limits should be based on any level above zero, whether air or water monitoring.

We believe testing should be expanded on milk, fish, and food grown in fields for all released radionuclides and their decay products.

To accurately determine risk, we also urge in-body testing for all released radionuclides and their decay products. Testing should include the breast milk of mothers and the baby teeth for strontium-90.

There is a lot at stake with a politically charged study on nuclear power plants. If conclusions are to be made about nuclear power plants, they must be based on an unbiased scientific collection of all the evidence for the most complete and accurate picture. The nation needs and deserves full and accurate disclosure of the whole truth. It is not enough to collect cancer registry data. If money is to be spent on determining harms from radiation emissions from nuclear power plants, infant and neonatal mortality, birth defects, thyroid disease, and all other diseases and disabilities associated with nuclear plants need to be collected and evaluated. At nuclear plants like Limerick with cooling towers, the harmful impacts from the massive amounts of particulate matter, all respiratory diseases, heart attacks, and strokes should also be included.

Our community, and we suspect most others impacted by nuclear power's pollution, can't afford to have more baseless, manipulated, and biased conclusions which lead to making things worse. We remind NRC, that since Limerick started operating in 1985, childhood cancer rates soared from 30% higher than the national average in the late 1980s to 92.5% higher than the national average in the late 1990s. Thyroid cancer rates increased by 128% from the mid 1980s to the mid 1990s and are far higher than the national average. Anecdotal evidence suggests that thyroid diseases are widespread and alarming. Many other cancers are documented to have increased dramatically and skyrocketed to rates far higher than national and state averages. Infant and neonatal mortality rates are documented to be far higher than the state average and even higher than Philadelphia and Reading. Learning disabilities increased by 94% (1990 to 2000), double the state average increases. Autism rose in that same time period by 310%. Other health problems are also far higher than the state average or Philadelphia.

Cancer threats from Limerick Nuclear Plant's radiation emissions will keep increasing as long as Limerick continues to operate. We even face increased threats from Limerick Nuclear Power Plant's "uprates". We also face Limerick relicensing that would ensure radiation emissions into our air, water, soil, food, and people for another 20 years.

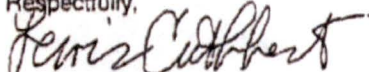
We are convinced, with good cause, that a biased and unsubstantiated cancer study conclusion that attempts to dismiss nuclear plant radiation emissions as a major factor in our already elevated cancer rates will ensure still higher rates of cancer and more suffering in future generations.

Unfortunately, through our ten-year investigation on Limerick Nuclear Plant's threats to our region, ACE has lost all confidence and trust in NRC's conclusions and objectivity. NRC's industry-biased comments, conclusions, and inaction on many issues were difficult for us to understand, until we realized that those making major NRC decisions had been long-time nuclear industry employees. Letters and videos document many examples of NRC's unsubstantiated claims, inconsistent and illogical conclusions, failure to take timely action on reported risks, failure to require compliance with regulations, and unprotective positions, such as NRC's failure to require protection against a 9/11 type terrorist attack even though terrorists have stated their intent to attack nuclear plants. NRC has shown repeatedly that they value the profits of the nuclear industry more than public health and safety.

Clearly, we believe there is good cause to ask NRC to step away from this study and to support the most independent, comprehensive health study possible. This community and the nation deserves nothing less. We are at a turning point both in this community and in the nation.

We request that this letter be entered as part of the official record for this planned study.

Respectfully,



Dr. Lewis Cuthbert
ACE President

CC: President Obama
Senator Casey
Senator Specter
Congressman Dent
Congressman Gerlach
Congressman Sestak
Energy Secretary Chu
Health and Human Services Secretary Sebelius

From: [Brock, Terry](#)
To: [Burnell, Scott R](#)
Cc: [BUSH-GODDARD, STEPHANIE P](#)
Subject: how to handle incoming letters
Date: Friday, May 07, 2010 7:09:59 AM
Attachments: [Tab D 04-21-10 Cuthbert 10-0170.pdf](#)

Hi Scott,

We've received a couple more public interest group letters on the cancer study with some familiar language. The EDO ticketed RES "For Appropriate Action" We think a systematic and appropriate action is for OPA to acknowledge the letter in writing and tell them we have forwarded your letter to the National Academy of Sciences for consideration by the to-be-established study committee. I've attached a current letter for your review.

Let us know what you think.

Terry

Terry Brock, Ph.D.

U.S. Nuclear Regulatory Commission

301-251-7487

From: [Mitlyng, Viktoria](#)
To: [Burnell, Scott R](#); [SCRENCI, DIANE P](#); [SHEEHAN, NEIL A](#); [HANNAH, ROGER D](#); [Ledford, Joey A](#); [Dricks, Victor L](#); [Uselding, Lara](#); [HARRINGTON, HOLLY M](#); [McIntyre, David T](#); [COURRET, IVONNE L](#); [Hayden, Elizabeth](#); [Brenner, Eliot B](#)
Cc: [Chandrathil, Prema](#)
Subject: RE: cancer study
Date: Tuesday, May 04, 2010 9:46:25 AM

Scott, I really appreciate your help on this. Vika

From: Burnell, Scott
Sent: Tuesday, May 04, 2010 6:52 AM
To: Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Hannah, Roger; Ledford, Joey; Dricks, Victor; Uselding, Lara; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hayden, Elizabeth; Brenner, Eliot
Cc: Chandrathil, Prema
Subject: RE: cancer study

Morning all;

I thought I'd sent along the updated comm plan, but just in case...

Vika – short answers to your Qs are below

From: Mitlyng, Viktoria
Sent: Monday, May 03, 2010 8:03 PM
To: Burnell, Scott
Cc: Chandrathil, Prema
Subject: cancer study

Scott,

Is there an updated complan on the cancer study or an updated set of QAs? They would be very useful for fielding inquiries at the EOC meetings. I reviewed the old complan but it seems to be outdated. For example, it says that we will consider doing a cancer incidence study after conducting the update to the mortality study. It sounds to me like the NAS study will focus on incidence. Should we not offer that complan as background info to staff?

I will have trouble responding to such questions as:

- Will the study look at all 104 power plants? If not - how many? The NRC has asked the NAS to examine all operating U.S. nuclear power plants, fuel cycle facilities and decommissioned reactors.
- What is the NRC's involvement in the study right now? What will its involvement be in the future? The NRC will provide input during the first phase of the NAS scoping study; decisions on the study method, researchers, etc will be made solely by the NAS.
- Will the NRC or the NAS provide status updates on the study's progress? The NAS is expected to create a Web site for the study; the NRC will also have Web pages on its site regarding the study.
- Will the NAS make its methodology available to the public once it's been developed? Yes.
- Will the methodology be reviewed by other scientific bodies? The NAS process includes peer review.
- Can communities near nuclear plants request the NAS to focus on a specific area that appears to have a cancer cluster? Yes, the NAS is expected to seek input from the public as well as scientific and professional groups.

Do we begin referring people to NAS to answer questions associated with future public involvement, methodology, etc. Yes, the current NAS contact is Toni Greenleaf at tgreenle@nas.edu.

Sorry to be a pain - in addition to all the other, more official pains who will remain nameless - but ... you know how it is.

Thanks! Vika

Viktoria Mitlyng

Office of Public Affairs

US Nuclear Regulatory Commission
Region III
Lisle, IL 60532
Tel 630/829-9662
Fax 630/515-1026
e-mail: viktoria.mitlyng@nrc.gov

From: [Crowley, Kevin](#)
To: [Burnell, Scott B;](#) [Walsh, Jennifer](#)
Subject: RE: seeing if plants cause cancer
Date: Monday, May 03, 2010 12:52:38 PM

Scott:

Please have her contact Toni Greenleaf at tgreenle@nas.edu.

Thanks,

Kevin

-----Original Message-----

From: Burnell, Scott [<mailto:Scott.Burnell@nrc.gov>]
Sent: Monday, May 03, 2010 11:26 AM
To: Crowley, Kevin; Walsh, Jennifer
Subject: FW: seeing if plants cause cancer

Good Morning, Kevin and Jennifer;

I'll respond to this, but I was wondering if any progress has been made on the listserv Chairman Meserve mentioned at the start of the meeting last week. I'd like to be able to point Ms. Cuevas in the right direction. Thanks.

Scott

-----Original Message-----

From: allison cuevas [[\(b\)\(6\)](mailto:(b)(6))]
Sent: Friday, April 30, 2010 12:34 AM
To: OPA Resource
Subject: seeing if plants cause cancer

Below is the result of your feedback form. It was submitted by

allison cuevas [[\(b\)\(6\)](mailto:(b)(6))] on Friday, April 30, 2010 at 00:33:35

comments: Hi, we are from minooka illinois. And i just read an article about checking to see if the plants out here cause cancer. My son is 5 and when he was almost 4 he was diagnosed with leukemia. the doctors have no ideal how he got it. I asked them if it was from living near the plants. (we live close enough that you can see the flame from our yard). And they said they do not know. I do know there are other children around us with leukemia. What i want to know is when will you do your study and when will it be complete"? I'm looking for an answer as to why my son is suffering like this. And also if it is found that they do cause cancer will anything be done about it? Will you be talking to people in this area that have cancer or have a child with cancer? Thank you..

Allison Cuevas

[\(b\)\(6\)](mailto:(b)(6))

Minooka, Ill

60447

[\(b\)\(6\)](mailto:(b)(6))

organization:

address1 [\(b\)\(6\)](mailto:(b)(6))

address2:

city: minooka

state: IL

zip: 60447

country: usa

phone:

From: [Sheehan, Neil](#)
To: [Burnell, Scott B](#); [Brenner, Eliot B](#); [Hayden, Elizabeth](#); [HARRINGTON, HOLLY M](#); [McIntyre, David T](#); [COURRET, IVONNE L](#)
Subject: RE: re: Cancer study
Date: Friday, April 30, 2010 3:22:22 PM

Got it. Thanks

From: Burnell, Scott
Sent: Friday, April 30, 2010 3:07 PM
To: Sheehan, Neil; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Couret, Ivonne
Subject: RE: re: Cancer study
RES folks say it's "in the \$5 million range" at this point.

From: Sheehan, Neil
Sent: Friday, April 30, 2010 2:53 PM
To: Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David; Couret, Ivonne
Subject: re: Cancer study
Does anyone know how much the NAS cancer study is expected to cost, or at least what has been budgeted for it?

From: [Brock, Terry](#)
To: [Burnell, Scott R](#)
Cc: [BUSH-GODDARD, STEPHANIE P](#)
Subject: RE: Cancer study
Date: Friday, April 30, 2010 3:05:43 PM

Not really. The first phase- scoping study will cost up to \$1 million. The results of Phase 1 will determine the cost of Phase 2 (actually doing the study). Our initial talks with Oak Ridge Associated Universities to do the entire cancer incidence and mortality study was about \$5 million. I would stick with upwards of \$5 million dollars as the estimate.

Terry

From: Burnell, Scott

Sent: Friday, April 30, 2010 2:54 PM

To: Sheehan, Neil; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Couret, Ivonne; Brock, Terry

Subject: RE: re: Cancer study

We've said "several million" up to now. Terry, any more definitive numbers available?

From: Sheehan, Neil

Sent: Friday, April 30, 2010 2:53 PM

To: Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David; Couret, Ivonne

Subject: re: Cancer study

Does anyone know how much the NAS cancer study is expected to cost, or at least what has been budgeted for it?

From: OPA Resource
To: [Burnell, Scott B](#)
Subject: FW: seeing if plants cause cancer
Date: Friday, April 30, 2010 8:11:06 AM

Given you're the cancer study guy, I'm sending to you. Let me know if it should be Dave.

-----Original Message-----

From: allison cuevas [mailto:[\(b\)\(6\)](#)]
Sent: Friday, April 30, 2010 12:34 AM
To: OPA Resource
Subject: seeing if plants cause cancer

Below is the result of your feedback form. It was submitted by

allison cuevas [\(b\)\(6\)](#) on Friday, April 30, 2010 at 00:33:35

comments: Hi, we are from minooka illinois. And i just read an article about checking to see if the plants out here cause cancer. My son is 5 and when he was almost 4 he was diagnosed with leukemia. the doctors have no ideal how he got it. I asked them if it was from living near the plants. (we live close enough that you can see the flame from our yard). And they said they do not know. I do know there are other children around us with leukemia. What i want to know is when will you do your study and when will it be complete"? I'm looking for an answer as to why my son is suffering like this. And also if it is found that they do cause cancer will anything be done about it? Will you be talking to people in this area that have cancer or have a child with cancer? Thank you..

Allison Cuevas

[\(b\)\(6\)](#)

Minooka, Ill
60447

[\(b\)\(6\)](#)

organization:

address1: [\(b\)\(6\)](#)

address2:

city: minooka

state: IL

zip: 60447

country: usa

phone: [\(b\)\(6\)](#)

From: [Sheron, Brian](#)
To: [Burnell, Scott R](#); [Brenner, Eliot B](#)
Cc: [Virgilio, Martin](#)
Subject: RE: Cancer Study
Date: Thursday, April 29, 2010 4:36:20 PM

OK.

From: Burnell, Scott
Sent: Thursday, April 29, 2010 3:22 PM
To: Sheron, Brian; Brenner, Eliot
Cc: Virgilio, Martin
Subject: RE: Cancer Study

I've made it clear in the interviews I've done that we have no issues with the NCI study, and we've made it clear to the folks in the regions that we don't use the "f" word. I'll make sure the regions also know the Congressional source of the NCI study.

From: Sheron, Brian
Sent: Thursday, April 29, 2010 2:32 PM
To: Burnell, Scott; Brenner, Eliot
Cc: Virgilio, Martin
Subject: RE: Cancer Study

Referring to it as "flawed" implies we think it contains errors. We don't. Also, there seems to be an implication that we (NRC) sponsored the NCI study. I don't think we did.

From: Burnell, Scott
Sent: Thursday, April 29, 2010 2:28 PM
To: Sheron, Brian; Brenner, Eliot
Cc: Virgilio, Martin
Subject: RE: Cancer Study

That Scripps-Howard reporter must have gotten her notes crossed -- we never used the words "flawed," but she has an out in that we've said today's data and analysis are "better."

From: Sheron, Brian
Sent: Thursday, April 29, 2010 2:26 PM
To: Brenner, Eliot; Burnell, Scott
Cc: Virgilio, Martin
Subject: Cancer Study

Catching up on mail, I saw in the NRC News Summary from Tuesday, April 27th, that the Scripps Howard News Service said that the NRC acknowledged that a previous study done 20 years ago was flawed. We have never said that the NCI study was flawed. The NCI study is not flawed. All we have ever said is that it had limitations (e.g., it did not look at cancer incidence). The person who continually characterizes the NCI study as "flawed" is Markey.

From: [Brock, Terry](#)
To: [Burnell, Scott R](#)
Subject: Scripps Howard is wrong
Date: Tuesday, April 27, 2010 9:17:01 AM

We never said it was flawed. Do you need to send a correction?

Terry

New NAS Study To Examine Cancer Risk For Residents Living Near Nuclear Plants.

[Scripps Howard News Service](#) (4/27, Sergent) reports the Nuclear Regulatory Commission formally requested that the National Academy of Sciences conduct a study to "examine cancer risk in populations living near nuclear facilities," even **as the NRC acknowledged that "a previous study done 20 years ago was flawed.** Families of 30 local children who were diagnosed with rare brain cancers in the '80s and '90s were always referred back to the 1990 study performed by the National Cancer Institute, which concluded there was no link between the cancers and nuclear plant emissions." Scripps adds "Those who testified Monday expressed hope that a new study can examine data much more precisely than was done earlier. ... Advances in technology will help generate a more accurate assessment of whether there truly is a link between nuclear power plants and cancer in children who live nearby, said Scott Burnell, spokesman for the Nuclear Regulatory Commission."

Terry Brock, Ph.D.

U.S. Nuclear Regulatory Commission

301-251-7487

From: [Powell, Amy](#)
To: [Burnell, Scott R](#)
Cc: [KUHLMANN, JENNY W](#)
Subject: Re: Clarifications on cancer study presentation
Date: Tuesday, April 27, 2010 6:20:58 AM

OK - thanks. Both Jenny and I are on the Hill a good chunk of today (including time with Annie), so this is helpful.

Amy Powell
Associate Director
Office of Congressional Affairs
U. S. Nuclear Regulatory Commission
Phone: 301-415-1673

----- Original Message -----

From: Burnell, Scott
To: Powell, Amy
Cc: Weil, Jenny
Sent: Tue Apr 27 06:14:44 2010
Subject: RE: Clarifications on cancer study presentation

That's my distinct recollection, that Annie identified herself as an Inhofe staffer but was speaking for herself. Freedhoff was passing along Markey's thoughts specifically. I'll call later.

Yep, real pitchers' duel... *rolling my eyes* But a win's a win's a win. *SIGH*

From: Powell, Amy
Sent: Monday, April 26, 2010 10:18 PM
To: Burnell, Scott
Cc: Weil, Jenny
Subject: Clarifications on cancer study presentation

Hi Scott -

I am interested in TNT's note that Annie Caputo "spoke for herself" at today's NAS meeting. Did she specifically say that she was not representing Sen. Inhofe or the Senate EPW Minority on the panel? Also, was the staff from Rep. Markey's office Michal Freedhoff as posted on the advance agenda? Speaking for her boss, given no note indicating otherwise?

BTW, a real pitchers' duel tonight: 9-8 in the 5th was the last score I saw...

Amy

Amy Powell
Associate Director
Office of Congressional Affairs
U. S. Nuclear Regulatory Commission
Phone: 301-415-1673

From: [Bush-Goddard, Stephanie](#)
To: [MILLIGAN, PATRICIA A](#); [Burnell, Scott B](#); [BROCK, TERRY A](#); [GARRY, STEVEN M](#)
Subject: RE: Cancer study
Date: Friday, April 23, 2010 4:27:16 PM

Scott,

...on a serious noteI am really just trying to understand.

Why cant the letter be to pro nukes, anti's and neutrals???

So my question is: is it proper to ask the Chairman to write a letter to: DIRECTLY ask the environmental activist groups to submit their studies for NAS review **AND** ask NEI **AND** ask States Radiation Program Depts., HPS....the list can go on and on.

-Steph

PS He (Chairman) wrote a letter to the Sauer two months ago and RES is stuck with following up with another letter to her..... After our attempt to educate Mike Marshall on her activates/background in dealing with the NRC.

From: Milligan, Patricia
Sent: Friday, April 23, 2010 3:36 PM
To: Burnell, Scott; Brock, Terry; Garry, Steven
Cc: Bush-Goddard, Stephanie
Subject: RE: Cancer study
do you really mean that?
Patricia Milligan, CHP, RPh
Senior Technical Advisor for Preparedness & Response
Office of Nuclear Security and Incident Response
US NRC
MS T B46M
Washington, DC 20555
301-415-2223
Blackberry (b)(6)

From: Burnell, Scott
Sent: Friday, April 23, 2010 3:32 PM
To: Brock, Terry; Garry, Steven
Cc: Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

Hey, at least I used a period and not exclamation points, right? Happy Friday, all.

From: Brock, Terry
Sent: Friday, April 23, 2010 3:32 PM
To: Burnell, Scott; Garry, Steven
Cc: Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

I don't quite understand your response ... Could you please use a larger font.

From: Burnell, Scott
Sent: Friday, April 23, 2010 3:28 PM
To: Brock, Terry; Garry, Steven
Cc: Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

NO.

Again, we want to avoid anything that could be used to suggest we agree with them. "Hey, the Chairman liked the study so much he asked us to send it in," etc.

From: Brock, Terry
Sent: Friday, April 23, 2010 3:21 PM
To: Burnell, Scott; Garry, Steven
Cc: Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

Ok, we should be getting the agreement together soon and that might be the best time to suggest they submit their "work" to the NAS. Do you agree that the letter should come from the Chairman?

Terry

From: Burnell, Scott
Sent: Friday, April 23, 2010 3:17 PM
To: Brock, Terry; Garry, Steven
Cc: Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

All;

I'd hold off until we have agreement from NAS on the statement of work. I'd phrase any letters more as a suggestion or a simple statement that the NAS is accepting information at site X -- I don't want any of the groups claiming we "endorse" their piles of paper.

Scott

From: Brock, Terry
Sent: Friday, April 23, 2010 3:11 PM
To: Garry, Steven
Cc: Burnell, Scott; Bush-Goddard, Stephanie; Milligan, Patricia
Subject: RE: Cancer study

Kevin Crowley, Stephanie, and I agree with your proposal. Let's get a list together of recipients and I will work on a letter early next week. I think the letter should be from the Chairman. Scott I cc'd you in this e-mail for your thoughts on Steve's proposal below. This seems like a winner to me.

We can start with the signatories on the 12/31/09 Gunter letter attached/ Also Dr. Sam Epstein from Chicago has been vocal about the study and asked to contribute.

Terry

From: Garry, Steven
Sent: Friday, April 23, 2010 1:24 PM
To: Brock, Terry; Milligan, Patricia
Subject: Cancer study

Terry,

I just got back from the Indian Point annual meeting discussing IPEC performance. There was a relatively large environmental activist crowd there, with much distrust of NRC and our ability to regulate.

One point that was brought up was that thyroid cancer rate was 110% higher than the national average. Afterwards, some activist referred me to the Mr. Mangano's "study" and that his data was taken from the CDC report, had been peer reviewed, etc. I didn't have the facts to disprove it, but we said that they should submit the study to us for review.

To get to the point, I think we should DIRECTLY ask the environmental activist groups to submit their studies for NAS review. I know you said they are encouraged to post their information on a web site, but I think we need to **explicitly** solicit their studies for review. I would have like to have pulled out a letter from the NRC to Mr. Mangano's asking him to submit his study for NAS review. If he submits it, good. If not, then we have proof we solicited his study.

So the goals of the NAS study would be expanded to include a peer review of smaller

studies done by environmental activists.

Thanks

Steve

<http://www.1010wins.com/Report--Cancer-Epidemic--in-Counties-Near-Indian-/5686412>

From: [Keith Dinger](#)
To: [Burnell, Scott B](#)
Cc: [Howard Dickson](#); [Ed Maher](#); [Rich Vetter](#); [David Connolly](#)
Subject: Contact with the National Academies
Date: Thursday, April 22, 2010 11:29:54 AM

Scott

Thank you for your phone message of yesterday suggesting we would need to talk with Kevin Crowley if we wanted to make comment at the National Academies' Nuclear and Radiation Studies Board (NRSB) meeting next week regarding the NRC contracted population cancer study.

We do understand the meeting is the Academies' meeting and not an NRC meeting. HPS representatives will be talking with Kevin but we do not desire to make comment at the meeting at this late date after the Agenda has been set. We will continue to watch for the opportunities to make input and provide the NRSB with our expertise at the appropriate times.

Thanks again, however, for getting back to the HPS and offering advise on how to be involved in this initiative.

Also, for your records, Dr. Richard Vetter, rvetter@mayo.edu, will be the HPS liaison on this issue as he assumes his new position with the HPS as the Federal Agency Liaison.

Best

Keith

Keith H. Dinger, CHP
Governmental Relations Liaison
Health Physics Society

Cell: (b)(6)

govtliaison@hps.org

From: Brock, Terry
To: Burnell, Scott B; Chandrathil, Prema; SHEEHAN, NEIL A; SCRENCI, DIANE P; Dricks, Victor L; Uselding, Lara; HANNAH, ROGER D; Ledford, Joey A; McIntyre, David T; HARRINGTON, HOLLY M; Hayden, Elizabeth; Brenner, Eliot B
Cc: MITLYNG, VIKTORIA T
Subject: RE: NAS-Question
Date: Thursday, April 15, 2010 2:50:59 PM

The meeting notice is here >> <http://dels.nas.edu/nrsb/meetings.shtml>
I'm checking with NAS about the vtc or teleconferencing.

From: Burnell, Scott
Sent: Thursday, April 15, 2010 11:41 AM
To: Chandrathil, Prema; Sheehan, Neil; Screnci, Diane; Dricks, Victor; Uselding, Lara; Hannah, Roger; Ledford, Joey; McIntyre, David; Harrington, Holly; Hayden, Elizabeth; Brenner, Eliot; Brock, Terry
Cc: Mitlyng, Viktoria
Subject: Re: NAS-Question
Terry;

If we have any info on this, including the NAS website, please let everyone know. Thanks.

Scott

Sent from an NRC Blackberry
Scott Burnell

(b)(6)

From: Chandrathil, Prema
To: Burnell, Scott
Cc: Mitlyng, Viktoria
Sent: Thu Apr 15 11:29:08 2010
Subject: NAS-Question

Scott,

We are being asked by several interested members of the public if the NAS meeting on April 26 is being webcast. Do you know?

Thanks

Prema

Prema Chandrathil-Yeaman
Public Affairs Officer
U.S. Nuclear Regulatory Commission
Region III
Lisle, IL
(630) 829-9663
prema.chandrathil@nrc.gov

From: Brock, Terry
To: Burnell, Scott R
Subject: RE: opa fact sheet
Date: Wednesday, April 14, 2010 12:23:14 PM

Thanks

From: Burnell, Scott
Sent: Wednesday, April 14, 2010 12:22 PM
To: Brock, Terry
Subject: RE: opa fact sheet

I think I'll be in Texas the next couple of days, but I'll work on a fact sheet.

From: Brock, Terry
Sent: Wednesday, April 14, 2010 12:21 PM
To: Burnell, Scott
Subject: RE: opa fact sheet

I think we need a new product now that we've gone public. What do you think?

From: Burnell, Scott
Sent: Wednesday, April 14, 2010 12:19 PM
To: Brock, Terry
Subject: RE: opa fact sheet

You'd like me to clean the info sheet up or create a brand-new product?

From: Brock, Terry
Sent: Wednesday, April 14, 2010 12:17 PM
To: Burnell, Scott
Subject: opa fact sheet

Scott,

Do you have time to work on an OPA fact sheet for the study? Here's the info sheet for a start or interim fact sheet.

I would like to have something the staff and the regional folks can distribute.

Give me a call if you want to discuss.

Terry

From: Burnell, Scott
Sent: Wednesday, April 14, 2010 10:42 AM
To: Brock, Terry
Subject: RE: pls review: na_statement_of_task_cancer_study041210.doc
Just some cleanup here and there, take 'em for what they're worth.
Any further details on the 26th meeting?

From: Brock, Terry
Sent: Tuesday, April 13, 2010 4:21 PM
To: Burnell, Scott
Subject: FW: pls review: na_statement_of_task_cancer_study041210.doc
NAS SOW, Pls do not distribute. Here's what I've hammered out with NRR and NSIR. No mgmnt review yet. What do you think? feel free to fix any goofy language.

Terry

From: [Brock, Terry](#)
To: [Burnell, Scott B](#)
Subject: RE: pls review: na_statement_of_task_cancer_study041210.doc
Date: Wednesday, April 14, 2010 10:47:50 AM
Attachments: [NRSB public agenda, April 9, 2010 draft.pdf](#)

thanks for the edits. Attached is the latest draft agenda for the 26th meeting. I'm working Brian's slides today and will go over them with him tomorrow afternoon.

From: Burnell, Scott
Sent: Wednesday, April 14, 2010 10:42 AM
To: Brock, Terry
Subject: RE: pls review: na_statement_of_task_cancer_study041210.doc
Just some cleanup here and there, take 'em for what they're worth.
Any further details on the 26th meeting?

From: Brock, Terry
Sent: Tuesday, April 13, 2010 4:21 PM
To: Burnell, Scott
Subject: FW: pls review: na_statement_of_task_cancer_study041210.doc
NAS SOW, Pls do not distribute. Here's what I've hammered out with NRR and NSIR. No mgmnt review yet. What do you think? feel free to fix any goofy language.

Terry

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

NUCLEAR AND RADIATION STUDIES BOARD

Fifteenth Meeting: April 26, 2010
Keck Center, Room 100
500 5th Street, NW, Washington, DC 20001

April 9, 2010 Draft

OPEN SESSION

- 12:55 pm **Call to order and welcome**
Richard Meserve, NRSB chair
- 1:00 pm **Strategies for Transforming Tank Waste Cleanup at Department of Energy Sites**
Steve Schneider, Co-Leader, Tank Waste System Project Team, DOE-EM
- 1:20 pm Questions and discussion
- 1:30 pm **FDA Initiative to Reduce Unnecessary Radiation Exposures from Medical Imaging**
Sean Boyd, Commander, U.S. Public Health Service
- FDA Update on Regulation of Tanning Devices/Sunlamps**
Sharon Miller, Captain, U.S. Public Health Service
- 2:00 pm Questions and discussion

CANCER RISK IN POPULATIONS LIVING NEAR NUCLEAR POWER FACILITIES

- 2:10 pm **U.S. Nuclear Regulatory Commission Request to the NAS for a Study of Cancer Risk in Populations Living Near Nuclear Power Facilities**
Brian Sheron, Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission
- 2:40 pm Questions and discussion
- 2:50 pm **Congressional Staff Perspectives on the Study Request and Task**
Michal Freedhoff, Policy Director, Office of Congressman Edward J. Markey, Chairman of the Energy and Environment Subcommittee
- 3:05 pm Questions and discussion
- 3:15 pm **Nuclear Industry Perspectives on the Study Request and Task**
Ralph L. Andersen, Senior Director, Radiation Safety & Environmental Protection, Nuclear Energy Institute
- 3:30 pm Questions and discussion

- 3:40 pm Break
- 4:00 pm **Perspectives on the Study Task and Approaches**
Arjun Makhijani, President, Institute for Energy and Environmental Research
- 4:20 pm Questions and discussion
- 4:30 pm **Developing Testable Hypotheses for Cancer Risks near Nuclear Power
Facilities**
Steven Wing, Associate Professor of Epidemiology, University of North Carolina,
Gillings School of Global Public Health
- 4:50 pm Questions and discussion
- 5:00 pm **Opportunity for Public Comment**
- 5:45 pm **Adjourn**

McNamara, Nancy T

From: Noggle, James
Sent: Wednesday, October 24, 2012 12:29 PM
To: Miller, Chris; Wilson, Peter
Cc: McNamara, Nancy; Tift, Doug; Screnci, Diane; Sheehan, Neil
Subject: Cancer pilot study info

Here is the background material that Ron Nimitz provided earlier. I have requested additional information. Stay tuned.

Jim

From: Bellamy, Ronald
Sent: Wednesday, October 10, 2012 10:27 AM
To: Nimitz, Ronald; Ferdas, Marc; Noggle, James; Hunegs, Gordon
Cc: Ambrosini, Josephine; Setzer, Thomas; Sheehan, Neil; Screnci, Diane; McNamara, Nancy; Tift, Doug; Wilson, Peter; Miller, Chris; Lew, David; Roberts, Darrell; Clifford, James; Kim, James; Dean, Bill; Modes, Kathy; Roberts, Mark; Kulp, Jeffrey; Barber, Scott; Brock, Terry
Subject: RE: ~~Not for Public disclosure~~ - Cancer pilot study

Millstone has been so informed by me in the absence of the PM.

Ron Bellamy.

From: Nimitz, Ronald
Sent: Wednesday, October 10, 2012 9:54 AM
To: Bellamy, Ronald; Ferdas, Marc; Noggle, James; Hunegs, Gordon
Cc: Ambrosini, Josephine; Setzer, Thomas; Sheehan, Neil; Screnci, Diane; McNamara, Nancy; Tift, Doug; Wilson, Peter; Miller, Chris; Lew, David; Roberts, Darrell; Clifford, James; Kim, James; Dean, Bill; Modes, Kathy; Roberts, Mark; Kulp, Jeffrey; Barber, Scott; Brock, Terry
Subject: ~~Not for Public disclosure~~ - Cancer pilot study

All..

The Information SECY paper announcing the cancer pilot study, as well as the planned study sites, is expected to be made public this week. The paper is informing the commission of the staff's next steps as regards the National Academy of Science (NAS) Phase I report. The proposed pilot study, as well as the potential study sites, were discussed in detail in the NAS Phase I report. NRC has contacted NEI to let them. The NRC project manager (Terry Brock)(listed below) has been trying to contacted NRR project managers to let them know so that the affected licensees could be informed . For Region I, three sites (Millstone, Oyster Creek, and Haddam Neck) were selected for study. Oyster Creek has been informed via the NRR project manager and efforts are underway to make Millstone and Haddam Neck aware. The below listed NRC project manager for the study has been trying to contact cognizant staff to inform them of plans and request site notification. I have informed the study project manager of NRC Region I contacts (cognizant site Branch Chief) to coordinate notification in the event contact is not made via the NRR project manager.

The key messages are:

Key Messages

- (1) The NRC has asked the NAS to evaluate the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities to update the 1990 NCI report on "Cancer

Risks in Populations near Nuclear Facilities.” NRC staff uses the NCI report to inform concerned stakeholder that cancer mortality rates are not elevated in these populations. However, the report is over 20 years old, additional facilities have come on-line, and analysis methods and cancer data registries have improved.

- (2) The NRC requested that the NAS study the feasibility of developing scientifically defensible methods to evaluate cancer incidence rates, as well as exploring how to divide the study areas around licensed and proposed nuclear facilities into geographical units smaller than the counties used in the NCI report so the results are more applicable to those populations that live closer to NRC-licensed facilities.
- (3) The NAS has completed the Phase 1 feasibility study. The Phase 1 study provided two different study designs that focus on childhood cancers and all common cancers in the total population. The report highlighted the many scientific limitations of performing low-dose and low-population epidemiology studies around NRC-licensed facilities. The NRC staff reviewed the report and are proceeding with the NAS recommendation to pilot study the Phase 1 methods at seven sites.
- (4) The NAS study process is independent of NRC, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and scientifically sound.

Link to the SECY paper here (~~NOT FOR PUBLIC DISCLOSURE~~) >>

[View ADAMS P8 Properties ML12249A121](#)

[Open ADAMS P8 Document \(SECY - Next Steps for the Analysis of Cancer Risks in Populations Near Nuclear Facilities Study\)](#)

A link to the public web site that speaks about study is here: <http://www.nrc.gov/about-nrc/regulatory/research/cancer-risk-analysis.html>

Oyster Creek - contacted by John Lamb
Millstone – not yet informed
Haddam Neck - note yet informed

NRC project manager

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

McNamara, Nancy T

From: McNamara, Nancy
Sent: Tuesday, April 22, 2014 10:38 AM
To: paul.baldauf@dep.state.nj.us; patrick.mulligan@dep.state.nj.us
Cc: Tiff, Doug
Subject: Oyster Creek Site Visit: NAS cancer Risk Study

Paul/Pat, wanted to give you a "heads up" that a small group of the NAS committee on Analysis of Cancer Risks: Pilot Planning will be touring Oyster Creek on June 5, 2014. NAS is in the process of organizing a public meeting on the evening of June 4 (the day before the site visit) in Toms River, New Jersey, to receive public comments on their study. We just got wind of this.. Don't know if Exelon is yet aware. As we get further information, we will forward to you. When we find out if the licensee is aware, we will let you know that also.

Nancy

McNamara, Nancy T

From: Mroz, Sara
Sent: Wednesday, December 03, 2014 3:37 PM
To: McNamara, Nancy; Tifft, Doug; Pelchat, John; Lea, Edwin; Barker, Allan; Logaras, Harra; Maier, Bill
Cc: Michalak, Paul; Ryan, Michelle
Subject: FYI: Cancer Risk Study - Pilot Planning Project Coming to an End
Attachments: 2012-0136scy.pdf

The attachment is publicly available at <http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2012/2012-0136scy.pdf>.

FYI ...

This just in from Terry Brock:

“Terry Brock here from RES. We’re coming to the end of another stage of the NRC –sponsored National Academy of Sciences Cancer Risk Study. As you may recall, we informed the Commission in SECY 2012-0136 (attached) that we were embarking on the Phase 1 NAS recommendation to perform pilot studies at seven sites: Dresden, SONGS, Oyster Creek, Haddam Neck, Millstone, Big Rock Point, and Nuclear Fuel Services. In the last year, NAS assembled a committee to plan the pilot project to give NRC the best cost estimate for performing the pilot study. Another two important parts of this effort were to determine the feasibility of retrieving cancer data from the various State agencies and the availability of effluent records for the dose assessment part of the study. On this last point, I must acknowledge the excellent help I received in retrieving and reviewing archived effluent records from David Pinckney (OIS), Kevin Ramsey/Marilyn Diaz (NMSS), and Steve Garry (NRR).

NAS is planning on briefing the RES Office Director on the results of the planning project **next Friday, December 12, 2014 from 1:00 to 2:00**. NAS will publicly release the report on **Monday, December 15**. RES plans to review the report and I’ll distribute it to you all. In January I’ll meet with you all to discuss the findings and our recommendation for the next step. This may involve another SECY paper to the Commission depending on the resource implications to complete the pilot execution phase of the study. At this point I don’t have anything to share because NAS holds things close to the vest until they brief us, so stay tuned.”

I’ll keep you posted on anything additional that I hear.

-Sara

Sara K. Mroz

Senior Liaison Program Manager (Acting)
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
301-415-1692 (direct)
sara.mroz@nrc.gov

Please consider the environment before printing this email

McNamara, Nancy T

From: Lopas, Sarah
Sent: Monday, August 31, 2015 11:51 AM
To: Barker, Allan; Lea, Edwin; Logaras, Harral; Maier, Bill; McNamara, Nancy; Pelchat, John; Tiff, Doug
Subject: FW: Update: Cancer Study

Thanks to John for forwarding this on - - not sure if you all saw this yet but I've reached out to Terry to keep me in the loop re: any comm plans.

Sarah L. Lopas

Senior Liaison Program Manager
Federal, State, and Tribal Liaison Branch
U.S. Nuclear Regulatory Commission
Office (301) 415-6360
BlackBerry (b)(6)

From: Brock, Terry
Sent: Monday, August 24, 2015 12:22 PM
To: Milligan, Patricia <Patricia.Milligan@nrc.gov>; Burnell, Scott <Scott.Burnell@nrc.gov>; Garry, Steven <Steven.Garry@nrc.gov>; Nimitz, Ronald <Ronald.Nimitz@nrc.gov>; Hinson, Charles <Charles.Hinson@nrc.gov>; Weil, Jenny <Jenny.Weil@nrc.gov>; Ramsey, Kevin <Kevin.Ramsey@nrc.gov>; Jones, Andrea <Andrea.Jones2@nrc.gov>; Mizuno, Beth <Beth.Mizuno@nrc.gov>; Cassidy, John <John.Cassidy@nrc.gov>; Stearns, Don <Don.Stearns@nrc.gov>; Woodruff, Gena <Gena.Woodruff@nrc.gov>
Cc: Tadesse, Rebecca <Rebecca.Tadesse@nrc.gov>
Subject: Update: Cancer Study

Hi All,

This is to inform you all that the cancer study has been canceled. Three of the four Commissioners specifically lined out the study from the budget. We had some back and forth with the OEDO about the SECY paper and we ended up not going forward with either the NAS or NCRP approaches. The final paper signed out by the EDO is here [ML15141A404](#)

At this point, I will be working with Scott (OPA) to work on the messaging for when the paper is made public in about ten days. We still have to communicate our decision with NAS, so please do not communicate this decision outside the agency until the Commission has an opportunity to read the paper and it's made public.

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop TWFN-10
phone: 301-415-1793

Tift, Doug B

From: Brock, Terry
Sent: Friday, February 24, 2012 9:36 AM
To: Burnell, Scott; Cassidy, John; Chapman, Gregory; Dacus, Eugene; Dehmel, Jean-Claude; Garry, Steven; Jones, Andrea; McIntyre, David; Milligan, Patricia; Mizuno, Beth; Nimitz, Ronald; Stearns, Don; Virgilio, Rosetta; VonTill, Bill; Weil, Jenny; Woodruff, Gena; Rakovan, Lance; Diaz, Marilyn; Bush-Goddard, Stephanie; Humberstone, Matthew; Conatser, Richard; Tomon, John
Cc: Schaaf, Robert; McCoppin, Michael; McNamara, Nancy; Tift, Doug; Maier, Bill; Pelchat, John; Barker, Allan; Logaras, Harral; Ryan, Michelle; Turtill, Richard; Gody, Tony; Cobey, Eugene; Crespo, Manuel
Subject: Cancer study communication team - Important Phase 1 rollout dates to remember

All,

As a reminder from the meeting this week, below are the important dates to remember for the release of the NAS Phase 1 report "Analysis of Cancer Risks in Populations near Nuclear Facilities."

- March 12, 2012 (Monday) - NAS staff briefing to NRC on results of Phase 1; 2 to 3 PM in CSB6B1. The communication team is invited, a scheduler should be coming out soon. NRC will be given the report and RES will transmit to the Commission and communication team members
- March 14, 2012 (Wednesday) - NAS publically releases report
- March 15, 2012 (Thursday); 10:30 AM - RIC presentation of results by NAS Committee Chair duringn the Radiation Protection session
- Late April, 2012 - NRC staff briefing to Commissioner TAs on possible policy issues related to implementing Phase 1 recommendations into Phase 2

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

Tifft, Doug B

From: Virgilio, Rosetta
Sent: Tuesday, March 27, 2012 1:35 PM
To: Salomon, Stephen; Turtill, Richard; Ryan, Michelle; McNamara, Nancy; Tifft, Doug; Pelchat, John; Woodruff, Gena; Barker, Allan; Logaras, Herral; Maier, Bill
Subject: FW: NAS Phase 1 Cancer Risk Study Report in ADAMS

Note below FYI

From: Brock, Terry
Sent: Tuesday, March 27, 2012 8:50 AM
To: Cassidy, John; Burnell, Scott; Chapman, Gregory; Dacus, Eugene; Dehmel, Jean-Claude; Garry, Steven; Jones, Andrea; McIntyre, David; Milligan, Patricia; Mizuno, Beth; Nimitz, Ronald; Stearns, Don; Virgilio, Rosetta; VonTill, Bill; Weil, Jenny; Woodruff, Gena; Rakovan, Lance; Diaz, Marilyn; Bush-Goddard, Stephanie; Humberstone, Matthew; Conatser, Richard; Tomon, John
Subject: NAS Phase 1 Cancer Risk Study Report in ADAMS

Hi All,

The NAS report, "Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase I" is available in ADAMS at ML120860057 .

Please note the report is embargoed until Thursday, March 29, 2012 at 11AM EST. As such, please do not distribute outside the agency until NAS releases the report to the public at that time.

RES will be sending out a formal request for comments in the near term.

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

Tift, Doug B

From: Virgilio, Rosetta
Sent: Tuesday, March 13, 2012 2:41 PM
To: Maier, Bill; Logaras, Herral; Barker, Allan; Woodruff, Gena; Pelchat, John; Tift, Doug; McNamara, Nancy
Cc: Turtill, Richard; Ryan, Michelle
Subject: RE: NAS PHASE I CANCER STUDY

Well, this is the danger of giving the States a heads up with dates (provided us by RES); turns out the NAS did not get the sign off on its report yet, so release is pending.

From: Ryan, Michelle
Sent: Friday, March 09, 2012 12:54 PM
To: Maier, Bill; Logaras, Herral; Barker, Allan; Woodruff, Gena; Pelchat, John; Tift, Doug; McNamara, Nancy
Cc: Virgilio, Rosetta; Turtill, Richard
Subject: NAS PHASE I CANCER STUDY

RSLOs – Below are current key messages and Q&A's you can share with your States regarding the March 12, National Academy of Sciences briefing of NRC staff on plans for **public release on March 14**, of Phase I of its new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities.

Key Messages

- (1) **The NRC has asked the NAS for a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities. The 1990 NCI report concluded that cancer mortality rates are not elevated in these populations.**
- (2) **In the new study, the NRC is requesting that the NAS evaluate cancer incidence rates, as well as exploring how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI report.**
- (3) **The NAS study is expected to include populations that live in the vicinity of past, present, and proposed nuclear facilities. This information is useful to the NRC in understanding the cancer risk for populations living near those facilities.**
- (4) **The NAS study process is independent, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and accurate.**

Questions and Answers

Q1. Why has the US Nuclear Regulatory Commission (NRC) asked the National Academy of Sciences (NAS) to conduct this study now?

A1. This study will provide the NRC staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear power facilities. The NRC staff has used a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of

nuclear power facilities. However, the NCI report is almost 20 years old and a new study needs to be performed to reflect the current populations living near nuclear power facilities. In addition, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in cancer incidence (e.g., being diagnosed with cancer, but not necessarily dying from the disease). Therefore, the NAS project will also assess cancer incidence study in addition to the mortality study.

Q2. Why is NAS, rather than NCI, conducting this follow-up study to NCI's 1990 work?

A2. The NRC staff approached NCI management about performing a new study under contract to the NRC, but because of staffing limitations, NCI was unable to commit staff resources for this activity for the foreseeable future. NAS will draw its project team from a wide range of technical experts, which could include NCI members.

Q3. Which nuclear facilities are included in the study?

A3. The NRC intends NAS to study all NRC-licensed nuclear power reactors and fuel cycle facilities (e.g., fuel enrichment and fabrication plants) that are or were in operation in the United States, however this will depend on the phase 1 results and NRC staff review.

The 1990 NCI report included all 52 commercial nuclear power facilities in the United States that that started operation before 1982. Preliminary information indicates that 25 new reactor sites have begun operation since 1982. The 25 new reactor sites will be included in the study. Researchers are identifying the study and control populations for these sites for inclusion in the cancer mortality study.

Q4. Which counties will be included in the study?

A4. The study will cover those counties that contain an NRC-licensed nuclear power or fuel cycle facility and those adjacent counties (an adjacent county is included if it is comprises at least 20 percent of the area within a 10-mile radius of the site). Researchers will select three comparison counties—termed control counties—and compare cancer mortality rates in those counties with the rates in the study county. Study counties will be matched with control counties having similar demographic characteristics. The NAS project will also examine how modern analysis methods can account for geographical areas smaller than counties.

Q5. How does the NAS project consider cancer incidence (occurrence)?

A5. The NAS is expected to gather cancer incidence data from individual State databases that house this information. When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns.

Q6. Does the NRC suspect that cancer mortality rates are elevated around nuclear power plants?

A6. The NCI study found no general increased risk of death from cancer for people living near nuclear facilities. The NRC expects NAS to test the hypothesis that there is no difference in cancer rates between those populations that live near nuclear power facilities and those that do not. Any epidemiology findings have to be interpreted in the context of the strictly regulated and very low off-site radiation doses from routine nuclear facility operations.

Q7. How can I be sure that the nuclear power plant is not causing cancer? If I lived near a power plant, how might I be exposed to radiation? For example, if my house is 2 miles away from a reactor, am I being exposed whenever I am at my house?

A7. The last time this topic was studied the NCI found no increased risk of cancer in those people that lived in counties near nuclear facilities. Nuclear facilities release very small regulated amounts of radioactivity in liquid and gaseous effluents (emissions). The amounts released are strictly controlled within limits set by the NRC and the U.S. Environmental Protection Agency. Any exposures that may occur are below the established

safety limits. The radioactive emissions from nuclear power plants only contribute a very small fraction of our yearly total radiation exposure (~ 0.1 percent). For comparison, your radiation exposure from natural radiation sources in soil and rocks, radon gas in homes, radiation from space, and other sources that are naturally found within the human body contributes to ~ 50 percent of your yearly exposure. The other half of our yearly exposure is from man-made sources, such as consumer products, medical procedures, and to a much lesser extent, industrial sources.

Q8. Which age groups are included in the study?

A8. The NRC expects the NAS project to analyze cancer incidence and mortality rate data for the following age groups: 0-5 years, 0-10 years, 10-19 years, 20-39 years, 40-59 years, and 60 years and older.

Q9. Will the study address cancer rates from leukemia in children near nuclear facilities?

A9. Yes. The study will address leukemia in all age groups, including children (0-5 years).

Q10. I live near a nuclear power plant and my husband died of cancer. Will this study prove that living near the plant caused the cancer?

A10. The study is designed to survey trends in populations and does not evaluate the cause of individual cases. However, the study does give us an indication if the cancer rates of populations near nuclear facilities are the same, greater, or less than what is expected.

Q11. Are such studies able to detect population health effects from industrial sources?

A11. Yes. NCI has effectively used county-based studies in the past to study cancer mortality rates. For example, NCI has used county-based studies to show elevated rates of lung cancer deaths in counties with shipyard industries and in counties with arsenic-emitting smelters and refineries.

Q12. Are past studies, such as the French and German studies on childhood leukemia and radiation from nuclear power plants, being considered?

A12. Yes, these studies were considered by the phase 1 expert committee when writing their recommendations in phase 1 report.

Q13. Will the study design be reviewed?

A12. The NAS study protocols (<http://www.nationalacademies.org/studycommitteprocess.pdf>) include procedures for rigorous review of the project's findings.

Q14. How will the NRC be certain that this study includes all proposed sites for nuclear power facilities?

A14. Representatives from several NRC program offices reviewed the list of decommissioned, operating, and proposed sites and found it to be accurate at the time the information was submitted to the study contractor for analysis. The staff plans to perform additional checks of the proposed site list during the conduct of this study.

Q15. What types of cancer are evaluated in this study?

A15. This study will evaluate mortality rates from the following types of cancer:

- leukemia and aleukemia
- all cancers excluding leukemia
- Hodgkin's disease
- other lymphoma (including non-Hodgkin's lymphoma)

- multiple myeloma
- digestive organ
 - stomach
 - colon
 - rectum
 - liver (primary)
- trachea, bronchus, and lung
- prostate, uterine, and ovarian
- breast (female)
- thyroid
- bone and joint
- bladder
- brain and other central nervous system
- benign, in situ, and unspecified neoplasms

Q16. How will the NRC consider this resulting data in new reactor reviews and relicensing decisions?

A16. The NRC will use the results of the study to answer recurring questions from our stakeholders during the public comment period for regulatory actions. If necessary the results could prompt further review of both new reactor and existing regulations to ensure the effluent and direct radiation exposure dose limits adequately protect public health and safety.

Q17. What will the NRC do if the results indicate an increase in cancer risk in some populations that live near a specific nuclear facility?

A17. While the NAS project is still in its formative stages, the NRC expects any increases in cancer risk will first be assessed against the strictly regulated radioactive materials released during plant operation, as well as any public radiation dose that might result from the releases. This data would assist NAS in examining any relationship between the study results and potential exposures of the public at individual plants. Furthermore, the public radiation doses from operating plants are significantly below the radiation safety dose limits set to protect the public. If there continues to be a concern then additional more refined epidemiology studies can be performed (e.g., case-control study).

Q18. I live near a nuclear power plant or in one of the studied counties. Will I be contacted during this study for information? Will my family or personal medical information be protected during this study or during a cancer incidence study?

A18. The NAS study process includes opportunities for the public to contribute, but the data used in this study will be obtained from anonymous state and national sources. These data do not contain personal identifying information making it impossible to determine to whom the medical information belongs.

Q19. Why did the NRC switch from Oak Ridge Associated Universities (ORAU) to NAS as a study provider after one year of work?

A19. Recently, the staff has reconsidered using ORAU to do the work due to the possibility of high public interest in the topic and the importance of the project to the agency. This action was not an indication of any deficiencies in the technical quality of ORAU's work, but more of ensuring the investigator brings a broad social and national policy perspective to the study. As such, the staff chose the NAS to perform the study.

Q20. How will the NRC decide on Phase 2 and has funding been reserved?

A20. The NRC will review and consider the phase 1 report and recommendations to determine the next step for phase 2 of the study. However, as with our regulatory process there are a number of ways we can proceed. Staff will review the document, discuss and determine if there are any policy issues that may warrant Commission involvement in the decision-making for phase 2. If so, one of the approaches would be to develop

a SECY paper with options. If not, staff will make the decision on phase 2 and work with NAS as appropriate. Funding for phase 2 has been reserved.

Q21. How does the NRC ensure the validity of the licensee's reporting of off-site doses and environmental monitoring results?

A21. The licensee is required to establish, implement, and maintain an acceptable effluent and environmental monitoring program. As such the licensee has the primary responsibility to ensure conformance with all applicable requirements in the area of effluent and environmental monitoring. The NRC performs selective inspections of the program to validate that the licensee is implementing such a program and that public doses are maintained well below regulatory requirements and are in fact as low as reasonably achievable. The following points illustrate this approach:

- 1) NRC has imposed strict regulatory requirements for conduct of both station effluent monitoring control and environmental monitoring. These requirements are designed to ensure licensee doses to member of the public are well below regulatory limits and are as low as reasonably achievable. Consequently, licensees are obligated to establish, implement, and maintain programs to sample, monitor, evaluate, and control effluents. The licensee is also required to collect and analyze environment samples to detect activity associated with facility operations. The sampling program is designed to review exposure pathways and sampling results. The environmental monitoring program is designed to provide a check on the station effluents control program.
- 2) The NRC has established reporting requirements that require the licensee to report effluent and or environmental monitoring issues as established in program requirements. NRC initiates appropriate reviews and evaluation of the reports and conducts follow-up inspections as appropriate.
- 3) The NRC conducts routine inspections in a variety of ways. The NRC maintains an onsite resident inspection staff that selectively and routinely reviews on-going activities to become aware of issues that may impact effluent or environmental monitoring including public dose. For example the residents review corrective action documents to evaluate potential impact on the effluents control program. The residents also review radiation monitors for indication of releases. During station tours residents also look for potential unmonitored release paths.
- 4) The NRC also uses specialist inspectors, independent of the resident staff, to conduct periodic onsite inspections of both effluent release and environmental monitoring programs to ensure the licensee conforms with applicable requirements. As part of this review, NRC inspectors also review ground water controls. The inspectors evaluate the adequacy of quality assurance of measurements to ensure measurements are of appropriate quality and that the licensee is implementing a robust quality assurance program for its measurements.
- 5) The NRC routinely reviews secondary evaluations conducted as part of the licensee's quality assurance programs (e.g., audits and assessments) as well as independent measurements conducted by other regulatory entities (e.g., state monitoring programs).
- 6) In addition, and as necessary, the NRC conducts independent confirmatory sampling to validate the accuracy of licensee measurements.

Tift, Doug B

From: Cai, June
Sent: Tuesday, October 09, 2012 2:50 PM
To: McNamara, Nancy; Maier, Bill; Logaras, Herral; Tift, Doug; Pelchat, John; Woodruff, Gena; Barker, Allan
Cc: O'Sullivan, Kevin; Lynch, Jeffery
Subject: Cancer study - heads up to States

I wanted to give everyone an early heads up. I just got a call from RES about the cancer study. They have selected several licensees to participate in the pilot. They will be informing those licensees tomorrow and then issuing a press release Thurs or Fri. They would also like to provide an early heads up (in advance of the press release, if possible) to the States where those licensees are located. The States are: Connecticut, New Jersey, Tennessee, Michigan, Illinois, and California.

I asked for any background info they have (e.g., comm. plan, talking points, etc.), and they will be sending me that soon. Once I get it, I will forward you all. Would you all reach out to those States to give them a heads up? If they have more detailed questions, you can work through the RES contacts to get the info.

I wanted to go ahead and make you all aware of this. As soon as I get the additional info, I'll send your way.

Thanks

June

Tifft, Doug B

From: Wilds, Edward <Edward.Wilds@ct.gov>
Sent: Wednesday, October 10, 2012 4:23 PM
To: Tifft, Doug
Subject: RE: NAS Cancer Study

Importance: Low

Doug:
I knew that the NRC had asked the NAS to update the study, I had not heard what sites would be used for the pilot study.

Thanks,
Ed

From: Tifft, Doug [mailto:Doug.Tifft@nrc.gov]
Sent: Wednesday, October 10, 2012 4:18 PM
To: Wilds, Edward; Baldauf, Paul
Cc: McNamara, Nancy
Subject: NAS Cancer Study

Ed / Paul,

As you are aware, the NRC has asked the National Academy of Sciences (NAS) to evaluate the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities to update the 1990 NCI report on "Cancer Risks in Populations near Nuclear Facilities."

We are going forward with a pilot study at seven sites. The pilot study sites in NRC Region I are:

- Millstone Power Station, Waterford, CT
- Haddam Neck (decommissioned), Haddam Neck, CT
- Oyster Creek Nuclear Generating Station, Forked River, NJ

A press release will go out Thursday or Friday announcing the pilot sites.

More information about the NAS study is available on our website:
<http://www.nrc.gov/about-nrc/regulatory/research/cancer-risk-analysis.html>

Thanks,
-Doug

Doug Tifft
Regional State Liaison Officer
Office: 610-337-6918
Cell: (b)(6)

Tifft, Doug B

From: Baldauf, Paul <Paul.Baldauf@dep.state.nj.us>
Sent: Thursday, October 11, 2012 8:14 AM
To: Tifft, Doug
Subject: RE: NAS Cancer Study

Thanks

Paul Baldauf, P.E., Director
Division of Environmental Safety and Health
(609) 633-7964

~~NOTE: This e-mail is protected by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail and its contents may be Privileged & Confidential due to the Attorney-Client Privilege, Attorney Work Product, Deliberative Process or under the New Jersey Open Public Records Act.~~

~~If you are not the intended recipient of this e-mail, please notify the sender, delete it and do not read, act upon, print, disclose, copy, retain, or redistribute it.~~

From: Tifft, Doug [mailto:Doug.Tifft@nrc.gov]
Sent: Wednesday, October 10, 2012 4:18 PM
To: edward.wilds@ct.gov; Baldauf, Paul
Cc: McNamara, Nancy
Subject: NAS Cancer Study

Ed / Paul,

As you are aware, the NRC has asked the National Academy of Sciences (NAS) to evaluate the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities to update the 1990 NCI report on "Cancer Risks in Populations near Nuclear Facilities."

We are going forward with a pilot study at seven sites. The pilot study sites in NRC Region I are:

- Millstone Power Station, Waterford, CT
- Haddam Neck (decommissioned), Haddam Neck, CT
- Oyster Creek Nuclear Generating Station, Forked River, NJ

A press release will go out Thursday or Friday announcing the pilot sites.

More information about the NAS study is available on our website:
<http://www.nrc.gov/about-nrc/regulatory/research/cancer-risk-analysis.html>

Thanks,
-Doug

Doug Tifft
Regional State Liaison Officer
Office: 610-337-6918
Cell: (b)(6)

Tifft, Doug B

From: McNamara, Nancy
Sent: Wednesday, October 24, 2012 12:04 PM
To: Miller, Chris; Roberts, Darrell; Screnci, Diane; Sheehan, Neil; Wilson, Peter; Tifft, Doug
Cc: Noggle, James
Subject: RE: RSLO information for the next phase of the cancer study

No.

From: Miller, Chris
Sent: Wednesday, October 24, 2012 11:30 AM
To: McNamara, Nancy; Roberts, Darrell; Screnci, Diane; Sheehan, Neil; Wilson, Peter; Tifft, Doug
Cc: Noggle, James
Subject: RE: RSLO information for the next phase of the cancer study

Thanks Nancy, do you know if the licensees were notified?

From: McNamara, Nancy
Sent: Wednesday, October 24, 2012 11:12 AM
To: Miller, Chris; Roberts, Darrell; Screnci, Diane; Sheehan, Neil; Wilson, Peter; Tifft, Doug
Subject: FW: RSLO information for the next phase of the cancer study

Chris, we received the email exchanges below from FSME regarding the study. We informed New Jersey and Connecticut two weeks ago that the information was forthcoming.

From: Cai, June
Sent: Tuesday, October 09, 2012 3:24 PM
To: McNamara, Nancy; Maier, Bill; Logaras, Harral; Tifft, Doug; Pelchat, John; Woodruff, Gena; Barker, Allan
Cc: Brock, Terry; Lynch, Jeffery; O'Sullivan, Kevin
Subject: FW: RSLO information for the next phase of the cancer study

Hi all,

This is in follow up to the earlier email I sent on this topic. Please see talking points and background info below from Terry Brock. As I indicated, RES is planning on issuing the press release Thurs or Fri, so please try to make contact before then if you can. Please contact Terry if you get any detailed questions.

Thanks

June

From: Brock, Terry
Sent: Tuesday, October 09, 2012 3:14 PM
To: Cai, June
Subject: RSLO information for the next phase of the cancer study

Hi June,

As discussed, NRC is moving forward with the National Academy of Sciences recommended pilot studies for the Analysis of Cancer Risks in Populations near Nuclear Facilities project. Key messages and the NAS selected pilot study sites are listed below. Please have the RSLO contact the appropriate state contact for the site in their region to inform them of

the forthcoming announcement of the study. This is mostly an awareness issue, there are no direct actions we are requesting of the State folks. If the RSLOs or State people have any questions on the study please have them contact me at my information below.

Thanks,
Terry Brock/RES

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

Key Messages

- (1) The NRC has asked the NAS to evaluate the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities to update the 1990 NCI report on "Cancer Risks in Populations near Nuclear Facilities." NRC staff uses the NCI report to inform concerned stakeholder that cancer mortality rates are not elevated in these populations. However, the report is over 20 years old, additional facilities have come on-line, and analysis methods and cancer data registries have improved.
- (2) The NRC requested that the NAS study the feasibility of developing scientifically defensible methods to evaluate cancer incidence rates, as well as exploring how to divide the study areas around licensed and proposed nuclear facilities into geographical units smaller than the counties used in the NCI report so the results are more applicable to those populations that live closer to NRC-licensed facilities.
- (3) The NAS has completed the Phase 1 feasibility study. The Phase 1 study provided two different study designs that focus on childhood cancers and all common cancers in the total population. The report highlighted the many scientific limitations of performing low-dose and low-population epidemiology studies around NRC-licensed facilities. The NRC staff reviewed the report and are proceeding with the NAS recommendation to pilot study the Phase 1 methods at seven sites.
- (4) The NAS study process is independent of NRC, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and scientifically sound.

NAS-recommended Pilot Study Sites

Region I

- Millstone Power Station, Waterford, CT
- Haddam Neck (decommissioned), Haddam Neck, CT
- Oyster Creek Nuclear Generating Station, Forked River, NJ

Region II

- Nuclear Fuel Services, Erwin, TN (operating uranium fuel fabrication facility)

Region III

- Big Rock Point Nuclear Power Plant (decommissioned), Charlevoix, MI
- Dresden Nuclear Power Station, Morris, IL

Region IV

- San Onofre Nuclear Generating Station, San Clemente, CA

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

Tift, Doug B

From: Burnell, Scott
Sent: Wednesday, October 24, 2012 12:30 PM
To: Noggle, James; Screnci, Diane; Sheehan, Neil; McNamara, Nancy; Tift, Doug
Cc: Brock, Terry; Bush-Goddard, Stephanie
Subject: FW: Pls post cancer study comm plan rev 2a
Attachments: cancer study communication plan rev 2a_10_20_12.docx

Jim;

I provided every regional PAO the updated comm. plan at 12:30 yesterday. Nancy and Doug now have the same information. Thanks.

Scott

From: Burnell, Scott
Sent: Tuesday, October 23, 2012 12:36 PM
To: Screnci, Diane; Sheehan, Neil; Hannah, Roger; Ledford, Joey; Chandrathil, Prema; Mitlyng, Viktoria; Dricks, Victor; Uselding, Lara
Cc: Brock, Terry; Weil, Jenny
Subject: FW: Pls post cancer study comm plan rev 2a

All;

The cancer study SECY is live in public ADAMS and the press release should be going up in about 90 minutes. Attached is the latest tweak to the comm. plan. Thanks.

Scott

**ANALYSIS OF CANCER RISKS IN POPULATIONS
LIVING NEAR NUCLEAR FACILITIES, REV. 2A**

Introduction

The objective of this communication plan is to outline the U.S. Nuclear Regulatory Commission (NRC) strategy for communicating the goals and key messages regarding the agency's request to the National Academy of Sciences (NAS) to evaluate the feasibility of conducting a new study analyzing cancer risks in NRC-licensed nuclear facilities with external and internal stakeholders.

Goals

This plan will help the NRC accomplish effective communications with internal and external stakeholders regarding the potential project of updating to the National Cancer Institute (NCI) report by undertaking the following tasks:

- **Promote** effective communications with internal and external stakeholders in a timely, consistent, and understandable manner.
- **Inform** all stakeholders that NRC and NAS carry out studies using processes designed to promote independence, transparency, objectivity, and technical rigor.
- **Identify** opportunities for educating the public regarding the impact of nuclear facilities on cancer mortality and incidence risk for populations surrounding those facilities.

Key Messages

The NRC will communicate the following four key messages to all stakeholders:

- (1) **The NRC has asked the NAS to evaluate the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities to update the 1990 NCI report on "Cancer Risks in Populations near Nuclear Facilities." NRC staff uses the NCI report to inform concerned stakeholder that cancer mortality rates are not elevated in these populations. However, the report is over 20 years old, additional facilities have come on-line, and analysis methods and cancer data registries have improved.**
- (2) **The Phase 1 study provided two different study designs that focus on childhood cancers and all common cancers in the total population. The report highlighted the many scientific limitations of performing low-dose and low-population epidemiology studies around NRC-licensed facilities. The staff has reviewed the results of the Phase 1 study and the NAS recommendations for the next phase. The staff's next step will be to proceed with the NAS-recommended approach to**

determine the feasibility of the Phase 1 methods through pilot studies at seven sites recommended by the NAS committee: Dresden in Illinois, Millstone in Connecticut, Oyster Creek in New Jersey, Haddam Neck (decommissioned) in Connecticut, Big Rock Point (decommissioned) in Michigan, San Onofre in California, and Nuclear Fuel Services in Tennessee.

- (3) The NAS study process is independent of NRC, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and scientifically sound.**

Appendix A to this document includes further discussion that elaborates on each of these key messages, and Appendix B provides responses to inquiries expected from the general public, congressional staff, the media, and other stakeholders. The appendices also include additional information for stakeholders who may be more familiar with these topics, such as elected officials, Federal and State Government officials, public interest groups, and certain members of the media.

Background

The NRC staff has used a 1990 study conducted by the NCI, "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. Stakeholders often ask the staff about perceived elevated cancer rates in populations working or residing near NRC-licensed nuclear facilities, including power reactors and fuel cycle facilities (e.g., fuel enrichment and fabrication plants). The staff uses this report as a scientifically defensible resource to aid in assuring stakeholders that cancer mortality rates are not elevated in counties that contain or are adjacent to nuclear power and fuel cycle facilities. However, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in a perceived increase in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Additionally, the report is almost 20 years old and more modern analysis methods combined with up-to-date information sources will better reflect the risk to current populations living near past and present licensed nuclear facilities. The NRC believes it is also beneficial to perform analyses at potential future facilities to establish a baseline cancer risk for these sites. The NRC has asked the NAS to undertake this project to determine the feasibility of performing such an update.

In the original report, NCI scientists studied more than 900,000 cancer deaths from 1950-1984, using mortality records collected from counties that contain nuclear facilities. The researchers evaluated changes in mortality rates for 16 types of cancer in these counties from 1950 to 1982 or until each facility began operation. Cancer incidence information was only available for four facilities located in Iowa and Connecticut, due to the lack of this type of data being collected. The NCI report showed no statistical increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities, including all of the nuclear power reactors operational before 1982.

The objective of the new study is to provide the NRC with an analysis of the latest cancer mortality and incidence data for populations living near NRC-licensed or proposed nuclear power and fuel-cycle facilities. This study will provide the staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear facilities. The NAS study process and protocols are expected to produce a high quality report.

The NAS project will evaluate the feasibility of studying cancer incidence to address the desire of stakeholders for this type of information. Cancer incidence data collected by the NCI's Surveillance, Epidemiology, and End Results program are limited to specific geographic regions within the United States. Other national, state, and county cancer surveillance programs collect cancer incidence data, and the NAS project is expected to assess these for inclusion in the overall analysis.

Audience/Stakeholders

Internal

- Commission
- Office of the Executive Director for Operations (OEDO)
- Advisory Committee on Reactor Safety (ACRS)
- Office of the General Counsel (OGC)
- Office of Congressional Affairs (OCA)
- Office of International Programs (OIP)
- Office of Public Affairs (OPA)

External

- Congress
- Federal agencies¹
- Institute for Nuclear Power Operations
- Electric Power Research Institute
- Nuclear Energy Institute
- Conference of Radiation Control Program Directors
- Organization of Agreement States

¹ U.S. Department of Homeland Security/Domestic Nuclear Detection Office, U.S. Department of Defense, U.S. Department of Energy/National Nuclear Security Administration, U.S. Department of Transportation, U.S. Environmental Protection Agency, U.S. Food and Drug Administration, U.S. Department of Health and Human Services, and U.S. Department of State.

- Office of Nuclear Regulatory Research (RES)
- Office of New Reactors (NRO)
- Office of Nuclear Reactor Regulation (NRR)
- Office of Nuclear Security and Incident Response (NSIR)
- Office of Federal State Materials and Environmental Management Programs (FSME)
- Office of Nuclear Material Safety and Safeguards (NMSS)
- Regions I-IV
- Agreement States
- news media (e.g., *Inside NRC*)
- International Atomic Energy Agency
- nuclear regulators of other countries
- residents living near nuclear power plants
- State and local governments
- public interest groups (e.g., Union of Concerned Scientists)
- academic and professional organizations (e.g., Health Physics Society, American Nuclear Society)
- NRC licensees

Communication Team

The Communication Team will assist the project manager as needed in developing uniform and accurate messages, initiating communication vehicles, and coordinating implementation plans for this project.

<u>Position</u>	<u>Name</u>	<u>Organization</u>	<u>Telephone Number</u>
<i>Team Leader</i>	Terry Brock	RES	(301) 251-7487
<i>NMSS Lead</i>	Greg Chapman	NMSS	(301) 492-3106
<i>NRR Lead</i>	Steven Garry	NRR	(301) 415-2766
<i>NRO Lead</i>	Jean-Claude Dehmel	NRO	(301) 415-6619
<i>NSIR Lead</i>	Trish Milligan	NSIR	(301) 415-2223
<i>Region I Lead</i>	Ron Nimitz	RI	(610) 337-5267
<i>Region II Lead</i>	Gena Woodruff	RII	(404) 997-4739
<i>Region III Lead</i>	John Cassidy	RIII	(630) 829-9667
<i>Region IV Lead</i>	Don Stearns	RIV	(817) 200-1176

<i>State Liaison Lead</i>	Stephen Salomon	FSME	(301) 415-2368
<i>Legal Lead</i>	Beth Mizuno	OGC	(301) 415-3122
<i>Public Affairs Lead</i>	David McIntyre	OPA	(301) 415-8206
<i>International Programs Lead</i>	Andrea Jones	OIP	(301) 415-2309
<i>Congressional Affairs Lead</i>	Gene Dacus	OCA	(301) 415-1697
<i>Congressional Affairs Backup</i>	Jenny Weil	OCA	(301) 415-1691
<i>OEDO Lead</i>	Lance Rakovan	OEDO	(301) 415-2589

Communication Tools

Tool

Description/Purpose

External Web Site

The NRC's external Web page will note the issuance of the study and provide a link to the NAS study web page. It will also contain a link to the NCI Web page for the original NCI study along with other related publicly available documents.

Internal Briefings

The Communication Team will conduct internal briefings at various points in the process to keep internal stakeholders informed of its activities and messages. The members of the Regional Communication Team will be responsible for coordinating communication within their regions.

Weekly Highlights and EDO Daily Notes

The weekly highlights and/or EDO Daily Notes will report on significant milestones.

Internet E-Mail

The Communication Team will e-mail significant information on the status of the study and deliverables to internal stakeholders.

Commissioners' Assistants Notes

Commissioners' Assistants Notes will be used to communicate to the Commission information about public meetings, study status, and other items of significant interest.

Commissioner Interactions

The Communication Team will coordinate and assist in preparing briefing materials for the interactions of Commissioners with

<u>Tool</u>	<u>Description/Purpose</u>
	various stakeholders.
Public Meetings	If necessary, the staff will conduct public meetings to discuss the final study report.
Issuance of Significant Correspondence	The project manager will coordinate the issuance of correspondence with key internal and external stakeholders. Before the agency sends any significant external correspondence related to the study, the Communication Team will receive notification. The Communication Team will coordinate with OPA when preparing press releases and interacting with the media.
Congressional Communications	OCA will coordinate all communication with Congress.
Media Communications	OPA will coordinate all communication with the media.

Communications Activities

<u>Activity</u>	<u>Responsibility</u>	<u>Date Planned</u>	<u>Date Completed</u>
Press release on NRC request of the NAS to perform the study	RES	04/07/2010	04/07/2010
Present study objectives to the National Academy of Sciences	RES	04/26/10	04/26/2010
Public kickoff meeting	RES, NAS	February 2011	02/24/2011
Communication team meeting	RES	02/22/2012	02/22/2012
Briefing on Cancer Study-Phase 1 report	NAS	03/26/2012	03/26/2012
Public release Cancer Study Phase 1 report	NAS	03/29/2012	03/29/2012

Submit Phase 1 document to Program offices for Review	RES	04/13/2012	04/13/2012
Commissioner's TA briefing	RES	5/24/2012	05/24/2012
Epidemiology Course	RES	07/16/2012	07/16/2012
Information Paper to the Commission with staff decision on Phase 2	RES	09/28/2012	

Communication Challenges

The Communication Team is likely to encounter challenges in the following two areas while implementing this plan:

(1) **Effective Communication with the General Public**

The results of this study will be of significant interest to the general public, particularly those members of the general public who live within the counties analyzed in the study. All NRC-produced materials must take into account the limited technical background of some stakeholders and the sensitivity of issues relating to cancer. In addition, various stakeholder groups have expressed concern with perceived elevated cancer risks in populations that live near nuclear facilities. The Communication Team will take appropriate steps to address this challenge using risk communication techniques.

(2) **Public Perceptions of the NRC and the NAS**

Communications regarding this study should address the frequent misconception among some stakeholders that the NRC promotes the use of nuclear power (i.e., to generate electricity). In addition, communication efforts must stress the NAS was established by Congress to provide scientific information and advice to the government, and that any NAS report will reflect the Academy's best judgment.

Evaluation and Monitoring

As needed, the Communication Team will monitor correspondence regarding this study to ensure consistency with the key messages and to determine if further key messages are needed. As needed, the Communication Team will assess the degree of success that key messages and talking points have with the target stakeholder audience.

The Team Leader will brief key staff as needed regarding revisions to the messages, talking points, or guidance based on immediate concerns or questions asked by the stakeholder audience.

Updates and Revisions

If major revisions to this plan or its key messages are necessary, the Team Leader will ensure that a formal revision is made and placed in the Agencywide Documents Access and Management System and on the internal communications Web page. The Team Leader will also determine the need for updates to the questions and answers in Appendix B to this plan. These updates will not constitute a revision to this plan.

Final Closeout

At the conclusion of the study, the Team Leader will prepare a brief closeout statement about the challenges and successes related to the communication plan and attach it to the end of the last draft.

OFFICIAL RECORD COPY

**Appendix A
Expanded Key Messages**

Note: These messages are written as if NAS will be completing this study. NRC staff analysis of the feasibility study is ongoing and a decision on completion is ongoing.

- (1) The National Academy of Sciences (NAS) has conducted a scoping study to determine the feasibility of a new study on cancer mortality and incidence risks in populations living near NRC-licensed and proposed nuclear facilities for the US Nuclear Regulatory Commission (NRC). The 1990 National Cancer Institute (NCI) report concluded that cancer mortality rates are not elevated in these populations.**
- The 1990 NCI report showed no general increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities operational before 1982.
 - The report showed that, in comparison with the control counties, some of the study counties had higher mortality rates of certain cancers and some had lower rates, either before or after the facilities came into service. None of the observed differences could be linked to the presence of nuclear facilities.
 - If approved, the scope of the new study covers the past and present nuclear facilities regulated by the NRC. In addition, the study will consider potential future facilities to establish a baseline mortality and incidence cancer risk for the site. The new study excludes all of the U.S. Department of Energy facilities in the original study because they are not licensed by the NRC.
- (2) The NRC has requested NAS to evaluate cancer incidence rates, as well as explore how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI reports.**
- The NAS is expected to investigate cancer incidence of populations surrounding nuclear facilities by collecting data from individual State databases. The quality and format of each State's databases are likely to vary.
 - When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns.

- (3) **The NAS study includes populations that live in the vicinity of past, present and proposed nuclear facilities. This information is useful to the NRC in understanding the cancer risk for populations living near those facilities.**
- The new study will include facilities in the following life-cycle phases: facilities in the process of being decommissioned or that have been decommissioned, and reactors that are currently in operation. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site.
 - The 1990 NCI report has provided valuable information to stakeholders. The NAS project will provide updated scientific information on cancer mortality in a transparent manner to keep the public informed and to earn and maintain public trust.
- (4) **The NAS study process is independent, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and accurate.**
- While the NRC will provide information to the NAS, the Academy has full autonomy in deciding how best to meet the NRC's request.
 - The NAS will hold several public meetings in the project's first phase, allowing the public and interest groups to provide input and information on conducting the study.

**Appendix B
Questions and Answers**

Note: These messages are written as if NAS will be completing this study. NRC staff analysis of the feasibility study is ongoing and a decision on completion is ongoing.

Q1. Why has the US Nuclear Regulatory Commission (NRC) asked the National Academy of Sciences (NAS) to conduct this study now?

A1. This study will provide the NRC staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear power facilities. The NRC staff has used a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. However, the NCI report is almost 20 years old and a new study needs to be performed to reflect the current populations living near nuclear power facilities. In addition, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in cancer incidence (e.g., being diagnosed with cancer, but not necessarily dying from the disease). Therefore, the NAS project will also assess cancer incidence in addition to mortality.

Q2. Why is NAS, rather than NCI, conducting this follow-up study to NCI's 1990 work?

A2. The NRC staff approached NCI management about performing a new study under contract to the NRC, but because of staffing limitations, NCI was unable to commit resources for this activity for the foreseeable future. NAS will draw its project team from a wide range of technical experts, which could include NCI members.

Q3. Which nuclear facilities are included in the study?

A3. The NRC intends NAS to study all NRC-licensed nuclear power reactors and fuel cycle facilities (e.g., fuel enrichment and fabrication plants) that are or were in operation in the United States, however this will depend on the phase 1 results and NRC staff review.

The 1990 NCI report included all 52 commercial nuclear power facilities in the United States that started operation before 1982. Preliminary information indicates that 25 new reactor sites have begun operation since 1982. The 25 new reactor sites will also be included in the study. Researchers are identifying the study and control populations for these sites for inclusion in the cancer mortality study.

Q4. Which geographical areas will be included in the study?

A4. The study will cover those geographical areas that contain past, present, and, future NRC-licensed nuclear power or fuel cycle facility. The NAS project will also examine how modern analysis methods can account for geographical areas smaller than the counties used in the NCI study. The phase 1 report should recommend the best approach.

Q5. How does the NAS project consider cancer incidence (occurrence)?

A5. The NAS is expected to gather cancer incidence data from individual States health databases. When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns.

Q6. Does the NRC suspect that cancer mortality rates are elevated around nuclear power plants?

A6. The NCI study found no general increased risk of death from cancer for people living near nuclear facilities. The NRC expects NAS to test the hypothesis that there is no difference in cancer rates between those populations that live near nuclear power facilities and those that do not. Any epidemiology findings have to be interpreted in the context of the strictly regulated and very low off-site radiation doses from routine nuclear facility operations.

Q7. How can I be sure that the nuclear power plant is not causing cancer? If I lived near a power plant, how might I be exposed to radiation? For example, if my house is 2 miles away from a reactor, am I being exposed whenever I am at my house?

A7. In the previous study NCI found no increased risk of cancer in those people who lived in counties near nuclear facilities. Nuclear facilities release very small regulated amounts of radioactivity, at very slow rates into the environment. The amounts released are strictly controlled within limits set by the NRC and the U.S. Environmental Protection Agency. Any exposures that may occur are below the established safety limits. The radioactive emissions from nuclear power plants only contribute a very small fraction (1/1000th) of our yearly total radiation exposure (approximately 0.1 percent). For comparison, your radiation exposure from natural radiation sources in soil and rocks, radon gas in homes, radiation from space, and other sources that are naturally found within the human body contributes to approximately 50 percent or 500 times more radiation than from nuclear facilities. The other half of your yearly exposure (also 500 times more radiation than nuclear facilities) is from man-made sources, such as consumer products, medical procedures, and to a much lesser extent, industrial sources.

Q8. Which age groups are included in the study?

A8. The NRC expects the NAS project to analyze cancer incidence and mortality rate data for the following age groups: 0-4 years, 5-9 years, 10-19 years, 20-39 years, 40-59 years, and 60 years and older.

Q9. Will the study address cancer rates from leukemia in children near nuclear facilities?

A9. Yes. The study will address leukemia in all age groups, including children (0-5 years).

Q10. I live near a nuclear power plant and my husband died of cancer. Will this study prove that living near the plant caused the cancer?

A10. No, the study is designed to survey trends in populations and does not evaluate the cause of individual cases. However, the study does give us an indication if the cancer rates of populations near nuclear facilities are the same, greater, or less than what is expected.

Q11. Are such studies able to detect population health effects from industrial sources?

A11. Yes. NCI has effectively used county-based studies in the past to study cancer mortality rates. For example, NCI has used county-based studies to show elevated rates of lung cancer deaths in counties with shipyard industries and in counties with arsenic-emitting smelters and refineries.

Q12. Are past studies, such as the French and German studies on childhood leukemia and radiation from nuclear power plants, being considered?

A12. Yes, these studies were considered by the phase 1 expert committee when writing their recommendations in the phase 1 report.

Q13. Why do some local cancer studies around some nuclear plants show increased cancer rates and some show no increase?

A13. Numerous local cancer studies that have been performed by local groups near nuclear plants show an increase in cancer. These local studies are sometimes based on small populations or groups and may or may not be influenced by local confounding factors, such as eating habits, cigarette smoking, and chemical exposures. In addition, some studies may not be using scientifically accepted epidemiology methods and as such may not be credible. Any local cancer studies should be submitted to the State Health Department, or to the U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry.

However, the NRC has evaluated the radiation levels from radioactive effluents and radiation from nuclear power plants and found that the levels are very low. Therefore, even with a conservative linear, no-threshold assumption, the corresponding cancer risk is very low.

Q14. Will the study design be reviewed?

OFFICIAL USE ONLY – SENSITIVE INTERNAL INFORMATION

- 4 -

A14. The NAS study protocols (<http://www.nationalacademies.org/studycommittee/process.pdf>) include procedures for rigorous review of the project's findings.

Q15. How will the NRC be certain that this study includes all proposed sites for nuclear power facilities?

A15. Representatives from several NRC program offices reviewed the list of decommissioned, operating, and proposed sites and found it to be accurate at the time the information was submitted to the study contractor for analysis. The staff plans to perform additional checks of the proposed site list during the conduct of this study.

Q16. What types of cancer are evaluated in this study and why is the study only looking at 16 types?

A16. This study may evaluate mortality rates from the following types of cancer that are linked to radiation exposure (radiogenic) and total cancer mortality.

- leukemia and aleukemia
- all solid cancers excluding leukemia
- Hodgkin's disease
- other lymphoma (including non-Hodgkin's lymphoma)
- multiple myeloma
- digestive organ
 - stomach
 - colon
 - rectum
 - liver (primary)
- trachea, bronchus, and lung
- prostate, uterine, and ovarian
- breast (female)
- thyroid
- bone and joint
- bladder
- brain and other central nervous system
- benign, in situ, and unspecified neoplasms

Q17. How will the NRC consider this resulting data in new reactor reviews and relicensing decisions?

A17. The NRC will use the results of the study to answer recurring questions from our stakeholders during the public comment period for regulatory actions. If necessary the results

OFFICIAL USE ONLY – SENSITIVE INTERNAL INFORMATION

Appendix B

could prompt further review of both new reactor and existing regulations to ensure the effluent and direct radiation exposure dose limits adequately protect public health and safety.

Q18. What will the NRC do if the results indicate an increase in cancer risk in some populations that live near a specific nuclear facility?

A18. While the NAS project is still in its formative stages, the NRC expects any increases in cancer risk will first be assessed against the levels of radiation dose attributable to strictly regulated radioactive materials released during plant operation, as well as any public radiation dose that might result from the releases. This data would assist NAS in examining any relationship between the study results and potential radiation exposures of the public at individual plants. Furthermore, the public radiation doses from operating plants are significantly below the radiation safety dose limits set to protect the public and are a small fraction of dose received from natural background. If there continues to be a concern then more refined epidemiology studies can be performed (e.g., case-control study).

Q19. I live near a nuclear power plant or in one of the studied counties. Will I be contacted during this study for information? Will my family or personal medical information be protected during this study or during a cancer incidence study?

A19. The NAS study process includes opportunities for the public to contribute, but the data used in this study will be obtained from anonymous state and national sources. These data do not contain personal identifying information making it impossible to determine to whom the medical information belongs.

Q20. Why did the NRC switch from Oak Ridge Associated Universities (ORAU) to NAS as a study provider after one year of work?

A20. Recently, the staff has reconsidered using ORAU to do the work due to the possibility of high public interest in the topic and the importance of the project to the agency. This action was not an indication of any deficiencies in the technical quality of ORAU's work, but more of ensuring the investigator brings a broad social and national policy perspective to the study. As such, the staff chose the NAS to perform the study.

Q21. What is the status of the project and how will the NRC decide on Phase 2 and has funding been reserved?

A21. NAS released the phase 1 report on March 29, 2012. The NRC will review and consider the phase 1 report and recommendations to determine the next step for phase 2 of the study. However, as with our regulatory process there are a number of ways we can proceed. Staff will review the document, discuss and determine if there are any policy issues that may warrant Commission involvement in the decision-making for phase 2. If so, one of the approaches

would be to develop a SECY paper with options. If not, staff will make the decision on phase 2 and work with NAS as appropriate. Funding for phase 2 has been reserved.

Q22. How does the NRC ensure the validity of the licensee's reporting of off-site doses and environmental monitoring results?

A22. The licensee is required to establish, implement, and maintain an acceptable effluent and environmental monitoring program. As such the licensee has the primary responsibility to ensure conformance with all applicable requirements in the area of effluent and environmental monitoring. The NRC performs selective inspections of the program to validate that the licensee is implementing such a program and that public doses are maintained well below regulatory requirements and are in fact as low as reasonably achievable. The following points illustrate this approach:

- 1) NRC has imposed strict regulatory requirements for conduct of both station effluent monitoring control and environmental monitoring. These requirements are designed to ensure licensee doses to members of the public are well below regulatory limits and are as low as reasonably achievable. Consequently, licensees are obligated to establish, implement, and maintain programs to sample, monitor, evaluate, and control effluents. The licensee is also required to collect and analyze environment samples to detect activity associated with facility operations. The sampling program is designed to review exposure pathways and sampling results. The environmental monitoring program is designed to provide a check on the station effluents control program.
- 2) The NRC has established reporting requirements that require the licensee to report effluent and or environmental monitoring issues as established in program requirements. NRC initiates appropriate reviews and evaluation of the reports and conducts follow-up inspections as appropriate.
- 3) The NRC conducts routine inspections in a variety of ways. The NRC maintains an onsite resident inspection staff that selectively and routinely reviews on-going activities to become aware of issues that may impact effluent or environmental monitoring including public dose. For example the residents review corrective action documents to evaluate potential impact on the effluents control program. The residents also review radiation monitors for indication of releases. During their inspections residents also look for potential unmonitored release paths.
- 4) The NRC also uses specialist inspectors, independent of the resident staff, to conduct periodic onsite inspections of both effluent release and environmental monitoring programs to ensure the licensee conforms with applicable requirements. As part of this review, NRC inspectors also review ground water controls. The inspectors evaluate the adequacy of quality assurance of measurements to ensure measurements are of

appropriate quality and that the licensee is implementing a robust quality assurance program for its measurements.

- 5) The NRC routinely reviews secondary evaluations conducted as part of the licensees' quality assurance programs (e.g., audits and assessments) as well as independent measurements conducted by other regulatory entities (e.g., state monitoring programs).
- 6) In addition, and as necessary, the NRC conducts independent confirmatory sampling to validate the accuracy of licensee measurements.
- 7) Information provided to the NRC by a licensee must be complete and accurate in all material respects. Submitting falsified information to the NRC is considered a violation of the regulations and will have severe implications. (For additional information, please refer to the Enforcement Policy.)

Q23. Why was/wasn't the site near me selected for the pilot studies?

A23. The NAS committee selected these sites because they provide a good sampling of facilities to examine how the study methodologies perform with actual data. The sites, in six states, offer different operating histories, population sizes, and levels of complexity in data retrieval from the State cancer registries. The State cancer registries for these sites are at different levels of maturation and have different approval protocols for accessing the cancer incidence and mortality data needed for the assessment.

Q24. How long will the pilot study take to complete and how much it cost?

A24. The NRC estimates the pilot study will take 2-3 years to complete and will cost approximately 2 million dollars. After the pilot study, staff will review the results, effort, and cost to determine if the study should be expanded to Phase 2.

Tift, Doug B

From: Cai, June
Sent: Friday, August 30, 2013 10:45 AM
To: Maier, Bill; Barker, Allan; Logaras, Haral; Pelchat, John; Woodruff, Gena; Tift, Doug; McNamara, Nancy
Cc: O'Sullivan, Kevin; Ryan, Michelle
Subject: Some info on cancer study

Here's a press release from last year that discusses the phase 1 results and planned pilot study of cancers near six reactor facilities (has a link to the SECY for more info): <http://pbadupws.nrc.gov/docs/ML1229/ML12298A078.pdf>

Terry indicated to me that they will be starting the pilots soon. I believe he would cover that in the update as well. He said he would add me to the comm plan for the effort (it had been Rosetta, then Steve Salomon), so as I get more info, I'll share with you.

Thanks

June

Tifft, Doug B

From: Cai, June
Sent: Monday, December 02, 2013 8:18 AM
To: Pelchat, John
Cc: Ryan, Michelle; Maier, Bill; Barker, Allan; Logaras, Harral; Lea, Edwin; Tifft, Doug; McNamara, Nancy
Subject: RE: NAS meeting on cancer study Dec 11
Attachments: Public Agenda Draft, 11-26-2013.pdf

Yes, the meeting notice can be shared outside the agency, to States, NGOs, public, etc. Please do clarify that it is not our meeting when sharing it.

Thanks

June

From: Pelchat, John
Sent: Monday, December 02, 2013 8:13 AM
To: Cai, June; Maier, Bill; Barker, Allan; Logaras, Harral; Lea, Edwin; Tifft, Doug; McNamara, Nancy
Cc: Ryan, Michelle
Subject: RE: NAS meeting on cancer study Dec 11

Good morning, and I hope you had a good Thanksgiving as well. Please see the attached document. It indicates that it is a draft agenda (I understand it is not our draft) Is this document releasable to the States?

In addition, I know of at least two NGO's that would be very interested in this meeting. Can this information be provided to them as well?

Thanks and take care . . .

John

John M. Pelchat
Senior Regional Government Liaison Officer
U.S. Nuclear Regulatory Commission, Region II
245 Peachtree Center Avenue, NE, Suite 1200
Atlanta, Georgia 30303-1257

Telephone: 404-997-4427
Work Cell#: (b)(6)
FAX: 404-997-4901
E-mail: john.pelchat@nrc.gov



Please consider the environment before printing this e-mail. Thank you.

From: Cai, June
Sent: Monday, December 02, 2013 8:08 AM
To: Maier, Bill; Barker, Allan; Logaras, Harral; Pelchat, John; Lea, Edwin; Tifft, Doug; McNamara, Nancy

Cc: Ryan, Michelle

Subject: NAS meeting on cancer study Dec 11

Good morning,

Hope everyone had a good Thanksgiving holiday.

National Academy of Science will be holding a meeting on Dec 11 on "Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 2 Pilot Planning." Please see attached meeting notice. Please note this is a NAS meeting. Anyone interest in calling in or viewing through the internet should contact the individual listed for instructions.

You may want to share this with States who have pilot facilities, which are:

- Dresden Nuclear Power Station, Morris, Illinois
- Millstone Power Station, Waterford, Connecticut
- Oyster Creek Nuclear Generating Station, Forked River, New Jersey
- Haddam Neck, Haddam Neck, Connecticut
- Big Rock Point Nuclear Power Plant, Charlevoix, Michigan
- San Onofre Nuclear Generating Station, San Clemente, California
- Nuclear Fuel Services, Erwin, Tennessee

Also, FYI Terry Brock will be coming to the Dec 19th RSLO telecon to give everyone an update. He has offered to hold a separate call just for SLOs (for the pilot facilities and also other States) if there is enough interest. We can talk about this at the telecon.

Thanks

June

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

Nuclear and Radiation Studies Board

500 Fifth Street, NW
Washington, DC 20001
Phone: 202 334-3066
Fax: 202 334-3077
www.nationalacademies.org

Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 2 Pilot Planning

MEETING AGENDA DRAFT*

First Committee Meeting: December 11, 2013

**National Academy of Sciences Building
2101 Constitution Avenue, NW
Room 125**

- 2:00 PM **Call to order and welcome**
Introductions of committee and staff
Jon Samet, committee chair
- 2:10 PM **Analysis of cancer risks in populations near nuclear facilities: study background**
Rania Kosti, study director
- 2:30 PM **Planning for the pilot of analysis of cancer risks near nuclear facilities**
Jon Samet, committee chair
- 2:40 PM **Analysis of cancer risks in populations near nuclear facilities—Phase 2 Pilot Planning study request**
Brian Sheron, Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission; Terry Brock, Senior Program Manager, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission
- 3:00 PM **Questions and Discussion**
- 3:15 PM **Congressional Comments (TBD)**
- 3:30 PM **Questions and Discussion**
- 3:40 PM **Public Comments**
- 4:00 PM **Adjourn Session Open to the Public**

Members of the public that wish to attend the meeting should contact Erin Wingo at 202 334 3066 or crs@nas.edu. Members of the press who wish to attend the meeting should contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu. Seating is limited.

Members of the public and press unable to attend may listen to the meeting through a toll-free telephone line or view the presentations via WebEx. Members of the public interested in calling in or viewing the WebEx should contact Erin Wingo at 202 334 3066 or crs@nas.edu by December 9 for instructions.

*This draft is subject to change. For updated information please visit the National Academy of Science's website.

Tifft, Doug B

From: Kulp, Jeffrey
Sent: Monday, April 21, 2014 12:54 PM
To: Lamb, John; Tifft, Doug; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

When they came last year, we didn't do anything except meet/greet when they visited the site. They had a public meeting also. We had no interaction. They had their own staff who publicized and arranged for the meeting.

From: Lamb, John
Sent: Monday, April 21, 2014 12:10 PM
To: Tifft, Doug; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Kulp, Jeffrey; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

This is an NAS meeting and not an NRC meeting. I do not know what NAS's protocol is regarding public meetings. I have not seen a meeting notice or agenda. I just heard of this visit and meeting this morning. If I found out anything, I will pass the info onto Region I SLOs and OPAs.

From: Tifft, Doug
Sent: Monday, April 21, 2014 11:55 AM
To: Lamb, John; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Kulp, Jeffrey; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

Thanks John. Is there a meeting notice or agenda for the public meeting?

-Doug

From: Lamb, John
Sent: Monday, April 21, 2014 11:44 AM
To: Tifft, Doug; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Kulp, Jeffrey
Subject: FYI: Oyster Creek Site Visit: NAS cancer Risk Study
Importance: High

BREAKING NEWS:

A small group of the NAS committee on Analysis of Cancer Risks: Pilot Planning will be touring the Oyster Creek on June 5, 2014. NAS is in the process of organizing a public meeting on the evening of June 4 (the day before the site visit) in Toms River, New Jersey, to receive public comments on their study.

I hope NAS has been in touch with Exelon about this; this is the first I heard of it.

Thanks.
John

Tifft, Doug B

From: Mangan, Kevin
Sent: Monday, April 21, 2014 1:52 PM
To: Tifft, Doug
Subject: FW: ~~OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION~~ - Update - Cancer Risk Study
Attachments: Public Agenda Draft 11-26-2013 (2).pdf; Course Description_brock_2014.docx

Here is some good info

From: Nimitz, Ronald
Sent: Monday, April 21, 2014 1:48 PM
To: Mangan, Kevin
Subject: FW: ~~OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION~~ - Update - Cancer Risk Study

As discussed .. ~~SOME OFFICIAL USE ONLY~~

From: Nimitz, Ronald
Sent: Tuesday, December 10, 2013 3:06 PM
To: Noggle, James; Trapp, James; Lorson, Raymond
Cc: Tifft, Doug; McNamara, Nancy; Screnci, Diane; Sheehan, Neil; Scott, Michael; Lew, David; Dean, Bill; Roberts, Darrell; Clifford, James; Collins, Daniel
Subject: ~~OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION~~ - Update - Cancer Risk Study

This mail provides an update on the cancer study and plans. It contains some ~~Official Use Only Information~~ (indicated below).

As a refresh... the NRC asked the National Academy of Sciences (NAS) to perform a state-of-the-art study on cancer risk for populations surrounding NRC-licensed facilities. The NAS will study nuclear power plants and certain plants that create the nuclear fuel used in the power plants. This assessment is being carried out in two consecutive phases. The first phase (Phase 1) was completed in May 2012 and resulted in a consensus report. The second phase (Phase 2) would be the assessment of cancer risks informed by the recommendations of the Phase 1 report. The NAS effort will create an up-to-date, more thorough examination of cancer incidence than the 1990 U.S. National Institutes of Health-National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities". The 1990 NCI report is now more than 20 years old, and more modern analysis methods, combined with up-to-date information sources, will provide contemporary cancer information in current populations living near NRC-licensed nuclear facilities. The 1990 NCI report concluded that cancer mortality rates were the same whether a reactor was nearby or not. The NRC staff uses the NCI report as a primary resource during public discussions of the risk of dying from cancer in communities near nuclear facilities. The pilot study will have two steps: Pilot Planning and Pilot Execution. The pilot study will look at selected sites. Once the pilot is completed (estimated time 2-3 years) a decision will be made to conduct further study

Some Important points and reference links..

1. Publicly Available - Research will be holding a public meeting with the National Academy of Science (NAS) this Wednesday to discuss the Phase II study. The draft agenda is attached. The latest is at the NAS website. This NAS link also provides good background information on the study from a NAS perspective

Here: <http://dels.nas.edu/global/nrsb/CancerRisk>

2. Publicly Available - An updated publicly available "Fact Sheet" on the study was issued. It provides background info.

Here: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bg-analys-cancer-risk-study.html>

3. ~~Official Use Only~~ - An updated NRC Communication Plan was issued. The Communication Plan contains an extensive list of Q&As. The plan is linked. This plan also includes key talking points. ~~(OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION)~~

Here: Communication Plan ML link here Open ADAMS P8

Document <https://adamsxt.nrc.gov/WorkplaceXT/getContent?objectStoreName=Main. .Library&id=current&vsId={E7252F84-3348-4D93-87F2-3377795146B7}&objectType=document>

NOTE: Training Opportunity - Research has put together a one and one-half day training course on how one goes about determining and communicating cancer risk. The course provides an in-depth introduction to the different types of health studies used to evaluate the relationship between radiation exposure and disease outcomes. The course also provides an in-depth introduction to risk communication skills and practices including, Introduction to Risk Communication, Importance of Risk Communication, Understanding Stakeholders, and Building Trust and Credibility, among other topics. See attached course description. The course can be brought to the region.

Understanding Radiation Health Risk Studies and How to Communicate Them

U.S. Nuclear Regulatory Commission (NRC)

Course Overview

This course is designed in two parts,

Day 1 Provides an in-depth introduction to the different types of health studies used to evaluate the relationship between radiation exposure and disease outcomes. Day 1 topics include the following:

- Introduction to Epidemiology
- Sources of Data & Information
- Study Designs & Risk
- Sources of Error
- Association & Causation
- Interpreting Epidemiological Studies
- Radiation Epidemiology

Course includes didactic instruction and a group exercise on different health study designs and their strengths and weaknesses — including how to address confounding factors and other bias, how to determine cause and affect relationships, and how health studies are used in risk assessment and the NRC's system of radiation protection.

Presenter Drs. Terry Brock and Stephanie Bush-Goddard

Day 2 Provides an in-depth introduction to risk communication skills and practices. Day 2 topics include the following:

- Introduction to Risk Communication
- Importance of Risk Communication
- Understanding Stakeholders
- Building Trust and Credibility
- Messaging: Delivering Information
- Risk Assessment In Action
- Communicating Epidemiology

Course includes didactic instruction and a group exercise on how to communicate radiation health risks to NRC internal and external stakeholders by integrating Day 1 topics about health studies with the latest risk communication practices.

Presenter Drs. Terry Brock and Stephanie Bush-Goddard

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

Nuclear and Radiation Studies Board

500 Fifth Street, NW
Washington, DC 20001
Phone: 202 334-3066
Fax: 202 334-3077
www.nationalacademies.org

Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 2 Pilot Planning

MEETING AGENDA DRAFT*

First Committee Meeting: December 11, 2013

**National Academy of Sciences Building
2101 Constitution Avenue, NW
Room 125**

- 2:00 PM **Call to order and welcome**
Introductions of committee and staff
Jon Samet, committee chair
- 2:10 PM **Analysis of cancer risks in populations near nuclear facilities: study background**
Rania Kosti, study director
- 2:30 PM **Planning for the pilot of analysis of cancer risks near nuclear facilities**
Jon Samet, committee chair
- 2:40 PM **Analysis of cancer risks in populations near nuclear facilities—Phase 2 Pilot Planning study request**
Brian Sheron, Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission; Terry Brock, Senior Program Manager, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission
- 3:00 PM **Questions and Discussion**
- 3:15 PM **Congressional Comments (TBD)**
- 3:30 PM **Questions and Discussion**
- 3:40 PM **Public Comments**
- 4:00 PM **Adjourn Session Open to the Public**

Members of the public that wish to attend the meeting should contact Erin Wingo at 202 334 3066 or crs@nas.edu. Members of the press who wish to attend the meeting should contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu. Seating is limited.

Members of the public and press unable to attend may listen to the meeting through a toll-free telephone line or view the presentations via WebEx. Members of the public interested in calling in or viewing the WebEx should contact Erin Wingo at 202 334 3066 or crs@nas.edu by December 9 for instructions.

*This draft is subject to change. For updated information please visit the National Academy of Science's website.

Tifft, Doug B

From: Baldauf, Paul <Paul.Baldauf@dep.state.nj.us>
Sent: Tuesday, April 22, 2014 10:48 AM
To: McNamara, Nancy; Mulligan, Patrick
Cc: Tifft, Doug; Orlando, Paul
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

Thanks – hadn't heard anything on this one. Nice to have a heads up this time around. Any details you can provide will be appreciated.

Paul Baldauf, P.E., Director
Division of Environmental Safety and Health
(609) 633-7964

~~NOTE: This e-mail is protected by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail and its contents may be Privileged & Confidential due to the Attorney-Client Privilege, Attorney work Product, Deliberative Process or under the New Jersey Open Public Records Act.~~

~~If you are not the intended recipient of this e-mail, please notify the sender, delete it and do not read, act upon, print, disclose, copy, retain, or redistribute it.~~

From: McNamara, Nancy [mailto:Nancy.McNamara@nrc.gov]
Sent: Tuesday, April 22, 2014 10:38 AM
To: Baldauf, Paul; Mulligan, Patrick
Cc: Tifft, Doug
Subject: Oyster Creek Site Visit: NAS cancer Risk Study

Paul/Pat, wanted to give you a "heads up" that a small group of the NAS committee on Analysis of Cancer Risks: Pilot Planning will be touring Oyster Creek on June 5, 2014. NAS is in the process of organizing a public meeting on the evening of June 4 (the day before the site visit) in Toms River, New Jersey, to receive public comments on their study. We just got wind of this.. Don't know if Exelon is yet aware. As we get further information, we will forward to you. When we find out if the licensee is aware, we will let you know that also.

Nancy

Tift, Doug B

From: Kulp, Jeffrey
Sent: Monday, April 28, 2014 2:51 PM
To: Tift, Doug; Lamb, John; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

I just received some information concerning the visit from licensing.

Exelon (Corporate) had contact with NAS since February. The site visit is on Thursday June 5. The agenda for the site visit is TBD. NAS wants to have a public meeting on Wednesday, June 4. I have the names of the NAS POC, the Exelon Corporate POC and the site POC. If we get the agenda or any other information for the visit, we will update everyone.

Jeff

From: Kulp, Jeffrey
Sent: Monday, April 28, 2014 1:43 PM
To: Tift, Doug; Lamb, John; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

The site has not heard anything about this visit as of this morning. Has anyone gotten any more information on this?

Jeff

From: Tift, Doug
Sent: Monday, April 21, 2014 11:55 AM
To: Lamb, John; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Kulp, Jeffrey; Mangan, Kevin
Subject: RE: Oyster Creek Site Visit: NAS cancer Risk Study

Thanks John. Is there a meeting notice or agenda for the public meeting?

-Doug

From: Lamb, John
Sent: Monday, April 21, 2014 11:44 AM
To: Tift, Doug; McNamara, Nancy; Screnci, Diane; Sheehan, Neil
Cc: Patel, Amar; Kulp, Jeffrey
Subject: FYI: Oyster Creek Site Visit: NAS cancer Risk Study
Importance: High

BREAKING NEWS:

A small group of the NAS committee on Analysis of Cancer Risks: Pilot Planning will be touring the Oyster Creek on June 5, 2014. NAS is in the process of organizing a public meeting on the evening of June 4 (the day before the site visit) in Toms River, New Jersey, to receive public comments on their study.

I hope NAS has been in touch with Exelon about this; this is the first I heard of it.

Tift, Doug B

From: Lopas, Sarah
Sent: Thursday, June 25, 2015 11:03 AM
To: NMSS_MSTR_FSTB Distribution; Barker, Allan; Lea, Edwin; Logaras, Herral; Maier, Bill; McNamara, Nancy; Pelchat, John; Tift, Doug
Subject: FW: Heads-UP: Cancer Study to be terminated
Attachments: FW: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

I will touch base with Terry Brock/RES to see if there is a Comm Plan, or minimally, Qs and As. More to come....

Sarah L. Lopas

Senior Liaison Program Manager
U.S. Nuclear Regulatory Commission
Office (301) 415-6360
BlackBerry (b)(6)
HQ Office Location T8F9
Mail Stop T8F42

From: Pelchat, John
Sent: Tuesday, June 23, 2015 12:44 PM
To: Lopas, Sarah
Cc: Lea, Edwin
Subject: FW: Heads-UP: Cancer Study to be terminated

From: Sykes, Marvin
Sent: Tuesday, June 23, 2015 11:33 AM
To: Pelchat, John
Subject: FW: Heads-UP: Cancer Study to be terminated

FYI

From: Brock, Terry
Sent: Thursday, June 18, 2015 1:05 PM
To: Mizuno, Beth; Burnell, Scott; Milligan, Patricia; Garry, Steven; Nimitz, Ronald; Ramsey, Kevin; Hinson, Charles; Ford, Jennifer
Cc: Tadesse, Rebecca
Subject: Cancer Study Update RE: Heads-UP: Cancer Study Secy Paper coming

All,

First off, thank you all for reviewing the cancer study SECY paper and getting your office concurrences. Late last week, senior management told us that the cancer study will not be moving forward because of the current budget issues impacting the agency. As a result, I have to redraft the SECY paper telling the Commission our plans to not move forward. In turn, I will have to ask for your office concurrences again in the short-term with this new direction. I plan to get the new paper out by next week. Again, thanks again for your review and comments on the original SECY paper. If you have any questions please e-mail or call me next week at my new TWFN number at 301-415-1793—I am currently between offices as we move from Church Street.

Terry

From: Brock, Terry

Sent: Monday, June 01, 2015 10:02 AM

To: Mizuno, Beth; Burnell, Scott; Milligan, Patricia; Garry, Steven; Nimitz, Ronald; Ramsey, Kevin; Hinson, Charles; Ford, Jennifer

Cc: Tadesse, Rebecca

Subject: Heads-UP: Cancer Study Secy Paper coming

Hi All,

The cancer study Secy paper on the next steps will be on its way today for your office concurrence >> link below if you want to get a jump start. I identified you as the cognizant staff on the project for review of the paper. We're looking for a June 10th concurrence date so it can be in front of the Commission during budget deliberations later this month.

[View ADAMS P8 Properties ML15141A343](#)

[Open ADAMS P8 Package \(SECY - Results of the Analysis of Cancer Risks in Populations Near Nuclear Facilities: Phase 2 Pilot Planning Project and Next Steps\)](#)

Since we last spoke, RES has briefed the EDO and informed your Deputy Office Directors on our plan to use the National Council on Radiation Protection and Measurements to do a direct update of the 1990 NCI study. NAS proved to be too expensive and take too long to finish the study to have useful results. Below are the talking points we conveyed to your upper management. I'm briefing the Commissioners' CAs on Wed 6/10/15 from 2-3 PM in the OWFN 18th Floor Conference room if you want to attend.

Staff plans for the next steps of the Cancer Study

- Staff plans to sole-source with the congressionally chartered U.S. National Council on Radiation Protection and Measurements (NCRP) to provide a direct update to the 1990 National Cancer Institute (NCI) Cancer Study in approximately 2.5 years for 2.5 million dollars.
- The update through NCRP would be a more modest approach than what was proposed by the National Academies, however NCRP will provide final results in a reasonable time frame at a reduced cost.
- Discussed NCRP sole-source with the Business Advisory Center and received support for this approach.
- Staff plans to communicate the NCRP approach to the Commission through a CA brief and Information SECY paper.
- SECY paper will go out for a two week office concurrence the first week of June to provide to the Commission by the end of June.
- Staff on the cancer risk study team in each office will be notified of the paper and requested by RES to review for the office.
- Concurrently RES will work with the BAC to establish the contracting mechanism with NCRP.

Thx,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

Tifft, Doug B

From: Pelchat, John
Sent: Tuesday, June 23, 2015 12:43 PM
To: Lopas, Sarah
Cc: Lea, Edwin; Hannah, Roger; Ledford, Joey; Wert, Leonard
Subject: FW: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

Good afternoon Sarah – **No Immediate Action Required, so save this until** (b)(6) **return the office.**

The decision to cancel the National Academy of Sciences' contract to study cancer incidence around licensed facilities is very likely to result in a reaction from the Erwin Citizens Action Network (ECAN), an NGO that actively opposes Nuclear Fuel Services in Erwin, TN. NFS was the only fuel facility selected for the study and it is reasonable to say that ECAN viewed this selection as the result of their interactions with members of the NAS' study group. The study has also been a subject on interest in the media as well.

ECAN also actively interacts with the Tennessee Department of Environment and Conservation (TDEC). It is a fair guess that both NRC, and without regard for their lack of a role in the decision, TDEC will receive complaints on this issue.

We need to stay aware of this issue as it goes up before the Commission for consideration, and at the appropriate time, notify the State of a Commission decision on the study. Please work with the NMSS staff to ensure we are included in any communication arrangements so we can ensure that the State is properly prepared for any public or media reaction and that our messages stay consistent.

Thanks and feel better . . .

John

From: Sykes, Marvin
Sent: Tuesday, June 23, 2015 11:45 AM
To: Pelchat, John
Subject: FW: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

More info on status of cancer study.

From: Ramsey, Kevin
Sent: Friday, June 19, 2015 3:21 PM
To: Lesser, Mark; Sykes, Marvin; Hartland, David; Toth, Matthew; Stancil, Charles; Rivera-Crespo, Carmen; Ledford, Joey; Hannah, Roger
Subject: FW: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

FYI

From: Gaskins, Kimberly
Sent: Friday, June 19, 2015 2:02 PM
To: RidsOpaMail Resource; RidsRgn1MailCenter Resource; RidsNmssOd Resource; RidsNroMailCenter Resource; RidsNrrMailCenter Resource; RidsNsirMailCenter Resource; RidsOgcMailCenter Resource
Cc: Brock, Terry; Coffin, Stephanie; Case, Michael; Tadesse, Rebecca; Ford, Jennifer; Ramsey, Kevin; Milligan, Patricia;

Hinson, Charles; Garry, Steven; Mizuno, Beth; Burnell, Scott; Nimitz, Ronald

Subject: RE: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

All,

Please concur no later than COB June 25th. Please contact Terry Brock at Terry.brock@nrc.gov with any questions or comments concerning this document.

Thank you
Kim

From: Gaskins, Kimberly

Sent: Friday, June 19, 2015 1:57 PM

To: RidsOpaMail Resource; RidsRgn1MailCenter Resource; RidsNmssOd Resource; RidsNroMailCenter Resource; RidsNrrMailCenter Resource; RidsNsirMailCenter Resource; RidsOgcMailCenter Resource

Cc: Brock, Terry; Coffin, Stephanie; Case, Michael; Tadesse, Rebecca; Ford, Jennifer; Ramsey, Kevin; Milligan, Patricia; Hinson, Charles; Garry, Steven; Mizuno, Beth; Burnell, Scott; Nimitz, Ronald

Subject: Review & Concurrence of Info SECY Paper-Results of the Analysis of Cancer Risk Populations

MEMORANDUM TO: Those on the Attached List

FROM: M. Case

SUBJECT: SECY-RESULTS OF THE ANALYSIS OF CANCER RISKS
IN POPULATION NEAR NUCLEAR FACILITIES:
PHASE 2 PILOT PLANNING PROJECT AND NEXT STEPS

[View ADAMS P8 Properties ML15141A343](#)

[Open ADAMS P8 Package \(SECY - Results of the Analysis of Cancer Risks in Populations Near Nuclear Facilities: Phase 2 Pilot Planning Project and Next Steps\)](#)

Tift, Doug B

From: Lopas, Sarah
Sent: Thursday, September 03, 2015 2:03 PM
To: Barker, Allan; Lea, Edwin; Logaras, Herral; Maier, Bill; McNamara, Nancy; Pelchat, John; Tift, Doug
Cc: McGrady-Finneran, Patricia
Subject: RE: Key points for Tuesday's cancer study announcement

Sorry – hit enter and send by accident - -

COMM PLAN → [View ADAMS P8 Properties ML15244A833](#)
[Open ADAMS P8 Document \(Communications Plan - Analysis of Cancer Risks in Populations Living Near Nuclear Facilities-Project Closeout\)](#)

From: Lopas, Sarah
Sent: Thursday, September 03, 2015 2:02 PM
To: Barker, Allan (Allan.Barker@nrc.gov) <Allan.Barker@nrc.gov>; Lea, Edwin (Edwin.Lea@nrc.gov) <Edwin.Lea@nrc.gov>; Logaras, Herral (Herral.Logaras@nrc.gov) <Herral.Logaras@nrc.gov>; Maier, Bill (Bill.Maier@nrc.gov) <Bill.Maier@nrc.gov>; McNamara, Nancy (Nancy.McNamara@nrc.gov) <Nancy.McNamara@nrc.gov>; Pelchat, John (John.Pelchat@nrc.gov) <John.Pelchat@nrc.gov>; Tift, Doug (doug.tift@nrc.gov) <Doug.Tift@nrc.gov>
Cc: McGrady-Finneran, Patricia <Patricia.McGrady-Finneran@nrc.gov>
Subject: Key points for Tuesday's cancer study announcement

From today's meeting on the comm plan – here's the timeline for the announcement which will happen on Tuesday, September 9th –

9:00am – RES is having their call with the National Academy of Sciences
9:30am – OPA will internally distribute the press release via e-mail
10am – OPA will send a courtesy e-mail to external stakeholders
10am – NMSS will issue a courtesy e-mail to all the SLOs and all agreement and non-agreement states
10:30am – The press release will be publicly released

In case you missed it in the scheduler – here is the link to the comm plan:

Sarah L. Lopas

Senior Liaison Program Manager
Federal, State, and Tribal Liaison Branch
U.S. Nuclear Regulatory Commission
Office (301) 415-6360
BlackBerry (b)(6)

Tift, Doug B

From: Nimitz, Ronald
Sent: Thursday, September 03, 2015 2:31 PM
To: Lorson, Raymond; Scott, Michael
Cc: Screnci, Diane; Sheehan, Neil; McNamara, Nancy; Tift, Doug; Lew, David; Noggle, James; Suber, Gregory; Nick, Joseph; Collins, Daniel
Subject: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities

~~NOT FOR PUBLIC RELEASE~~

The below link provides the communication plan for NRC cancellation of the cancer study. (Note that this plan is not yet fully approved but it is believed that no significant changes will occur.)

The study was to focus on the following sites: Dresden Nuclear Power Station, Illinois; Millstone Power Station, Connecticut; Oyster Creek Nuclear Generating Station, New Jersey, Haddam Neck, Connecticut (decommissioned); Big Rock Point Nuclear Power Plant, Michigan (decommissioned); San Onofre Nuclear Generating Station, California (permanently shut down); and Nuclear Fuel Services, Tennessee.

Basically, the Phase 2 Pilot planning identified a number of challenges to the study including the belief that the work "may not have adequate statistical power to detect the presumed small increases in cancer risks arising from... monitored and reported releases." Given the uncertainty in the usability of the pilot results and the high cost and duration of the pilot (39 months and \$8 million), the staff found that the NAS proposal would take too long and cost too much.

The cancellation is to be made public on September 8 (day after Labor Day) with the following time line (see also plan time line):

September 8, 2015:

9:00 AM – NRC to inform NAS of study cancellation

9:30 AM – Press release to be sent to internal stake holders (SLOs, PAOs, etc.) to allow them to inform states with facilities considered for study

10:00 AM - HQ PAO to send E-mail to external stakeholders (Grammies etc.) to inform them. (Scott Burnell, HQ, PAO, needs their E-mail addresses)

10:30 AM - Press Release and associated SECY paper to be publicly released

~~NOT FOR PUBLIC RELEASE~~

Below is the link to the cancer study comm plan with Q&As. It is not expected that there will be any changes.

[View ADAMS P8 Properties ML15244A833](#)

[Open ADAMS P8 Document \(Communications Plan - Analysis of Cancer Risks in Populations Living Near Nuclear Facilities-Project Closeout\)](#)

~~NOT FOR PUBLIC RELEASE:~~ The SECY paper is here: [ML15141A404](#)

Tifft, Doug B

From: Anzenberg, Vered
Sent: Monday, November 29, 2010 3:47 PM
To: 'Edward.wilds@ct.gov'
Cc: Tifft, Doug; McNamara, Nancy; Brock, Terry; Bush-Goddard, Stephanie
Subject: RIC 2011 Speaker Invitation (Analysis of Cancer Risk in Populations Living near Nuclear Facilities)
Attachments: Speaker Panelist Confirmation Packet for RIC 2011 CancerStudy.doc; Tentative Program Overview for SCs.docx
Importance: High

Dear Mr. Wilds,

With the past holiday week, I just want to make sure this formal invitation made it your way.

Vered

11/23/2010

[**Edward Wilds**, Director of Radiation Division, Bureau of Air Management, Department of Environmental Protection, Connecticut]

Dear Mr. Wilds:

It is my sincere pleasure to invite you to speak at NRC's 23rd annual United States Nuclear Regulatory Information Conference (RIC). The Conference will be held on March 8-10, 2011, at the Bethesda North Marriott Hotel and Conference Center, 5701 Marinelli Road, North Bethesda, MD 20852. Every year, the RIC brings together over 3,000 CEOs and presidents of nuclear industry licensees, vendors insurers, law firms, consultants, nuclear industry associations and regulators from around the world to address mutual challenges and share information.

Specific session details are provided below:

Session Title and Abstract: Analysis of Cancer Risk in Populations Living near Nuclear Facilities

Session Goals and Learning Objectives: The Nuclear Regulatory Commission has requested the National Academy of Sciences (NAS) to update the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities." The staff uses the NCI report as a primary resource when communicating with the public about cancer mortality risk in counties that contain or are adjacent to nuclear power facilities. In the new study, the NRC is also interested in having the NAS evaluate cancer diagnosis rates, as well as exploring how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI report. This session will provide a historical context of NRC's request to NAS with an introduction of the study committee and study schedule. In addition, speakers from various perspectives will present their views on the study.

Other Potential Speakers/Panelists:

- Dr. Terry Brock, Sr. Project Manager, Health Effects Branch, Office of Nuclear Regulatory Research, NRC
- Dr. Kevin Crowley, Sr. Board Director, Nuclear and Radiation Studies Board, National Academy of Science
- Dr. Thomas B. Cochran, Senior Scientist, Natural Resources Defense Council

- Dr. Edward F. Maher, President, Health Physics Society

- Mr. Ralph Andersen, Senior Director, Radiation Safety and Environmental Protection, Nuclear Energy Institute

Session Coordinator:

Vered Anzenberg, Ph.D
Nuclear Engineer, Health Effects Branch
Mailstop: CSB 03A07M
Washington, DC 20555
(O) 301-251-7546; (F) 301-251-7416
Vered.Anzenberg@nrc.gov

Please find enclosed with this letter a confirmation packet and tentative program overview. The purpose of the confirmation packet is to obtain your permission to use your name, photographs, presentation, etc, in NRC's RIC printed materials and on the RIC website. The confirmation form is written so that you are aware that it is your responsibility to inform the Session Coordinator if you prefer your information not be posted prior to the conference. Upon acceptance of this invitation, please complete and return the enclosed "Confirmation Packet" including a completed confirmation form, a signed acceptance form and biographical information by **December 3, 2010** to ensure inclusion in the final printed program. This can be returned to the **Session Coordinator**, (contact information above) by mail, fax, or email. Also, please include a title for your presentation. If you are unavailable to be a speaker/panelist for this session, please notify me as soon as possible.

Also enclosed is a tentative program overview, for your information. The highlighted fields indicate possible times for this session. However, at this time the exact date and time has not been determined.

I look forward to working with you to help this session be a success. If you have any questions or need further assistance, please feel free to contact me.

Sincerely,
Kathy Gibson
Deputy Division Director, Division of Systems Analysis

Enclosures:

1. Speaker/Panelist Confirmation Packet
(confirmation form/acceptance form/bio form)
2. Tentative Program Overview



SPEAKER/PANELIST CONFIRMATION PACKET
(Confirmation, Acceptance, and Bio)

SPEAKER/PANELIST CONFIRMATION FORM

Please complete the information below and return by: December 3, 2010

Session Information (to be completed by Session Chair):

Session Title: Analysis of Cancer Risk in Populations Living near Nuclear Facilities

Session Chair: Kathy H. Gibson, Deputy Division Director, Division of Systems Analysis
Office of Nuclear Regulatory Research, NRC
Kathy.Gibson@nrc.gov
(301)-251-7499

Session Coordinator: Vered Anzenberg, Ph.D
Nuclear Engineer, Health Effects Branch
Mailstop: CSB 03A07M
Washington, DC 20555
(O) 301-251-7546; (F) 301-251-7416
Vered.Anzenberg@nrc.gov

Speaker Confirmation Information (to be completed by speaker):

PLEASE PRINT and ensure that the information provided is legible and accurate. The information you provide below will be used to populate the online and formal conference program.

FULL NAME (as shown in printed program):

FULL POSITION TITLE:

FULL ORGANIZATION NAME (no abbreviations, please):

CONTACT INFORMATION:

BUSINESS MAILING ADDRESS:

BUSINESS TELEPHONE NUMBER:

BUSINESS E-MAIL ADDRESS:

PRESENTATION TITLE:

IMPORTANT NOTE: Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.

For Internal NRR Use Only:	Confirmation #:
Date Received: _____ Date Entered: _____	Date Submitted: _____

SPEAKER/PANELIST ACCEPTANCE AGREEMENT

Information contained in the printed materials and on the website for the Regulatory Information Conference (RIC) is made available to the general public in advance of the conference. **In order for your information to be included in the conference printed program and on the RIC website, please sign the required release below and return by December 3, 2010**

By accepting the invitation to be a speaker at the RIC, I grant the NRC permission to:

- Photograph, videotape, audiotape and post my presentation slides on the public website (Internet); and
- Use the aforementioned images in educational and information activities without compensation.

Important Note: If you accept the invitation to be a speaker but do not wish to have your information made public, it is your responsibility to inform your Session Coordinator so that appropriate arrangements may be made to honor this request.

Confirmed Speaker Acceptance:

Printed Name

Signature

Organization

Date

IMPORTANT NOTE: Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.

Return completed confirmation form by December 3, 2010.

SPEAKER/PANELIST BIOGRAPHICAL INFORMATION

Speaker Biographical Information:

Please provide a short bio for introduction during the conference and posting on the public website (MS Word format preferred).

[Insert bio here]

IMPORTANT NOTE: Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.

Return completed speaker bio by December 3, 2010



TENTATIVE PROGRAM OVERVIEW
As of 11/1/2010

IMPORTANT NOTE: THIS PROGRAM IS TENTATIVE, THE TIMES ARE TENTATIVE. THE INFORMATION IS SUBJECT TO CHANGE

Tuesday, March 8, 2011

8:30 am	10:00 am	Opening Session	
		Welcome and Introductory Remarks	Eric Leeds, Director Office of Nuclear Reactor Regulation
		Keynote Speaker	Gregory B. Jaczko, Chairman
		EDO Remarks	R. William Borchardt Executive Director for Operations
10:00 am	10:30 am	Networking Break	Break
10:30 am	11:30 am	Guest Speaker	Guest Speaker
11:30 am	1:00 pm	Lunch Break	Lunch
1:00 pm	1:45 pm	Commissioner Plenary	Commissioner
1:45 pm	2:30 pm	Commissioner Plenary	Commissioner
2:30 pm	3:00 pm	Networking Break	Break
3:00 pm	4:30 pm	Technical Sessions	Various Speakers

Wednesday, March 9, 2011 (Regional Session on Wednesday)

8:30 am	9:15 am	Commissioner Plenary	Commissioner
9:15 am	10:00 am	Commissioner Plenary	Commissioner
10:00 am	10:30 am	Networking Break	Break
10:30 am	12:00 pm	Technical Sessions	Various Speakers
12:00 pm	1:30 pm	Lunch Break	Lunch
1:30 pm	3:00 pm	Technical Sessions	Various Speakers
3:00 pm	3:30 pm	Networking Break	Break
3:30 pm	5:00 pm	Technical Sessions	Various Speakers

Thursday, March 10, 2011

8:30 am	10:00 am	Special Directors Session	Eric Leeds, Chair
10:00 am	10:30 am	Networking Break	Break
10:30 am	12:00 pm	Technical Sessions	Various Speakers
12:00 pm	1:30 pm	Lunch Break	Lunch
1:30 pm	3:00 pm	Technical Sessions	Various Speakers

Tift, Doug B

From: Anzenberg, Vered
Sent: Tuesday, November 23, 2010 1:27 PM
To: Gibson, Kathy
Cc: Tift, Doug; McNamara, Nancy; Brock, Terry; Bush-Goddard, Stephanie
Subject: EWilds RIC 2011 Speaker Invitation (Analysis of Cancer Risk in Populations Living near Nuclear Facilities)
Attachments: Speaker Panelist Confirmation Packet for RIC 2011 CancerStudy.doc; Tentative Program Overview for SCs.docx

Hi Kathy,

We are proceeding with inviting Edward Wilds from Connecticut. Do you mind sending out the invite to him? His email is Edward.Wilds@ct.gov

Thanks!

Vered

From: Anzenberg, Vered
Sent: Tuesday, November 23, 2010 9:34 AM
To: 'emaher@moellerinc.com'
Subject: RIC 2011 Speaker Invitation (Analysis of Cancer Risk in Populations Living near Nuclear Facilities)

11/23/2010

[**Edward Wilds**, Director of Radiation Division, Bureau of Air Management, Department of Environmental Protection, Connecticut]

Dear Mr. Wilds:

It is my sincere pleasure to invite you to speak at NRC's 23rd annual United States Nuclear Regulatory Information Conference (RIC). The Conference will be held on March 8-10, 2011, at the Bethesda North Marriott Hotel and Conference Center, 5701 Marinelli Road, North Bethesda, MD 20852. Every year, the RIC brings together over 3,000 CEOs and presidents of nuclear industry licensees, vendors insurers, law firms, consultants, nuclear industry associations and regulators from around the world to address mutual challenges and share information.

Specific session details are provided below:

Session Title and Abstract: Analysis of Cancer Risk in Populations Living near Nuclear Facilities

Session Goals and Learning Objectives: The Nuclear Regulatory Commission has requested the National Academy of Sciences (NAS) to update the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities." The staff uses the NCI report as a primary resource when communicating with the public about cancer mortality risk in counties that contain or are adjacent to nuclear power facilities. In the new study, the NRC is also interested in having the NAS evaluate cancer diagnosis rates, as well as exploring how to divide the study areas around the facilities into geographical units smaller than the counties used in the NCI report. This session will provide a historical context of NRC's request to NAS with an introduction of the study committee and study schedule. In addition, speakers from various perspectives will present their views on the study.

Other Potential Speakers/Panelists:

- Dr. Terry Brock, Sr. Project Manager, Health Effects Branch, Office of Nuclear Regulatory Research, NRC
- Dr. Kevin Crowley, Sr. Board Director, Nuclear and Radiation Studies Board, National Academy of Science
- Dr. Thomas B. Cochran, Senior Scientist, Natural Resources Defense Council
- Dr. Edward F. Maher, President, Health Physics Society
- Mr. Ralph Andersen, Senior Director, Radiation Safety and Environmental Protection, Nuclear Energy Institute

Session Coordinator:

Vered Anzenberg, Ph.D
Nuclear Engineer, Health Effects Branch
Mailstop: CSB 03A07M
Washington, DC 20555
(O) 301-251-7546; (F) 301-251-7416
Vered.Anzenberg@nrc.gov

Please find enclosed with this letter a confirmation packet and tentative program overview. The purpose of the confirmation packet is to obtain your permission to use your name, photographs, presentation, etc. in NRC's RIC printed materials and on the RIC website. The confirmation form is written so that you are aware that it is your responsibility to inform the Session Coordinator if you prefer your information not be posted prior to the conference. Upon acceptance of this invitation, please complete and return the enclosed "Confirmation Packet" including a completed confirmation form, a signed acceptance form and biographical information by December 3, 2010 to ensure inclusion in the final printed program. This can be returned to the **Session Coordinator**, (contact information above) by mail, fax, or email. Also, please include a title for your presentation. If you are unavailable to be a speaker/panelist for this session, please notify me as soon as possible.

Also enclosed is a tentative program overview, for your information. The highlighted fields indicate possible times for this session. However, at this time the exact date and time has not been determined.

I look forward to working with you to help this session be a success. If you have any questions or need further assistance, please feel free to contact me.

Sincerely,
Kathy Gibson
Deputy Division Director, Division of Systems Analysis

Enclosures:

1. Speaker/Panelist Confirmation Packet
(confirmation form/acceptance form/bio form)
2. Tentative Program Overview



SPEAKER/PANELIST CONFIRMATION PACKET
(Confirmation, Acceptance, and Bio)

SPEAKER/PANELIST CONFIRMATION FORM

Please complete the information below and return by: December 3, 2010

Session Information (to be completed by Session Chair):

Session Title: Analysis of Cancer Risk in Populations Living near Nuclear Facilities

Session Chair: Kathy H. Gibson, Deputy Division Director, Division of Systems Analysis
Office of Nuclear Regulatory Research, NRC
Kathy.Gibson@nrc.gov
(301)-251-7499

Session Coordinator: Vered Anzenberg, Ph.D
Nuclear Engineer, Health Effects Branch
Mailstop: CSB 03A07M
Washington, DC 20555
(O) 301-251-7546; (F) 301-251-7416
Vered.Anzenberg@nrc.gov

Speaker Confirmation Information (to be completed by speaker):

PLEASE PRINT and ensure that the information provided is legible and accurate. The information you provide below will be used to populate the online and formal conference program.

FULL NAME (as shown in printed program):

FULL POSITION TITLE:

FULL ORGANIZATION NAME (no abbreviations, please):

CONTACT INFORMATION:

BUSINESS MAILING ADDRESS:

BUSINESS TELEPHONE NUMBER:

BUSINESS E-MAIL ADDRESS:

PRESENTATION TITLE:

IMPORTANT NOTE: Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.

For Internal NRR Use Only:	Confirmation #: _____
Date Received: _____	Date Entered: _____
	Date Submitted: _____

SPEAKER/PANELIST ACCEPTANCE AGREEMENT

Information contained in the printed materials and on the website for the Regulatory Information Conference (RIC) is made available to the general public in advance of the conference. **In order for your information to be included in the conference printed program and on the RIC website, please sign the required release below and return by December 3, 2010.**

By accepting the invitation to be a speaker at the RIC, I grant the NRC permission to:

- Photograph, videotape, audiotape and post my presentation slides on the public website (Internet); and
- Use the aforementioned images in educational and information activities without compensation.

Important Note: If you accept the invitation to be a speaker but do not wish to have your information made public, it is your responsibility to inform your Session Coordinator so that appropriate arrangements may be made to honor this request.

Confirmed Speaker Acceptance:

Printed Name

Signature

Organization

Date

IMPORTANT NOTE: Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.

Return completed confirmation form by December 3, 2010.

SPEAKER/PANELIST BIOGRAPHICAL INFORMATION

Speaker Biographical Information:

Please provide a short bio for introduction during the conference and posting on the public website (MS Word format preferred).

[Insert bio here]

IMPORTANT NOTE: *Speaker(s)/Panelist(s) are reminded to pre-register for the conference. Registration opens in early January 2011.*

Return completed speaker bio by December 3, 2010



**TENTATIVE PROGRAM OVERVIEW
As of 11/1/2010**

*****IMPORTANT NOTE: THIS PROGRAM IS TENTATIVE. THE TIMES ARE TENTATIVE. THE INFORMATION IS SUBJECT TO CHANGE*****

Tuesday, March 8, 2011

8:30 am	10:00 am	Opening Session	
		Welcome and Introductory Remarks	Eric Leeds, Director Office of Nuclear Reactor Regulation
		Keynote Speaker	Gregory B. Jaczko, Chairman
		EDO Remarks	R. William Borchardt Executive Director for Operations
10:00 am	10:30 am	Networking Break	Break
10:30 am	11:30 am	Guest Speaker	Guest Speaker
11:30 am	1:00 pm	Lunch Break	Lunch
1:00 pm	1:45 pm	Commissioner Plenary	Commissioner
1:45 pm	2:30 pm	Commissioner Plenary	Commissioner
2:30 pm	3:00 pm	Networking Break	Break
3:00 pm	4:30 pm	Technical Sessions	Various Speakers

Wednesday, March 9, 2011 (Regional Session on Wednesday)

8:30 am	9:15 am	Commissioner Plenary	Commissioner
9:15 am	10:00 am	Commissioner Plenary	Commissioner
10:00 am	10:30 am	Networking Break	Break
10:30 am	12:00 pm	Technical Sessions	Various Speakers
12:00 pm	1:30 pm	Lunch Break	Lunch
1:30 pm	3:00 pm	Technical Sessions	Various Speakers
3:00 pm	3:30 pm	Networking Break	Break
3:30 pm	5:00 pm	Technical Sessions	Various Speakers

Thursday, March 10, 2011

8:30 am	10:00 am	Special Directors Session	Eric Leeds, Chair
10:00 am	10:30 am	Networking Break	Break
10:30 am	12:00 pm	Technical Sessions	Various Speakers
12:00 pm	1:30 pm	Lunch Break	Lunch
1:30 pm	3:00 pm	Technical Sessions	Various Speakers

Tift, Doug B

From: Virgilio, Rosetta
Sent: Tuesday, September 07, 2010 1:37 PM
To: Turtil, Richard; Ryan, Michelle; Barker, Allan; Logaras, Harral; McNamara, Nancy; Tift, Doug; 'Robert@Trojanowski'; 'bill@maier'; Woodruff, Gena
Cc: Virgilio, Rosetta
Subject: Fw: cancer study update
Attachments: cancer-opa-090110.pdf Attachment is publicly available as ML102460036.

Note attached Please be sure the RSLOs get a copy My address book is not properly populating everyone

Sent from an NRC Blackberry
Rosetta O. Virgilio
(b)(6)

From: Brock, Terry
To: Damon, Dennis; Garry, Steven; Clement, Richard; Milligan, Patricia; Nimitz, Ronald; Woodruff, Gena; Orth, Steven; Stearns, Don; Virgilio, Rosetta; Mizuno, Beth; Burnell, Scott; Jones, Andrea; Dacus, Eugene; Weil, Jenny; Bagley, Susan
Cc: Anzenberg, Vered; Bush-Goddard, Stephanie
Sent: Thu Sep 02 15:04:27 2010
Subject: cancer study update

Greetings all cancer study communication team members:

Yesterday the National Academy of Sciences (NAS) started the nomination process to select committee members for the cancer study. See attached OPA press release.

We expect the selection process to take approximately 2-3 months. The first public meeting of the to-be established committee is slated for Jan. 2011. Once the committee is established I'll hold another meeting to discuss the members and the path forward for the study. In the meanwhile, take a look at the NAS website for the study at <http://dels.nas.edu/global/nrsb/CancerRisk>

Let me know if you have any questions.

Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

AN ANALYSIS OF CANCER RISK IN POPULATIONS LIVING NEAR NUCLEAR-POWER FACILITIES

Introduction

The objective of this communication plan is to outline the strategy and organization for integrating U.S. Nuclear Regulatory Commission (NRC) communications with external and internal stakeholders regarding the agency's request to the National Academy of Sciences for a study to replace the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities."

Goals

This plan will help the NRC accomplish effective communications regarding the update to the NCI report by undertaking the following tasks:

- **Promoting** effective communications with internal and external stakeholders in a timely, consistent, and understandable manner.
- **Informing** all stakeholders that the NAS carries out studies independently of the government using processes designed to promote transparency, objectivity, and technical rigor.
- **Identifying** opportunities for educating the public regarding the impact of nuclear power facilities on cancer mortality and incidence risk for populations surrounding those facilities.

Background

The NRC staff uses the NCI report as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. Stakeholders often ask the staff about perceived elevated cancer rates in populations working or residing near reactors. The staff uses this report as a scientifically defensible resource to aid in assuring stakeholders that cancer mortality rates are consistently not elevated in counties that contain or are adjacent to nuclear power facilities. However, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in a perceived elevation in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Additionally, the report is almost 20 years old and modern analysis combined with up-to-date information sources will better reflect the risk to current populations living near past and present licensed nuclear power facilities. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for these sites. As a result, the NRC has asked the National Academy of Sciences to undertake this project..

In the original report, NCI scientists studied more than 900,000 cancer deaths from 1950–1984, using mortality records collected from counties that contain nuclear facilities. The researchers evaluated changes in mortality rates for 16 types of cancer in these counties from 1950 until each facility began operation, up until 1982. Cancer incidence information was only available for four facilities located in Iowa and Connecticut, due to the lack of this type of data being collected.

The NCI report showed no increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities, including all of the nuclear power reactors operational before 1982. The report showed that, in comparison with the control counties, some of the study counties had higher rates of certain cancers and some had lower rates, either before or after the facilities came into service. None of the observed differences were linked to the presence of nuclear facilities.

The objective of the new study is to provide the NRC with an analysis of the latest cancer mortality and incidence data if available— for populations living near NRC-licensed nuclear power facilities. This study will provide the staff with an analysis of the most current scientific information for responding to stakeholder concerns related to cancer mortality rates for populations that live near past, present, and proposed nuclear power facilities. The NAS study process and protocols are expected to produce the highest quality report possible.

To address the desire of stakeholders for information on cancer incidence rates for populations living near nuclear power facilities, the NAS project will assess the feasibility of studying cancer incidence concurrent with the cancer mortality study. Cancer incidence data collected by the NCI's Surveillance, Epidemiology, and End Results (SEER) program are limited to specific geographic regions within the United States. Other national, State, and county cancer surveillance programs collect cancer incidence data, and the NAS project is expected to assess these for inclusion in the overall analysis.

Key Messages

The NRC will communicate the following four key messages to all stakeholders:

- (1) **The NRC has asked the National Academy of Sciences for a study to replace the 1990 NCI report. The 1990 NCI report concluded that cancer mortality rates are not elevated in these populations.**
- (2) **The NAS study is expected to include populations that live in the vicinity of past, present, and proposed nuclear power facilities. This information is useful to the NRC in understanding the cancer mortality risk for populations living near those facilities.**
- (3) **The NAS study process is independent, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and accurate.**

- (4) **The NAS project will assess the feasibility of using currently available information to study cancer incidence in populations surrounding nuclear power facilities.**

Appendix A to this document includes language that elaborates on each of these key messages, and Appendix B provides responses to inquiries expected from the general public, congressional staff, the media, and other stakeholders. The appendices also include additional information for stakeholders who may be more familiar with these topics, such as elected officials, Federal and State Government officials, public interest groups, and certain members of the media.

Audience/Stakeholders

Internal

- Commission
- Office of the Executive Director for Operations (OEDO)
- Advisory Committee on Reactor Safety (ACRS)
- Office of the General Counsel (OGC)
- Office of Congressional Affairs (OCA)
- Office of International Programs (OIP)
- Office of Public Affairs (OPA)
- Office of Nuclear Regulatory Research (RES)
- Office of New Reactors (NRO)
- Office of Nuclear Reactor Regulation (NRR)

External

- Congress
- Federal agencies¹
- Institute for Nuclear Power Operations
- Electric Power Research Institute
- Nuclear Energy Institute
- Conference of Radiation Control Program Directors
- Organization of Agreement States
- Agreement States
- news media (e.g., *Inside NRC*)
- International Atomic Energy Agency

- Office of Nuclear Security and Incident Response (NSIR)
- Office of Federal State Materials and Environmental Management Programs (FSME)
-
- Office of Nuclear Material Safety and Safeguards (NMSS)
- Regions I–IV
- nuclear regulators of other countries
- residents living near nuclear power plants
- State and local governments
- public interest groups (e.g., Union of Concerned Scientists)
- academic and professional organizations (e.g., Health Physics Society, American Nuclear Society)
- NRC licensees

¹ U.S. Department of Homeland Security/Domestic Nuclear Detection Office, U.S. Department of Defense, U.S. Department of Energy/National Nuclear Security Administration, U.S. Department of Transportation, U.S. Environmental Protection Agency, Food and Drug Administration, U.S. Department of Health and Human Services, U.S. Department of State

Communication Team

The Communication Team will assist the project manager as needed in developing uniform and accurate messages, initiating communication vehicles, and coordinating implementation plans for this project.

Position	Name	Organization	Telephone Number
<i>Team Leader</i>	Terry Brock	RES	(301) 251-7458
<i>NRR Lead</i>	Steven Garry	NRR	(301) 415-2766
<i>NRO Lead</i>	Rich Clement	NRO	(301) 415-8524
<i>NSIR Lead</i>	Trish Milligan	NSIR	(301) 415-2223
<i>Region I Lead</i>	Ron Nimitz	RI	(610) 337-5267
<i>Region III Lead</i>	Steven Orth	RIII	(630) 829-9827
<i>Legal Lead</i>	Beth Mizuno	OGC	(301) 415-3122
<i>Public Affairs Lead</i>	Scott Burnell	OPA	(301) 415-8204
<i>International Programs Lead</i>	Andrea Jones	OIP	(301) 415-2309
<i>Congressional Affairs Lead</i>	Gene Dacus	OCA	(301) 415-1697
<i>Congressional Affairs Backup</i>	Jenny Weil	OCA	(301) 415-1691
<i>EDO Lead</i>	Susan Bagley	OEDO	(301) 415-2240
<i>Communication Specialist</i>	Wendy West	ORAU	(865) 576-0028

Communication Tools

Tool

Description/Purpose

External Web Site	The NRC's external Web page will note the issuance of the study. It will also contain a link to the NCI Web page for the original NCI study along with other related publicly available documents.
Internal Briefings	The Communication Team will conduct internal briefings at various points in the process to keep internal stakeholders informed of its activities and messages.
Weekly Highlights and EDO Daily Notes	The weekly highlights and/or EDO Daily Notes will report on significant milestones.
Internet E-Mail	The Communication Team will e-mail significant information on the status of the study and deliverables to internal stakeholders.
Commissioners' Assistants Notes	Commissioners' Assistants Notes will be used to communicate to the Commission information about public meetings, study status, and other items of significant interest.
Commissioner Interactions	The Communication Team will coordinate

Tool

Description/Purpose

and assist in preparing briefing materials for the interactions of Commissioners with various stakeholders.

Public Meetings

If necessary, the staff will conduct public meetings to discuss the final study report.

Issuance of Significant Correspondence

The project manager will coordinate the issuance of correspondence with key internal and external stakeholders. Before the agency sends any significant external correspondence related to the study, the Communication Team will receive notification. The Communication Team will coordinate with OPA when preparing press releases and interacting with the media.

Congressional Communications

OCA will coordinate all communication with Congress.

Media Communications

OPA will coordinate all communication with the media.

Planned Communications Activities

The dates for the planned communications activities given in the table below are based on finalizing the composition of the external peer review committee.

Activity	Responsibility	Date Planned	Date Completed
Hold kickoff meeting with NRC and contractor staff and provide technical information for study	RES, NSIR, NRO, NRR, RI, RIII, OPA	10/2008	10/14/2008
Develop draft information sheet	RES	10/2008	10/30/2008
Submit first draft of the Communication plan to Communication Team for review; meet with Communication Team	RES	1/2009	1/15/2009
Meet with contractor regarding	RES	2/2009	2/10/2009

~~OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION~~

- 7 -

communications needs at end of study, including plain language fact sheet

Meet with Communication Team on revised draft Communication plan, Regulatory Information Conference (2009), and other studies	RES	3/2009	3/05/2009
---	-----	--------	-----------

Meet with Communication Team on revised draft Communication plan; share draft protocol	RES	6/2009	6/09/2009
--	-----	--------	-----------

Inform NRC internal and external stakeholders of peer review committee selections	OPA, RES, OCA	01/2010	01/2010
---	---------------	---------	---------

Submit communication plan to OEDO for posting on internal NRC Web site	RES	02/2010	
--	-----	---------	--

Issue press release and post public meeting notice on NRC external web	RES, OPA	TBD	
--	----------	-----	--

Hold public meeting with peer review committee to gather technical comments on the draft study protocol	OPA, RES	TBD	
---	----------	-----	--

Contractor submits cancer incidence feasibility study for NRC review	RES	TBD	
--	-----	-----	--

ORAU submits draft report on cancer mortality to the NRC	RES	TBD	
--	-----	-----	--

ORAU submits plain language fact sheet	RES	TBD	
--	-----	-----	--

Receive peer review comments on draft cancer mortality study report; respond to congressional and media inquiries	OPA, RES, OCA	TBD	
---	---------------	-----	--

~~OFFICIAL USE ONLY - SENSITIVE INTERNAL INFORMATION~~

Communication Team completes review of plain language fact sheet	RES, NRO, NRR, NSIR, OPA, OCA, OEDO	TBD
Complete final report with the comment reconciliation addendum	RES	TBD
Brief ACRS	RES, ORAU	TBD
Prepare draft press release	OPA	TBD
Inform stakeholders of report publication	NRR, NRO, NSIR, OCA, Regions	TBD

Communication Challenges

The Communication Team is likely to encounter challenges in the following two areas while implementing this plan:

(1) Effective Communication with the General Public

The results of this study will be of significant interest to the general public, particularly those members of the general public who live within the counties analyzed in the study. All NRC-produced materials must take into account the limited technical background of some stakeholders and the sensitivity of issues relating to cancer. In addition, various stakeholder groups have expressed concern with perceived elevated cancer risks in populations that live near nuclear power facilities. The Communication Team will take appropriate steps to address this challenge using risk communication techniques.

(2) Public Perceptions of the NRC and the NAS

Communications regarding this study should address the frequent misconception among some stakeholders that the NRC promotes the use of nuclear power (i.e., to generate electricity). In addition, communication efforts must stress the NAS is an independent, objective organization, and that the final report will reflect the Academy's best judgement.

Evaluation and Monitoring

The Communication Team will monitor correspondence regarding this study to ensure consistency with the key messages and to determine if further key messages are needed. The

Communication Team will assess the degree of success that key messages and talking points have with the target stakeholder audience.

The Team Leader will brief key staff as needed regarding revisions to the messages, talking points, or guidance based on immediate concerns or questions asked by the stakeholder audience.

Updates and Revisions

If major revisions to this plan or its key messages are necessary, the Team Leader will ensure that a formal revision is made and placed in the Agencywide Documents Access and Management System (ADAMS) and on the internal communications Web page. The Team Leader will determine also the need for updates to the questions and answers in Appendix B to this plan. These updates will not constitute a revision to this plan.

Final Closeout

At the conclusion of the study, the Team Leader will prepare a brief closeout statement about the challenges and successes related to the communication plan and attach it to the end of the last draft.

**Appendix A
Expanded Key Messages**

- (1) **The NRC has asked the National Academy of Sciences for a study to replace the 1990 NCI report. The 1990 NCI report concluded that cancer mortality rates are not elevated in populations near or within counties that had commercial nuclear power plants generating at that time.**
- The 1990 National Cancer Institute (NCI) report showed no general increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities operational before 1982.
 - The report showed that, in comparison with the control counties, some of the study counties had higher mortality rates of certain cancers and some had lower rates, either before or after the facilities came into service. None of the observed differences could be linked to the presence of nuclear facilities.
 - The scope of the new study covers the past and present nuclear power facilities regulated by the NRC. In addition, studies will be performed at potential future facilities to establish a baseline mortality and incidence cancer risk for the site. The new study excludes all of the U.S. Department of Energy facilities in the original study because they are not licensed by the NRC.
- (2) **The NAS study includes populations that live in the vicinity of past, present, and proposed nuclear power facilities. This information is useful to the NRC in understanding the cancer mortality risk for populations living near those facilities.**
- The new study includes reactors in the following life-cycle phases: reactors in the process of being decommissioned or that have been decommissioned, reactors that are currently in operation. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site.
 - The 1990 NCI report has provided valuable information to stakeholders. The NAS project will provide updated scientific information on cancer mortality in a transparent manner to keep the public informed and to earn and maintain public trust.
- (3) **The NAS study process is independent, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and accurate.**
- The NRC will provide information to the NAS, but the Academy has full autonomy in deciding how best to meet the NRC's request.

- The NAS will hold several public meetings in the project's first phase, allowing the public and interest groups to provide input and information on conducting the study.
- (4) **The NAS project will assess the feasibility of using currently available information to study cancer incidence in populations surrounding nuclear power facilities.**
- The NAS is expected to investigate whether a cancer incidence study of populations surrounding nuclear power facilities would be feasible, given that States maintain separate cancer incidence databases and therefore the quality of data and the database formats are likely to vary.
 - When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns.
 - If there is enough cancer incidence information, the second phase of the NAS study would include analysis of cancer incidence rates near nuclear power facilities.

**Appendix B
Questions and Answers**

Q1. Why has the Nuclear Regulatory Commission (NRC) asked the NAS to conduct this study now?

A1. This study will provide the NRC staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality rates for populations that live near past, present, and proposed nuclear power facilities. The NRC staff has used a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. However, the NCI report is almost 20 years old and needs updating to reflect the current populations living near nuclear power facilities. In addition, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in a perceived elevation in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Therefore, the NAS project will also assess the feasibility of performing a cancer incidence study in the future.

Q2. Why is the NAS, rather than NCI, conducting this follow-up study to NCI's 1990 work?

A2. The NRC staff approached NCI management about updating the 1990 study under contract to the NRC, but because of staffing limitations, NCI was unable to commit staff resources for this activity for the foreseeable future. The NAS will draw its project team from a wide range of technical experts, which could include NCI members.

Q3. Which nuclear facilities are included in the study?

A3. The NRC intends the study to include all NRC-licensed nuclear power reactor facilities that are or were in operation in the United States.

The 1990 NCI report included all 52 commercial nuclear power facilities in the United States that started operation before 1982. Preliminary information indicates that 25 new reactor sites have begun operation since 1982. The 25 new reactor sites will be included in the study. Researchers are identifying the study and control populations for these sites for inclusion in the cancer mortality study.

Q4. Which counties will be included in the study?

A4. The study will cover those counties that contain an NRC-licensed nuclear power facility and those adjacent counties (an adjacent county is included if it comprises at least 20 percent of the area within a 10-mile radius of the site). Researchers will select three comparison counties—termed control counties—and compare cancer mortality rates in those counties with the rates in the study county. Study counties will be matched with control counties having similar demographic characteristics. The NAS project will also examine how modern analysis methods can account for geographical areas smaller than counties.

Q5. How does the NAS project consider cancer occurrence (incidence)?

A5. The NAS project will assess the feasibility of using currently available information to study cancer incidence in populations surrounding nuclear power facilities. The NAS is expected to investigate whether a cancer incidence study of populations surrounding nuclear power facilities would be feasible, given that States maintain separate cancer incidence databases and therefore the quality of data and the database formats are likely to vary. When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns. If there is enough cancer incidence information, the second phase of the NAS study would include analysis of cancer incidence rates near nuclear power facilities.

Q6. Does the NRC suspect that cancer mortality rates are elevated around nuclear power plants?

A6. The NCI study found no general increased risk of death from cancer for people living near nuclear facilities. The NRC expects the NAS to test the hypothesis that there is no difference in cancer death rates between those populations that live near nuclear power facilities and those that do not. The agency considers this research to be important in light of ongoing public interest in the topic and increased licensing activity in the nuclear industry. The NRC is committed to the regulation of the safe operation of nuclear power plants to protect public health and the environment.

Q7. How can I be sure that the nuclear power plant is not causing cancer? If I lived near a power plant, how might I be exposed to radiation? For example, if my house is 2 miles away from a reactor, am I being exposed whenever I am at my house?

A7. Nuclear power plants release very small regulated amounts of radioactivity in liquid and gaseous effluents (emissions). The amounts released are strictly controlled within limits set by the NRC and the U.S. Environmental Protection Agency. The radioactive emissions from nuclear power plants only contribute a very small fraction of our yearly total radiation exposure (~ 0.1%). For comparison, your radiation exposure from natural radiation sources in soil and rocks, radon gas in homes, radiation from space, and other sources that are naturally found within the human body contributes to ~ 50 % of your yearly exposure. The other half of our yearly exposure is from man-made sources, such as consumer products, medical procedures, and to a much lesser extent, industrial sources.

Q8. Which age groups are included in the study?

A8. The NRC expects the NAS project to analyze cancer death rate data for the following age groups: 0-5 years, 0-10 years, 10-19 years, 20-39 years, 40-59 years, and 60 years and older.

Q9. Will the study address cancer death rates from leukemia in children near nuclear facilities?

A9. Yes. The study will address cancer death rates from leukemia in children since it will analyze leukemia death rates in all age groups, including 0–5 years.

Q10. I live near a nuclear power plant and my husband died of cancer. Will this study prove that living near the plant caused the cancer?

A10. No. the study is designed to survey trends in populations and does not evaluate the cause of individual cases. However, the study does give us an indication if the cancer rates of populations are the same, greater, or less than the average.

Q11. Why is the study based on counties?

A11. The county is the smallest geographic unit for which cancer mortality data for all 50 States has been collected for many years (since 1950). Also, other data needed to properly analyze and compare the study and control counties, such as population data, are available for each county. The NAS project will investigate the use of smaller geographic areas around the sites using Geographical Information Systems (GIS)

Q12. Are such county-based studies able to detect population health effects from industrial sources?

A12. Yes. NCI has effectively used county-based studies in the past to study cancer mortality rates. For example, NCI has used county-based studies to show elevated rates of lung cancer deaths in counties with shipyard industries and in counties with arsenic-emitting smelters and refineries.

Q13. Will the study design be reviewed?

A13. The NAS study protocols (<http://www.nationalacademies.org/studycommitteeprocess.pdf>) include procedures for rigorous review of the project's findings.

Q14. How will the NRC be certain that this study includes all proposed sites for nuclear power facilities?

A14. Representatives from several NRC program offices reviewed the list of decommissioned, operating, and proposed sites and found it to be accurate at the time the information was submitted to the study contractor for analysis. The staff plans to perform additional checks of the proposed site list during the conduct of this study.

Q15. What types of cancer are evaluated in this study?

A15. This study will evaluate mortality rates from the following types of cancer:

- leukemia and aleukemia
- all cancers excluding leukemia
- Hodgkin's disease

- other lymphoma (including non-Hodgkin's lymphoma)
- multiple myeloma
- digestive organ
 - stomach
 - colon
 - rectum
 - liver (primary)
- trachea, bronchus, and lung
- prostate, uterine, and ovarian
- breast (female)
- thyroid
- bone and joint
- bladder
- brain and other central nervous system
- benign, in situ, and unspecified neoplasms

Q16. How will the NRC consider this resulting data in new reactor reviews and relicensing decisions?

A16. The NRC will use the results of the study to answer recurring questions from our stakeholders during the public comment period for regulatory actions. If necessary the results could prompt further review of both new reactor and relicensing regulations to ensure the effluent and direct radiation exposure is within dose limits and provides adequate protection of public health and safety

Q17. What will the NRC do if the results indicate an increase in cancer risk in some populations that live near a specific nuclear power facility?

While the NAS project is still in its formative stages, the NRC expects it will include features to examine data on radioactive materials released during plant operation, as well as any public radiation dose that might result from the releases. This data would assist the NAS in examining any relationship between increased risks and individual plants.

Q18. I live near a nuclear power plant or in one of the studied counties. Will I be contacted during this study for information? Will my family or personal medical information be protected during this study or during a cancer incidence study?

A18. The NAS study process includes opportunities for the public to contribute, but the data used in this study will be obtained from anonymous state and national sources. These data do not contain personal identifying information making it impossible to determine to whom the medical information belongs.

Q19. Why did the NRC drop ORAU as a study provider after several years of preparatory activities?

A19. Recently, the staff has reconsidered the sole-sourcing of the work due to the possibility of high public interest in the topic and the importance of the project to the agency. As such, the staff developed a "Sources-Sought Notification" to openly solicit for any commercial entities that may be able to perform the work. This action is not an indication of any deficiencies in the technical quality of ORAU's work, but more of ensuring that other commercial research organizations be made aware of the project and offered the chance to compete if skilled and capable.

From: [Heck, Jared](#)
To: [Barker, Allan](#); [Logaras, Herral](#)
Cc: [Mitlyng, Viktoria](#); [Chandrathil, Prema](#)
Subject: training in radiation health risks
Date: Friday, June 03, 2011 3:02:00 PM

Gentlemen,

Cindy passed along a training course being developed by RES that may be of interest. The point of contact in RES is our friend, Vered Anzenberg, who spent some time here in Region III a year or so ago:

Class Title: Understanding Radiation Health Risk Studies and How to Communicate Them (Course ID_1881)

Date and Location: November 1-2, 2011 at the PDC (Bethesda, MD)

Course Description: This course is designed in two parts. Day 1 will focus on an in-depth introduction of the different type of health studies used to evaluate the relationship between radiation exposure and disease outcomes. Topics to be covered on Day 1 include: different health study designs and their strengths and weaknesses—including how to address confounding factors and other bias, how to determine cause and effect relationships, and how health studies are used in risk assessment and the NRC's system of radiation protection. Day 2 will focus on communicating radiation health risks to our internal and external stakeholders through integrating what was learned on Day 1 with the latest risk communication practices.

Course Audience: NRC staff interested in understanding radiation health studies, how they fit into the NRC system of radiation protection, and how to communicate radiation health risks to internal and external stakeholders.

This course is being developed in part to support the rollout of the NAS study on cancer risks surrounding nuclear plants. Let me know if you're interested (it may already be in iLearn—I haven't checked).

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: [Logaras, Herral](#)
To: [Brock, Terry](#)
Subject: Accepted: Cancer study communication activities
Start: Thursday, September 03, 2015 12:00:00 PM
End: Thursday, September 03, 2015 1:00:00 PM
Location: HQ-TWFN-06C01-20p

From: [Mitlyng, Viktoria](#)
To: [Brock, Terry](#); [Chandrathil, Prema](#); [Milligan, Patricia](#); [Heck, Jared](#); [Ramsey, Kevin](#); [Garry, Steven](#); [Hinson, Charles](#); [Nimitz, Ronald](#); [Woodruff, Gena](#); [Cassidy, John](#); [Stearns, Don](#); [Lopas, Sarah](#); [Mizuno, Beth](#); [Burnell, Scott](#); [Weil, Jenny](#); [Pelchat, John](#); [Tifft, Doug](#); [McNamara, Nancy](#); [Maier, Bill](#); [McGrady-Finneran, Patricia](#); [Logaras, Harral](#); [Lea, Edwin](#); [Barker, Allan](#); [Tadesse, Rebecca](#); [Rakovan, Lance](#)
Subject: RE: Cancer study communication activities
Date: Tuesday, September 01, 2015 1:46:45 PM

Thanks so much, Harral! -Vika

-----Original Appointment-----

From: Logaras, Harral **On Behalf Of** Brock, Terry

Sent: Tuesday, September 01, 2015 1:16 PM

To: Mitlyng, Viktoria; Chandrathil, Prema; Milligan, Patricia; Heck, Jared; Ramsey, Kevin; Garry, Steven; Hinson, Charles; Nimitz, Ronald; Woodruff, Gena; Cassidy, John; Stearns, Don; Lopas, Sarah; Mizuno, Beth; Burnell, Scott; Weil, Jenny; Pelchat, John; Tifft, Doug; McNamara, Nancy; Maier, Bill; McGrady-Finneran, Patricia; Logaras, Harral; Lea, Edwin; Barker, Allan; Tadesse, Rebecca; Rakovan, Lance

Subject: FW: Cancer study communication activities

When: Thursday, September 03, 2015 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-TWFFN-06C01-20p

Vika and Prema, It looks like something is about to break on the Cancer Study. This just came my way through our HQ person, Sarah Lopas. I'll let you know what happens...

Harral

-----Original Appointment-----

From: Brock, Terry

Sent: Tuesday, September 01, 2015 12:43 PM

To: Brock, Terry; Milligan, Patricia; Ramsey, Kevin; Garry, Steven; Hinson, Charles; Nimitz, Ronald; Woodruff, Gena; Cassidy, John; Stearns, Don; Lopas, Sarah; Mizuno, Beth; Burnell, Scott; Weil, Jenny; Pelchat, John; Tifft, Doug; McNamara, Nancy; Maier, Bill; McGrady-Finneran, Patricia; Logaras, Harral; Lea, Edwin; Barker, Allan; Tadesse, Rebecca; Rakovan, Lance

Subject: Cancer study communication activities

When: Thursday, September 03, 2015 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: HQ-TWFFN-06C01-20p

All,

This meeting is to coordinate the message to our stakeholders about the forthcoming

public release of the SECY paper on the cancelling of the cancer study. I'll send the communication plan soon for our discussion and sequencing of notifications. Bridge-line info below:

Passcodes/Pin codes:

Participant passcode: (b)(6)

For security reasons, the passcode will be required to join the conference.

Dial in numbers:

Country

Toll Numbers

**Freephone/
Toll Free Number**

USA

888-989-7692

Thanks,

Terry

Terry Brock, Ph.D.

Office of Nuclear Regulatory Research

U.S. Nuclear Regulatory Commission

Washington D.C. 20555

Mail Stop TWFN-10

phone: 301-415-1793

From: [Logaras, Harral](#) on behalf of [Brock, Terry](#)
To: [Ryan, Michelle](#); [Milligan, Patricia](#); [Ramsey, Kevin](#); [Garry, Steven](#); [Hinson, Charles](#); [Nimitz, Ronald](#); [Woodruff, Gena](#); [Cassidy, John](#); [Stearns, Don](#); [Lopas, Sarah](#); [Mizuno, Beth](#); [Burnell, Scott](#); [Weil, Jenny](#); [Pelchat, John](#); [Tiff, Doug](#); [McNamara, Nancy](#); [Maier, Bill](#); [McGrady-Finneran, Patricia](#); [Logaras, Harral](#); [Lea, Edwin](#); [Barker, Allan](#); [Tadesse, Rebecca](#); [Rakovan, Lance](#)
Cc: [Mitlyng, Viktoria](#); [Chandraithil, Prema](#); [Heck, Jared](#); [Johnson, Robert](#); [Hartland, David](#); [Sykes, Marvin](#); [Hannah, Roger](#); [Ledford, Joey](#)
Subject: FW: UPDATE: COMM PLAN Available Cancer study communication activities

-----Original Appointment-----

From: Brock, Terry
Sent: Tuesday, September 01, 2015 12:43 PM
To: Brock, Terry; Milligan, Patricia; Ramsey, Kevin; Garry, Steven; Hinson, Charles; Nimitz, Ronald; Woodruff, Gena; Cassidy, John; Stearns, Don; Lopas, Sarah; Mizuno, Beth; Burnell, Scott; Weil, Jenny; Pelchat, John; Tiff, Doug; McNamara, Nancy; Maier, Bill; McGrady-Finneran, Patricia; Logaras, Harral; Lea, Edwin; Barker, Allan; Tadesse, Rebecca; Rakovan, Lance
Cc: Mitlyng, Viktoria; Chandraithil, Prema; Heck, Jared; Johnson, Robert; Hartland, David; Sykes, Marvin; Hannah, Roger; Ledford, Joey
Subject: UPDATE: COMM PLAN Available Cancer study communication activities
When: Thursday, September 03, 2015 1:00 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: HQ-TWFN-06C01-20p

Hi All,

Below is the link to the cancer study comm plan for our meeting today. Brian Sheron hasn't signed it out yet because he is on vacation this week. I don't expect any dramatic changes between now and Monday when he gets back. Thanks, Terry

View ADAMS P8 Properties ML15244A833 <https://adamsxt.nrc.gov/WorkplaceXT/integrationWebBasedCommand?_commandId=3010&objectStoreName=Main___Library&id=current&vsId={F3E8DC77-F373-45EB-8238-058DB5FDBFC9}&objectType=document>
Open ADAMS P8 Document (Communications Plan - Analysis of Cancer Risks in Populations Living Near Nuclear Facilities-Project Closeout) <https://adamsxt.nrc.gov/WorkplaceXT/getContent?objectStoreName=Main___Library&id=current&vsId={F3E8DC77-F373-45EB-8238-058DB5FDBFC9}&objectType=document>

All,

This meeting is to coordinate the message to our stakeholders about the forthcoming public release of the SECY paper on the cancelling of the cancer study. I'll send the communication plan soon for our discussion and sequencing of notifications. Bridge-line info below:

Passcodes/Pin codes:
Participant passcode (b)(5)

For security reasons, the passcode will be required to join the conference.

Dial in numbers:
Country

Toll Numbers
Freephone/
Toll Free Number

USA

888-989-7692

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop TWFN-10
phone: 301-415-1793

From: [Heck, Jared](#)
To: [Mitlyng, Viktoria](#); [Chandrathil, Prema](#)
Cc: [Barker, Allan](#)
Subject: FW: Joliet Herald News:
Date: Monday, April 12, 2010 8:53:00 AM

FYI, if you haven't seen already: an article about the upcoming NAS cancer-risk study

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: Barker, Allan
Sent: Monday, April 12, 2010 8:13 AM
To: Heck, Jared
Subject: Fw: Joliet Herald News:

Jared,
Can you please forward this to Vika and Prema for me - thanks!
(Sent from my Blackberry)

From: King, William <William.King@dhs.gov>
To: Simpson, John <john.simpson@dhs.gov>; Quinn, Vanessa <Vanessa.Quinn@dhs.gov>; Barker, Allan; Logaras, Harral
Cc: King, William <William.King@dhs.gov>; Tulley, Stephen <Stephen.Tulley@dhs.gov>; Warren, Dwaine <dwaine.warren@dhs.gov>; Naskrent, Gary <gary.naskrent@dhs.gov>
Sent: Mon Apr 12 08:55:14 2010
Subject: FW: Joliet Herald News:

John:

Please pass to Jean baker (FYI Only). Steve Coleman may also be interested. I will ask that Alan Barker or Harral (NRC III) also provide any additional details, if there are any.

Bill

From: Tulley, Stephen
Sent: Monday, April 12, 2010 7:35 AM
To: Bebrich, Carl; Bellone, Christopher; Kinsley, Delwyn; Lawson, Todd; Scott, Kara; Simpson, John
Cc: Langel, Cat; Warren, Dwaine; King, William
Subject: Joliet Herald News:

The Joliet Herald News serves most all of will county and parts of Kankakee and Grundy, which we know is the area for both Braidwood and Dresden. This is just FYI in the event we hear any buzz when we are out and about..

Source:

http://www.suburbanchicagonews.com/heraldnews/news/2152958,4_1_JO12_NUCLEAR_S1-100412.article

Nuclear power, cancer risk study OK'd

[Comments](#)

April 12, 2010

By [KIM SMITH](#) ksmith@stmedianetwork.com

Some people living around nuclear power plants have always said there is an alarmingly high rate of cancer.

Now, after years of trying to convince officials of the need, the Nuclear Regulatory Commission has asked the National Academy of Sciences to perform a state-of-the-art study on cancer risks for populations surrounding nuclear power plants.

The news came after many years of speeches by Cindy Sauer, a former Morris resident who moved to Indiana to get away from the nuclear power plants in the area after her daughter, Sarah, contracted a rare form of brain cancer.

"A lot of work by many, good and dedicated people went into bringing this health study to fruition," Sauer said. "People who, like me, truly want the study to be fair and balanced. On behalf of Sarah and all the Sarahs, I am most grateful for all they have done and continue to do. I am pleased with the selection of NAS and feel it was a wise choice."

The NAS is a non-government organization chartered by Congress to advise the country on issues of science, technology and medicine.

Kim Morey, a Braidwood resident and cancer survivor, is also overjoyed with the news. She helped perform a grassroots study in 2006 of the Reed Township area. She and a group of ladies went knocking on doors in the area and uncovered 111 cancer cases around the Braidwood plant on streets surrounding the area, with more than one case in several homes.

Morey and others point to the fact that there are numerous benefits raising funds to help cancer victims in the area. She was among a group of residents who tried to plead their case many times to different health groups only to be told there was no proof of their claims.

Tritium spills at both Braidwood and Dresden Nuclear facilities have been numerous through the years. The U.S. Environmental Protection Agency has established a safe drinking water limit of 20,000 picocuries of tritium per liter of water. Some of the spills were higher than that amount.

Tritium is a naturally occurring isotope of hydrogen that emits radiation and is found in more concentrated levels in water used in nuclear reactors. Exposure to high levels of tritium increases the risk of developing cancer.

"There are some states that allow no tritium at any levels in their drinking water and you have to wonder why," Morey said.

Yet the group said it was not pointing fingers at the power plant, noting that there were high levels of contamination in the former Joliet Arsenal bomb-making facility. They would just like someone to look at the problem closer and come up with ways to prevent the illnesses.

"We are pleased the Academy is interested in taking on this important study," said Brian Sheron, director of the NRC office of nuclear regulatory research. "Their broad range of medical and scientific experts can give us the best available analysis of the complex issues involved in discussing cancer risk and commercial nuclear power plants."

The NRC will use the information to update the 1990 U.S. National Institutes of Health National Cancer Institute report entitled "Cancer in Populations Living Near Nuclear Facilities" which can be found at <http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-facilities>.

The report is used as a primary resource when asked about cancer mortality risks in counties containing nuclear power plants.

The first report studied more than 900,000 cancer deaths from 1950 to 1984.

Stephen E. Tulley

Technological Hazards Supervisory Team Leader
U.S. Department of Homeland Security
FEMA - Region V
536 S. Clark Street, 6th Floor
Chicago, IL 60605
(Office) 312.408.4425
(Blackberry) (b)(6)
(Fax) 312.408.5222
Stephen.Tulley@DHS.gov

~~**WARNING:** This document is FOR OFFICIAL USE ONLY (FOUO). This information shall not be distributed beyond the original addressees without prior authorization of the originator. It is to be controlled, stored, handled, transmitted, distributed, and disposed of in accordance with DHS policy relating to FOUO information. This communication, along with any attachments, is covered by Federal and State law governing electronic communications and may contain restricted and legally privileged information. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, use or copying of this message is strictly prohibited. If you have received this in error, please reply immediately to the sender and delete this message.~~

From: [Logaras, Harral](#)
To: [Lopas, Sarah](#)
Subject: RE: Key points for Tuesday's cancer study announcement
Date: Thursday, September 03, 2015 1:06:00 PM

Sarah,

Now that is Nordstrom level service. Thank you! Enjoy your weekend!

Sincerely,

Harral

From: Lopas, Sarah
Sent: Thursday, September 03, 2015 1:03 PM
To: Barker, Allan <Allan.Barker@nrc.gov>; Lea, Edwin <Edwin.Lea@nrc.gov>; Logaras, Harral <Harral.Logaras@nrc.gov>; Maier, Bill <Bill.Maier@nrc.gov>; McNamara, Nancy <Nancy.McNamara@nrc.gov>; Pelchat, John <John.Pelchat@nrc.gov>; Tift, Doug <Doug.Tift@nrc.gov>
Cc: McGrady-Finneran, Patricia <Patricia.McGrady-Finneran@nrc.gov>
Subject: RE: Key points for Tuesday's cancer study announcement

Sorry – hit enter and send by accident - -

COMM PLAN → [View ADAMS P8 Properties ML15244A833](#)
[Open ADAMS P8 Document \(Communications Plan - Analysis of Cancer Risks in Populations Living Near Nuclear Facilities-Project Closeout\)](#)

From: Lopas, Sarah
Sent: Thursday, September 03, 2015 2:02 PM
To: Barker, Allan ([Allan.Barker@nrc.gov](#)) <[Allan.Barker@nrc.gov](#)>; Lea, Edwin ([Edwin.Lea@nrc.gov](#)) <[Edwin.Lea@nrc.gov](#)>; Logaras, Harral ([Harral.Logaras@nrc.gov](#)) <[Harral.Logaras@nrc.gov](#)>; Maier, Bill ([Bill.Maier@nrc.gov](#)) <[Bill.Maier@nrc.gov](#)>; McNamara, Nancy ([Nancy.McNamara@nrc.gov](#)) <[Nancy.McNamara@nrc.gov](#)>; Pelchat, John ([John.Pelchat@nrc.gov](#)) <[John.Pelchat@nrc.gov](#)>; Tift, Doug ([doug.tift@nrc.gov](#)) <[Doug.Tift@nrc.gov](#)>
Cc: McGrady-Finneran, Patricia <[Patricia.McGrady-Finneran@nrc.gov](#)>
Subject: Key points for Tuesday's cancer study announcement

From today's meeting on the comm plan – here's the timeline for the announcement which will happen on Tuesday, September 9th –

9:00am – RES is having their call with the National Academy of Sciences
9:30am – OPA will internally distribute the press release via e-mail
10am – OPA will send a courtesy e-mail to external stakeholders
10am – NMSS will issue a courtesy e-mail to all the SLOs and all agreement and non-agreement states
10:30am – The press release will be publicly released

In case you missed it in the scheduler – here is the link to the comm plan:

Sarah L. Lopas

Senior Liaison Program Manager
Federal, State, and Tribal Liaison Branch
U.S. Nuclear Regulatory Commission
Office (301) 415-6360
BlackBerry (b)(6)

From: [Heck, Jared](#)
To: [Pederson, Cynthia](#)
Subject: RE: REQUEST for forward - Training Class of interest for the Resident Inspectors
Date: Monday, June 06, 2011 9:47:00 AM

Thanks. I followed up: RES recommends this for RSLOs, however, the dates conflict with the national RSLO conference. RES is looking to possibly bring the course to the Regions in CY 2012.

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: Pederson, Cynthia
Sent: Thursday, June 02, 2011 7:19 PM
To: Heck, Jared
Subject: Fw: REQUEST for forward - Training Class of interest for the Resident Inspectors

I am sharing this training opportunity. It may be way too much for your guys but thought I would share anyway
(sent from Blackberry device)

From: West, Steven
To: Pederson, Cynthia
Sent: Thu Jun 02 07:54:55 2011
Subject: FW: REQUEST for forward - Training Class of interest for the Resident Inspectors

FYI

From: West, Steven
Sent: Thursday, June 02, 2011 6:55 AM
To: Lara, Julio; Cameron, Jamnes; Duncan, Eric; Giessner, John; Kunowski, Michael; Riemer, Kenneth; Ring, Mark
Cc: Shear, Gary
Subject: RE: REQUEST for forward - Training Class of interest for the Resident Inspectors

Thanks. Good approach.

From: Lara, Julio
Sent: Thursday, June 02, 2011 6:34 AM
To: Cameron, Jamnes; Duncan, Eric; Giessner, John; Kunowski, Michael; Riemer, Kenneth; Ring, Mark
Cc: West, Steven; Shear, Gary
Subject: FW: REQUEST for forward - Training Class of interest for the Resident Inspectors

Fyi.

Yesterday, I informed RES that we could **NOT** send all RIs to the HQ PDC for this course but offered to hold a spot for them during next seminar.

From: Shaffer, Vered
Sent: Thursday, June 02, 2011 6:32 AM
To: Lara, Julio; Hopper, George; Powers, Dale; Powell, Raymond
Cc: Bush-Goddard, Stephanie; Brock, Terry; Lewis, Doris
Subject: REQUEST for forward - Training Class of interest for the Resident Inspectors

Hello,

I was given your names as the contact personnel in our regional offices that coordinate the biannual counterpart meetings with our resident inspectors. I work in the Office of Nuclear Regulatory Research (RES) on the project: "Analysis of Cancer Risk in Populations near Nuclear Facilities."

As background, the NRC has asked the National Academy of Sciences (NAS) to perform a state-of-the-art study on cancer risk for populations surrounding NRC-licensed nuclear facilities. The NRC is seeking the expertise of the NAS to update the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "[*Cancer in Populations Living Near Nuclear Facilities*](#)". The NRC uses the 1990 NCI report as a primary resource when communicating with the public about cancer mortality risk in counties that contain or are adjacent to nuclear power facilities. The 1990 NCI report concluded that cancer mortality rates were not elevated in these populations.

In the new study, the NRC is asking the NAS to evaluate cancer diagnosis rates, in addition to mortality risk, for populations living near decommissioned, operating and proposed NRC-licensed nuclear facilities. The NAS will study nuclear power plants as well as the fuel cycle and uranium recovery facilities. Phase 1 of the NAS study will determine whether a technically defensible approach to meet the goals of the study request is feasible—and if so, the approach will be developed using scientifically sound processes for evaluating cancer risk that could be associated with nuclear facilities. The result of this Phase 1 study will be used to inform the design of the cancer risk assessment, which will be carried out in a future Phase 2 study.

The NAS feasibility report is tentatively due to be published in December 2011. In anticipation, RES developed a 1.5 day training class to give staff an opportunity to expand their knowledge base regarding health studies and how to communicate them. We have lined up well known and respected experts in the field of epidemiology and risk communication to teach the course at NRC's PDC in Bethesda, MD. (See additional information below and class registration is through iLearn).

We feel that our resident inspectors would benefit in attending this course since they often attend public meetings and there could be a chance that they might be asked about this study. I am writing to ask if you could please pass this course information along to our resident inspectors.

In addition, I would like to ask if it would be possible for us to get on the agendas for the next counterpart meetings to be held in the winter? We think it would be useful for the attendees to hear a short 1.5 hr presentation on the study during the counterpart meetings.

Thank your cooperation,
Vered

Class Title: Understanding Radiation Health Risk Studies and How to Communicate Them
(Course ID_1881)

Date and Location: November 1-2, 2011 at the PDC (Bethesda, MD)

Course Description: This course is designed in two parts. Day 1 will focus on an in-depth introduction of the different type of health studies used to evaluate the relationship between radiation exposure and disease outcomes. Topics to be covered on Day 1 include: different health study designs and their strengths and weaknesses—including how to address confounding factors and other bias, how to determine cause and effect relationships, and how health studies are used in risk assessment and the NRC's system of radiation protection. Day 2 will focus on communicating radiation health risks to our internal and external stakeholders through integrating what was learned on Day 1 with the latest risk communication practices.

Course Audience: NRC staff interested in understanding radiation health studies, how they fit into the NRC system of radiation protection, and how to communicate radiation health risks to internal and external stakeholders.

Vered Anzenberg Shaffer, Ph.D.
Nuclear Engineer
Health Effects Branch
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Office 301.251.7546

From: [Heck, Jared](#)
To: [Shaffer, Vered](#)
Cc: [Barker, Allan](#); [Logaras, Harral](#)
Subject: RE: RES Training in Risk Communication
Date: Friday, August 26, 2011 8:34:00 AM

I think we can plan for that. Thanks!

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: Shaffer, Vered
Sent: Friday, August 26, 2011 7:50 AM
To: Heck, Jared
Cc: Logaras, Harral; Barker, Allan; Tomon, John; Lewis, Doris
Subject: RE: RES Training in Risk Communication

Good morning Jared,

I wanted to follow up with you regarding this training class. We are in the final stages of approving funds to bring this class to your region. I also received a call from Pat Loudon a few weeks ago. He called to request that we schedule the R3 training course in January during the MLK week since the inspectors would not be away that week. Does this week work for you and the liaison team?

Also, I wanted to let you know that I am no longer working on this training class. I accepted a new position. Your point of contacts will be Doris Lewis and John Tomon.

Thanks!

Vered

From: Heck, Jared
Sent: Monday, June 06, 2011 9:14 AM
To: Shaffer, Vered
Cc: Logaras, Harral; Barker, Allan
Subject: RES Training in Risk Communication

Vered,

I recently saw the email you sent around describing a training course in risk communication that centers around the NAS cancer-risk study. Do you think it would be a course that our liaison officers would benefit from?

Based on your description, it seems like something that our liaison team could use. So, how would one go about registering? Does the course appear in iLearn?

Thanks, and I hope all is well with you.

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: [Heck, Jared](#)
To: [Barker, Allan](#)
Subject: FW: Understanding Radiation Health Risk Studies & How to Communicate Them Training Course in Region III
Date: Monday, November 21, 2011 4:01:00 PM
Attachments: Understanding Radiation Health Risk Studies Descr.docx
Importance: High

Allan,

Let's talk about this training course tomorrow. Consideration may be given to inviting State counterparts, and I'd like to hear your thoughts about how to gauge their interest. I'm also wondering how/whether to reach back to FSME to figure out whether this is the type of training NRC would consider paying travel costs for.

Thanks.

Jared K. Heck
Regional Counsel &
Government Liaison Team Leader
NRC Region III
Tel. 630-829-9653
Fax 630-515-1096

From: McCormick, Chad
Sent: Monday, November 21, 2011 3:49 PM
To: Heck, Jared
Cc: Loudon, Patrick; Rubic, Mark
Subject: Understanding Radiation Health Risk Studies & How to Communicate Them Training Course in Region III
Importance: High

Jared, please see the emails below.....Pat Loudon asked me to contact you regarding your, Allan's and Harral's interest in and availability to attend this 2-day course here in Region III during the week of 1/16/12. We're trying to gauge the number of people who would attend and whether we need to present 1 or 2 session (both would be the week of 1/16) in order to accommodate them.

Pat is thinking that we may want to invite State personnel to participate also....

Appreciate it if you could get back to me by next Tuesday 11/29 as we'll be discussing this with the RES folks on Wed. I've attached a copy of the description of this class from iLearn.

Thanks. --Chad

From: McCormick, Chad
Sent: Monday, November 21, 2011 12:31 PM
To: Lewis, Doris
Cc: Tomon, John; Loudon, Patrick; Rubic, Mark
Subject: RE: UPDATE: Follow-up on Risk communications Training Course in Region III
Importance: High

Doris, good talking to you earlier today. Thank you for the additional information about the class. As we discussed, this confirms the week of **1/16/12** for the class to be presented here in Region III and we'll plan on 2-days per session (rather than 1½ days per session).

For the conference call you suggested (to help tailor the class to our needs).....Pat Loudon is available next Wed, **11/30 at 1:00 or 2:00 CST** (our time, so would be an hour later there at HQ) or on **Friday afternoon, 12/2**. Please let me know which would work for you and the phone number we should call.

We'll try to have a better estimate of the number of attendees so we can further discuss, during next week's conference call, whether we need 1 or 2 sessions to be presented during the week of 1/16.

Again, thank you. -Chad

Chad McCormick

Region III Training Coordinator
630/829-9552

From: Lewis, Doris
Sent: Thursday, November 17, 2011 12:31 PM
To: McCormick, Chad
Cc: Tomon, John
Subject: RE: UPDATE: Follow-up on Risk communications Training Course in Region III

Hi Chad,

The only requirements for the course is that we need a room that has a projector and computer with PowerPoint. The instructors will walk through slide presentations.

John and I will have the course manuals shipped to you in Region III. The class size we had for the course at HQ was 29, however, if Region III would like more to attend, that is fine. Do you know about how many Region III staff are interested in attending this course?

Please let us know a good time to call you on 11/21. John and I can give your office a call.

Thanks,
Doris

From: McCormick, Chad
Sent: Thursday, November 17, 2011 12:53 PM
To: Lewis, Doris
Cc: Tomon, John
Subject: UPDATE: Follow-up on Risk communications Training Course in Region III

Resending with corrections to dates (in red, below).

From: McCormick, Chad
Sent: Thursday, November 17, 2011 11:47 AM
To: Lewis, Doris

Cc: Tomon, John
Subject: RE: UPDATE: Follow-up on Risk communications Training Course in Region III
Importance: High

Doris, I left a voice mail for you yesterday about this....Region III would definitely like to bring this course out on the week of 1/16/12. Please call so we can discuss the requirements (do the students need PCs, class size, etc.).

I'll be out of the office until Monday, 11/21 but would like to get the arrangements made next week, if possible. Thanks. -Chad

Chad McCormick

Region III Training Coordinator
630/829-9552

From: Lipa, Christine
Sent: Tuesday, November 15, 2011 10:32 AM
To: McCormick, Chad
Subject: FW: UPDATE: Follow-up on Risk communications Training Course in Region III

Chad - this is the other course we discussed.

From: Lipa, Christine
Sent: Wednesday, November 09, 2011 3:26 PM
To: McCormick, Chad
Cc: Logaras, Herral; Barker, Allan; Heck, Jared
Subject: FW: UPDATE: Follow-up on Training Course in Region III

Hi Chad. Pat and Anne informed me that you are the lead for arrangements for this course. Looks like they had Jeremy's name for some reason and there was some idea about checking Allan and Harrals' interest and availability in scheduling. This course. I'll let you take it from here, but I believe the course is either scheduled or at least tentatively scheduled for the week of Jan 16, 2012.

Thanks, Christine

From: Lewis, Doris
Sent: Thursday, November 03, 2011 8:27 AM
To: Tapp, Jeremy
Cc: Tomon, John
Subject: UPDATE: Follow-up on Training Course in Region III

Hi Jeremy,

I am following-up with you regarding the course "Understanding Radiation Health Risk Studies and How to Communicate Them." If you recall, Vered was in contact with you this summer about bringing this course to Region III. John Tomon and I are the project managers for this course.

The training course is 1.5 days and will give staff an opportunity to expand their knowledge regarding radiation health studies and how to communicate them. This course was developed by the Office of Nuclear Regulatory Research (RES) as part of communicating with the staff regarding The National Academy of Sciences (NAS) "Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 1" study. The Phase 1 report is scheduled to be finalized in February 2012.

Vered had a discussion with Patrick Loudon and he suggested that the training course be provided to Region III during the week of Jan. 16, 2012. Vered was also in contact with Jared Heck regarding participation of the RSLOs in this course.

Please follow-up with Patrick and Jared and let us know if there is still interest in bringing this course to RIII and if so, what days work best.

Thank you for your assistance,
Doris Lewis, 301-251-7559
John Tomon, 301-251-7904

This is a description of the course, "Understanding Radiation Health Risk Studies & How to Communicate Them":

Course ID_1881

Revision: 1 - 4/25/2011 02:13 PM CST

Description: This course is designed in two parts, Day 1 provides you an in-depth introduction to the different types of health studies used to evaluate the relationship between radiation exposure and disease outcomes. Day 1 topics include the following: different health study designs and their strengths and weaknesses—including how to address confounding factors and other bias, how to determine cause and affect relationships, and how health studies are used in risk assessment and the NRC's system of radiation protection.

Day 2 you will learn how to communicate radiation health risks to our internal and external stakeholders by integrating what you learned on Day 1 about health studies with the latest risk communication practices.

Who Should Attend:

- NRC staff interested in understanding radiation health studies
- How they fit into the NRC system of radiation protection
- How to communicate radiation health risks to internal and external stakeholders.

Exam: None

Related curriculum: None

Mandatory course: None

Mandatory pre-requisites: None

Recommended pre-requisites: None

Goals: Upon completion of this course, you will be able to discuss and analyze radiation human health studies and explain how they relate to NRC's system of radiation protection.

Delivery Method: Lecture (ILT)

Audience:

Needs Approval

From: [Logaras, Harral](#)
To: [Roberts, Darrell](#); [Giessner, John](#); [Louden, Patrick](#); [OBrien, Kenneth](#); [Shuaibi, Mohammed](#); [Mitlyng, Viktoria](#); [Chandrathil, Prema](#); [Pederson, Cynthia](#); [Barker, Allan](#)
Cc: [Lara, Julio](#); [Heck, Jared](#)
Subject: Re: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities
Date: Friday, September 04, 2015 10:21:19 AM

Darrell, Thank you for your message. I participated in a conference call yesterday to plan implementing the communication plan. The news will be released Tuesday morning and I will be implementing the RSLO actions for Region-III States in accordance with the plan.

Harral

From: Roberts, Darrell
Sent: Thursday, September 03, 2015 02:19 PM
To: Giessner, John; Louden, Patrick; OBrien, Kenneth; Shuaibi, Mohammed; Mitlyng, Viktoria; Chandrathil, Prema; Pederson, Cynthia; Logaras, Harral; Barker, Allan
Cc: Lara, Julio
Subject: RE: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities

I saw the SECY paper on this last week. The paper provided the consideration of an alternative approach and the basis for cancellation (may be in your RIDS boxes).

DJR

From: Giessner, John
Sent: Thursday, September 03, 2015 1:46 PM
To: Louden, Patrick; OBrien, Kenneth; Shuaibi, Mohammed; Mitlyng, Viktoria; Chandrathil, Prema; Roberts, Darrell; Pederson, Cynthia; Logaras, Harral; Barker, Allan
Cc: Lara, Julio
Subject: FW: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities

Not sure folks had heard – I had not.

Jack

From: Collins, Daniel
Sent: Thursday, September 03, 2015 1:43 PM
To: Giessner, John; Lara, Julio; Shaffer, Mark; Howell, Linda
Subject: FW: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities

FYI

From: Nimitz, Ronald
Sent: Thursday, September 03, 2015 2:31 PM
To: Lorson, Raymond <Raymond.Lorson@nrc.gov>; Scott, Michael <Michael.Scott@nrc.gov>
Cc: Screnci, Diane <Diane.Screnci@nrc.gov>; Sheehan, Neil <Neil.Sheehan@nrc.gov>; McNamara,

Nancy <Nancy.McNamara@nrc.gov>; Tift, Doug <Doug.Tift@nrc.gov>; Lew, David <David.Lew@nrc.gov>; Noggle, James <James.Noggle@nrc.gov>; Suber, Gregory <Gregory.Suber@nrc.gov>; Nick, Joseph <Joseph.Nick@nrc.gov>; Collins, Daniel <Daniel.Collins@nrc.gov>

Subject: ~~NOT FOR PUBLIC RELEASE~~ -- Cancellation/abandonment of cancer Study Around Nuclear facilities

~~NOT FOR PUBLIC RELEASE~~

The below link provides the communication plan for NRC cancellation of the cancer study. (Note that this plan is not yet fully approved but it is believed that no significant changes will occur.)

The study was to focus on the following sites: Dresden Nuclear Power Station, Illinois; Millstone Power Station, Connecticut; Oyster Creek Nuclear Generating Station, New Jersey, Haddam Neck, Connecticut (decommissioned); Big Rock Point Nuclear Power Plant, Michigan (decommissioned); San Onofre Nuclear Generating Station, California (permanently shut down); and Nuclear Fuel Services, Tennessee.

Basically, the Phase 2 Pilot planning identified a number of challenges to the study including the belief that the work "may not have adequate statistical power to detect the presumed small increases in cancer risks arising from... monitored and reported releases." Given the uncertainty in the usability of the pilot results and the high cost and duration of the pilot (39 months and \$8 million), the staff found that the NAS proposal would take too long and cost too much.

The cancellation is to be made public on September 8 (day after Labor Day) with the following time line (see also plan time line):

September 8, 2015:

9:00 AM – NRC to inform NAS of study cancellation

9:30 AM – Press release to be sent to internal stake holders (SLOs, PAOs, etc.) to allow them to inform states with facilities considered for study

10:00 AM - HQ PAO to send E-mail to external stakeholders (Grammies etc.) to inform them. (Scott Burnell, HQ, PAO, needs their E-mail addresses)

10:30 AM - Press Release and associated SECY paper to be publicly released

~~NOT FOR PUBLIC RELEASE~~

Below is the link to the cancer study comm plan with Q&As. It is not expected that there will be any changes.

[View ADAMS P8 Properties ML15244A833](#)
[Open ADAMS P8 Document \(Communications Plan - Analysis of Cancer Risks in Populations Living Near Nuclear Facilities-Project Closeout\)](#)

NOT FOR PUBLIC RELEASE: The SECY paper is here: [ML15141A404](#)

AN ANALYSIS OF CANCER RISK IN POPULATIONS LIVING NEAR NUCLEAR-POWER FACILITIES

Introduction

The objective of this communication plan is to outline the strategy and organization for integrating U.S. Nuclear Regulatory Commission (NRC) communications with external and internal stakeholders regarding an update to the 1990 U.S. National Institutes of Health - National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities."

Goals

This plan will help the NRC accomplish effective communications regarding the update to the NCI report by undertaking the following tasks:

- **Promote** effective communications with internal and external stakeholders in a timely, consistent, and understandable manner.
- **Inform** all stakeholders that an external peer review committee comprised of domestic and international experts will review study products to ensure a high-quality, transparent, and technically robust study.
- **Obtain** stakeholder perspectives on the update to the NCI report to inform NRC decision-making on paths forward.
- **Identify** opportunities for educating the public regarding the impact of nuclear power facilities on cancer mortality risk for populations surrounding those facilities.

Background

The NRC staff used the NCI report as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. Stakeholders often ask the staff about perceived elevated cancer rates in populations working or residing near reactors. The staff uses this report as a scientifically defensible resource to aid in assuring stakeholders that cancer mortality rates are consistently not elevated in counties that contain or are adjacent to nuclear power facilities. However, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in a perceived elevation in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Additionally, the report is almost 20 years old and needs updating to reflect the risk to current populations living near past and present licensed nuclear power facilities. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site. As a result, the NRC staff is developing an up-to-date report that complements the

NCI report on cancer mortality and also is assessing the feasibility of performing a cancer incidence study in the future.

In the original report, NCI scientists studied more than 900,000 cancer deaths from 1950–1984, using mortality records collected from counties that contain nuclear facilities. The researchers evaluated changes in mortality rates for 16 types of cancer in these counties from 1950 until each facility began operation, up until 1982. Cancer incidence information was only available for four facilities located in Iowa and Connecticut, due to the lack of this type of data being collected.

The NCI report showed no increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities, including all of the nuclear power reactors operational before 1982. The report showed that, in comparison with the control counties, some of the study counties had higher rates of certain cancers and some had lower rates, either before or after the facilities came into service. None of the observed differences were linked to the presence of nuclear facilities.

The objective of the new study is to provide the NRC with an analysis of the latest cancer mortality data for populations living near NRC-licensed nuclear power facilities and to evaluate the feasibility of studying cancer incidence among populations of concern. This study will provide the staff with an analysis of the most current scientific information for responding to stakeholder concerns related to cancer mortality rates for populations that live near past, present, and proposed nuclear power facilities. To ensure the development of the highest quality report within the study scope, the agency is creating an independent external peer review committee to advise the NRC staff on study methods and the study report.

To address the desire of stakeholders for information on cancer incidence rates for populations living near nuclear power facilities, the NRC staff is assessing the feasibility of conducting a cancer incidence study at the conclusion of the cancer mortality study. Cancer incidence data collected by the NCI's Surveillance, Epidemiology, and End Results (SEER) program are limited to specific geographic regions within the United States. Other national, State, and county cancer surveillance programs collect cancer incidence data, and the NRC is also assessing these for inclusion in a possible cancer incidence study.

Key Messages

The NRC will communicate the following four key messages to all stakeholders:

- (1) **The NRC is producing an up-to-date report that complements the 1990 NCI study by using the latest scientific methods and including reactors that became operational after the original NCI study period. The 1990 NCI report concluded that cancer mortality rates are not elevated in these populations.**

- (2) The NRC study includes populations that live in the vicinity of past, present, and proposed nuclear power facilities. This information is useful to the NRC in understanding the cancer mortality risk for populations living near those facilities.
- (3) The NRC is working with a team of epidemiologists and an independent external peer review committee to ensure that the new study is comprehensive and accurate. This independent peer review committee includes domestic and international experts in the field of epidemiology.
- (4) While conducting the study of cancer mortality rates, the NRC is investigating whether it is feasible to study cancer incidence in populations surrounding nuclear power facilities with currently available information.

Appendix A to this document includes language that elaborates on each of these key messages, and Appendix B provides responses to inquiries expected from the general public, congressional staff, the media, and other stakeholders. The appendices also include additional information for stakeholders who may be more familiar with these topics, such as elected officials, Federal and State Government officials, public interest groups, and certain members of the media.

Audience/Stakeholders

Internal

- Commission
- Office of the Executive Director for Operations (OEDO)
- Advisory Committee on Reactor Safety (ACRS)
- Office of the General Counsel (OGC)
- Office of Congressional Affairs (OCA)
- Office of International Programs (OIP)
- Office of Public Affairs (OPA)

External

- Congress
- Federal agencies¹
- Institute for Nuclear Power Operations
- Electric Power Research Institute
- Nuclear Energy Institute
- Conference of Radiation Control Program Directors
- Organization of Agreement States

- Office of Nuclear Regulatory Research (RES)
- Office of New Reactors (NRO)
- Office of Nuclear Reactor Regulation (NRR)
- Office of Nuclear Security and Incident Response (NSIR)
- Office of Federal State Materials and Environmental Management Programs (FSME)
-
- Office of Nuclear Material Safety and Safeguards (NMSS)
- Regions I-IV
- Agreement States
- news media (e.g., *Inside NRC*)
- international Atomic Energy Agency
- nuclear regulators of other countries
- residents living near nuclear power plants
- State and local governments
- public interest groups (e.g., Union of Concerned Scientists)
- academic and professional organizations (e.g., Health Physics Society, American Nuclear Society)
- NRC licensees

¹ U.S. Department of Homeland Security/Domestic Nuclear Detection Office, U.S. Department of Defense, U.S. Department of Energy/National Nuclear Security Administration, U.S. Department of

Transportation, U.S. Environmental Protection Agency, Food and Drug Administration, U.S. Department of Health and Human Services, U.S. Department of State

Communication Team

The Communication Team will assist the project manager as needed in developing uniform and accurate messages, initiating communication vehicles, and coordinating implementation plans for this project.

Position	Name	Organization	Telephone Number
<i>Team Leader</i>	Terry Brock	RES	(301) 251-7458
<i>Technical Advisor</i>	Vince Holahan	RES	(301) 251-7563
<i>NRR Lead</i>	Steven Garry	NRR	(301) 415-2766
<i>NRO Lead</i>	Rich Clement	NRO	(301) 415-8524
<i>NSIR Lead</i>	Trish Milligan	NSIR	(301) 415-2223
<i>Region I Lead</i>	Ron Nimitz	RI	(610) 337-5267
<i>Region III Lead</i>	Steven Orth	RIII	(630) 829-9827
<i>Legal Lead</i>	Beth Mizuno	OGC	(301) 415-3122
<i>Public Affairs Lead</i>	Scott Burnell	OPA	(301) 415-8204
<i>International Programs Lead</i>	Andrea Jones	OIP	(301) 415-2309
<i>Congressional Affairs Lead</i>	Gene Dacus	OCA	(301) 415-1697
<i>Congressional Affairs Backup</i>	Jenny Weil	OCA	(301) 415-1691
<i>EDO Lead</i>	Susan Bagley	OEDO	(301) 415-2240
<i>Communication Specialist</i>	Wendy West	ORAU	(865) 576-0028

Communication Tools

<u>Tool</u>	<u>Description/Purpose</u>
External Web Site	The NRC's external Web page will note the issuance of the study. It will also contain a link to the NCI Web page for the original NCI study along with other related publicly available documents.
Internal Briefings	The Communication Team will conduct internal briefings at various points in the process to keep internal stakeholders informed of its activities and messages.
Weekly Highlights and EDO Daily Notes	The weekly highlights and/or EDO Daily Notes will report on significant milestones.
Internet E-Mail	The Communication Team will e-mail significant information on the status of the

<u>Tool</u>	<u>Description/Purpose</u>
Commissioners' Assistants Notes	study and deliverables to internal stakeholders. Commissioners' Assistants Notes will be used to communicate to the Commission information about public meetings, study status, and other items of significant interest.
Commissioner Interactions	The Communication Team will coordinate and assist in preparing briefing materials for the interactions of Commissioners with various stakeholders.
Public Meetings	If necessary, the staff will conduct public meetings to discuss the final study report.
Issuance of Significant Correspondence	The project manager will coordinate the issuance of correspondence with key internal and external stakeholders. Before the agency sends any significant external correspondence related to the study, the Communication Team will receive notification. The Communication Team will coordinate with OPA when preparing press releases and interacting with the media.
Congressional Communications	OCA will coordinate all communication with Congress.
Media Communications	OPA will coordinate all communication with the media.

Planned Communications Activities

The dates for the planned communications activities given in the table below are based on finalizing the composition of the external peer review committee.

Activity	Responsibility	Date Planned	Date Completed
Hold kickoff meeting with NRC and contractor staff and provide	RES, NSIR, NRO, NRR, RI,	10/2008	10/14/2008

technical information for study	RIII, OPA		
Develop draft information sheet	RES	10/2008	10/30/2008
Submit first draft of the Communication plan to Communication Team for review; meet with Communication Team	RES	1/2009	1/15/2009
Meet with contractor regarding communications needs at end of study, including plain language fact sheet	RES	2/2009	2/10/2009
Meet with Communication Team on revised draft Communication plan, Regulatory Information Conference (2009), and other studies	RES	3/2009	3/05/2009
Meet with Communication Team on revised draft Communication plan; share draft protocol	RES	6/2009	6/09/2009
Complete draft communication plan	RES, NRO, NRR, NSIR, OPA, OCA, OEDO	7/2009	06/30/09
Submit communication plan to OEDO for posting on internal NRC Web site	RES	01/2010	
Inform NRC internal and external stakeholders of peer review committee selections	OPA, RES, OCA	01/2010	
Issue press release and post public meeting notice on NRC external web	RES, OPA	TBD	
Hold public meeting with peer review committee to gather technical comments on the draft study protocol	OPA, RES	TBD	

Contractor submits cancer incidence feasibility study for NRC review	RES	TBD
ORAU submits draft report on cancer mortality to the NRC	RES	TBD
ORAU submits plain language fact sheet	RES	TBD
Receive peer review comments on draft cancer mortality study report; respond to congressional and media inquiries	OPA, RES, OCA	TBD
Communication Team completes review of plain language fact sheet	RES, NRO, NRR, NSIR, OPA, OCA, OEDO	TBD
Complete final report with the comment reconciliation addendum	RES	TBD
Brief ACRS	RES, ORAU	TBD
Prepare draft press release	OPA	TBD
Inform stakeholders of report publication	NRR, NRO, NSIR, OCA, Regions	TBD

Communication Challenges

The Communication Team is likely to encounter challenges in the following two areas while implementing this plan:

(1) **Effective Communication with the General Public**

The results of this study will be of significant interest to the general public, particularly those members of the general public who live within the counties analyzed in the study. All NRC-produced materials must take into account the limited technical background of some stakeholders and the sensitivity of issues relating to cancer. The Communication

Team will take appropriate steps to address this challenge using risk communication techniques.

(2) Public Perceptions of the NRC and the Study Contractor

Communications regarding this study should address the frequent misconception among some stakeholders that the NRC promotes the use of nuclear power (i.e., to generate electricity). In addition, the Oak Ridge Associated Universities' Center for Epidemiologic Research at the Oak Ridge Institute for Science and Education (ORISE) and its subcontractor, Oak Ridge National Laboratory (ORNL), are conducting this study. The public may view CER and ORNL as less neutral entities than the organization that produced the previous study (NCI). To address this concern, communications should note the expertise of CER and the independence of the diverse external peer review panel.

Evaluation and Monitoring

The Communication Team will monitor correspondence regarding this study to ensure consistency with the key messages and to determine if further key messages are needed. The Communication Team will assess the degree of success that key messages and talking points have with the target stakeholder audience.

The Team Leader will brief key staff as needed regarding revisions to the messages, talking points, or guidance based on immediate concerns or questions asked by the stakeholder audience.

Updates and Revisions

If major revisions to this plan or its key messages are necessary, the Team Leader will ensure that a formal revision is made and placed in the Agencywide Documents Access and Management System (ADAMS) and on the internal communications Web page. The Team Leader will determine also the need for updates to the questions and answers in Appendix B to this plan. These updates will not constitute a revision to this plan.

Final Closeout

At the conclusion of the study, the Team Leader will prepare a brief closeout statement about the challenges and successes related to the communication plan and attach it to the end of the last draft.

Appendix A
Expanded Key Messages

- (1) **The NRC study is developing an up-to-date report that complements the 1990 NCI study by using the latest scientific methods and including reactors that became operational after the original NCI study period. The 1990 NCI report concluded that cancer mortality rates are not elevated in these populations.**
- The 1990 National Cancer Institute (NCI) report showed no general increased risk of death from cancer for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities operational before 1982.
 - The report showed that, in comparison with the control counties, some of the study counties had higher rates of certain cancers and some had lower rates, either before or after the facilities came into service. None of the observed differences could be linked to the presence of nuclear facilities.
 - The scope of the new study covers the past and present nuclear power facilities regulated by the NRC. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site. The new study excludes all of the U.S. Department of Energy facilities in the original study because they are not licensed by the NRC.
- (2) **The NRC study includes populations that live in the vicinity of past, present, and proposed nuclear power facilities. This information is useful to the NRC in understanding the cancer mortality risk for populations living near those facilities.**
- The new study includes reactors in the following life-cycle phases: reactors in the process of being decommissioned or that have been decommissioned, reactors that are currently in operation. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site.
 - The 1990 NCI report has provided valuable information to stakeholders. The new NRC study will provide updated scientific information on cancer mortality in a transparent manner to keep the public informed and to earn and maintain public trust.
- (3) **The NRC is working with a team of epidemiologists and an independent external peer review committee to ensure that the new study is comprehensive and accurate. This independent peer review committee will include domestic and international experts in the field of epidemiology.**
- The NRC is conducting a new study with epidemiologists from the Oak Ridge Associated Universities —Center for Epidemiologic Research (CER) at the Oak

Ridge Institute for Science and Education (ORISE). Additionally, an independent external peer review committee is being assembled to review project deliverables. ORISE researchers have extensive experience conducting epidemiological studies on a wide range of topics, including occupational exposure to ionizing radiation.

- The external peer review committee is an independent, diverse group of subject matter experts in the field of epidemiology. The NRC convened this committee to independently review the study protocols and report to ensure that the study is of the highest technical quality. This approach will ensure the development of a high-quality and technically defensible study report.

(4) While conducting the study of cancer mortality rates, the NRC is investigating whether it is feasible to study cancer incidence in populations surrounding nuclear power facilities with currently available information.

- The NRC is investigating whether a cancer incidence study of populations surrounding nuclear power facilities would be feasible, given that States maintain separate cancer incidence databases and therefore the quality of data and the database formats are likely to vary.
 - When NCI conducted its 1990 study, cancer incidence information was only available for counties adjacent to four facilities located in Iowa and Connecticut. The limited cancer incidence data for these counties resembled the counties' mortality data patterns.
- If there is enough cancer incidence information, the NRC is considering performing an appropriate follow-on study of cancer incidence rates near nuclear power facilities.

**Appendix B
Questions and Answers**

Q1. Why is the U.S. Nuclear Regulatory Commission (NRC) conducting this epidemiology study now?

A1. This study will provide the NRC staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality rates for populations that live near past, present, and proposed nuclear power facilities. The NRC staff has used a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. However, the NCI report is almost 20 years old and needs updating to reflect the current populations living near nuclear power facilities. In addition, the analyses in the NCI report focus on cancer deaths, and the general public is often also interested in a perceived elevation in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Therefore, the NRC update of the NCI report will also assess the feasibility of performing a cancer incidence study in the future.

Q2. Why is the NRC, rather than NCI, conducting this follow-up study to NCI's 1990 work?

A2. The NRC staff approached NCI management about updating the 1990 study under contract to the NRC, but because of staffing limitations, NCI was unable to commit staff resources for this activity for the foreseeable future. An NCI scientist is serving on the external peer review committee for this study, along with other domestic and international experts from the field of epidemiology in order to ensure a high-quality, transparent, and technically robust study. The NRC contractor for this study at the Oak Ridge Institute for Science and Education (operated by Oak Ridge Associated Universities) has extensive experience in conducting epidemiology studies.

Q3. Which nuclear facilities are included in the study?

A3. The NRC intends the study to include all nuclear power reactor facilities that are or were in operation in the United States.

The 1990 NCI report included all 52 commercial nuclear power facilities in the United States that that started operation before 1982. Preliminary information indicates that 25 new reactor sites have begun operation since 1982. The 25 new reactor sites will be included in the study. Researchers are identifying the study and control populations for these sites for inclusion in the cancer mortality study.

Q4. Which counties will be included in the study?

A4. The study will cover those counties that contain a nuclear power facility and those adjacent counties (an adjacent county is included if it comprises at least 20 percent of the area within a 10-mile radius of the site). Researchers will select three comparison counties—termed control

counties—and compare cancer mortality rates in those counties with the rates in the study county. Study counties will be matched with control counties having similar demographic characteristics.

Q5. Why does the initial NRC study not include cancer occurrence (incidence)?

A5. The first step in this study is to obtain updated information on cancer mortality rates in the vicinity of nuclear power plants. The NRC will assess the feasibility of examining cancer occurrence rates concurrently with the mortality study. The U.S. does not have a national tumor registry that includes every state. Therefore, the researchers have to evaluate each individual state tumor registry on the availability and quality of data to perform the study.

Q6. Does the NRC suspect that cancer mortality rates are elevated around nuclear power plants?

A6. The NCI study found no general increased risk of death from cancer for people living near nuclear facilities. The NRC is testing the hypothesis that there is no difference in cancer death rates between those populations that live near nuclear power facilities and those that do not. The agency considers this research to be important in light of ongoing public interest in the topic and increased licensing activity in the nuclear industry. The NRC is committed to the regulation of the safe operation of nuclear power plants to protect public health and the environment.

Q7. How can I be sure that the nuclear power plant is not causing cancer? If I lived near a power plant, how might I be exposed to radiation? For example, if my house is 2 miles away from a reactor, am I being exposed whenever I am at my house?

A7. Nuclear power plants release very small regulated amounts of radioactivity in liquid and gaseous effluents (emissions). The amounts released are strictly controlled within limits set by the NRC and the U.S. Environmental Protection Agency. The radioactive emissions from nuclear power plants only contribute a very small fraction of our yearly total radiation exposure (~ 0.1%). For comparison, your radiation exposure from natural radiation sources in soil and rocks, radon gas in homes, radiation from space, and other sources that are naturally found within the human body contributes to ~ 50 % of your yearly exposure. The other half of our yearly exposure is from man-made sources, such as consumer products, medical procedures, and to a much lesser extent, industrial sources.

Q8. Which age groups are included in the study?

A8. Like the 1990 NCI report, the NRC study will analyze cancer death rate data for the following age groups: 0–10 years, 10–19 years, 20–39 years, 40–59 years, and 60 years and older. The NRC study will also analyze data for the 0–5 age group.

Q9. Will the study address cancer death rates from leukemia in children near nuclear facilities?

A9. Yes. The study will address cancer death rates from leukemia in children since it will analyze leukemia death rates in all age groups, including 0–5 years.

Q10. I live near a nuclear power plant and my husband died of cancer. Will this study prove that living near the plant caused the cancer?

A10. No. Unfortunately, cancer is a very common disease and is not easily traceable to a single cause. This study assesses trends in populations and does not evaluate the cause of individual cases.

Q11. Why is the study based on counties?

A11. The county is the smallest geographic unit for which cancer mortality data for all 50 States has been collected for many years (since 1950). Also, other data needed to properly analyze and compare the study and control counties, such as population data, are available for each county.

Q12. Are such county-based studies able to detect population health effects from industrial sources?

A12. Yes. NCI has effectively used county-based studies in the past to study cancer mortality rates. For example, NCI has used county-based studies to show elevated rates of lung cancer deaths in counties with shipyard industries and in counties with arsenic-emitting smelters and refineries.

Q13. Will the study design be reviewed?

A13. Once the study and control counties and other geographical areas of interest are identified and the study design are established, the NRC project manager will receive a letter report for review and comment by the staff and external peer review committee. The external peer review committee will include experts from the field of epidemiology.

Q14. How will the NRC be certain that this study includes all proposed sites for nuclear power facilities?

A14. Representatives from several NRC program offices reviewed the list of decommissioned, operating, and proposed sites and found it to be accurate at the time the information was submitted to the study contractor for analysis. The staff plans to perform additional checks of the proposed site list during the conduct of this study.

Q15. What types of cancer are evaluated in this study?

A15. This study will evaluate mortality rates from the following types of cancer:

- leukemia and aleukemia
- all cancers excluding leukemia
- Hodgkin's disease
- other lymphoma (including non-Hodgkin's lymphoma)

- multiple myeloma
- digestive organ
 - stomach
 - colon
 - rectum
 - liver (primary)
- trachea, bronchus, and lung
- prostate, uterine, and ovarian
- breast (female)
- thyroid
- bone and joint
- bladder
- brain and other central nervous system
- benign, in situ, and unspecified neoplasms

Q16. How will the NRC consider this resulting data in new reactor reviews and relicensing decisions?

A16. The NRC will use the results of the study to answer recurring questions from our stakeholders during the public comment period for regulatory actions.

Q17. I live near a nuclear power plant or in one of the studied counties. Will I be contacted during this study for information? Will my family or personal medical information be protected during this study or during a cancer incidence study?

A17. The NRC does not plan to contact any residents near the study facilities. The data used in this study will be obtained from state and national sources. These data do not contain personal identifying information making it impossible to determine to whom the medical information belongs.

From: [Werner, Greg](#)
To: [Stearns, Don](#); [Greene, Natasha](#)
Cc: [Werner, Greg](#)
Subject: RE: cancer study comm plan - Appraisal Input for Don and Natasha
Date: Friday, April 30, 2010 11:16:45 AM

Be sure and add to your appraisal list for inclusion in your appraisal for this, with what you did for the communication team.

Thanks,
Greg

From: Brock, Terry
Sent: Friday, April 30, 2010 11:05 AM
To: Werner, Greg
Cc: Stearns, Don; Greene, Natasha
Subject: RE: cancer study comm plan

Thanks Greg.

I'll add them to the list.

Terry

From: Werner, Greg
Sent: Friday, April 30, 2010 12:02 PM
To: Brock, Terry
Cc: Stearns, Don; Greene, Natasha
Subject: FW: cancer study comm plan

Good Morning Terry.

I'm forgot to get back to you sooner about a RIV participant on the cancer study. I have two individuals that have expressed interest. I would like Don Stearns to be the primary rep with Dr. Natasha Greene being his backup. Don has many years of HP experience, both with the NRC and with a utility. Natasha just completed her HP quals, but did her doctoral work on atmospheric dispersion, so she may be a good contact if any information or help is needed in that area. Don has the regulatory background and radiation health effect knowledge that you indicated you were looking for.

Greg Werner
RIV/DRS/PSB2 Branch Chief
817-860-8156

From: Werner, Greg
Sent: Thursday, April 08, 2010 4:55 PM
To: Ricketson, Larry; Carson, Louis; Stearns, Don; Graves, Chris; Greene, Natasha; Baca, Bernadette
Subject: FW: cancer study comm plan

Research is doing a cancer study for near nuclear sites - probably a 2 or 3 yr project. The communication team has technical representatives from RI and RIII and they are looking for someone from RIV to participate. Terry Brock in Research indicated that they are looking

for somebody with a effluents background that understands the regulatory requirements and radiation health effects. Terry indicated that the team is having quarterly meetings. You would be responsible for interacting with the public and press (along with OPA) to discuss the details and results of the study.

If you are interested, please let me know. If you need additional details, give Terry Brock a call.

Greg

From: Brock, Terry
Sent: Thursday, April 08, 2010 4:05 PM
To: Werner, Greg
Subject: FW: cancer study comm plan

Hi Greg,

Thanks for supporting the cancer risk study. I look forward to having a RIV rep on the communication team. Attached is the cancer study communication plan with references to the old contractor Oak Ridge Associated Universities. As you know, we've changed investigators to the National Academy of Sciences. As a result, I'm updating the communication plan as we speak and will try to distribute the new rev after management approval.

Thanks,
Terry Brock
RES
301-215-7487

From: [Gepford, Heather](#)
To: [Ricketson, Larry](#); [Carson, Louis](#); [Greene, Natasha](#); [O'Donnell, John](#); [Hernandez, Pete](#)
Subject: FW: UPDATE-HEADS-UP: Cancer Risk Study - Pilot Planning Project Coming to an End
Date: Thursday, December 04, 2014 6:42:31 AM
Attachments: [2012-0136scy.pdf](#)

From: Shoop, Undine
Sent: Wednesday, December 03, 2014 4:55 PM
To: Bonser, Brian; Dickson, Billy; Gepford, Heather; Noggle, James
Subject: FW: UPDATE-HEADS-UP: Cancer Risk Study - Pilot Planning Project Coming to an End

FYI – We are close to another milestone in the cancer study.

Undine

From: Garry, Steven
Sent: Wednesday, December 03, 2014 2:54 PM
To: Shoop, Undine
Cc: Smith, Micheal; Clement, Richard; Jimenez, Manuel; Pedersen, Roger
Subject: FW: UPDATE-HEADS-UP: Cancer Risk Study - Pilot Planning Project Coming to an End

Undine,

Here's the update on the cancer study for the public. There is a briefing from NAS a week from Friday at 1 pm.

Steve

From: Brock, Terry
Sent: Wednesday, December 03, 2014 1:32 PM
To: Milligan, Patricia; Burnell, Scott; Garry, Steven; Ramsey, Kevin; Diaz, Marilyn; Cassidy, John; Nimitz, Ronald; Stearns, Don; McCoppin, Michael; Jones, Andrea; Weil, Jenny; Rakovan, Lance; Cai, June; Pinckney, David
Cc: Tadesse, Rebecca; McIntyre, David; Dacus, Eugene
Subject: UPDATE-HEADS-UP: Cancer Risk Study - Pilot Planning Project Coming to an End

All,

Terry Brock here from RES. We're coming to the end of another stage of the NRC – sponsored National Academy of Sciences Cancer Risk Study. As you may recall, we informed the Commission in SECY 2012-0136 (attached) that we were embarking on the Phase 1 NAS recommendation to perform pilot studies at seven sites: Dresden, SONGS, Oyster Creek, Haddam Neck, Millstone, Big Rock Point, and Nuclear Fuel Services. In the last year, NAS assembled a committee to plan the pilot project to give NRC the best cost estimate for performing the pilot study. Another two important parts of this effort were to determine the feasibility of retrieving cancer data from the various State agencies and the availability of effluent records for the dose assessment part of the study. On this last point, I must acknowledge the excellent help I received in retrieving and reviewing archived effluent records from David Pinckney (OIS), Kevin Ramsey/Marilyn Diaz (NMSS), and

Steve Garry (NRR).

NAS is planning on briefing the RES Office Director on the results of the planning project **next Friday, December 12, 2014 from 1:00 to 2:00**. NAS will publicly release the report on **Monday, December 15**. RES plans to review the report and I'll distribute it to you all. In January I'll meet with you all to discuss the findings and our recommendation for the next step. This may involve another SECY paper to the Commission depending on the resource implications to complete the pilot execution phase of the study. At this point I don't have anything to share because NAS holds things close to the vest until they brief us, so stay tuned.

Thanks,

Terry

Terry Brock, Ph.D.

Office of Nuclear Regulatory Research

U.S. Nuclear Regulatory Commission

Washington D.C. 20555

Mail Stop CSB-3A07

phone: 301-251-7487

From: [Werner, Greg](#)
To: [Flory, Shirley](#)
Cc: [Fleischmann, Trevor](#); [Ricketson, Larry](#); [Greene, Natasha](#); [Carson, Louis](#); [O'Donnell, John](#); [Aldredge, Casey](#)
Subject: FW: REMINDER: NAS CANCER STUDY BRIEFING TO BRIAN SHERON
Date: Wednesday, March 21, 2012 3:33:10 PM

Hello Shirley,

Please contact Trevor Fleischmann in Region IV to get a VTC setup in the Region IV office so Larry Ricketson and/or other HPs can listen into the briefing for Brian Sheron. I was scheduled to listen in on the original meeting, but will be out of the office next week. I'm currently leading an AIT at San Onofre Nuclear Generating Station.

Thanks,

Greg Werner, Branch Chief

RIV/DRS/PSB2

From: Diaz, Marilyn
Sent: Wednesday, March 21, 2012 1:05 PM
To: Flory, Shirley; Sheron, Brian; Holian, Brian; Weber, Michael; Leeds, Eric; Johnson, Michael; Wiggins, Jim; Haney, Catherine; Satorius, Mark; McCree, Victor; Pederson, Cynthia; Collins, Elmo; Brenner, Eliot; Schmidt, Rebecca; Cassidy, John; Chapman, Gregory; Dacus, Eugene; Dehmel, Jean-Claude; Garry, Steven; Jones, Andrea; McIntyre, David; Milligan, Patricia; Mizuno, Beth; Nimitz, Ronald; Stearns, Don; Virgilio, Rosetta; VonTill, Bill; Weil, Jenny; Woodruff, Gena; Rakovan, Lance; Bush-Goddard, Stephanie; Humberstone, Matthew; Conatser, Richard; Tomon, John; Dean, Bill; Brock, Terry; Gibson, Kathy; Scott, Michael
Cc: Buckley, Patricia; Bailey, Marissa; Smith, Brian; Dickson, Billy; Screnci, Diane; Sheehan, Neil; R1DRSCAL RESOURCE; Dapas, Marc; Uhle, Jennifer; Caniano, Roy; Campbell, Vivian; Freeman, Denise; Fleischmann, Trevor; R4Meeting Resource; Tannenbaum, Anita; Vogel, Anton; Blount, Tom; Mehrhoff, Vivian; Werner, Greg; Carson, Louis; Aldredge, Casey; Greene, Natasha; Ricketson, Larry; O'Donnell, John; Ramsey, Kevin; Castleman, Patrick; Pope, Tia
Subject: REMINDER: NAS CANCER STUDY BRIEFING TO BRIAN SHERON

REMINDER: NAS BRIEFING TO BRIAN SHERON ON THE CANCER STUDY PHASE I RESULTS NEXT MONDAY MARCH 26

IF YOU WANT TO JOIN THE MEETING VIA VTC, PLEASE CONTACT SHIRLEY FLORY.

-----Original Appointment-----

From: Flory, Shirley
Sent: Friday, February 24, 2012 10:38 AM
To: Flory, Shirley; Sheron, Brian; Holian, Brian; Weber, Michael; Leeds, Eric; Johnson, Michael; Wiggins, Jim; Haney, Catherine; Satorius, Mark; McCree, Victor; Pederson, Cynthia; Collins, Elmo; Brenner, Eliot; Schmidt, Rebecca; Cassidy, John; Chapman, Gregory; Dacus, Eugene; Dehmel, Jean-Claude; Garry, Steven; Jones, Andrea; McIntyre, David; Milligan, Patricia; Mizuno, Beth; Nimitz, Ronald; Stearns, Don; Virgilio, Rosetta; VonTill, Bill; Weil, Jenny; Woodruff, Gena; Rakovan, Lance; Diaz, Marilyn; Bush-Goddard, Stephanie; Humberstone, Matthew; Conatser, Richard; Tomon, John; Dean, Bill; Brock, Terry; Gibson, Kathy; Scott, Michael
Cc: Buckley, Patricia; Bailey, Marissa; Smith, Brian; Dickson, Billy; Screnci, Diane; Sheehan, Neil; R1DRSCAL RESOURCE; Dapas, Marc; Uhle, Jennifer; Caniano, Roy; Campbell, Vivian; Freeman, Denise;

Fleischmann, Trevor; R4Meeting Resource; Tannenbaum, Anita; Vogel, Anton; Blount, Tom; Mehrhoff, Vivian; Werner, Greg; Carson, Louis; Alldredge, Casey; Greene, Natasha; Ricketson, Larry; O'Donnell, John; Ramsey, Kevin; Castleman, Patrick; Pope, Tia

Subject: RE-SCHEDULING OF THE NAS CANCER STUDY BRIEFING TO BRIAN SHERON

When: Monday, March 26, 2012 10:00 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).

Where: CSB 6B1 - Bridge Lline: 888-997-8507, Passcode: (b)(6)

Importance: High

When: Monday, March 26, 2012 10:00 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).

Where: CSB 6B1 - Bridge Lline: 888-997-8507, Passcode: (b)(6)

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

NOTE: THIS MEETING WAS ORIGINALLY SCHEDULED FOR MONDAY, MARCH 12. NAS WAS UNABLE TO GET FINAL SIGNATURE ON THE REPORT IN TIME TO HOLD THE BRIEFING. THE BRIEFING FOR BRIAN SHERON IS BEING RE-SCHEDULED FOR MONDAY, MARCH 26..

BRIDGE LINE: 888-997-8507, PASSCODE: (b)(6)

Thanks – Shirley (301-251-7400)

PURPOSE: NAS (K. Crowley) Briefing to Brian Sheron on the Results of the Analysis of cancer Risk in Populations Near Nuclear Facilities – Phase I Study

VTC will be set up for Regions and other offices that request it at HQ and the satellite locations.

Contacts: Shirley Flory/Tia Pope

From: [Werner, Greg](#)
To: [Greene, Natasha](#); [Carson, Louis](#); [Ricketson, Larry](#); [O'Donnell, John](#)
Subject: Fw: cancer study update - SECY paper and Next Phase
Date: Friday, October 12, 2012 8:23:50 AM
Attachments: [SECY 12-0136 NAS Cancer Study on Populations.docx](#)

Fyi
Sent from blackberry

From: Garry, Steven
To: Noggle, James; Bonser, Brian; Dickson, Billy; Drake, James; Werner, Greg
Cc: Shoop, Undine; Pedersen, Roger; Conatser, Richard; Clemons-Webb, Candace; Jimenez, Manuel; McCoppin, Michael; Brock, Terry
Sent: Fri Oct 12 07:51:44 2012
Subject: FW: cancer study update - SECY paper and Next Phase

Hi Jim, Brian, Billy, Jim and Greg,

As you know, there are two types of cancer studies beginning:

- 1) A cancer study of the public
- 2) A cancer study of nuclear workers (both DOE workers and nuclear power plant workers)

This email is updating you on the cancer study of the public (populations living near nuclear facilities; i.e., the National Academy of Science (NAS) cancer study of the public. You may get questions on the SECY paper (attached) and the press release (draft attached) that are being released today (Friday 10/12/2012) (see more info below).

Update:

For the cancer study of the public, NAS has completed a paperwork "feasibility" study of whether a cancer study could be done. NAS has recommended, that yes, a cancer study can be done. However, instead of doing a full blown study on all the nuclear plants, that instead NAS first do a "pilot" study of cancers in the public near 6 nuclear power plants and one fuel processing facility (Nuclear Fuel Services in Region II). The pilot study will be done over the next 2.5 years.

Details:

The Office of Research has written a SECY paper to the Commission that will be publicly released today (Friday, 10/12/12). The SECY information paper tells the Commission what the staff plans to do (i.e., we don't have to wait for Commission review and vote). The Office of Public Affairs is also putting out a press release telling the public that NRC is working with NAS and the "pilot" cancer study is proceeding. The pilot study for cancer in the public will do 2 different types of cancer studies; 1) cancer in the general populations living near the facilities and 2) a child cancer study.

PS: Worker Cancer Study

In addition, here is a quick update on the Worker Cancer Study

Plans for the worker cancer study are just now getting started. The worker study is called the "million-man" study and has now been funded by DOE with NRC support, so we will have upcoming meetings you may hear about to discuss/plan this worker study.

Steve

From: Brock, Terry
Sent: Thursday, October 11, 2012 9:20 AM
To: Weil, Jenny; Woodruff, Gena; Dacus, Eugene; Salomon, Stephen; Milligan, Patricia; Garry, Steven; Smith, James; Chapman, Gregory; Nimitz, Ronald; Stearns, Don; Cassidy, John; Burnell, Scott; Mizuno, Beth; Jones, Andrea; Dehmel, Jean-Claude
Cc: Tomon, John; Bush-Goddard, Stephanie; Cai, June
Subject: cancer study update - SECY paper and Next Phase

Hi All,

RES has completed the Information SECY paper informing the Commission that staff is pursuing the next phase of the cancer study. In the next phase, NAS will use the methods developed in Phase 1 to perform pilot studies at the seven sites they recommended (listed below). This effort should take approximately 2.5 years. You can access the SECY by clicking on the link below (the paper will be publicly available on Friday 10/12/12). Thanks to all that have helped contact the affected licensees and State folks.

[View ADAMS P8 Properties ML12249A121](#)

[Open ADAMS P8 Document \(SECY - Next Steps for the Analysis of Cancer Risks in Populations Near Nuclear Facilities Study\)](#)

Region I

- Millstone Power Station, Waterford, CT
- Haddam Neck (decommissioned), Haddam Neck, CT
- Oyster Creek Nuclear Generating Station, Forked River, NJ

Region II

- Nuclear Fuel Services, Erwin, TN (operating uranium fuel fabrication facility)

Region III

- Big Rock Point Nuclear Power Plant (decommissioned), Charlevoix, MI
- Dresden Nuclear Power Station, Morris, IL

Region IV

- San Onofre Nuclear Generating Station, San Clemente, CA

Call or e-mail if you have additional questions

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Shaffer, Vered
To: Abu-Eld, Bobby; Baggett, Steven; Bartlett, Matthew; Bemal, Sara; Blumberg, Mark; Brock, Terry; Burrows, Ronald; Burrows, Sheryl; Bush-Goddard, Stephanie; Cecere, Bethany; Clement, Richard; Conatser, Richard; Emch, Richard; Garry, Steven; Powers, George; Gibson, Kathy; Giebel, Stephen; Gran, Zachary; Hart, Michelle; Hernandez, Pete; Hogan, Rosemary; Holahan, Patricia; Holahan, Vincent; Holiday, Sophie; Kellner, Robert; Killian, Michelle; Klementowicz, Stephen; Kurian, Varughese; Lai, Sandra; LaVera, Ronald; LaVie, Steve; Lu, Shanlai; Lukes, Robert; Mamish, Nader; Cervera, Margaret; Markley, Michael; McCoppin, Michael; Meighan, Sean; Milligan, Patricia; Naquin, Tyrone; O'Donnell, John; Orendi, Monica; Pedersen, Roger; Saba, Mohammad; Sahle, Solomon; Sakai, Stacie; Hawkins, Sarenee; Schaffer, Steven; Schmitt, Ronald; Schneider, Stewart; Shaffer, Mark; Shaffer, Vered; Sherbini, Sami; Smith, Arthur; Struckmeyer, Richard; Sullivan, Randy; Oxenberg, Tanya; Taylor, Torre; Thaggard, Mark; Virgilio, Rosetta; Waters, Michael; Reed, Wendy; Whaley, Sheena; Williams, Stephen; Yin, Xiaosong; Young, Thomas; Youngblood, Thomas; Zelac, Ronald; Barr, Cynthia; Benton, Laray; Reed, Elizabeth; Bolling, Lloyd; Brandon, Lou; Broaddus, Doug; Brock, Kathryn; Brown, David; Camper, Larry; Carrera, Andrew; Chapman, Gregory; Clements, John; Clemons-Webb, Candace; Cockerham, Ashley; Compton, Keith; Cook, John; Cool, Donald; Damon, Dennis; DeCicco, Joseph; Dehmel, Jean-Claude; Dickson, Elijah; Dimmick, Lisa; Flannery, Cindy; Foster, Jack; Garbone, Kimberly; Goldfeiz, Eliezer; Gray, Anita; Hall, Holly; Hayes, John; Hinson, Charles; Howe, Donna-Beth; Hsueh, Kevin; Huffert, Anthony; Kowalczyk, Jeffrey; Jones, Andrea; Jones, Cynthia; Karagiannis, Harriet; Keegan, Elaine; Kock, Andrea; Gibson, Lauren; Lewis, Doris; Lohr, Edward; Markley, Michael; Mattsen, Catherine; Maupin, Cardella; McCraw, Aaron; McIntosh, Angela; McKenney, Christopher; Mike Boyd; Morell, Gregory; MorganButler, Kimyata; Palmrose, Donald; Persinko, Andrew; Pstrak, David; Purdy, Gary; Quichocho, Jessie; Roach, Edward; Schmidt, Duane; Schneider, Kathleen; Snyder, Amy; Sollenberger, Dennis; Streit, Katherine; Sturz, Fritz; Sun, Casper; Tobin, Jennifer; Tomon, John; Villamar, Glenda; Watson, Bruce; Webb, James; Weber, Michael; White, Duane; White, Duncan; Abogunde, Maryann; Alldredge, Casey; Bermudez, Hector; Bloomer, Tamara; Bonano, Eugenio; Bonser, Brian; Bramnik, Andrew; Cain, Chuck; Campbell, Vivian; Carrico, J Bruce; Carson, Louis; Casey, Colleen; Cassidy, John; Cook, Jackie; Courtemanche, Steven; Diaz, Jose; Dickson, Billy; DNMSIII; Donovan, Larry; Dykes, Carmen; Elliott, Robin; Bonano, Eugenio; Evans, Robert; Everett, Vincent; Foster, Jennifer; Frazier, Cassandra; Furia, Joseph; Gabriel, Sandra; Gaines, Anthony; Gaskins, Farrah; Gattone, Robert; Gepford, Heather; Gersey, Linda; Gibson, Richard; Gloersen, William; Go, Tony; Gordon, Craig; Graves, Chris; Greene, Natasha; Griffis, Jeff; Guerra, Gilbert; Hamilton, Ruben; Hammann, Stephen; Hammond, Michelle; Hanson, Latischa; Hays, Robert; Henson, Jay; Herr, Michael; Jackson, Todd; Katanic, Janine; Kauffman, Laurie; Kulzer, Edward; Kuzo, George; LaFranzo, Michael; Lambert, Kenneth; Lanzisera, Penny; Lawyer, Dennis; Learn, Matthew; Lee, Peter; Lodhi, Sattar; Loo, Wade; Lynn, Henry; Mahlahia, Latonya; McCann, Mike; Mitchell, Mark; Modes, Kathy; Moslak, Thomas; Mulay, Sam; Munoz, Rick; Murnahan, Colleen; Myers, Valerie; Nguyen, Janice; Nicholson, John; Nielsen, Adam; Nirmitz, Ronald; Noggle, James; Null, Kevin; Oxenberg, Tanya; Parker, Bryan; Patterson, Jan; Pelchat, John; Phalen, Martin; Piskura, Deborah; Poston-Brown, Martha; Powers, Dale; Pursley, William; Ragland, Randolph; Razo, Jason; Reichard, Michael; Reichhold, William; Ricci, John; Ricketson, Larry; Rivera, Jonathan; Roberts, Mark; Rodriguez, Lionel; Roldan, Lizette; Rolph, Ronald; Schlapper, Gerald; Seeley, Shawn; Simmons, Michelle; Simmons, Tove; Slawinski, Wayne; Stearns, Don; Tapp, Jeremy; Taylor, Cynthia; Thomas, MaryLynne; Thompson, James; Thompson, Thomas; Torres, Roberto; Tran, Frank; Tripp, Lester; Ulrich, Elizabeth; Warren, Geoffrey; Weidner, Tara; Werner, Greg; White, John; Whitten, Jack; Wiedeman, Darrel; Wilson, Scott

Subject: REGISTER NOW! HP Class of Interest - Understanding Health Risk Studies
Date: Monday, June 27, 2011 7:47:29 AM

The National Academy of Sciences "Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 1" feasibility report is tentatively due to be published this December. In anticipation of the feasibility report, we have developed a 1.5 day training class to give staff an opportunity to expand their knowledge base regarding health studies and how to communicate them. Please see additional information below and class registration is through iLearn.

If the class fills up, please place your name on the wait list. If we get enough interest, we will look into offering the course again in the winter.

Also, we are working on bringing this class out to the regions in the January/February 2012 timeframe. If you work in the regions and think you would be interested in attending the regional course, please let me know.

Feel free to forward this class information to anyone that might be interested in participating!

Thank you,

Vered

Title of class: Understanding Radiation Health Risk Studies and How to Communicate Them (Course ID_1881)

Date and Location: November 1-2, 2011 at the PDC

Course Description: This course is designed in two parts. Day 1 will focus on an in-depth introduction of the different type of health studies used to evaluate the relationship between radiation exposure and disease outcomes. Topics to be covered on Day 1 include: different health study designs and their strengths and weaknesses—including how to address confounding factors and other bias, how to determine cause and effect relationships, and how health studies are used in risk assessment and the NRC's system of radiation protection. Day 2 will focus on communicating radiation health risks to our internal and external stakeholders through integrating what was learned on Day 1 with the latest risk communication practices.

Course Audience: NRC staff interested in understanding radiation health studies, how they fit into the NRC system of radiation protection, and how to communicate radiation health risks to internal and external stakeholders.

Update to the Report "Cancer in Populations Living Near Nuclear Facilities"

Background

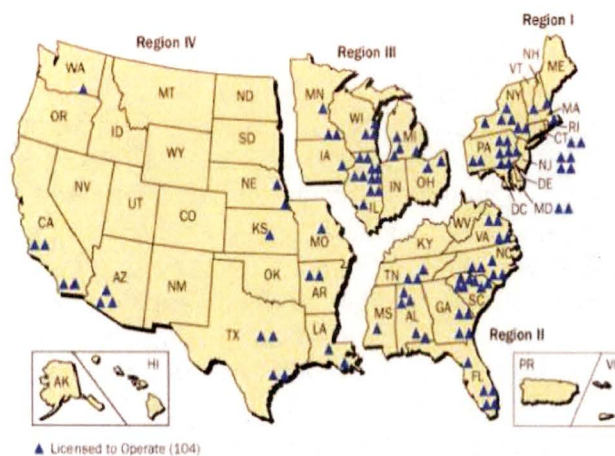
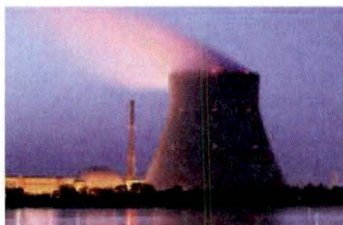
The NRC is conducting a new study to update a 1990 National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities." The NCI study was done in response to concerns about elevated risk of childhood leukemia to persons near a British nuclear facility (Sellafield). NCI researchers studied more than 900,000 cancer deaths using county mortality records collected from 1950-1984. Changes in mortality rates for 16 types of cancer were evaluated. The NCI report concluded that cancer *mortality* rates are generally not elevated for people living in the 107 U.S. counties containing or closely adjacent to 62 nuclear facilities. However, the population data used in the NCI report is more than 20 years old.

Today, stakeholder interest continues about perceived elevated cancer rates in populations near reactors, including cancer *incidence* (i.e., being diagnosed with cancer, but not necessarily dying from the disease). The NRC is conducting the update to provide contemporary information on potential elevated risks of cancer near nuclear power facilities.

Approach

Cancer Mortality Study

A protocol for selecting study and control populations in the vicinity of past, present and future nuclear power facilities will be reviewed by an external peer review committee. The peer review committee will include academic, industry, and government experts to ensure a high quality and technically robust study. The study's draft report, including an overview of its findings, will be submitted to the peer review committee and NRC staff for review and comment. Following resolution of comments, a final report will be issued, which is scheduled for publication in 2011.



Locations of Operating Nuclear Power Facilities

Cancer Incidence Feasibility Study

The update to the 1990 NCI study will include development of a protocol for examining cancer incidence in the vicinity of nuclear power facilities. This part of the study is intended to provide the NRC staff with information on the feasibility of conducting a future study on cancer incidence in 2011.

Study Status

The NRC began this study in October 2008 and consults with the NCI staff about its Surveillance, Epidemiology, and End Results Program, which is an authoritative source of information on cancer incidence and survival in the United States. Also, this study will use updated information available from advanced geographical information systems and cancer incidence reports.

Biographies of committee members will be available upon selection of the committee in 2009.

¹ See <http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-facilities>

For More Information

Contact Anthony Huffert at 301-251-7506 or Anthony.Huffert@nrc.gov

Analysis of Cancer Risk in Populations Living Near Nuclear Facilities

Background

On April 7, 2010, the U.S. Nuclear Regulatory Commission (NRC) requested that the U.S. National Academy of Sciences (NAS) conduct a study that analyzes the cancer risk of populations living near NRC-licensed facilities. This study will be used as an update to the 1990 National Cancer Institute (NCI) report, "Cancer in Populations Living Near Nuclear Facilities." This new study will provide the NRC with an analysis of the latest cancer mortality and incidence data for populations living near NRC-licensed or proposed nuclear power and fuel-cycle facilities. This study will provide the staff with the most current scientific information for responding to stakeholder concerns related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear facilities.

Approach

The study is being performed in two phases: (1) preparation of a scoping study to determine the best methodology, the best approach, and the potential limitations for performing the cancer incidence and mortality epidemiology study and (2) perform the actual study. However, the NRC staff will review the Phase 1 report and determine the next steps for Phase II. NRC's objective is to determine whether the cancer risks to populations living near or adjacent to nuclear facilities are different from the cancer risks to those not living near these facilities. The study also will evaluate whether the risks are different for various age groups, including children.

Study Status

- The NAS formed a 19-person expert Phase I committee in January 2011.
- NAS held meetings in Washington D.C., Chicago, Atlanta, and Irvine, California. The meetings were for committee members to collect data and stakeholder input in developing the Phase I report.
- NAS is scheduled to brief and submit the report to the NRC staff on March 12, 2012.
- NAS is scheduled to publicly release the final Phase I report on March 14 2012.
- The NRC staff is in the process of scheduling a briefing with the Commission on the Phase I report in June 2012.
- Phase II is proposed to commence in FY 13.

From: [Bush-Goddard, Stephanie](#)
To: [Davis, Chon](#); [Tadesse, Rebecca](#)
Cc: [Ramirez, Lisa](#)
Subject: FW: STAQS Document Notification: For your review-Requisition: Support Visual Sample Plan (VSP) (RES-15-0434)
Date: Thursday, July 16, 2015 7:48:00 PM

Chon: Please review RES-15-0434.

Rebecca: I understand that we need to find where this 15K is coming from and that you might ask Chon to take it from the Cancer Study.

Both, please advise.

Thanks
-Stephanie

-----Original Message-----

From: STAQS_Notifications_NoReply@esc.gov [mailto:STAQS_Notifications_NoReply@esc.gov]
Sent: Wednesday, July 15, 2015 8:14 PM
To: Bush-Goddard, Stephanie
Subject: [External_Sender] STAQS Document Notification: For your review-Requisition: Support Visual Sample Plan (VSP) (RES-15-0434)

Requisition: RES-15-0434 is ready for your review in STAQS.

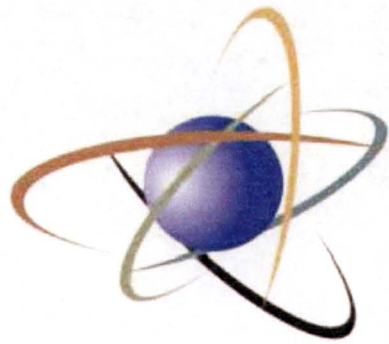
Project Title: Support Visual Sample Plan (VSP)

Description: Title: Support to Visual Sample Plan (VSP) Description of Action needed: (1) Add Incremental Funding for NRC Award #: NRC-HQ-25-14-D-0001, Task Number: NRC-HQ-60-14-T-0008, (2) Designate Alternate COR.

Owner: LISA RAMIREZ

Requisitioner: STEPHANIE BUSH-GODDARD

Site: RES



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment



Status, Update and Path Forward for NAS Cancer Risk Study

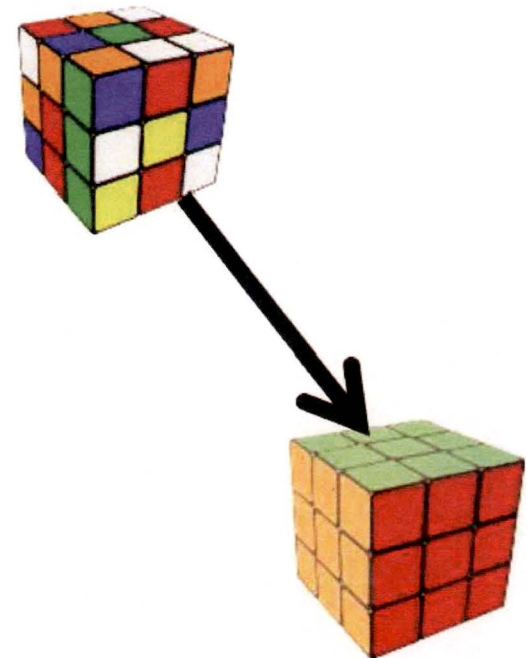
Stephanie Bush-Goddard

April 4th, 2012 Brian's Office

3:00 pm to 3:30 pm

Purpose, Outcome and Process

- **Purpose:**
 - Path forward on Cancer Study
- **Outcome:**
 - Awareness of:
 - Charge to NAS
 - What we learned/wanted
 - Do Better??? Jury is still out.
 - Alignment of Next Steps
- **Process:**
 - 15 minute presentation slides
 - 15 minute question and answer





Objective

- What we asked NAS to do
- What we learned
- Current/Next Steps
 - Communications
 - Technical Review/SECY Paper??

Charge to NAS

- Scoping Study
 - vs Feasibility Study
- If we should update NCI Study,
- Look at Nuclear Other Facilities
- Determine Technical Feasibility
 - vs range of Options
- Preferred Options (later)
- Resource Implications (later)
 - Not detailed cost consideration



What we learned

- The 1990 NCI county based study design should not be repeated
- States have very diverse tumor registries at different stages of development
- Finding effluent records past 1976 can be a challenge
- Uranium recovery facilities are not to be studied—too sparsely populated



What we learned cont.

- Two preferred study designs are recommended
- Both designs consider dose
- One focuses specifically on childhood cancers
- Another looks at all radiogenic cancers using census tracts
- A risk-projection model with no epidemiological study was considered and rejected

Do Better??

- Got a good epidemiological review and state-of-the-art assessment of the issue
- Grant vs Contract
- A prescriptive recommendation that told NRC to analyze all facilities without piloting the recommended designs would have been cost-prohibitive and put NRC in an untenable position
- Jury is still out



Next Steps: Communication

- April
 - Solicit user-need office feedback
 - Update Communication Plan
- May
 - TA Briefing
 - Start information paper
- June
 - Finalized path forward (e.g. Secy Paper)
 - Consider Public Comment???

From: Kosti, Ourania
Sent: 25 Jun 2015 12:48:49 -0400
To: Brock, Terry
Subject: [External_Sender] NRSB meeting agenda
Attachments: NRSB spring 2015 meeting, public agenda, June 2015.pdf

FYI.

Thanks,

Rania

Ourania (Rania) Kosti, Ph.D.

Senior Program Officer

Nuclear and Radiation Studies Board

The National Academies

email: okosti@nas.edu

phone: 202 334 3066

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

NUCLEAR AND RADIATION STUDIES BOARD Twenty-Sixth Meeting: June 29, 2015

Keck Center of the National Academies
500 Fifth Street, NW
Washington, DC

(June 24, 2015 Draft)

Monday, June 29, 2015

OPEN SESSION Keck 100

- | | |
|---------|---|
| 1:05 pm | Call to order and welcome
Bob Dynes, Chair, Nuclear and Radiation Studies Board |
| 1:15 pm | Recent developments in commercial & defense nuclear waste management
Mary Louise Wagner, Senior Policy Advisor, Office of the Secretary, U.S.
Department of Energy |
| 1:45 pm | Questions and discussion |
| 1:55 pm | Proposal for a scientific symposium on 30th anniversary of the Chernobyl accident
Amy Berrington de González, Branch Chief and Senior Investigator, Radiation
Epidemiology Branch, Division of Cancer Epidemiology & Genetics, National
Cancer Institute |
| 2:25 pm | Questions and discussion |
| 2:35 pm | EPA views on proposed BEIR VIII study
Jerome S. Puskin, Director for the Center of Science and Technology, Radiation
Protection Division, U.S. Environmental Protection Agency |
| 3:05 pm | Questions and discussion |
| 3:15 pm | Break |

- 3:35 pm **Adopting the international system of units for radiation measurements in the United States**
Robert C. Whitcomb, Jr., Chief, Radiation Studies Branch, Centers for Disease Control & Prevention
Armin Ansari, Health Physicist, Radiation Studies Branch, Centers for Disease Control & Prevention
- 4:05 pm Questions and discussion
- 4:15 pm **Opportunity for public comment (please sign up)**
- 4:35 pm **Adjourn open session**

From: Brock, Terry
Sent: 27 May 2011 11:31:56 -0400
To: Kosti, Ourania
Subject: Effluent Reports for Dose subcmt consideration
Attachments: NFS biannual effluent report 01 to 06 2009.pdf, crow butte_ uranium
recovery_Feb 2011_ML1108401241.pdf

Rania,

Attached are two recent effluent and dose reports for the Crow Butte uranium recovery facility and the Nuclear Fuel Services fuel cycle facility that the subcommittee is planning to tour. Please forward these to the dose subcommittee for their review and consideration. Let me know if the committee members need additional NRC expertise to discuss these reports

Thank,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487



NUCLEAR FUEL SERVICES, INC.
a subsidiary of The Babcock & Wilcox Company

■ 1205 banner hill road ■ brwn. tn 37650 ■ phone 423 743 9141
■ www.nuclearfuelservices.com

21G-09-0131
GOV-01-55
ACF-09-0259

August 26, 2009

Mr. Luis A. Reyes, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II, Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303

References: 1) Docket No. 70-143; SNM License 124

Subject: **Biannual Effluent Monitoring Report January through June 2009**

Dear Mr. Reyes:

In accordance with the requirements set forth in 10 CFR, Part 70.59, Nuclear Fuel Services, Inc. (NFS) submits the attached reports. Attachment A reports the Radioactivity in Effluent Liquid for the period January through June 2009. Attachment B reports the Radioactivity in Effluent Air for the period January through June 2009. Attachment C summarizes an evaluation of the dose and air activity concentrations for the maximally exposed offsite individual due to gaseous effluents, during the period January through June 2009.

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me or Mr. Robert Holley, Environmental Safety Manager, at (423) 743-1777. Please reference our unique document identification number (21G-09-0131) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

A handwritten signature in black ink that reads 'B. Marie Moore'.

B. Marie Moore
Director
Safety and Regulatory

CJB/rrm

Attachments

B. M. Moore to L. A. Reyes (NRC)

August 26, 2009

21G-09-0131

GOV-01-55

ACF-09-0259

xc: Mr. Manuel Crespo, Project Inspector
U. S. Nuclear Regulatory Commission
Region II, Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, GA 30303

Director
Office of Nuclear Material Safety & Safeguards
U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Mr. Peter Habighorst, Chief
Fuel Manufacturing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety & Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Mr. Mark G. Poirier, Account Engineer
American Nuclear Insurers
95 Glastonbury Boulevard
Glastonbury, CT 06033

Mr. Stephen Burris
Senior Resident Inspector
U. S. Nuclear Regulatory Commission

B. M. Moore to L. A. Reyes (NRC)
August 26, 2009

21G-09-0131
GOV-01-55
ACF-09-0259

Attachment A
To Letter Dated August 26, 2009
B. M. Moore to L. A. Reyes (NRC)

Report of Radioactivity in Effluent Liquid for the Period
January - June 2009

(Two Pages to Follow)

Radioactivity in Effluent Liquid January 1, 2009 to June 30, 2009

Location	Total Volume (l)	Activity Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
BLEU Sewer							
Pu-238	6,820,227	2.42E-11	2.18E-10	5.17E-10	1.65E-07	9.65E-09	1.21E-03
Pu-239/240	6,820,227	1.90E-11	1.64E-10	4.21E-10	1.30E-07	2.08E-06	9.50E-04
Tc-99	6,820,227	-5.72E-09	3.49E-08	6.10E-08	-3.90E-05	-2.31E-03	-9.53E-05
Th-228	6,820,227	1.85E-11	1.82E-10	4.53E-10	1.26E-07	1.54E-10	9.27E-05
Th-230	6,820,227	2.62E-10	2.48E-10	3.63E-10	1.79E-06	8.86E-05	2.62E-03
Th-232	6,820,227	-3.44E-12	1.29E-10	3.16E-10	-2.35E-08	-2.15E-01	-1.15E-04
U-232	6,820,227	-1.59E-11	1.70E-10	4.36E-10	-1.08E-07	-5.07E-09	-2.65E-04
U-233/234	6,820,227	7.50E-10	4.25E-10	3.68E-10	5.12E-06	8.20E-04	2.50E-03
U-235/236	6,820,227	7.25E-11	1.77E-10	3.49E-10	4.94E-07	2.29E-01	2.42E-04
U-238	6,820,227	1.49E-10	1.83E-10	2.96E-10	1.02E-06	3.03E+00	4.97E-04
						Total:	7.64E-03
Sewer							
Pu-238	19,419,101	5.27E-11	1.28E-10	3.10E-10	1.02E-06	5.98E-08	2.63E-04
Pu-239/240	19,419,101	3.60E-11	1.39E-10	2.93E-10	6.99E-07	1.12E-05	1.80E-04
Tc-99	19,419,101	-1.92E-08	4.20E-08	7.41E-08	-3.73E-04	-2.21E-02	-3.20E-05
Th-228	19,419,101	-5.85E-11	1.82E-10	4.98E-10	-1.14E-06	-1.39E-09	-2.92E-05
Th-230	19,419,101	5.08E-10	3.04E-10	2.97E-10	9.87E-06	4.89E-04	5.08E-04
Th-232	19,419,101	4.72E-11	1.44E-10	2.09E-10	9.16E-07	8.41E+00	1.57E-04
U-232	19,419,101	9.89E-11	2.11E-10	4.45E-10	1.92E-06	8.98E-08	1.65E-04
U-233/234	19,419,101	2.14E-08	2.30E-09	4.38E-10	4.16E-04	6.67E-02	7.15E-03
U-235/236	19,419,101	1.09E-09	4.88E-10	3.74E-10	2.12E-05	9.81E+00	3.64E-04
U-238	19,419,101	3.76E-09	9.81E-10	3.63E-10	7.30E-05	2.18E+02	1.25E-03
						Total:	9.98E-03
WWTF							
Am-241	3,123,715	5.52E-11	1.71E-10	3.49E-10	1.72E-07	5.03E-08	2.76E-03
Cs-137	3,123,715	1.13E-09	1.36E-09	1.83E-09	3.54E-06	4.07E-08	1.13E-03
Na-22	3,123,715	2.31E-10	1.05E-09	1.78E-09	7.21E-07	1.16E-10	3.85E-05
Np-237	3,123,715	7.47E-11	1.87E-10	4.08E-10	2.33E-07	3.31E-04	3.74E-03
Pb-212	3,123,715	1.32E-09	3.07E-09	3.48E-09	4.13E-06	2.98E-12	6.60E-04
Pu-238	3,123,715	1.67E-11	1.33E-10	3.48E-10	5.21E-08	3.04E-09	8.33E-04
Pu-239/240	3,123,715	5.54E-11	1.31E-10	3.04E-10	1.73E-07	2.78E-06	2.77E-03
Pu-241	3,123,715	3.54E-09	9.47E-09	1.62E-08	1.11E-05	1.07E-07	3.54E-03
Ra-224	3,123,715	1.05E-08	1.23E-09	4.12E-09	3.28E-05	2.06E-10	5.25E-02
Tc-99	3,123,715	7.18E-09	6.46E-08	1.13E-07	2.24E-05	1.33E-03	1.20E-04
Th-228	3,123,715	-2.82E-11	1.45E-10	3.68E-10	-8.82E-08	-1.08E-10	-1.41E-04
Th-230	3,123,715	1.27E-10	1.88E-10	2.73E-10	3.98E-07	1.97E-05	1.27E-03
Th-231	3,123,715	5.22E-09	4.07E-08	4.65E-08	1.63E-05	3.06E-11	1.04E-04
Th-232	3,123,715	-2.12E-11	1.09E-10	2.52E-10	-6.63E-08	-6.08E-01	-7.07E-04
U-232	3,123,715	-5.35E-12	2.22E-10	4.57E-10	-1.67E-08	-7.81E-10	-8.92E-05
U-233/234	3,123,715	8.88E-08	4.95E-09	5.16E-10	2.78E-04	4.45E-02	2.96E-01

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B

Radioactivity in Effluent Liquid January 1, 2009 to June 30, 2009

Location	Total Volume (l)	Activity Concentration ($\mu\text{Ci/ml}$)	Error Estimate ($\mu\text{Ci/ml}$)	LLD ($\mu\text{Ci/ml}$)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
WWTF							
U-235/236	3,123,715	8.80E-09	1.52E-09	4.13E-10	2.75E-05	1.27E+01	2.93E-02
U-238	3,123,715	1.32E-09	6.18E-10	4.98E-10	4.14E-06	1.23E+01	4.41E-03
						Total:	3.98E-01

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B.

B. M. Moore to L. A. Reyes (NRC)
August 26, 2009

21G-09-0131
GOV-01-55
ACF-09-0259

Attachment B
To Letter Dated August 26, 2009
B. M. Moore to L. A. Reyes (NRC)

Report of Radioactivity in Effluent Air for the Period
January - June 2009

(Four Pages to Follow)

Radioactivity in Effluent Air January 1, 2009 to June 30, 2009

Location	Total Volume (m ³)	Activity Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
Main Stack 416		1100.64 m ³ /min		18.34 m ³ /sec			
Tc-99	290,040,710	8.52E-14	3.93E-14	5.02E-14	2.47E-05	1.46E-03	9.47E-05
Th-228	290,040,710	1.41E-16	7.79E-17	1.01E-16	4.09E-08	4.99E-11	7.05E-03
Th-230	290,040,710	7.52E-17	4.15E-17	5.38E-17	2.18E-08	1.08E-06	3.76E-03
Th-232	290,040,710	4.70E-17	2.60E-17	3.36E-17	1.36E-08	1.25E-01	1.17E-02
U-234	290,040,710	4.36E-14	2.41E-14	3.12E-14	1.26E-05	2.03E-03	8.72E-01
U-235	290,040,710	2.77E-15	1.53E-15	1.99E-15	8.04E-07	3.72E-01	4.62E-02
U-238	290,040,710	3.48E-16	1.92E-16	2.49E-16	1.01E-07	3.01E-01	5.80E-03
						Total:	9.47E-01
Stack 185 Bldg. 131		92.96 m ³ /min		1.55 m ³ /sec			
Tc-99	24,497,931	5.51E-14	3.52E-14	5.05E-14	1.35E-06	7.99E-05	6.12E-05
Th-230	24,497,931	2.77E-19	7.69E-19	1.51E-18	6.78E-12	3.36E-10	1.38E-05
Th-231	24,497,931	7.03E-16	4.49E-16	6.44E-16	1.72E-08	3.24E-14	7.81E-08
U-234	24,497,931	6.19E-15	1.72E-14	3.37E-14	1.52E-07	2.43E-05	1.24E-01
U-235	24,497,931	1.04E-16	2.88E-16	5.66E-16	2.54E-09	1.18E-03	1.73E-03
U-238	24,497,931	1.20E-19	3.32E-19	6.52E-19	2.93E-12	8.75E-06	1.99E-06
						Total:	1.26E-01
Stack 327 Bldg. 330		167.98 m ³ /min		2.80 m ³ /sec			
Tc-99	43,381,031	1.17E-13	4.00E-14	5.46E-14	5.10E-06	3.02E-04	1.31E-04
Th-230	43,381,031	2.38E-18	1.12E-18	1.58E-18	1.03E-10	5.12E-09	1.19E-04
Th-231	43,381,031	1.50E-15	5.11E-16	6.97E-16	6.51E-08	1.22E-13	1.67E-07
U-234	43,381,031	5.32E-14	2.50E-14	3.53E-14	2.31E-06	3.70E-04	1.06E+00
U-235	43,381,031	8.93E-16	4.20E-16	5.93E-16	3.88E-08	1.79E-02	1.49E-02
U-238	43,381,031	1.03E-18	4.84E-19	6.83E-19	4.46E-11	1.33E-04	1.71E-05
						Total:	1.08E+00
Stack 421 Bldg. 100		19.51 m ³ /min		0.33 m ³ /sec			
Tc-99	5,141,357	3.03E-13	6.21E-14	7.10E-14	1.56E-06	9.22E-05	3.37E-04
Th-230	5,141,357	1.16E-17	2.23E-18	2.07E-18	5.97E-11	2.95E-09	5.80E-04
Th-231	5,141,357	3.87E-15	7.93E-16	9.07E-16	1.99E-08	3.74E-14	4.30E-07
U-234	5,141,357	2.59E-13	4.98E-14	4.64E-14	1.33E-06	2.14E-04	5.19E+00
U-235	5,141,357	4.35E-15	8.36E-16	7.78E-16	2.24E-08	1.04E-02	7.26E-02
U-238	5,141,357	5.01E-18	9.63E-19	8.96E-19	2.58E-11	7.69E-05	8.36E-05
						Total:	5.26E+00
Stack 424 Bldg. 100		30.53 m ³ /min		0.51 m ³ /sec			
Tc-99	8,044,097	5.80E-14	3.48E-14	4.89E-14	4.67E-07	2.76E-05	6.45E-05
Th-230	8,044,097	1.11E-19	7.19E-19	1.46E-18	8.89E-13	4.40E-11	5.53E-06
Th-231	8,044,097	7.41E-16	4.44E-16	6.25E-16	5.96E-09	1.12E-14	8.23E-08
U-234	8,044,097	2.47E-15	1.61E-14	3.27E-14	1.99E-08	3.18E-06	4.94E-02
U-235	8,044,097	4.15E-17	2.69E-16	5.49E-16	3.33E-10	1.54E-04	6.91E-04

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B. Fraction of ECV at the stack is provided for reference only. Concentrations at off-site locations are significantly less than those reported here (at stack) due to the atmospheric dispersion that occurs before the effluent exits the site.

Radioactivity in Effluent Air January 1, 2009 to June 30, 2009

Location	Total Volume (m ³)	Activity Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
Stack 424 Bldg. 100*		30.53 m³/min		0.51 m³/sec			
U-238	8,044,097	4.77E-20	3.10E-19	6.32E-19	3.84E-13	1.15E-06	7.96E-07
						Total:	5.02E-02
Stack 501 Bldg. 510		54.44 m³/min		0.91 m³/sec			
Tc-99	14,267,696	3.64E-14	1.63E-14	2.03E-14	5.19E-07	3.07E-05	4.04E-05
Th-228	14,267,696	1.95E-16	1.53E-15	3.19E-15	2.79E-09	3.41E-12	9.77E-03
Th-230	14,267,696	2.20E-16	1.72E-15	3.59E-15	3.14E-09	1.55E-07	1.10E-02
Th-232	14,267,696	2.05E-16	1.61E-15	3.35E-15	2.93E-09	2.69E-02	5.13E-02
U-234	14,267,696	6.68E-16	5.23E-15	1.09E-14	9.53E-09	1.53E-06	1.34E-02
U-235	14,267,696	1.25E-16	9.78E-16	2.04E-15	1.78E-09	8.24E-04	2.08E-03
U-238	14,267,696	2.17E-16	1.70E-15	3.54E-15	3.09E-09	9.23E-03	3.61E-03
						Total:	9.12E-02
Stack 502 OCB		205.62 m³/min		3.43 m³/sec			
Tc-99	53,000,906	2.92E-14	1.55E-14	2.05E-14	1.55E-06	9.17E-05	3.25E-05
Th-228	53,000,906	-3.64E-16	1.38E-15	3.22E-15	-1.93E-08	-2.35E-11	-1.82E-02
Th-230	53,000,906	-4.09E-16	1.55E-15	3.62E-15	-2.17E-08	-1.07E-06	-2.05E-02
Th-232	53,000,906	-3.82E-16	1.45E-15	3.38E-15	-2.02E-08	-1.86E-01	-9.54E-02
U-234	53,000,906	-1.24E-15	4.70E-15	1.10E-14	-6.58E-08	-1.06E-05	-2.48E-02
U-235	53,000,906	-2.32E-16	8.79E-16	2.06E-15	-1.23E-08	-5.69E-03	-3.87E-03
U-238	53,000,906	-4.03E-16	1.53E-15	3.57E-15	-2.14E-08	-6.38E-02	-6.72E-03
						Total:	-1.69E-01
Stack 503 EPB		5.95 m³/min		0.10 m³/sec			
Tc-99	1,559,611	4.36E-14	1.73E-14	2.04E-14	6.79E-08	4.02E-06	4.84E-05
Th-228	1,559,611	-1.31E-16	1.45E-15	3.19E-15	-2.04E-10	-2.49E-13	-6.54E-03
Th-230	1,559,611	-1.47E-16	1.64E-15	3.59E-15	-2.30E-10	-1.14E-08	-7.36E-03
Th-232	1,559,611	-1.37E-16	1.53E-15	3.35E-15	-2.14E-10	-1.97E-03	-3.43E-02
U-234	1,559,611	-4.47E-16	4.97E-15	1.09E-14	-6.97E-10	-1.12E-07	-8.94E-03
U-235	1,559,611	-8.35E-17	9.28E-16	2.04E-15	-1.30E-10	-6.03E-05	-1.39E-03
U-238	1,559,611	-1.45E-16	1.61E-15	3.54E-15	-2.26E-10	-6.75E-04	-2.42E-03
						Total:	-6.10E-02
Stack 573 Bldg 306-W		83.48 m³/min		1.39 m³/sec			
Tc-99	21,998,142	4.72E-14	3.36E-14	4.98E-14	1.04E-06	6.15E-05	5.25E-05
Th-230	21,998,142	4.57E-20	7.11E-19	1.49E-18	1.01E-12	4.98E-11	2.28E-06
Th-231	21,998,142	6.03E-16	4.29E-16	6.35E-16	1.33E-08	2.49E-14	6.70E-08
U-234	21,998,142	1.02E-15	1.59E-14	3.32E-14	2.25E-08	3.60E-06	2.04E-02
U-235	21,998,142	1.71E-17	2.66E-16	5.58E-16	3.77E-10	1.74E-04	2.86E-04
U-238	21,998,142	1.97E-20	3.07E-19	6.42E-19	4.34E-13	1.30E-06	3.29E-07
						Total:	2.08E-02
Stack 600 Bldg. 110		255.05 m³/min		4.25 m³/sec			
Tc-99	67,210,741	1.38E-12	4.83E-14	3.37E-14	9.29E-05	5.50E-03	1.54E-03

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B. Fraction of ECV at the stack is provided for reference only. Concentrations at off-site locations are significantly less than those reported here (at stack) due to the atmospheric dispersion that occurs before the effluent exits the site.

Radioactivity in Effluent Air January 1, 2009 to June 30, 2009

Location	Total Volume (m ³)	Activity Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
Stack 600 Bldg. 110		255.05 m³/min		4.25 m³/sec			
Th-230	67,210,741	1.98E-18	6.60E-19	9.16E-19	1.33E-10	6.59E-09	9.90E-05
Th-231	67,210,741	1.76E-14	6.17E-16	4.30E-16	1.19E-06	2.23E-12	1.96E-06
U-234	67,210,741	4.42E-14	1.47E-14	2.05E-14	2.97E-06	4.77E-04	8.85E-01
U-235	67,210,741	7.43E-16	2.47E-16	3.43E-16	4.99E-08	2.31E-02	1.24E-02
U-238	67,210,741	8.55E-19	2.85E-19	3.95E-19	5.75E-11	1.72E-04	1.43E-05
Total:						8.99E-01	
Stack 615 Bldg. 306-W		39.64 m³/min		0.66 m³/sec			
Tc-99	10,446,879	4.58E-14	3.40E-14	5.09E-14	4.79E-07	2.83E-05	5.09E-05
Th-230	10,446,879	-1.55E-20	7.07E-19	1.52E-18	-1.61E-13	-7.99E-12	-7.73E-07
Th-231	10,446,879	5.85E-16	4.34E-16	6.49E-16	6.11E-09	1.15E-14	6.50E-08
U-234	10,446,879	-3.45E-16	1.58E-14	3.39E-14	-3.61E-09	-5.78E-07	-6.90E-03
U-235	10,446,879	-5.79E-18	2.65E-16	5.70E-16	-6.05E-11	-2.80E-05	-9.66E-05
U-238	10,446,879	-6.67E-21	3.05E-19	6.56E-19	-6.97E-14	-2.08E-07	-1.11E-07
Total:						-6.95E-03	
Stack 646 Bldg. 110		51.96 m³/min		0.87 m³/sec			
Tc-99	13,692,873	5.49E-14	4.07E-14	6.09E-14	7.51E-07	4.45E-05	6.10E-05
Th-230	13,692,873	-8.40E-20	8.29E-19	1.82E-18	-1.15E-12	-5.69E-11	-4.20E-06
Th-231	13,692,873	7.00E-16	5.20E-16	7.77E-16	9.59E-09	1.80E-14	7.78E-08
U-234	13,692,873	-1.88E-15	1.85E-14	4.07E-14	-2.57E-08	-4.12E-06	-3.75E-02
U-235	13,692,873	-3.15E-17	3.11E-16	6.83E-16	-4.31E-10	-2.00E-04	-5.25E-04
U-238	13,692,873	-3.63E-20	3.58E-19	7.87E-19	-4.96E-13	-1.48E-06	-6.04E-07
Total:						-3.80E-02	
Stack 649 Bldg. 330		15.05 m³/min		0.25 m³/sec			
Tc-99	4,000,926	7.76E-14	2.31E-14	3.40E-14	3.10E-07	1.84E-05	8.62E-05
Th-230	4,000,926	8.11E-20	4.47E-19	9.26E-19	3.24E-13	1.61E-11	4.05E-06
Th-231	4,000,926	9.94E-16	2.96E-16	4.36E-16	3.98E-09	7.47E-15	1.10E-07
U-234	4,000,926	1.81E-15	9.99E-15	2.07E-14	7.25E-09	1.16E-06	3.62E-02
U-235	4,000,926	3.05E-17	1.68E-16	3.48E-16	1.22E-10	5.65E-05	5.08E-04
U-238	4,000,926	3.50E-20	1.93E-19	4.00E-19	1.40E-13	4.18E-07	5.83E-07
Total:						3.68E-02	
Stack 701 Bldg. 307		165.03 m³/min		2.75 m³/sec			
Tc-99	43,489,231	6.39E-14	3.58E-14	4.90E-14	2.78E-06	1.64E-04	7.10E-05
Th-230	43,489,231	9.74E-19	9.43E-19	1.47E-18	4.24E-11	2.10E-09	4.87E-05
Th-231	43,489,231	8.15E-16	4.57E-16	6.25E-16	3.55E-08	6.67E-14	9.06E-08
U-234	43,489,231	2.18E-14	2.11E-14	3.27E-14	9.47E-07	1.52E-04	4.35E-01
U-235	43,489,231	3.65E-16	3.54E-16	5.50E-16	1.59E-08	7.36E-03	6.09E-03
U-238	43,489,231	4.21E-19	4.07E-19	6.33E-19	1.83E-11	5.46E-05	7.01E-06
Total:						4.42E-01	

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B. Fraction of ECV at the stack is provided for reference only. Concentrations at off-site locations are significantly less than those reported here (at stack) due to the atmospheric dispersion that occurs before the effluent exits the site.

Radioactivity in Effluent Air January 1, 2009 to June 30, 2009

Location	Total Volume (m ³)	Activity Concentration (μCi/ml)	Error Estimate (μCi/ml)	LLD (μCi/ml)	Quantity Released (Ci)	Quantity Released (g)	Fraction of ECV ¹
Stack 702 Bldg. 307		151.34 m ³ /min		2.52 m ³ /sec			
Tc-99	39,881,225	4.52E-14	3.29E-14	4.89E-14	1.80E-06	1.07E-04	5.03E-05
Th-230	39,881,225	2.37E-20	6.94E-19	1.46E-18	9.43E-13	4.67E-11	1.18E-06
Th-231	39,881,225	5.78E-16	4.20E-16	6.24E-16	2.30E-08	4.33E-14	6.42E-08
U-234	39,881,225	5.28E-16	1.55E-14	3.27E-14	2.11E-08	3.38E-06	1.06E-02
U-235	39,881,225	8.87E-18	2.60E-16	5.48E-16	3.54E-10	1.64E-04	1.48E-04
U-238	39,881,225	1.02E-20	3.00E-19	6.31E-19	4.07E-13	1.22E-06	1.70E-07
						Total:	1.08E-02
Stack 703 Exhaust Room Air		677.65 m ³ /min		11.29 m ³ /sec			
Tc-99	178,574,470	3.92E-14	2.98E-14	4.49E-14	7.00E-06	4.14E-04	4.36E-05
Th-228	178,574,470	1.03E-16	9.69E-16	2.02E-15	1.83E-08	2.24E-11	5.13E-03
Th-230	178,574,470	8.71E-17	8.23E-16	1.72E-15	1.55E-08	7.70E-07	4.35E-03
Th-232	178,574,470	9.70E-17	9.17E-16	1.91E-15	1.73E-08	1.59E-01	2.43E-02
U-234	178,574,470	1.04E-15	9.86E-15	2.05E-14	1.86E-07	2.98E-05	2.08E-02
U-235	178,574,470	1.43E-16	1.35E-15	2.82E-15	2.56E-08	1.18E-02	2.39E-03
U-238	178,574,470	5.55E-17	5.24E-16	1.09E-15	9.90E-09	2.96E-02	9.24E-04
						Total:	5.79E-02
Stack 704 Process Exhaust (H2)		70.28 m ³ /min		1.17 m ³ /sec			
Tc-99	18,520,824	4.31E-14	3.29E-14	4.96E-14	7.98E-07	4.72E-05	4.79E-05
Th-228	18,520,824	2.26E-17	1.05E-15	2.23E-15	4.19E-10	5.12E-13	1.13E-03
Th-230	18,520,824	1.92E-17	8.93E-16	1.90E-15	3.56E-10	1.76E-08	9.61E-04
Th-232	18,520,824	2.14E-17	9.95E-16	2.11E-15	3.97E-10	3.64E-03	5.35E-03
U-234	18,520,824	2.30E-16	1.07E-14	2.27E-14	4.26E-09	6.83E-07	4.60E-03
U-235	18,520,824	3.16E-17	1.47E-15	3.12E-15	5.86E-10	2.71E-04	5.27E-04
U-238	18,520,824	1.22E-17	5.69E-16	1.21E-15	2.27E-10	6.77E-04	2.04E-04
						Total:	1.28E-02
Stack 773 Bldg. 440		193.59 m ³ /min		3.23 m ³ /sec			
Tc-99	51,015,999	7.86E-14	4.39E-14	6.06E-14	4.01E-06	2.37E-04	8.73E-05
Th-228	51,015,999	2.05E-16	2.36E-15	4.88E-15	1.04E-08	1.27E-11	1.02E-02
Th-230	51,015,999	2.30E-16	2.65E-15	5.49E-15	1.17E-08	5.81E-07	1.15E-02
Th-232	51,015,999	2.15E-16	2.47E-15	5.13E-15	1.10E-08	1.01E-01	5.37E-02
U-234	51,015,999	6.99E-16	8.05E-15	1.67E-14	3.57E-08	5.72E-06	1.40E-02
U-235	51,015,999	1.31E-16	1.50E-15	3.12E-15	6.66E-09	3.09E-03	2.18E-03
U-238	51,015,999	2.27E-16	2.61E-15	5.41E-15	1.16E-08	3.45E-02	3.78E-03
						Total:	9.55E-02
Stack 774 Bldg. 301		311.09 m ³ /min		5.18 m ³ /sec			
Th-230	65,753,112	1.55E-17	3.62E-17	7.19E-17	1.02E-09	5.05E-08	7.75E-04
U-234	65,753,112	5.06E-15	1.18E-14	2.34E-14	3.33E-07	5.33E-05	1.01E-01
U-235	65,753,112	9.67E-17	2.25E-16	4.48E-16	6.36E-09	2.94E-03	1.61E-03
						Total:	1.04E-01

¹ ECV: Effluent Concentration Value from 10-CFR-20, Appendix B. Fraction of ECV at the stack is provided for reference only. Concentrations at off-site locations are significantly less than those reported here (at stack) due to the atmospheric dispersion that occurs before the effluent exits the site.

B. M. Moore to L. A. Reyes (NRC)
August 26, 2009

21G-09-0131
GOV-01-55
ACF-09-0259

Attachment C
To Letter Dated August 26, 2009
B. M. Moore to L. A. Reyes (NRC)

Report of Gaseous Effluent Dose and Activity Concentrations
for the Maximally Exposed
Off-Site Individual for the Release Period
January – June 2009

(Three Pages to Follow)

Report of Potential Gaseous Effluent Dose to the Maximally Exposed Offsite Individual and on the Maximum Radionuclide Concentrations for the Period: January through June 2009

Introduction

During this biannual period, NRC License SNM-124, Part I, Section 5.1.1.3 required NFS to assess the total effective dose equivalent (TEDE) to the maximally exposed offsite receptor and the maximum radioactive air concentrations at the site boundary, attributable to NFS' air effluents. The required biannual assessment has been completed and the details of the assessment are provided in the subsequent sections.

Summary of Methods

In accordance with SNM-124, Section 5.1.1.4 and internal procedure NFS-HS-A-27, the U.S. Department of Energy's CAP88-PC computer program was used to estimate off-site doses and activity concentrations for gaseous effluents. NFS operated nineteen (19) radiological stacks during the 1st half of 2009. Based on effluent types and stack physical characteristics, releases from these stacks were grouped into effective stacks for modeling purposes. To accommodate the co-location limitation of the model, the effective stacks were taken to be at the approximate center of the plant site. The distance to the site boundary (nearest model receptor distance) was conservatively taken to be 150 meters for all sectors. Meteorological data were based on five-year average wind speed and direction frequencies as presented in NFS' 1996 Environmental Report. Atmospheric stability class D (neutral atmosphere) was used for all releases (default value recommended by the U.S. Environmental Protection Agency in "User's Guide for COMPLY"). The most conservative inhalation class was assumed for each radionuclide released. A particle size (activity median aerodynamic diameter or AMAD) of 1.0 microns was assumed for modeling purposes since no information on actual particle sizes exists.

Because CAP88-PC models releases over an entire year, the six-month source term (i.e., total curies of each radionuclide released over the period, given in Attachment B) was annualized (i.e., transformed into a 12-month release) so that airborne activity concentrations would not be under-estimated during the release period.

Summary of Results

Doses are reported in table 1 below and are derived from the CAP88-PC "Synopsis Report". These doses are at the location of the maximally exposed (off-site) individual (MEI). The results include an adjustment (using the normalization factor mentioned above) to convert the "annualized" doses back to those doses that were actually received in the six-month release period. Activity concentrations reported in table 2 come directly from the CAP88-PC "Concentration Tables" report; no adjustments are needed for these concentrations. The CAP88-PC output reports are available for review at NFS.

Table 1 summarizes the six-month dose to a hypothetical individual at the MEI location, which was determined to be approximately 300 meters North Northeast from the center of the plant site. The TEDE to the MEI was estimated to be 1.8E-03 mrem for gaseous effluents released during the 1st half of 2009. The highest organ committed dose equivalent (CDE) to the MEI was estimated to be 6.3E-03 mrem to the spleen. These MEI doses are well below SNM-124 license action levels and applicable regulatory limits/ALARA constraints.

Table 1. Organ Doses and Total Effective Dose Equivalent at the MEI Location

Organ	Committed Dose Equivalent (mrem per 1" half of 2009)
Adrenals	6.6E-05
Bone Surface	2.6E-04
Breasts	1.6E-04
Stomach Wall	6.6E-05
Upper Large Intestine Wall	6.8E-05
Kidneys	6.5E-05
Lungs	3.5E-03
Ovaries	3.0E-04
Red Bone Marrow	2.2E-03
Spleen	6.3E-03
Thymus	7.9E-05
Uterus	9.1E-05
Bladder Wall	4.0E-04
Brain	6.7E-05
Esophagus	6.6E-05
Small Intestine Wall	6.6E-05
Lower Large Intestine Wall	7.0E-05
Liver	7.4E-05
Muscle	6.6E-05
Pancreas	6.8E-05
Skin	6.6E-05
Testes	1.6E-03
Thyroid	6.6E-05
Total Effective Dose Equivalent	1.8E-03 mrem
Location of MEI:	300 meters North Northeast

Table 2 summarizes the maximum radioactive air concentrations at or beyond the site boundary, as determined by CAP88-PC, for the radionuclides released. The total sum of fractions was estimated to be 1.1E-04 and indicates that exposures to offsite public from gaseous effluents were much less than 1% of the 10 CFR 20, Appendix B, Table 2, Col. 1 values for all offsite receptors including the site boundary. It is noted that the location of the maximum airborne concentration for a given radionuclide does not necessarily correspond to the MEI location. This is due primarily to the fact that the maximum concentrations for individual nuclides can vary due to large differences in values input into the dispersion model for each of the effective stacks—such inputs include stack height, stack diameter, flow rate, and total radionuclide activities released per stack. Another reason for the disparity is the fact that the MEI dose includes both inhalation and ingestion pathways.

Table 2. Maximum Predicted Airborne Concentrations at or Beyond the Site Boundary

Maximum Predicted Airborne Concentrations at or Beyond the Site Boundary					
Nuclide	Maximum Concentration (μCi/mL)	Concentration Location		10 CFR 20, App. B, Table 2, Col. 1 Value (μCi/mL)	Ratio of Maximum Concentration to 10 CFR 20 Value
		Sector	Dist. (m)		
⁹⁹ Tc	7.3E-17	NNE	300	9.E-10	8.1E-08
²²⁸ Th	1.6E-20	NNE	350	2.E-14	8.0E-07
²³⁰ Th	1.5E-20	NNE	300	2.E-14	7.5E-07
²³¹ Th	8.4E-19	NNE	300	9.E-09	9.3E-11
²³² Th	1.5E-20	NNE	350	4.E-15	3.8E-06
²³⁴ U	5.1E-18	NNE	300	5.E-14	1.0E-04
²³⁵ U	1.5E-19	NNE	500	6.E-14	2.5E-06
²³⁸ U	2.0E-20	NNE	550	6.E-14	3.3E-07
Sum of Fractions:					1.1E-04

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**86 Crow Butte Road
P.O. Box 169
Crawford, Nebraska 69339-0169**

**(308) 665-2215
(308) 665-2341 – FAX**

February 24, 2011

Mr. Keith J. McConnell, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Mailstop T8-F5
Washington, DC 20555-0001

Subject: Semiannual Radiological Effluent and Environmental Monitoring Report
Source Materials License No. SUA-1534, Docket No. 40-8943

Dear Sir or Madam:

Enclosed please find one copy of the Semiannual Radiological Effluent and Environmental Monitoring Report for the Crow Butte Uranium Project. The report is provided in accordance with License Condition 12.1 of Source Materials License SUA-1534 and 10 CFR Part 40. This report covers the third and fourth quarters of 2010.

If you have any questions concerning the report, please feel free to call me at (307) 316-7595.

Sincerely,
CAMECO RESOURCES

A handwritten signature in black ink, appearing to read 'T. Young'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Thomas P. Young
Vice-President, Operations

cc: NRC Region IV
Jenny Coughlin – NDEQ, Lincoln Office
CBO File

ec: CR – Cheyenne Office

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**CROW BUTTE URANIUM PROJECT
RADIOLOGICAL EFFLUENT
AND
ENVIRONMENTAL MONITORING
REPORT**

for

THIRD AND FOURTH QUARTERS, 2010

USNRC Source Materials License SUA 1534

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

Table of Contents

1 WATER QUALITY MONITORING DATA..... 1

1.1 Excursion Monitoring 1

1.2 Water Supply Wells and Surface Water 2

2 OPERATIONAL..... 2

2.1 Production Data Summary 2

2.2 Wastewater Summary 3

2.3 Effluent Release 3

2.4 Restoration 4

3 ENVIRONMENTAL MONITORING..... 5

3.1 Air Monitor Stations 5

3.2 TLD Monitors 5



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

1 WATER QUALITY MONITORING DATA

1.1 Excursion Monitoring

Biweekly excursion monitoring in the shallow aquifer and perimeter monitor wells was continued in Mine Units 2 through 10 during the third and fourth quarters of 2010. Excursion monitoring for Mine Unit 11 began on November 1, 2010. Injection of lixiviant into Mine Unit 11 began on November 17, 2010.

PR-15 and IJ-13 remain on excursion status. These monitor wells are associated with Mine Units 2 and 3, which are currently undergoing groundwater restoration.

On September 26, 2006, Mine Unit 2 perimeter monitor well PR-15 was placed on excursion status. PR-15 is a baseline restoration well in Mine Unit 1 that was chosen to monitor the boundary of Mine Unit 2 following the approval of restoration. The current restoration activity in Mine Unit 2 adjacent to PR-15 includes the injection of permeate. IJ-13 has remained on excursion status since December 27, 2002. Due to the geometry of Mine Units 2 and 3, CBO is of the opinion that PR-15 will continue to exhibit the same trend as IJ-13 until Mine Units 2 and 3 can be fully restored along the perimeter of Mine Unit 1.

PR-8, a Mine Unit 2 perimeter monitor well, was successfully removed from excursion status on July 27, 2010 as a result of continued restoration along the perimeter of Mine Unit 2. This well had been on excursion status since December 23, 2003.

CM8-12 was placed on excursion status on July 8, 2010 due to over injection of lixiviant. CM8-12 was successfully removed from excursion status on August 20, 2010.

High ground water levels due to a significant amount of precipitation received at the site in the spring caused several shallow monitor wells in Mine Units 6 and 8 to exceed the excursion parameters. The mining wells nearest these wells were successfully mechanically integrity tested to verify that the exceedance of the excursion parameters is due to natural conditions and not from an operational problem.

Excursion reports have been submitted to NRC as required in License Condition 12.2. Complete excursion monitoring results are available on site for inspection. A summary table for monitor wells on excursion status during the second half of 2010 follows.

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

Monitor Well ID	Date On Excursion	Date Off Excursion	Biweekly Sampling Resumed	Causal Factor(s)
PR-8	23 Dec 03	27 July 10	11 Aug 10	Wellfield geometry
IJ-13	27 Dec 03			Wellfield geometry
PR-15	26 Sep 06			Wellfield geometry
SM6-20	15 Mar 10	1 Sep 10	13 Sep 10	High water table
SM8-6	12 Apr 10	1 Sep 10	13 Sep 10	High water table
SM6-23	16 Jun 10	30 Jul 10	11 Aug 10	High water table
SM6-28	16 Jun 10	30 Jul 10	11 Aug 10	High water table
SM8-28	16 Jun 10	13 Aug 10	25 Aug 10	High water table
SM6-21	22 Jun 10	11 Aug 10	13 Sep 10	High water table
SM8-5	22 Jun 10	4 Aug 10	16 Aug 10	High water table
CM8-12	8 July 10	20 Aug 10	1 Sep 10	Over Injection

1.2 Water Supply Wells and Surface Water

Summary sheets of quarterly radiological analytical data for the reporting period from all surface waters and water supply wells within one kilometer of the active wellfield boundary are included in Appendix A.

The reported radiological data are within the expected ranges for each well and surface water sampling points. Samples were obtained from all sample locations with the exceptions noted in Appendix A.

2 OPERATIONAL

2.1 Production Data Summary

Mining operations continued through the third and fourth quarters of 2010. The average operating production flow rate was 7,080 gpm for the third quarter and 6,115 gpm for the fourth quarter. Injection and production totals from the totalizers and the calculated bleed totals for the reporting period are included in Appendix B.

CAMECO RESOURCES CROW BUTTE OPERATION



Second Half 2010 Semiannual Radiological Effluent and Environmental Monitoring Report

2.2 Wastewater Summary

The total volume of wastewater discharged to the ponds was 836,009 gallons during the third quarter and 1,037,710 gallons during the fourth quarter. Currently, all five evaporation ponds contain wastewater.

Wastewater that is not disposed of in the evaporation ponds is injected into the Deep Disposal Well (DDW). Currently, the well is operated on a nearly continuous basis and 41,977,289 gallons of wastewater was injected into the well during the second half of 2010. A summary of the total volume of wastewater injected and the average radionuclide content is contained in Appendix D.

2.3 Effluent Release

10 CFR §40.65 requires licensees to report quantities of radionuclides in liquid and gaseous effluent releases to the environment. In the Application for Renewal of Source Materials License SUA-1534, submitted December 1995, Table 7.3(A) presented calculations of the annual radon emissions for the Crow Butte Plant. These calculations assumed a 7.04×10^{-4} Curies/m³ radon release from leaching operations and the radon release calculations for the second half of 2010 use this release rate estimate.

During the third quarter, production occurred at an average flow rate of 7,080 gpm (26,801 lpm). Production was maintained nearly continuously for 92 days during the third quarter with an operating factor of 99.7%. The production flow for the third quarter results in a calculated radon release of 1,794 Curies. During the fourth quarter, production occurred at an average flow rate of 6,115 gpm (23,140 lpm). Production was maintained nearly continuously for 92 days during the second quarter with an operating factor of 100.0%. The production flow for the fourth quarter results in a calculated radon release of 1,554 Curies. Calculations for radon release from production operations are shown in Appendix E.

Additional wells were brought on line during the second half of 2010. Calculations for the start-up of 8.2 acres of a new wellfield are shown in Appendix E. The calculated radon released from start-up of 8.2 acres is 10 Curies.

The total radon emission due to leaching operations from the Crow Butte plant for the second half of 2010 was 3,359 Curies. This calculated release rate is comparable with the releases estimated in CBR's License Renewal Application.

Radon gas is also released from restoration activities. For restoration water that is treated by ion exchange only, the radon concentration is 0.697 μ Ci/l. Of the total restoration production flow it is assumed that 25% of the radon is released through wellfield loss and 10% of the remaining radon is released during pressurized ion exchange treatment. For water that is treated by reverse osmosis, it

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

is assumed that 100% of the remaining radon is released. For water treated by reverse osmosis the radon concentration is 0.470 $\mu\text{Ci/l}$ after adjusting for wellfield loss and ion exchange loss.

During the second half of 2010, a total of 217,821,749 gallons (824,542,448 l) of restoration water was produced from Mine Units 2, 3, 4, 5, and 6. Based upon an estimated radon concentration of 0.697 $\mu\text{Ci/l}$, the total amount of radon in the restoration solution was calculated to be 575 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 144 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 43 Curies. For water that is treated by reverse osmosis, it is assumed that 100% of the remaining radon is released. For water treated by reverse osmosis the radon concentration is 0.470 $\mu\text{Ci/l}$ after adjusting for wellfield loss and ion exchange loss.

Of the total amount of restoration water produced in the second half of 2010, 102,922,003 gallons (389,600,950 l) of the water was treated by reverse osmosis. The total estimated radon release from reverse osmosis treatment was 183 Curies. An additional 5.4 acres of wellfields were placed in restoration during the second half of 2010. The calculated radon released from start-up of 5.4 acres is 7 Curies. Calculations for the start-up of 5.4 acres of a wellfield placed in restoration are shown in Appendix E.

Based upon the calculations shown in Appendix E, the total estimated semiannual radon emission for the second half of 2010 from restoration activities was 377 Curies. This resulted in a total estimated radon release from the Crow Butte project during the second half of 2010 of 3,735 Curies.

2.4 Restoration

On October 28, 2010 Mine Unit 6 was placed into restoration. A notice of cessation of mining and a request for an alternate decommissioning schedule was submitted to NRC on December 21, 2010.

Restoration activities continued in Mine Units 2, 3, 4, and 5 during the second half of 2010. Permeate continued to be injected into Mine Units 2 and 3. Mine Units 4 and 5 remained in IX treatment. Restoration injection and production totals are included in Appendix B. Restoration injection pressures are included in Appendix C.



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

3 ENVIRONMENTAL MONITORING

3.1 Air Monitor Stations

Seven air monitoring stations are used to monitor the Crow Butte Plant. Ambient radon-222 concentrations and radionuclide concentrations in air for each monitoring site are listed in Appendix F. All air monitoring results were within expected historical ranges.

3.2 TLD Monitors

Environmental TLD monitors are located at each air monitoring station. The results of the area TLD monitors fall within the expected ranges and are listed in Appendix G.

3.3 Annual Dose to the Public (2010)

10 CFR 20.1301 requires that each NRC licensee conduct their operations in such a manner that the total effective dose equivalent (TEDE) to members of the public does not exceed 0.1 rem (100 mrem) in a year, and that the dose from external sources in any unrestricted area does not exceed 0.002 rem (2 mrem) in any one hour.

Additionally, 10 CFR 20.1302 requires that each NRC licensee annually show compliance with the above described dose limits by demonstrating one of the following:

- 1) Show by actual measurement or calculation that the TEDE to the public does not exceed 100 mrem; or
- 2) Show that the annual average concentrations of radioactive effluents released at the restricted area boundary do not exceed the values in Table 2 of Appendix B to 10 CFR 20 and that the external dose to an individual continuously present in an unrestricted area would not exceed 2 mrem in an hour and 50 mrem in a year.

The Dose to the Public table in Appendix F compares the 2010 annual average concentrations of radioactive effluents from the Crow Butte Project to the 10 CFR 20, Table 2 limits of Appendix B. The table also shows the calculated TEDE at unrestricted area sampling locations (AM-2 – Nearest Downwind Residence) and the Site Area location (AM – 8) assuming a person was continuously in the area for the entire year. As shown in the table, all measured concentrations of radioactive effluents are less than the Table 2 limits of Appendix B, confirming compliance with 10 CFR 20.1302(b)(2)(i) and (ii). Additionally, the calculated TEDE for the two locations confirms compliance with 10 CFR 20.11302(b)(1).

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**Second Half 2010 Semiannual Radiological Effluent
and Environmental Monitoring Report**

3.4 Stream Sediments

Sediment samples are collected from three locations on Squaw Creek (S-1, S-2, and S-5), two locations on English Creek (E-1 and E-2 Composite, and E-5), and from three impoundments on English Creek (I-3, I-4, and I-5) on an annual basis during the fourth quarter. The results of sediment sampling for 2010 are included in Appendix H.

The concentration of natural uranium at the upper end of English Creek was above the regional background levels. CBR has noted these elevated concentrations in the English Creek drainage during preoperational monitoring, which indicates that these levels are anomalous natural background concentrations. Composite samples obtained from E-1 and E-2 as part of the preoperational sampling program from 1982 through 1986 had average results with elevated natural uranium (3.4 pCi/g) and lead-210 (1.4 pCi/g) when compared with the other surface water sample locations. Samples obtained in 1998 before mining operations began in this area showed similar elevated uranium concentrations.

This sample location is in a wetland area in the upper course of English Creek. The area has a large amount of organic matter and low water flows as compared with the other surface water sampling locations for the project. CBR believes that the upper courses of English Creek are an area with reducing conditions that favor deposition of radionuclides. Appendix H contains a trend graph for English Creek sediment sample points since 1998 that shows the elevated uranium concentrations noted in past sediment samples along with a trend graph for Squaw Creek showing the elevated uranium concentrations upstream from the current operation.

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

Third Quarter, 2010

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM μ Ci/ml	RADIUM-226 pCi/l	RADIUM-226 precision \pm
Well #8	09/09/10	0.0120	8.50E-09	0.28	0.14
Well #11	09/03/10	0.0068	4.60E-09	0.18	0.13
Well #12	09/09/10	0.0035	2.40E-09	ND	0.11
Well #26	09/03/10	0.0060	4.10E-09	ND	0.12
Well #28	09/09/10	0.0058	4.00E-09	0.19	0.13
Well #41	09/22/10	0.0068	4.60E-09	ND	0.14
Well #61	09/03/10	ND	ND	4.1	0.41
Well #63	09/22/10	0.0180	1.20E-08	0.31	0.16
Well #66	09/22/10	0.0240	1.60E-08	0.64	0.21
Well #125	09/21/10	0.0054	3.60E-09	ND	0.12
Well #129	09/09/10	0.0054	3.70E-09	ND	0.13
Well #131	09/24/10	0.0050	3.40E-09	0.22	0.11
Well #133	09/22/10	0.0089	6.00E-09	0.26	0.15
Well #134	09/09/10	0.0072	4.90E-09	0.31	0.15
Well #135	09/09/10	0.0140	9.50E-09	0.31	0.15
Well #138	09/03/10	0.0200	1.40E-08	0.38	0.16
Well #140	09/09/10	0.0095	6.40E-09	ND	0.12
Well #435	09/22/10	0.0073	4.90E-09	0.33	0.17
Drinking Water Well	09/21/10	0.0065	4.40E-09	0.18	0.14
Stream S-1	09/20/10	0.0042	2.80E-09	0.3	0.15
Stream S-2	09/20/10	0.0041	2.80E-09	0.19	0.13
Stream S-5	09/20/10	0.0048	3.20E-09	0.27	0.14
Stream E-1 & E-2	09/20/10	0.0120	8.00E-09	0.52	0.18
Stream E-5	09/21/10	0.0026	1.80E-09	ND	0.11
Impoundment I-3	09/20/10	0.0050	3.40E-09	0.46	0.16
Impoundment I-4	09/20/10	0.0420	2.80E-08	0.3	0.12
Impoundment I-5	09/21/10	0.0035	2.40E-09	0.27	0.12
Reporting Limit		0.0003	2.00E-10	0.2	-

ND-Not detected at the reporting limit

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

Fourth Quarter, 2010

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM μCi/ml	RADIUM-226 pCi/l	RADIUM-226 precision \pm
Well #8	11/19/10	0.0130	8.70E-09	0.24	0.12
Well #11	11/18/10	0.0066	4.50E-09	ND	0.09
Well #12	11/19/10	0.0031	2.10E-09	ND	0.08
Well #26	11/11/10	0.0068	4.60E-09	ND	0.09
Well #28	11/19/10	0.0056	3.80E-09	0.15	0.1
Well #41	11/11/10	0.0046	3.10E-09	ND	0.08
Well #61	11/19/10	ND	ND	3.1	0.31
Well #63	11/11/10	0.0130	8.80E-09	0.17	0.11
Well #66	11/18/10	0.0210	1.40E-08	0.24	0.12
Well #125	11/11/10	0.0054	3.70E-09	ND	0.08
Well #129	11/19/10	0.0052	3.50E-09	ND	0.09
Well #131	11/19/10	0.0036	2.40E-09	ND	0.08
Well #133	11/11/10	0.0065	4.40E-09	0.14	0.1
Well #134	11/19/10	0.0070	4.70E-09	0.23	0.12
Well #135	11/19/10	0.0130	8.80E-09	0.17	0.1
Well #138	11/18/10	0.0130	9.00E-09	0.26	0.12
Well #140	11/19/10	0.0080	5.40E-09	ND	0.1
Well #435	11/11/10	0.0053	3.60E-09	ND	0.08
Drinking Water Well	11/19/10	0.0055	3.80E-09	ND	0.08
Well #38	12/10/10	0.0029	2.00E-09	ND	0.08
Stream S-1	12/10/10	0.0035	2.30E-09	ND	0.08
Stream S-2	12/10/10	0.0034	2.30E-09	ND	0.06
Stream S-5	12/10/10	0.0039	2.60E-09	ND	0.06
Stream E-1 & E-2	12/10/10	0.0240	1.70E-08	ND	0.1
Stream E-5	12/29/10	0.0110	7.20E-09	ND	0.1
Impoundment I-3	12/29/10	0.0440	3.00E-08	ND	0.1
Impoundment I-4	12/10/10	0.0320	2.20E-08	N	0.1
Impoundment I-5	12/30/10	0.0120	8.40E-09	ND	0.1
Reporting Limit		0.0003	2.00E-10	0.2	-

ND-Not detected at the reporting limit

Appendix B

Plant Production and Waste Totals

Third and Fourth Quarter, 2010

WASTE VOLUME Third Quarter 2010						
TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND
July	272,950	3,173,085	3,654,759	525,366	6,827,844	98,229
August	202,430	3,801,669	3,583,781	568,248	7,485,430	58,270
September	135,480	3,725,221	3,254,451	519,838	6,979,872	70,650
TOTAL GAL. EQQ	610,860	10,799,975	10,492,971	1,613,452	21,292,946	225,149

TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS =	836,009 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO DEEP WELL =	21,292,946 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	22,128,955 GALLONS
TOTAL 3rd QTR VOLUME WF BLEED FROM WELLFIELDS =	20,290,354 GALLONS

WELLFIELD BLEED Third Quarter 2010			
MONTH	July	August	September
BLEED	0.9%	1.1%	1.1%

PLANT FLOW Third Quarter 2010	
AVERAGE OPERATING FLOW RATE =	7,080 GPM EQQ
TOTAL GALLONS PRODUCED =	938,009,389 GALLONS EQQ
TOTAL GALLONS INJECTED =	926,598,554 GALLONS EQQ

	TOTAL GALS. PRODUCED	TOTAL GALS. INJECTED	HOURS IN MONTH	HOURS IN PRODUCTION	AVERAGE PROD. GPM	AVERAGE COM INJ GPM	AVERAGE REST INJ GPM	HRS. DOWN TIME
Prev. YTD	1,798,661,557	1,773,371,553	4,344	4,344	6,893	6,804	643	0
July	322,446,080	319,000,045	744	738	7,223	7,146	721	6
August	313,281,482	309,177,383	744	744	7,018	6,928	788	0
September	302,281,827	298,421,126	720	720	6,997	6,908	627	0
EQQ TOTAL	938,009,389	926,598,554	2,208	2,202	7,080	6,994	712	6
YTD TOTAL	2,734,670,946	2,699,970,107	8,552	8,546	6,956	6,868	666	6

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL MUIV GALS PRODUCED	TOTAL MUV GALS PRODUCED	MUII BLEED TO WASTE	MUIII BLEED TO WASTE	MUIV BLEED TO WASTE	MUV BLEED TO WASTE
Prev. YTD	11,296,085	79,145,903	10,297,853	87,783,889	-9,235,064	4,139,355	9,875,820	18,359,666
July	1,395,350	14,850,635	2,792,590	18,201,440	-1,128,111	-484,858	2,792,362	4,118,771
August	1,331,211	14,883,512	5,250,633	17,897,730	-1,399,926	-487,393	3,667,183	2,494,814
September	1,798,918	11,436,980	3,245,100	12,722,522	-922,695	-480,369	2,222,922	1,288,223
EQQ TOTAL	4,523,479	41,171,127	11,288,323	48,821,692	-3,450,732	-1,432,620	8,682,467	7,899,808
YTD TOTAL	15,819,564	120,317,030	21,585,976	136,605,381	-12,685,796	2,708,735	18,558,287	24,259,474

	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED
Prev. YTD	23,799,306	79,654,935	0
July	3,830,392	15,396,745	0
August	3,559,394	15,028,625	0
September	3,230,084	12,325,118	0
EQQ TOTAL	10,419,870	42,750,488	0
YTD TOTAL	34,219,176	122,405,423	0

WASTE VOLUME
Fourth Quarter 2010

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND
October	150,680	3,453,280	3,907,658	531,792	7,360,919	68,750
November	183,400	3,331,868	3,153,168	558,584	6,484,832	15,900
December	489,750	3,208,288	3,832,328	532,232	6,838,592	121,250
TOTAL GAL. EQQ	833,810	9,991,192	10,893,151	1,622,608	20,684,343	203,900

TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS =	1,037,710 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO DEEP WELL=	20,684,343 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	21,722,053 GALLONS
TOTAL 4th QTR VOLUME WF BLEED FROM WELLFIELDS=	19,895,545 GALLONS

WELLFIELD BLEED
Fourth Quarter 2010

MONTH	October	November	December
BLEED	1.1%	1.2%	1.1%

PLANT FLOW
Fourth Quarter 2010

AVERAGE OPERATING FLOW RATE=	6,115 GPM EQQ
TOTAL GALLONS PRODUCED=	810,169,738 GALLONS EQQ
TOTAL GALLONS INJECTED=	799,344,734 GALLONS EQQ

	TOTAL GALS. PRODUCED	TOTAL GALS. INJECTED	HOURS IN MONTH	HOURS IN PRODUCTION	AVERAGE PROD. GPM	AVERAGE COM INJ GPM	AVERAGE REST INJ GPM	HRS. DOWN TIME
Prev. YTD	2,734,670,948	2,899,970,107	6,552	6,548	6,058	6,888	668	0
October	272,092,018	268,488,098	744	744	6,095	6,015	818	0
November	253,442,842	249,917,778	720	720	5,887	5,785	724	0
December	284,834,878	280,938,882	744	744	6,378	6,293	928	0
EQQ TOTAL	810,169,738	799,344,734	2,208	2,208	6,115	6,034	824	0
YTD TOTAL	3,544,840,882	3,499,314,841	8,760	8,754	6,744	6,658	708	0

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL MUIV GALS PRODUCED	TOTAL MUV GALS PRODUCED	TOTAL MUVI GALS PRODUCED	MUII BLEED TO WASTE	MUIII BLEED TO WASTE	MUIV BLEED TO WASTE	MUV BLEED TO WASTE	MUVI BLEED TO WASTE
Prev. YTD	15,819,564	120,317,030	21,585,978	138,805,381	0	-12,685,798	2,708,735	18,558,287	16,359,888	16,359,887
October	3,148,188	13,454,457	5,828,573	15,898,818	0	-541,314	-1,214,517	2,513,601	874,388	0
November	2,491,804	7,958,127	6,954,907	15,881,835	135,907	-123,287	-2,302,384	2,008,830	2,332,258	135,815
December	4,028,337	8,403,887	14,733,834	12,704,381	802,895	-125,703	-1,825,508	124,497	76,738	802,688
EQQ TOTAL	9,864,127	29,814,451	27,517,114	44,682,834	938,802	-790,284	-5,142,407	4,844,928	3,283,382	938,481
YTD TOTAL	25,483,891	150,131,461	49,103,090	180,888,215	938,802	-13,478,080	-2,435,672	23,203,215	19,843,048	17,295,148

	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED
Prev. YTD	34,219,178	122,405,423	0
October	3,883,292	14,108,259	0
November	3,128,799	11,965,808	0
December	3,607,959	13,057,430	0
EQQ TOTAL	10,620,050	39,131,565	0
YTD TOTAL	44,839,228	161,537,018	0

Appendix C

Wellfield Injection Pressures

Third and Fourth Quarter, 2010

WELLFIELD INJECTION PRESSURE - PSI

Third Quarter 2010

	WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	40	42	45	65	35	37	29	70	11	16
August	39	42	43	46	33	38	27	37	11	15
September	31	56	34	44	26	54	20	28	7	11
AVERAGE	37	56	41	65	31	54	25	70	10	16
	WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	20	22	0	0	0	0	0	0	0	2
August	20	24	68	80	0	0	0	0	0	0
September	15	24	61	87	0	0	0	0	0	0
AVERAGE	19	24	43	87	0	0	0	0	0	2
	WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	0	0	0	0	0	0	77	80	56	74
August	0	0	33	90	0	0	79	88	57	66
September	1	35	60	78	0	0	68	90	50	67
AVERAGE	0	35	31	90	0	0	75	90	54	74
	WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	69	77	77	81	63	70	83	88	87	89
August	72	83	78	85	65	74	83	85	88	90
September	63	81	65	87	57	75	83	84	87	90
AVERAGE	68	83	73	87	61	75	83	88	87	90
	WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	88	90	93	97	93	95	88	92	89	94
August	89	91	91	96	92	94	89	91	90	93
September	90	98	95	96	93	94	90	94	89	90
AVERAGE	89	98	93	98	93	95	89	94	89	94
	WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	67	76	64	90	64	73	39	48	45	53
August	68	72	63	75	65	70	40	44	46	52
September	68	75	64	73	66	73	41	46	47	53
AVERAGE	68	76	63	90	65	73	40	48	46	53
	WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	44	51	87	94	89	98	2	65	83	95
August	46	52	87	90	88	92	0	0	92	94
September	47	52	85	87	86	88	0	0	92	95
AVERAGE	46	52	87	94	88	98	1	65	92	95
	WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	92	95	89	93	95	98	92	95	95	98
August	93	95	90	94	95	98	93	96	95	100
September	94	95	91	95	95	96	94	95	96	98
AVERAGE	93	95	90	95	95	98	93	96	95	100
	WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #46A	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	95	96	94	96	94	96	87	95	82	92
August	95	96	95	97	95	98	87	90	82	96
September	96	99	95	96	95	96	81	85	87	90
AVERAGE	95	99	94	97	95	98	85	95	84	96
	WF HOUSE #47		WF HOUSE #47A		WF HOUSE #48		WF HOUSE #49		WF HOUSE #50	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	94	96	82	84	73	90	64	94	61	67
August	95	96	83	89	69	75	60	64	65	72
September	95	97	85	94	65	66	60	61	62	64
AVERAGE	95	97	83	94	69	90	61	94	63	72
	WF HOUSE #51		WF HOUSE #52		WF HOUSE #53		WF HOUSE #54			
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM		
July	70	74	67	72	67	88	48	48		
August	70	74	67	82	68	84	45	50		
September	66	69	63	66	61	65	40	42		
AVERAGE	68	74	65	82	64	88	43	50		

WELLFIELD INJECTION PRESSURE - PSI
Fourth Quarter 2010

	WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	36	40	40	53	29	36	23	27	7	11
November	29	38	33	49	23	41	22	24	7	10
December	28	32	31	35	21	26	22	30	6	10
AVERAGE	31	40	35	53	24	41	22	30	7	11
	WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	17	20	75	78	39	68	0	0	0	0
November	16	18	73	76	63	76	2	63	1	4
December	16	24	66	76	58	69	56	64	1	4
AVERAGE	16	24	71	78	53	76	20	64	1	4
	WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	75	79	0	0	84	86	64	78
November	0	0	72	76	0	0	79	82	61	64
December	0	0	65	78	0	0	79	86	58	67
AVERAGE	0	0	71	79	0	0	81	86	61	78
	WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	79	84	82	85	72	75	73	86	78	92
November	76	82	79	84	69	73	40	86	28	89
December	70	81	75	90	65	75	74	85	32	96
AVERAGE	75	84	79	90	69	75	63	86	46	96
	WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	80	94	80	97	78	94	80	94	79	94
November	1	5	6	11	0	0	0	0	0	2
December	3	13	36	97	0	0	0	0	0	2
AVERAGE	28	94	41	97	26	94	27	94	27	94
	WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	65	78	64	90	56	74	32	48	32	54
November	62	78	59	68	56	72	31	43	34	50
December	62	68	60	66	58	66	34	40	40	47
AVERAGE	63	78	61	80	57	74	32	48	35	54
	WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	35	54	87	89	88	90	0	0	92	95
November	38	50	85	87	83	86	54	60	94	95
December	41	47	82	85	75	77	53	57	93	95
AVERAGE	38	54	84	89	82	90	35	60	93	95
	WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	93	95	93	95	93	96	89	96	92	98
November	94	95	95	99	94	95	84	94	87	96
December	94	95	94	96	94	94	92	98	95	96
AVERAGE	93	95	94	99	94	96	88	98	91	98
	WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #48A	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	92	98	91	96	72	96	84	85	90	91
November	87	97	86	95	87	96	85	94	90	93
December	96	96	95	98	95	98	84	84	90	90
AVERAGE	92	98	91	98	84	98	84	94	90	93
	WF HOUSE #47		WF HOUSE #47A		WF HOUSE #48		WF HOUSE #49		WF HOUSE #50	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	87	96	78	86	66	70	61	69	62	64
November	83	96	66	83	63	84	55	60	55	75
December	95	96	80	82	59	69	52	57	49	59
AVERAGE	88	96	75	86	63	84	56	69	52	75
	WF HOUSE #51		WF HOUSE #52		WF HOUSE #53		WF HOUSE #54			
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM		
October	68	70	67	69	64	68	41	43		
November	63	70	62	68	60	66	35	51		
December	60	61	59	61	57	59	30	38		
AVERAGE	62	70	60	69	58	68	32	51		
	WF HOUSE #60		WF HOUSE #81							
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM						
October			0	0						
November			33	52						
December			52	54						
AVERAGE			42	54						

Appendix D

Deep Disposal Well Injection Radiological Data

Third and Fourth Quarter, 2010

**Crow Butte Uranium Mine
Deep Disposal Well Injection Radiological Data**

Month	Total Gallons Injected	Average Natural Uranium (mg/l)	Total Natural Uranium Injected (mg)	Total Natural Uranium Injected (μ Ci)	Average Radium-226 (pCi/l)	Total Radium-226 Injected (μ Ci)
July-10	6,827,844	12	3.10E+08	2.10E+05	1,600	4.14E+04
August-10	7,485,430	11	3.12E+08	2.11E+05	876	2.48E+04
September-10	6,979,672	9	2.38E+08	1.61E+05	851	2.25E+04
October-10	7,360,919	9	2.51E+08	1.70E+05	964	2.69E+04
November-10	6,484,832	10	2.45E+08	1.66E+05	1,470	3.61E+04
December-10	6,838,592	14	3.62E+08	2.45E+05	931	2.41E+04
Totals	41,977,289		1.72E+09	1.16E+06		1.76E+05

Appendix E

Radon Release Calculations

Third and Fourth Quarter, 2010

Radon Effluent Release Calculation (Production and Startup)

Third Quarter 2010 Radon Release from Leaching Operations:

Curies/M3	Production Flow (liters)	Radon-222 Decay Constant	Operating Days	Operating Factor	M3/liter conversion	Hours/Day Conversion	Minutes/Hour Conversion	Total Radon Release from Leaching
7.04E-04	26,801	0.72	92	99.7%	0.001	24	60	1,794

Fourth Quarter 2010 Radon Release from Leaching Operations:

Curies/M3	Production Flow (liters)	Radon-222 Decay Constant	Operating Days	Operating Factor	M3/liter conversion	Hours/Day Conversion	Minutes/Hour Conversion	Total Radon Release from Leaching
7.04E-04	23,140	0.72	92	100.0%	0.001	24	60	1,554

Second Half 2010 Radon Release From Startup:

Curies/M3	Total Acres of New Wellfield	Meter 3/Acre Conversion	Orebody Thickness (meters)	Porosity	Total Radon Release from Startup
7.04E-04	8.2	4074	1.52	0.29	10

Total Estimated Radon Release from Production:

3,359

Radon Effluent Release Calculation (Restoration)

Second Half 2010 Radon Release From Restoration:

Total Restoration Flow (liters)	Microcuries/liter	Curies/Microcurie	Production Potential
824,542,448	0.697	1.00E-06	575

Wellfield Loss (25% of Production Potential):

144

Ion Exchange Loss (10% of Production Potential minus Wellfield Loss):

43

Reverse Osmosis Loss (100% of remaining activity at 0.470 microcuries/liter)

183

Total Reverse Osmosis Flow (liters)	Microcuries/liter	Curies/Microcurie
389,600,950	0.470	1.00E-06

Second Half 2010 Radon Release From Startup of New Restoration:

Curies/M3	Total Acres of New Wellfield	Meter 3/Acre Conversion	Orebody Thickness (meters)	Porosity	Total Radon Release from Startup
7.04E-04	5.4	4074	1.52	0.29	7

Total Estimated Radon Release from Restoration:

377

Total Estimated Radon Release, Second Half 2010:

3,735

Appendix F

Environmental Air Monitoring Results

Third and Fourth Quarter, 2010

**Crow Butte Resources, Inc.
Crow Butte Uranium Project**

Track Etch Cup Ambient Radon Concentrations

*Air Monitoring Station
No.*

Period: June 30, 2010 to January 4, 2011

	Gross Count	Average Radon Concentration (x 10 ⁻⁹ μCi/ml)	Accuracy (x 10 ⁻⁹ μCi/ml)	Percent Effluent Concentration
AM-1	139.0	0.3	0.03	3.0%
AM-2	171.0	0.5	0.04	5.0%
AM-3	148.0	0.4	0.03	4.0%
AM-4	147.0	0.4	0.03	4.0%
AM-5	176.0	0.5	0.04	5.0%
AM-6	171.0	0.5	0.04	5.0%
AM-8	170.0	0.5	0.04	5.0%
AB-1 (AM-1 Duplicate)	145.0	0.4	0.03	4.0%
AB-2 (AM-2 Duplicate)	215.0	0.7	0.05	7.0%
AB-6 (AM-6 Duplicate)	125.0	0.2	0.02	2.0%
LLD (x 10 ⁻⁹ μCi/ml)				0.2
Effluent Concentration Limit, 10 CFR 20 App B Column 2:				10

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-1

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-001 First Quarter 2010 Air Volume in mLs 5.25E+09	²³⁸ U	9.4E-15	N/A	N/A	1E-16	9E-14	1.0E+01
	²²⁶ Ra	< 1E-16	1E-17	2E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.3E-14	1E-15	2E-15	2E-15	6E-13	3.8E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-001 Second Quarter 2010 Air Volume in mLs 5.42E+09	²³⁸ U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	5E-15	9E-16	1E-15	2E-15	6E-13	8E-01

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-001 Third Quarter 2010 Air Volume in mLs 5.75E+09	²³⁸ U	4E-16	N/A	N/A	1E-16	9E-14	4E-01
	²²⁶ Ra	< 1E-16	6E-17	1E-16	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.2E-14	1E-15	2E-15	2E-15	6E-13	2.1E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-001 Fourth Quarter 2010 Air Volume in mLs 5.62E+09	²³⁸ U	< 1E-16	N/A	N/A	1E-16	9E-14	< 1E-01
	²²⁶ Ra	< 1E-16	3E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.8E-14	1E-15	2E-15	2E-15	6E-13	2.9E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-002 First Quarter 2010 Air Volume in mLs 5.05E+09	²³⁸ U	5E-16	N/A	N/A	1E-16	9E-14	5E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.7E-14	1E-15	2E-15	2E-15	6E-13	2.7E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-002 Second Quarter 2010 Air Volume in mLs 5.22E+09	²³⁸ U	1E-16	N/A	N/A	1E-16	9E-14	2E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	7E-15	9E-16	1E-15	2E-15	6E-13	1E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-002 Third Quarter 2010 Air Volume in mLs 5.54E+09	²³⁸ U	2.1E-15	N/A	N/A	1E-16	9E-14	2.3E+00
	²²⁶ Ra	< 1E-16	4E-17	8E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.2E-14	1E-15	2E-15	2E-15	6E-13	2.0E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-002 Fourth Quarter 2010 Air Volume in mLs 4.58E+09	²³⁸ U	3E-16	N/A	N/A	1E-16	9E-14	4E-01
	²²⁶ Ra	< 1E-16	4E-17	8E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.6E-14	1E-15	2E-15	2E-15	6E-13	2.7E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-003 First Quarter 2010 Air Volume in mLs 5.34E+09	^{nat} U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
	²²⁶ Ra	< 1E-16	1E-17	2E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.7E-14	1E-15	2E-15	2E-15	6E-13	4.5E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-003 Second Quarter 2010 Air Volume in mLs 5.64E+09	^{nat} U	5E-16	N/A	N/A	1E-16	9E-14	6E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	4E-15	8E-16	1E-15	2E-15	6E-13	6E-01

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-003 Third Quarter 2010 Air Volume in mLs 6.02E+09	^{nat} U	2E-16	N/A	N/A	1E-16	9E-14	3E-01
	²²⁶ Ra	< 1E-16	5E-17	9E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.2E-14	1E-15	1E-15	2E-15	6E-13	2.0E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-003 Fourth Quarter 2010 Air Volume in mLs 5.91E+09	^{nat} U	< 1E-16	N/A	N/A	1E-16	9E-14	< 1E-01
	²²⁶ Ra	< 1E-16	3E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.0E-14	1E-15	2E-15	2E-15	6E-13	3.3E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-004 First Quarter 2010 Air Volume in mLs 5.41E+09	²³⁸ U	1E-16	N/A	N/A	1E-16	9E-14	1E-01
	²²⁶ Ra	< 1E-16	3E-17	8E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	< 2E-15	3E-16	5E-16	2E-15	6E-13	< 3E-01

Note: Pb210 analysis rechecked with similar results.

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-004 Second Quarter 2010 Air Volume in mLs 5.60E+09	²³⁸ U	1.96E-14	N/A	N/A	1E-16	9E-14	2.17E+01
	²³⁵ U	1.95E-14	N/A	N/A	1E-16	9E-14	2.16E+01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	5E-15	8E-16	1E-15	2E-15	6E-13	9E-01

Note: Uranium results are reported where first row is initial analysis 7/10/2010, and the second row is the reanalysis done 8/9/2010.

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-004 Third Quarter 2010 Air Volume in mLs 5.88E+09	²³⁸ U	8E-16	N/A	N/A	1E-16	9E-14	9E-01
	²²⁶ Ra	< 1E-16	4E-17	9E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.3E-14	1E-15	1E-15	2E-15	6E-13	2.2E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-004 Fourth Quarter 2010 Air Volume in mLs 5.70E+09	²³⁸ U	1E-16	N/A	N/A	1E-16	9E-14	1E-01
	²²⁶ Ra	< 1E-16	4E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.1E-14	1E-15	2E-15	2E-15	6E-13	3.5E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-5

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-005 First Quarter 2010 Air Volume in mLs 5.31E+09	²³⁸ U	3E-16	N/A	N/A	1E-16	9E-14	3E-01
	²²⁶ Ra	< 1E-16	2E-17	4E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.8E-14	1E-15	2E-15	2E-15	6E-13	2.9E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-005 Second Quarter 2010 Air Volume in mLs 5.65E+09	²³⁸ U	4E-16	N/A	N/A	1E-16	9E-14	4E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	5E-15	8E-16	1E-15	2E-15	6E-13	8E-01

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-005 Third Quarter 2010 Air Volume in mLs 5.82E+09	²³⁸ U	1.1E-15	N/A	N/A	1E-16	9E-14	1.2E+00
	²²⁶ Ra	< 1E-16	6E-17	1E-16	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.4E-14	1E-15	2E-15	2E-15	6E-13	2.3E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-005 Fourth Quarter 2010 Air Volume in mLs 5.57E+09	²³⁸ U	3E-16	N/A	N/A	1E-16	9E-14	3E-01
	²²⁶ Ra	< 1E-16	4E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.2E-14	1E-15	2E-15	2E-15	6E-13	3.7E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10040065-006 First Quarter 2010 Air Volume in mLs 5.43E+09	²³⁸ U	1E-15	N/A	N/A	1E-16	9E-14	1E+00
	²²⁶ Ra	< 1E-16	1E-17	2E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.5E-14	1E-15	2E-15	2E-15	6E-13	2.5E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10070139-006 Second Quarter 2010 Air Volume in mLs 5.68E+09	²³⁸ U	2E-16	N/A	N/A	1E-16	9E-14	3E-01
	²²⁶ Ra	< 1E-16	2E-17	4E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	4E-15	8E-16	1E-15	2E-15	6E-13	7E-01

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C10100241-006 Third Quarter 2010 Air Volume in mLs 5.89E+09	²³⁸ U	3E-16	N/A	N/A	1E-16	9E-14	4E-01
	²²⁶ Ra	< 1E-16	3E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.4E-14	1E-15	2E-15	2E-15	6E-13	2.4E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Counting Precision µCi/mL	MDC µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
C11010238-006 Fourth Quarter 2010 Air Volume in mLs 5.68E+09	²³⁸ U	< 1E-16	N/A	N/A	1E-16	9E-14	< 1E-01
	²²⁶ Ra	< 1E-16	3E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.2E-14	1E-15	2E-15	2E-15	6E-13	3.6E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

Week for Radium-226

Day for Lead-210

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: Crow Butte Resources
PROJECT: 4th Quarter 2010 Env Air Sampling Composite
REPORT DATE: February 7, 2011

SAMPLE ID: AM-8

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Counting Precision μCi/mL	MDC μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C10040065-007 First Quarter 2010 Air Volume in mLs 4.55E+09	²³⁸ U	2E-16	N/A	N/A	1E-16	9E-14	3E-01
	²²⁶ Ra	< 1E-16	1E-17	2E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.2E-14	1E-15	2E-15	2E-15	6E-13	3.6E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Counting Precision μCi/mL	MDC μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C10070139-007 Second Quarter 2010 Air Volume in mLs 4.73E+09	²³⁸ U	5E-16	N/A	N/A	1E-16	9E-14	5E-01
	²²⁶ Ra	< 1E-16	2E-17	5E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	3E-15	1E-15	2E-15	2E-15	6E-13	5E-01

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Counting Precision μCi/mL	MDC μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C10100241-007 Third Quarter 2010 Air Volume in mLs 5.31E+09	²³⁸ U	7E-16	N/A	N/A	1E-16	9E-14	8E-01
	²²⁶ Ra	< 1E-16	4E-17	8E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	1.4E-14	1E-15	2E-15	2E-15	6E-13	2.3E+00

Quarter/Date Sampled Air Volume	Radionuclide	Concentration μCi/mL	Counting Precision μCi/mL	MDC μCi/mL	L.L.D. μCi/mL	Effluent Conc.* μCi/mL	% Effluent Concentration
C11010238-007 Fourth Quarter 2010 Air Volume in mLs 5.39E+09	²³⁸ U	2E-16	N/A	N/A	1E-16	9E-14	2E-01
	²²⁶ Ra	< 1E-16	4E-17	7E-17	1E-16	9E-13	< 1E-02
	²¹⁰ Pb	2.3E-14	1E-15	2E-15	2E-15	6E-13	3.8E+00

LLD's are from Reg. Guide 4.14

*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Year for Thorium-230

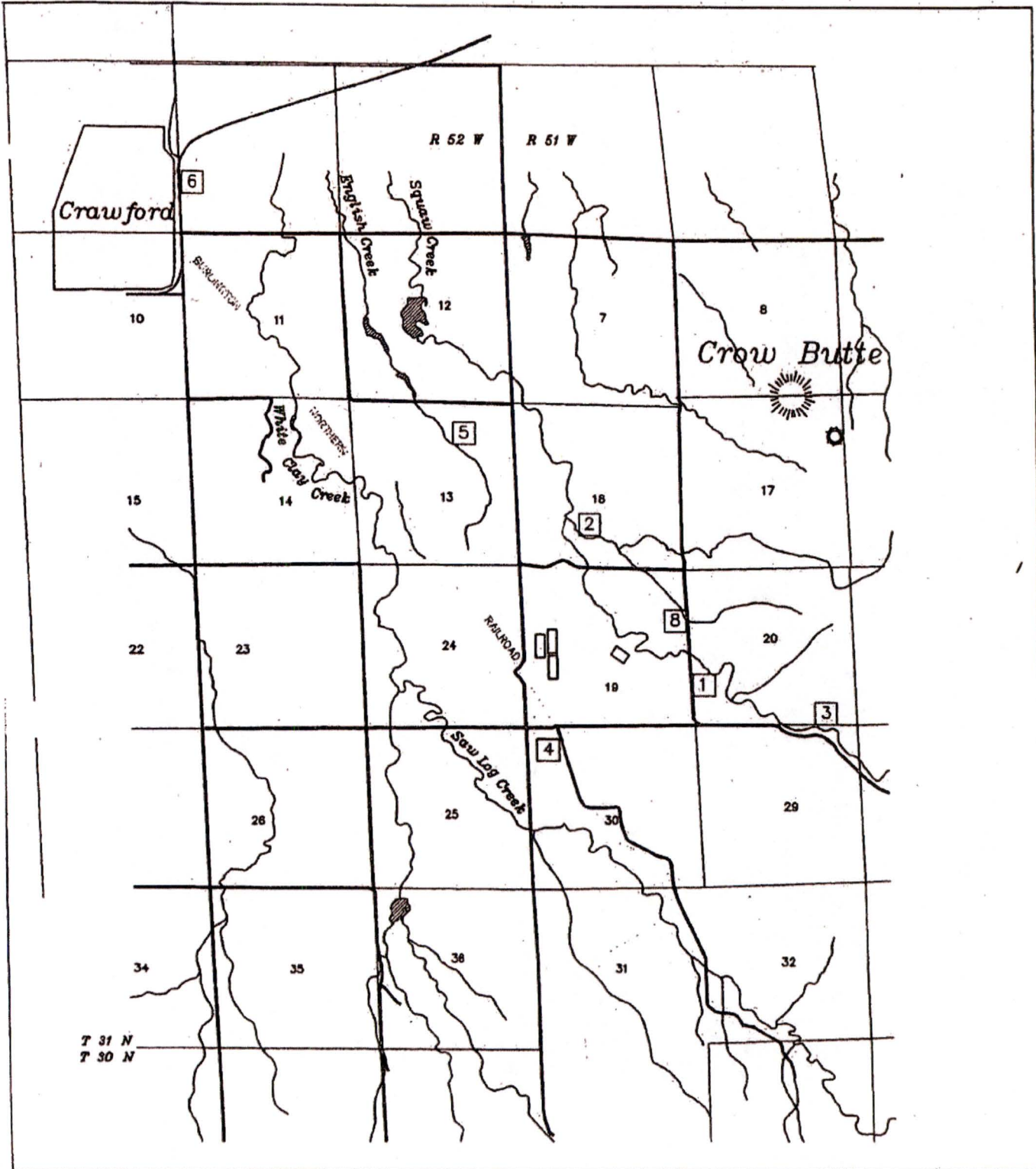
Week for Radium-226

Day for Lead-210

2010 DOSE TO PUBLIC CALCULATIONS

Monitoring Location/Parameter		Average	Average	10 CFR 20	Dose to
		Concentration/Annual Gamma Dose	Concentration/Annual Gamma Dose Above Background	App. B, Table 2 Values	the Public mrem/yr ¹
AM-6 Background	Uranium (μCi/ml)	4.E-16		9.E-14	
	Radium-226 (μCi/ml)	1.E-16		9.E-13	
	Lead-210 (μCi/ml)	1.E-14		6.E-13	
	Radon-222 (μCi/ml)	4.E-10		1.E-08	
	Gamma (mrem/yr)	40.6		--	
	TEDE (mrem/yr)				Background
AM-1 Residence	Uranium (μCi/ml)	2.E-15	2.E-15	9.E-14	1.13
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	1.E-14	0	6.E-13	0.00
	Radon-222 (μCi/ml)	4.E-10	0	1.E-08	0.00
	Gamma (mrem/yr)	39	0	--	0
	TEDE (mrem/yr)				1.13
AM-2 Nearest Downwind Residence	Uranium (μCi/ml)	7.E-16	3.E-16	9.E-14	0.18
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	1.E-14	0	6.E-13	0.00
	Radon-222 (μCi/ml)	5.E-10	1.E-10	1.E-08	0.50
	Gamma (mrem/yr)	31	0	--	0
	TEDE (mrem/yr)				0.68
AM-3 Permit Area Boundary	Uranium (μCi/ml)	3.E-16	0	9.E-14	0.00
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	2.E-14	3.E-15	6.E-13	0.21
	Radon-222 (μCi/ml)	4.E-10	0	1.E-08	0.00
	Gamma (mrem/yr)	37.8	0	--	0
	TEDE (mrem/yr)				0.21
AM-4 Permit Area Boundary	Uranium (μCi/ml)	5.E-15	5.E-15	9.E-14	2.69
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	9.E-15	0	6.E-13	0.00
	Radon-222 (μCi/ml)	4.E-10	0	1.E-08	0.00
	Gamma (mrem/yr)	28.2	0	--	0
	TEDE (mrem/yr)				2.69
AM-5 Residence	Uranium (μCi/ml)	5.E-16	1.E-16	9.E-14	0.06
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	1.E-14	0	6.E-13	0.00
	Radon-222 (μCi/ml)	5.E-10	1.E-10	1.E-08	0.50
	Gamma (mrem/yr)	38.2	0	--	0
	TEDE (mrem/yr)				0.56
AM-8 Site Boundary	Uranium (μCi/ml)	4.E-16	0	9.E-14	0.00
	Radium-226 (μCi/ml)	1.E-16	0	9.E-13	0.00
	Lead-210 (μCi/ml)	1.E-14	0	6.E-13	0.00
	Radon-222 (μCi/ml)	5.E-10	5.E-11	1.E-08	0.25
	Gamma (mrem/yr)	35.7	0	--	0
	TEDE (mrem/yr)				0.25

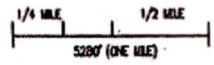
Notes: TEDE Total Effective Dose Equivalent (mrem/yr)
 < One or more of the Lower Limits of Detection (LLD) used to determine average concentration.
 1 Dose from radionuclides (m Avg concentration above background in μCi/ml) * 50 mrem
 10 CFR 20 AppB, Table 2 value in μCi/ml



8 Air Monitoring Stations

**CROW BUTTE
RESOURCES, INC.**

Environmental Air Sample Locations



— PERMIT AREA

Date: 1/5/2010

Fig. 1

Appendix G

Environmental TLD Monitoring Results

Third and Fourth Quarter, 2010

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (708) 755-7000 Facsimile: (708) 755-7016

ENVIRONMENTAL / LOW LEVEL DOSIMETRY REPORT

ADDRESS	ACCOUNT NO.	SERIES CODE
CROW BUTTE RESOURCES ATTN : RHONDA GRANTHAM PO BOX 169 CRAWFORD, NE 69339	306192	

FOR EXPOSURE PERIOD 07/01/2010

NET CUMULATIVE TOTALS (MILLIREMS)

LOCATION ID NUMBER	IDENTIFIER (CLIENT SUPPLIED)	NOTE CODE	EXPOSURE OF DOSIMETER (MILLIREMS AMBIENT DOSE EQUIVALENT)	CALENDAR QUARTER	YEAR TO DATE	PERMANENT	ADJUST-MENTS	NUMBER OF DOSIMETERS REPORTED	INCEPTION DATE OF PERM. TOTAL
			GROSS	NET					
00000	TRANSIT CONTROL		26.6						
000X9	DEPLOY CONTROL		27.0						
01001	AM-1		35.7		8.7	25.0		8	/ /
01002	AM-2		35.4		8.4	25.2		8	/ /
01003	AM-6		37.3	10.3	10.3	27.4		8	/ /
01008	AM-8		36.2	9.2	9.2	27.1		8	/ /
01009	AM-3		38.8	11.8	11.8	28.0		8	/ /
01010	AM-4		35.5	8.5	8.5	18.6		8	/ /
01011	AM-5		38.5	11.5	11.5	26.6		8	/ /

O.C. Release	Process No.	Reported Date	Date Processed	Date Received	Minimum Detectable Dose In This Process, Millirems Ambient Dose Equivalent	ONLY PAGE
--------------	-------------	---------------	----------------	---------------	--	-----------

LANDAUER

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (708) 755-7000 Facsimile: (708) 755-7016

ENVIRONMENTAL / LOW LEVEL DOSIMETRY REPORT

ADDRESS	ACCOUNT NO.	SERIES CODE
CROW BUTTE RESOURCES ATTN : RHONDA GRANTHAM PO BOX 169 CRAWFORD, NE 69339	306192	

FOR EXPOSURE PERIOD 10/01/2010

LOCATION ID NUMBER	IDENTIFIER (CLIENT SUPPLIED)	NOTE CODE	EXPOSURE OF DOSIMETER (MILLIREMS AMBIENT DOSE EQUIVALENT)		CALENDAR QUARTER	YEAR TO DATE	PERMANENT	ADJUST-MENTS	NUMBER OF DOSIMETERS REPORTED	INCEPTION DATE OF PERM. TOTAL
			GROSS	NET						
00000	TRANSIT CONTROL		28.9	4.8						
000X9	DEPLOY CONTROL		24.1	0.0						
01001	AM-1		38.3	14.2	14.2	47.5	98.4	10	/ /	
01002	AM-2		30.0	5.9	5.9	40.5	100.7	10	/ /	
01003	AM-6		37.3	13.2	13.2	48.1	98.6	10	/ /	
01008	AM-8		32.6	8.5	8.5	45.8	128.2	10	/ /	
01009	AM-3		33.9	9.8	9.8	47.6	109.7	10	/ /	
01010	AM-4		33.8	9.7	9.7	32.9	78.6	10	/ /	
01011	AM-5		35.7	11.6	11.6	46.4	107.9	10	/ /	

Q.C. Release	Process No.	Reported Date	Date Processed	Date Received	Minimum Detectable Dose In This Process, Millirems Ambient Dose Equivalent	ONLY PAGE
sb	B32002	01/24/2011	01/24/2011	01/13/2011	0.10	1

Appendix H
Sediment Monitoring Results
Fourth Quarter, 2010



www.energylab.com
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-008
Client Sample ID: E-1 and E2 Composite

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	19.2	mg/kg-dry		0.3		SW6020	10/22/10 13:21 / sml
Uranium, Activity	13.0	pCi/g-dry		0.2		SW6020	10/22/10 13:21 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.8	pCi/g-dry		0.05		E909.0M	11/08/10 00:07 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/08/10 00:07 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/08/10 00:07 / eli-cs
Radium 226	0.04	pCi/g-dry		0.003		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.006	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.003	pCi/g-dry				E903.0	11/08/10 12:01 / jb

Report Definitions:
 RL - Analyte reporting limit.
 QCL - Quality control limit.
 MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
 ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-004
Client Sample ID: Stream E5

Report Date: 11/11/10
Collection Date: 09/21/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	3.0	mg/kg-dry		0.3		SW6020	10/22/10 13:04 / sml
Uranium, Activity	2.0	pCi/g-dry		0.2		SW6020	10/22/10 13:04 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.4	pCi/g-dry		0.05		E909.0M	11/07/10 15:21 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/07/10 15:21 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 15:21 / eli-cs
Radium 226	0.04	pCi/g-dry		0.004		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.006	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.004	pCi/g-dry				E903.0	11/08/10 12:01 / jb

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



www.energylab.com
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-005
Client Sample ID: Stream S-1

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	1.0	mg/kg-dry		0.3		SW6020	10/22/10 13:08 / sml
Uranium, Activity	0.7	pCi/g-dry		0.2		SW6020	10/22/10 13:08 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.3	pCi/g-dry		0.05		E909.0M	11/07/10 17:32 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/07/10 17:32 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 17:32 / eli-cs
Radium 226	0.3	pCi/g-dry		0.008		E903.0	11/08/10 21:55 / jb
Radium 226 precision (±)	0.02	pCi/g-dry				E903.0	11/08/10 21:55 / jb
Radium 226 MDC	0.008	pCi/g-dry				E903.0	11/08/10 21:55 / jb

Report Definitions: RL - Analyte reporting limit.

QCL - Quality control limit.

MDC - Minimum detectable concentration

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



www.energylab.com
Analytical Excellence Since 1852

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-006
Client Sample ID: Stream S-2

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	1.0	mg/kg-dry		0.3		SW6020	10/22/10 13:12 / sml
Uranium, Activity	0.7	pCi/g-dry		0.2		SW6020	10/22/10 13:12 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.5	pCi/g-dry		0.05		E909.0M	11/07/10 19:44 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/07/10 19:44 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 19:44 / eli-cs
Radium 226	0.2	pCi/g-dry		0.003		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.01	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.003	pCi/g-dry				E903.0	11/08/10 12:01 / jb

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



www.energylab.com
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-007
Client Sample ID: Stream S-5

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	1.3	mg/kg-dry		0.3		SW6020	10/22/10 13:16 / sml
Uranium, Activity	0.9	pCi/g-dry		0.2		SW6020	10/22/10 13:16 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.3	pCi/g-dry		0.05		E909.0M	11/07/10 21:55 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/07/10 21:55 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 21:55 / eli-cs
Radium 226	0.06	pCi/g-dry		0.008		E903.0	11/08/10 21:55 / jb
Radium 226 precision (±)	0.01	pCi/g-dry				E903.0	11/08/10 21:55 / jb
Radium 226 MDC	0.008	pCi/g-dry				E903.0	11/08/10 21:55 / jb

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-001
Client Sample ID: Impoundment I3

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	25.1	mg/kg-dry		0.3		SW6020	10/22/10 12:31 / sml
Uranium, Activity	17.0	pCi/g-dry		0.2		SW6020	10/22/10 12:31 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.4	pCi/g-dry		0.05		E909.0M	11/07/10 08:47 / eli-cs
Lead 210 precision (±)	0.04	pCi/g-dry				E909.0M	11/07/10 08:47 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 08:47 / eli-cs
Radium 226	0.006	pCi/g-dry		0.003		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.003	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.003	pCi/g-dry				E903.0	11/08/10 12:01 / jb

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



www.energylab.com
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-002
Client Sample ID: Impoundment I4

Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	1.4	mg/kg-dry		0.3		SW6020	10/22/10 12:56 / sml
Uranium, Activity	0.9	pCi/g-dry		0.2		SW6020	10/22/10 12:56 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.3	pCi/g-dry		0.05		E909.0M	11/07/10 10:58 / eli-cs
Lead 210 precision (±)	0.03	pCi/g-dry				E909.0M	11/07/10 10:58 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 10:58 / eli-cs
Radium 226	0.2	pCi/g-dry		0.003		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.01	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.003	pCi/g-dry				E903.0	11/08/10 12:01 / jb

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



www.energylab.com
Analytical Excellence Since 1952

Helena, MT 877-472-0711 • Billings, MT 800-735-4489 • Casper, WY 888-235-0515
Gillette, WY 866-686-7175 • Rapid City, SD 888-672-1225 • College Station, TX 888-690-2218

LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Annual Sediment Samples 2010
Lab ID: C10100032-003
Client Sample ID: Impoundment 15

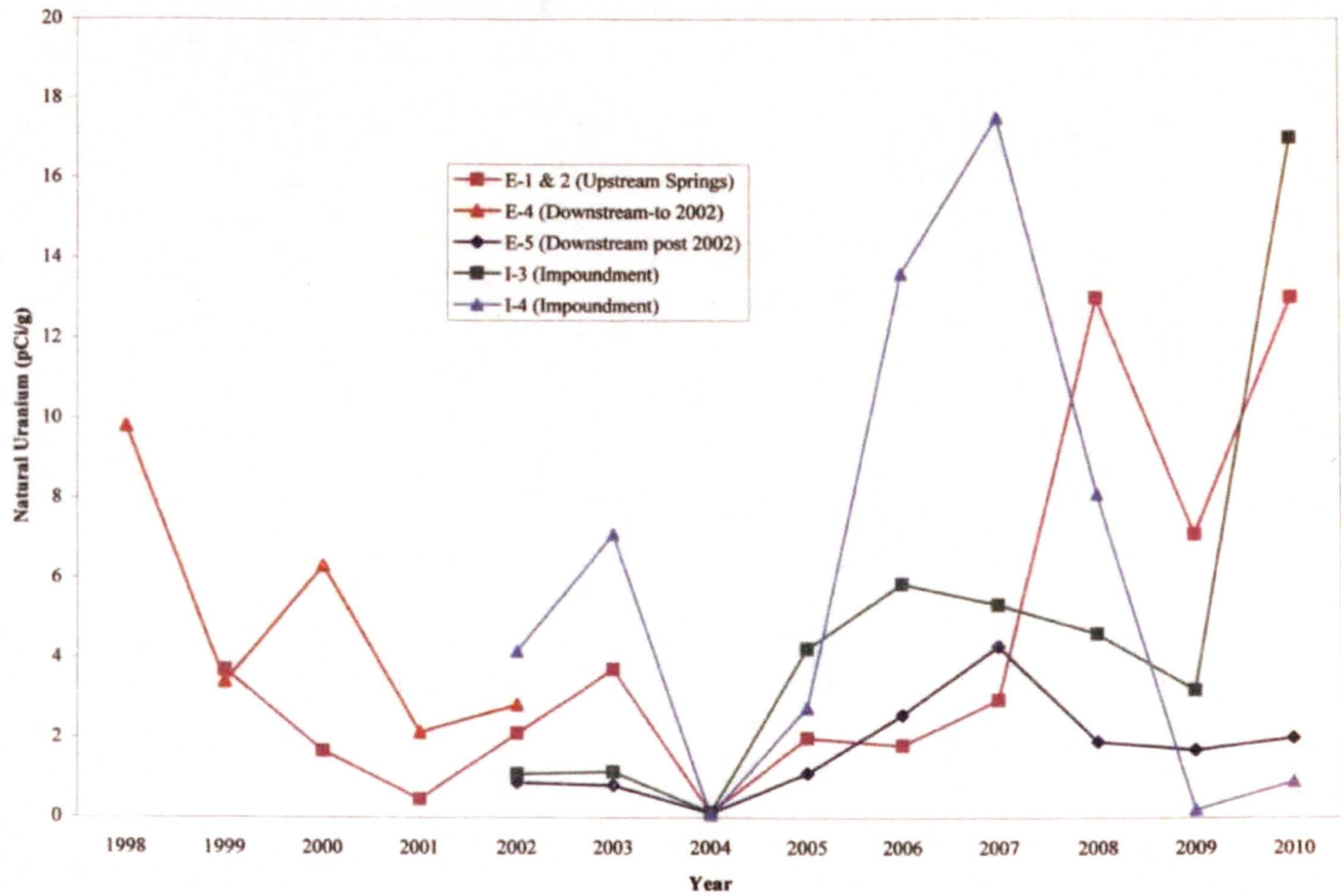
Report Date: 11/11/10
Collection Date: 09/20/10
Date Received: 10/01/10
Matrix: Sediment

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Uranium	7.3	mg/kg-dry		0.3		SW6020	10/22/10 13:00 / sml
Uranium, Activity	4.9	pCi/g-dry		0.2		SW6020	10/22/10 13:00 / sml
RADIONUCLIDES - TOTAL							
Lead 210	0.2	pCi/g-dry		0.05		E909.0M	11/07/10 13:10 / eli-cs
Lead 210 precision (±)	0.03	pCi/g-dry				E909.0M	11/07/10 13:10 / eli-cs
Lead 210 MDC	0.05	pCi/g-dry				E909.0M	11/07/10 13:10 / eli-cs
Radium 226	0.03	pCi/g-dry		0.004		E903.0	11/08/10 12:01 / jb
Radium 226 precision (±)	0.005	pCi/g-dry				E903.0	11/08/10 12:01 / jb
Radium 226 MDC	0.004	pCi/g-dry				E903.0	11/08/10 12:01 / jb

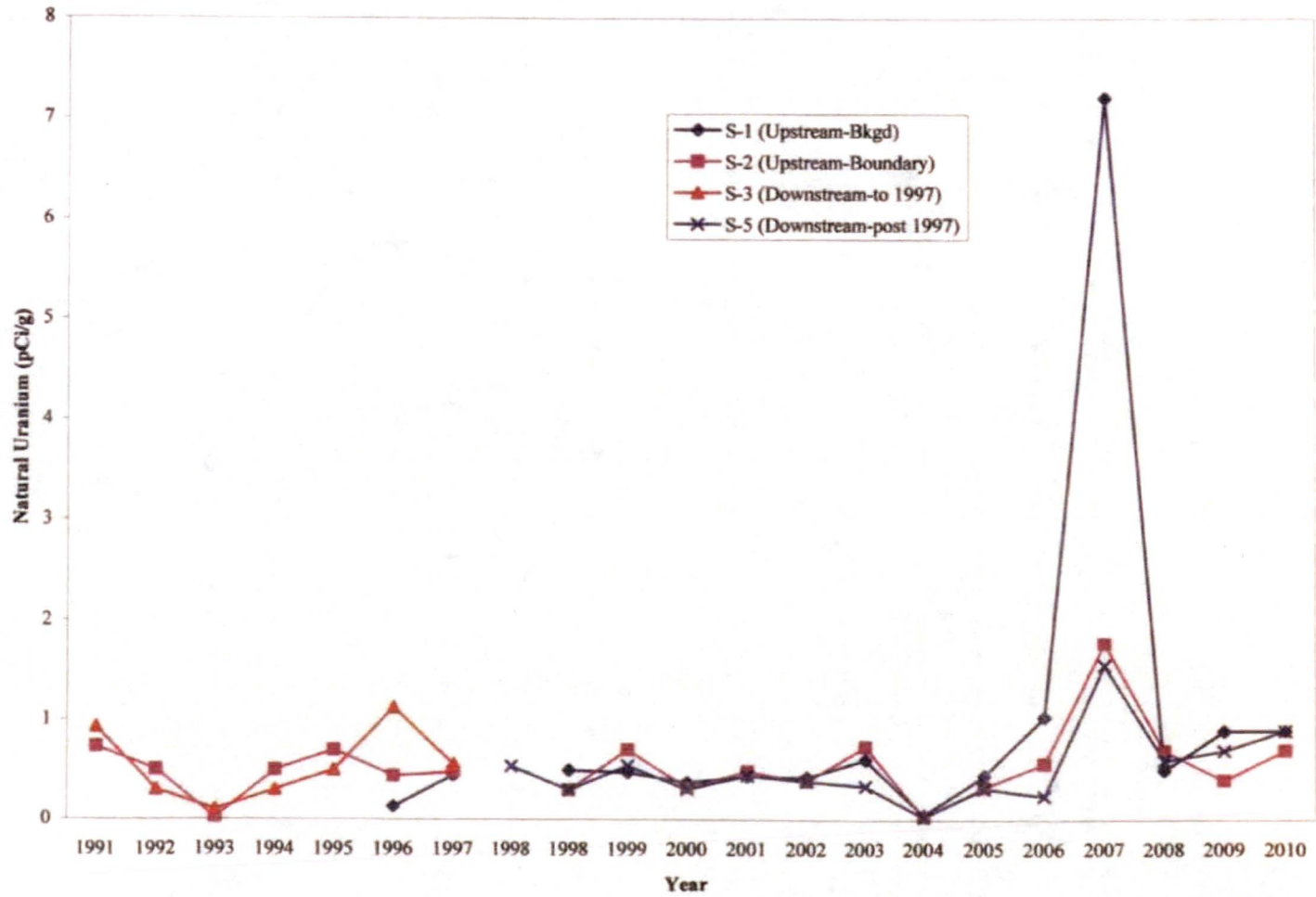
Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

English Creek Sediment Uranium Concentration



Squaw Creek Sediment Uranium Concentration



From: Kosti, Ourania
Sent: 10 Sep 2015 15:16:09 -0400
To: Brock, Terry
Subject: [External_Sender] Correction statement

Terry:
I wanted to let you know that our press office issued this correction.
Thanks,
Rania

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Date: Sept. 10, 2015

Correction regarding NRC cancellation of NAS study on cancer risks

The Nuclear Regulatory Commission (NRC) announced Tuesday that it has decided to stop work on the National Academy of Sciences (NAS) study on cancer risks in populations living near U.S. nuclear facilities. The NRC cited the long duration and high cost of the NAS pilot study, and the long duration of a subsequent nationwide study, as reasons to end the study.

Several media outlets have reported incorrectly that NAS estimated the pilot study would take 8 to 10 years to complete at a cost of \$8 million.

In fact, the NAS estimated that it would take 39 months at a cost of \$8 million to complete the pilot study of 7 nuclear facilities, which was intended to inform the feasibility, schedule, and cost of a nationwide study. NAS did not provide time or cost estimates for a nationwide study. The NRC made its own estimate that it may take 8 to 10 years to complete both the pilot and subsequent nationwide studies, and offered no additional cost estimate.

From: Kosti, Ourania
Sent: 25 Jun 2015 12:48:49 -0400
To: Brock, Terry
Subject: [External_Sender] NRSB meeting agenda
Attachments: NRSB spring 2015 meeting, public agenda, June 2015.pdf

FYI.

Thanks,

Rania

Ourania (Rania) Kosti, Ph.D.

Senior Program Officer

Nuclear and Radiation Studies Board

The National Academies

email: okosti@nas.edu

phone: 202 334 3066

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

NUCLEAR AND RADIATION STUDIES BOARD Twenty-Sixth Meeting: June 29, 2015

Keck Center of the National Academies
500 Fifth Street, NW
Washington, DC

(June 24, 2015 Draft)

Monday, June 29, 2015

OPEN SESSION Keck 100

- 1:05 pm **Call to order and welcome**
Bob Dynes, Chair, Nuclear and Radiation Studies Board
- 1:15 pm **Recent developments in commercial & defense nuclear waste management**
Mary Louise Wagner, Senior Policy Advisor, Office of the Secretary, U.S.
Department of Energy
- 1:45 pm Questions and discussion
- 1:55 pm **Proposal for a scientific symposium on 30th anniversary of the Chernobyl
accident**
Amy Berrington de González, Branch Chief and Senior Investigator, Radiation
Epidemiology Branch, Division of Cancer Epidemiology & Genetics, National
Cancer Institute
- 2:25 pm Questions and discussion
- 2:35 pm **EPA views on proposed BEIR VIII study**
Jerome S. Puskin, Director for the Center of Science and Technology, Radiation
Protection Division, U.S. Environmental Protection Agency
- 3:05 pm Questions and discussion
- 3:15 pm Break

- 3:35 pm **Adopting the international system of units for radiation measurements in the United States**
Robert C. Whitcomb, Jr., Chief, Radiation Studies Branch, Centers for Disease Control & Prevention
Armin Ansari, Health Physicist, Radiation Studies Branch, Centers for Disease Control & Prevention
- 4:05 pm Questions and discussion
- 4:15 pm **Opportunity for public comment (please sign up)**
- 4:35 pm **Adjourn open session**

From: Kosti, Ourania
Sent: 2 Sep 2015 13:53:32 -0400
To: Brock, Terry
Subject: [External_Sender] RE: RE: RE: RE: RE: RE: schedule a teleconference this week

Terry:

Jon Samet and Bob Dynes were not happy with the request to reschedule the call an hour earlier—in our view it is disrespectful to ask them to participate at a 6 AM call. However they said they will connect. I have forwarded the call-in information.

Kevin and I had a call with Jon and Bob earlier today. We have been reading between the lines and suspect that the USNRC has made a decision not to fund the pilot study on cancer risks near nuclear facilities and that it will make a public announcement of its decision. We are certainly disappointed—if this is indeed the decision—as we were looking forward to working on the study using the best possible information to answer the stakeholders' questions about risks near nuclear facilities. However we understand that your agency's priorities may have changed since inception of the project some 5 years ago and that staff have no control over this. We are sympathetic that your decision was not easy. We expect that there will be some negative reaction to the announcement. The USNRC informed its stakeholders that it will be funding the Academies study in 2012 and now it will reverse its decision. We would like to work with you and help you be responsive to the stakeholders' health concerns. Although there is no direct substitute to an epidemiological study in populations near nuclear facilities we would like to work with you to identify and engage in activities that address some of the stakeholders' concerns related to chronic low dose and low dose-rate radiation-induced health effects.

As you know, our board has started thinking of the next BEIR study and have initiated discussions with EPA on the timing and scope of the BEIR VIII. BEIR VIII will address, among other topics, risks related to chronic low radiation doses. There is an opportunity for the USNRC to support the BEIR VIII study and announce its intent to do so when it announces its decision about the cancer risk study. There might be other ways for the USNRC to acknowledge that even if it will not sponsor the study in cancer risks near nuclear facilities it will continue to engage in activities aiming to better understand risks at low radiation doses.

I welcome any initial thoughts you might have. In any case we will talk September 8 at 9 AM (ET).

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Tuesday, September 01, 2015 12:30 PM
To: Kosti, Ourania
Subject: RE: RE: RE: RE: RE: RE: schedule a teleconference this week

Hi Rania,

I just found out Brian has to go in front of the Commission at 10 AM on September 8. So, unfortunately the call will have to be at 9 AM ET, there really isn't another time for him to make this call. I know this is a pain, but would you ask Drs. Samet and Dynes to call in at that time. If they can't make it then we will just go ahead with you (although I suggest they join the call just in case they get called by the press about the study).

Thanks for your patience

Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop TWFN-10

phone: 301-415-1793

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Monday, August 31, 2015 11:03 AM

To: Brock, Terry

Subject: [External_Sender] RE: RE: RE: RE: RE: schedule a teleconference this week

Terry:

Jon Samet and Bob Dynes have confirmed that they are available for a call September 8 at 10 AM (ET). Please send me the connection information so that I forward to them.

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Friday, August 28, 2015 1:49 PM

To: Kosti, Ourania

Subject: Re: RE: RE: RE: RE: RE: schedule a teleconference this week

We want to make sure all folks that were involved with the study and that might be contacted by the press be present to hear what Brian has to say. Would an hour later work? If not, I can call them to ask.

Terry

From: Kosti, Ourania <OKosti@nas.edu>

Sent: Friday, August 28, 2015 1:03 PM

To: Brock, Terry

Subject: [External_Sender] RE: RE: RE: RE: RE: schedule a teleconference this week

Terry:

I would be happy to arrange that. Can you please explain why your senior management is asking for Jon Samet and Bob Dynes to join the call? This is the first question they will ask me when I contact them. Also, most likely a 9 PM call would not work with them; they are both based in California.

Thanks,

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Friday, August 28, 2015 9:14 AM

To: Kosti, Ourania

Subject: RE: RE: RE: RE: RE: schedule a teleconference this week

Rania,

My senior level management would like John Samet and your NSRB chair on the call too. Would you be able to set that up, or should I call them directly?

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Tuesday, August 25, 2015 12:22 PM

To: Brock, Terry

Subject: [External_Sender] RE: RE: RE: RE: schedule a teleconference this week

Terry:

Kevin is off that week

(b)(6)

appointments and is unsure of his schedule at this point. If the purpose of the call is for the USNRC to announce to our board its decision to move forward or not with the study I could handle the call by myself, if needed.

Also, will the USNRC want to coordinate the release of media notifications with the Academies like we have done for previous phases? If so, I will need to line up our press officer.

Thanks,

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Tuesday, August 25, 2015 11:36 AM

To: Kosti, Ourania

Subject: RE: RE: RE: schedule a teleconference this week

Got it. Is there any way he could call in? He should probably be on the call considering we plan to go public that week with our decision about the study.

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Tuesday, August 25, 2015 11:33 AM

To: Brock, Terry

Subject: [External_Sender] RE: RE: schedule a teleconference this week

...scheduled (b)(6) that week.

From: Kosti, Ourania

Sent: Tuesday, August 25, 2015 11:33 AM

To: 'Brock, Terry'

Subject: RE: RE: schedule a teleconference this week

Terry:

Kevin in on scheduled week that week. Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Tuesday, August 25, 2015 11:28 AM

To: Kosti, Ourania

Subject: RE: RE: schedule a teleconference this week

Hi Rania,

Sorry to do this, I thought I had Brian's schedule solidified and was trying to get him before he went (b)(6)

(b)(6) Brian won't be able to talk until Tuesday, September 8. Would 9 AM work?

Thanks

Terry

From: Brock, Terry

Sent: Tuesday, August 25, 2015 8:49 AM

To: 'Kosti, Ourania'

Subject: RE: RE: schedule a teleconference this week

Hi Rania,

I'll be in touch with a bridge-line soon. Unfortunately I'm unable to provide any updates at this time.

Thx,

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Monday, August 24, 2015 3:16 PM

To: Brock, Terry

Subject: [External_Sender] RE: schedule a teleconference this week

Hello Terry,

This day/time works well with our schedules. Can you provide an early read on the direction USNRC is going with funding the study?

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Monday, August 24, 2015 2:15 PM

To: Kosti, Ourania

Subject: schedule a teleconference this week

Hi Rania,

Brian Sheron would like to schedule a teleconference with you and Kevin to discuss the cancer study.
Are you two available on Thursday at 1 PM for a call?

Thanks,

Terry

Terry Brock, Ph.D.

Office of Nuclear Regulatory Research

U.S. Nuclear Regulatory Commission

Washington D.C. 20555

Mail Stop TWFN-10

phone: 301-415-1793

From: Kosti, Ourania
Sent: 28 Aug 2015 14:50:44 -0400
To: Brock, Terry
Subject: [External_Sender] RE: RE: RE: RE: RE: schedule a teleconference this week

Terry:

I will contact them and ask them if September 8, at 10 AM (ET) works.

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Friday, August 28, 2015 1:49 PM
To: Kosti, Ourania
Subject: Re: RE: RE: RE: RE: schedule a teleconference this week

We want to make sure all folks that were involved with the study and that might be contacted by the press be present to hear what Brian has to say. Would an hour later work? If not, I can call them to ask.

Terry

From: Kosti, Ourania <OKosti@nas.edu>
Sent: Friday, August 28, 2015 1:03 PM
To: Brock, Terry
Subject: [External_Sender] RE: RE: RE: RE: RE: schedule a teleconference this week

Terry:

I would be happy to arrange that. Can you please explain why your senior management is asking for Jon Samet and Bob Dynes to join the call? This is the first question they will ask me when I contact them.

Also, most likely a 9 PM call would not work with them; they are both based in California.

Thanks,

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Friday, August 28, 2015 9:14 AM
To: Kosti, Ourania
Subject: RE: RE: RE: RE: RE: schedule a teleconference this week

Rania,

My senior level management would like John Samet and your NSRB chair on the call too. Would you be able to set that up, or should I call them directly?

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Tuesday, August 25, 2015 12:22 PM
To: Brock, Terry
Subject: [External_Sender] RE: RE: RE: schedule a teleconference this week

Terry:

Kevin is off that week (b)(6)

appointments and is unsure of his schedule at this point. If the purpose of the call is for the USNRC to announce to our board its decision to move forward or not with the study I could handle the call by myself, if needed.

Also, will the USNRC want to coordinate the release of media notifications with the Academies like we have done for previous phases? If so, I will need to line up our press officer.

Thanks,

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Tuesday, August 25, 2015 11:36 AM

To: Kosti, Ourania

Subject: RE: RE: RE: schedule a teleconference this week

Got it. Is there any way he could call in? He should probably be on the call considering we plan to go public that week with our decision about the study.

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Tuesday, August 25, 2015 11:33 AM

To: Brock, Terry

Subject: [External_Sender] RE: RE: schedule a teleconference this week

...scheduled (b)(6) that week.

From: Kosti, Ourania

Sent: Tuesday, August 25, 2015 11:33 AM

To: 'Brock, Terry'

Subject: RE: RE: schedule a teleconference this week

Terry:

Kevin in on scheduled week that week. Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Tuesday, August 25, 2015 11:28 AM

To: Kosti, Ourania

Subject: RE: RE: schedule a teleconference this week

Hi Rania,

Sorry to do this, I thought I had Brian's schedule solidified and was trying to get him before he went (b)(6) (b)(6) Brian won't be able to talk until Tuesday, September 8. Would 9 AM work?

Thanks

Terry

From: Brock, Terry

Sent: Tuesday, August 25, 2015 8:49 AM

To: 'Kosti, Ourania'

Subject: RE: RE: schedule a teleconference this week

Hi Rania,

I'll be in touch with a bridge-line soon. Unfortunately I'm unable to provide any updates at this time.

Thx,

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]

Sent: Monday, August 24, 2015 3:16 PM

To: Brock, Terry

Subject: [External_Sender] RE: schedule a teleconference this week

Hello Terry,

This day/time works well with our schedules. Can you provide an early read on the direction USNRC is going with funding the study?

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]

Sent: Monday, August 24, 2015 2:15 PM

To: Kosti, Ourania

Subject: schedule a teleconference this week

Hi Rania,

Brian Sheron would like to schedule a teleconference with you and Kevin to discuss the cancer study.
Are you two available on Thursday at 1 PM for a call?

Thanks,

Terry

Terry Brock, Ph.D.

Office of Nuclear Regulatory Research

U.S. Nuclear Regulatory Commission

Washington D.C. 20555

Mail Stop TWFN-10

phone: 301-415-1793

From: Kosti, Ourania
Sent: 6 Apr 2011 17:49:22 -0400
To: Brock, Terry
Subject: 2 papers on our study
Attachments: Zakaib_11_Nat_NAS-nuc study debate (2).pdf, Wing_2011.pdf

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

NUCLEAR ENERGY

US radiation study sparks debate

Researchers divided on how best to probe any possible link to cancer.

BY GWYNETH DICKEY ZAKAIB

Japan's ongoing nuclear emergency has intensified discussion on a simmering issue: the potential cancer risk from living near a reactor that is operating normally.

Last year, long before the crisis in Japan, the US Nuclear Regulatory Commission (NRC) asked the National Academy of Sciences (NAS) to examine this cancer question, prompted in part by long-standing public unease. The NAS is now consulting with experts about how to design a study, with the next public meetings on the effort scheduled for 18–19 April in Chicago, Illinois. Already, however, some researchers have questioned the study's feasibility and expressed doubt over whether it will produce meaningful results.

According to the NRC, less than 1% of a person's total annual background-radiation exposure comes from living near nuclear power plants. Much more comes from natural sources in the earth and air, and from some medical exams. Even so, "there are recurrent concerns among the public about increased cancer risks", says Terry Brock, the NRC's project manager for the Analysis of Cancer Risk in Populations Near Nuclear Facilities study. "We want the most current and most scientifically valid information to respond."

The last US-wide study, which found no evidence of a problem, was published by the National Cancer Institute in 1990. Now the NRC aims to update this effort by taking advantage of two decades of improvements in data and technology. For example, whereas the 1990 study considered only cancer deaths, better record-keeping means that researchers can now look for suspect patterns in cancer diagnoses. The previous study also lumped people by county, regardless of their actual distance from a nuclear plant. Global positioning systems, which can pinpoint where people live in relation to a reactor, should now help provide more meaningful results. A further step would be including estimates of radiation doses and looking for correlations with cancer incidence.

But Edward Maher, president of the US-based Health Physics Society, says that even if the study takes all of those factors into account, its statistical power will be too low.

"We feel that those studies don't have a lot of value," says Maher. "They may make the

"They may make the public feel better, but they're not going to see very low-dose effects."



Some studies have found links between childhood cancer and proximity to power stations.

public feel better, but they're not going to see very low-dose effects." The money would be better spent on more laboratory research, he adds, where confounding factors such as the presence of other carcinogens can be effectively controlled.

Other experts say that the NAS should build on and improve a 2008 German study (C. Spix *et al. Eur. J. Cancer* 44, 275–284; 2008), which found a roughly 1.5-fold increase in cancers in children younger than 5 living within 5 kilometres of nuclear power plants. The authors concluded that plant emissions were too low to explain the effect, and similar studies done later in France and Britain failed to show any cancer increase, but some researchers have challenged their interpretation of the data.

Nevertheless, Steve Wing, an epidemiologist from the University of North Carolina at Chapel Hill, says that if there is an effect, it will be easiest to see in children and fetuses. Their rapidly dividing cells make them more sensitive to radiation than adults, and they haven't been exposed to as many possible carcinogens. Wing and his colleagues wrote an article on how best to design the NAS study in the 1 April issue of *Environmental Health Perspectives* (S. Wing *et al. Environ. Health Perspect.* doi:10.1289/ehp.1002853; 2011). Among other things, they emphasize the need to obtain radiation-dose estimates for the populations under study.

In the upcoming April meetings, the NAS

committee will discuss nuclear power plant emission monitoring and hear study design suggestions. After a series of additional meetings, the committee aims to complete recommendations by the end of 2011, after which they will be posted online for public comment. If the committee decides to move forward with the study, another committee will be appointed next year to carry it out.

Some experts think that there is no effect for the study to find. Antone Brooks, a radiation toxicologist at Washington State University Tri-cities in Richland, says that DNA repair mechanisms and selective suicide of damaged cells are adequate to handle DNA damage below a certain dose threshold.

"We've lived in a sea of radiation throughout evolution," says Brooks. "The body knows how to handle low doses."

Others believe that the risk never vanishes. DNA repair mechanisms don't work perfectly 100% of the time, and even small amounts of radiation confer some risk, says Bill Morgan, the director of radiation biology and biophysics at Pacific Northwest National Laboratory in Richland. "It's a tremendous debate," he says.

Some will argue that if no effect is found, there isn't a problem, says David Brenner, director of the Center for Radiological Research at Columbia University in New York. "But the fact that you can't measure a risk in an epidemiological study doesn't mean that the risk isn't there." ■

VENTURE MEDIA GROUP/AURORA PHOTOS/CORBIS

Cancer Risks near Nuclear Facilities: The Importance of Research Design and Explicit Study Hypotheses

Steve Wing,¹ David B. Richardson,¹ and Wolfgang Hoffmann²

¹Department of Epidemiology, University of North Carolina–Chapel Hill, Chapel Hill, North Carolina, USA; ²Institute for Community Medicine, Section Epidemiology of Health Care and Community Health, Ernst-Moritz-Arndt University of Greifswald, Greifswald, Germany

BACKGROUND: In April 2010, the U.S. Nuclear Regulatory Commission asked the National Academy of Sciences to update a 1990 study of cancer risks near nuclear facilities. Prior research on this topic has suffered from problems in hypothesis formulation and research design.

OBJECTIVES: We review epidemiologic principles used in studies of generic exposure–response associations and in studies of specific sources of exposure. We then describe logical problems with assumptions, formation of testable hypotheses, and interpretation of evidence in previous research on cancer risks near nuclear facilities.

DISCUSSION: Advancement of knowledge about cancer risks near nuclear facilities depends on testing specific hypotheses grounded in physical and biological mechanisms of exposure and susceptibility while considering sample size and ability to adequately quantify exposure, ascertain cancer cases, and evaluate plausible confounders.

CONCLUSIONS: Next steps in advancing knowledge about cancer risks near nuclear facilities require studies of childhood cancer incidence, focus on *in utero* and early childhood exposures, use of specific geographic information, and consideration of pathways for transport and uptake of radionuclides. Studies of cancer mortality among adults, cancers with long latencies, large geographic zones, and populations that reside at large distances from nuclear facilities are better suited for public relations than for scientific purposes.

KEY WORDS: childhood cancer, environmental epidemiology, ionizing radiation, methodology, nuclear power. *Environ Health Perspect* 119:417–421 (2011). doi:10.1289/ehp.1002853 [Online 10 December 2010]

The possibility that radiation releases from nuclear facilities could cause cancer in surrounding populations has been of interest for more than two decades. Epidemiologic studies of spatial variation in cancer incidence or mortality have been conducted to investigate effects of unplanned releases as well as routine operations. For example, a case–control study of cancer among children < 5 years of age found that residence within 5 km of a nuclear facility was associated with a 61% [one-sided lower bound of the 95% confidence interval (CI), 26%] increased incidence of all cancer (Spix et al. 2008) and a 119% (lower bound of the 95% CI, 51%) excess risk of leukemia (Kaatsch et al. 2008a). A meta-analysis of geographic studies reported 23% (95% CI, 7–40%) higher incidence of leukemia among children 0–9 years of age living within 16 km of nuclear facilities (Baker and Hoel 2007). Other studies have compared risks among populations whose radiation doses have been estimated based on releases and transport of radiation or deposition of radionuclides. A study of thyroid disease among people who were exposed to radioactive iodine from the Hanford site in Washington State found that the risk of thyroid disease was similar regardless of the estimated doses from radioiodine (Davis et al. 2004), whereas a study of childhood leukemia after the Chernobyl accident, which classified radiation doses based on soil radioactivity and diet, reported an excess relative risk per gray of radiation of 32.4 (95% CI, 8.8–84.0) (Davis et al. 2006).

In April 2010 the U.S. Nuclear Regulatory Commission (NRC) asked the National Academy of Sciences (NAS) to analyze “radiogenic cancer mortality and total cancer mortality in populations living near past, present, and possible future commercial nuclear facilities for all age groups,” and to conduct the same analyses for cancer incidence (Sheron 2010). Nuclear power, weapons, and fuel-cycle plants are to be included. Before beginning the full study in late 2011, the NAS is to conduct a scoping study to determine availability of data, feasibility of considering geographic units smaller than counties, and the best study design for assessing risks. The NRC request underscores the need to evaluate logical problems with previous studies of cancer around nuclear facilities and to consider the appropriateness of specific hypotheses and design options. In the United States these issues are of interest, in part, because of continued nuclear weapons production and federal support for construction of new nuclear power plants.

Currently, the NRC relies on a 1990 report from the National Cancer Institute (NCI 1990) as its primary source for information about cancer risk from nuclear facilities (NRC 2010). That study compared cancer death rates in 107 counties that either contained, or neighbored a county that contained, a nuclear facility, with rates in 292 matched counties. For the period 1950–1984, investigators enumerated approximately 900,000 cancer deaths in nuclear facility counties and 1.8 million deaths

in matched counties. A study of cancer incidence was restricted to Iowa and Connecticut, states that included four nuclear facilities. Jablon et al. (1991) summarized the findings from this study and concluded that “if nuclear facilities posed a risk to neighboring populations, that risk was too small to be detected by a survey such as this one.”

The NRC request for an “update” of the NCI study requires that NAS wrestle with several logical and methodological problems that have plagued the literature on cancer risks around nuclear facilities. Here we identify some key issues that must be addressed in order for the new study to advance science more than public relations.

Hypothesis Formation and Research Design in Epidemiology

General versus specific causation. Most epidemiologic studies investigate general exposure–response relationships; neither the source of exposure nor a particular population is of interest. A major consideration in such studies is that exposures and responses can be measured accurately. Populations that have been enumerated to evaluate the question of radiation and cancer include A-bomb survivors whose doses were estimated as a function of distance from hypocenter and shielding, patients exposed to medical or diagnostic radiation procedures recorded in clinical records, and workers whose occupational exposures have been monitored by individual dosimeters (National Research Council 2006). Results from general causation studies are often used to estimate risks in specific populations that have not, or cannot, be studied.

Other epidemiologic studies are designed to evaluate specific causation relevant to particular people, places, and times. Although

Address correspondence to S. Wing, 2101F McGavran-Greenberg Hall, Department of Epidemiology, CB# 7435, 135 Dauer Dr., University of North Carolina–Chapel Hill, Chapel Hill, NC 27599-7435 USA. Telephone: (919) 966-7416. Fax: (919) 966-2089. E-mail: steve_wing@unc.edu

Supplemental Material is available online (doi:10.1289/ehp.1002853 via <http://dx.doi.org/>).

This article is adapted from a presentation given to the National Academy of Sciences Radiation and Nuclear Studies Board on 29 April 2010.

The authors declare they have no actual or potential competing financial interests.

Received 11 August 2010; accepted 6 December 2010.

hypotheses in these studies rely on knowledge of general causation, they aim to address the causes of disease in a particular population or similar populations. The question of cancer risks near nuclear facilities is specific because it concerns people who live near this category of facilities rather than the general exposure-response association for ionizing radiation and cancer. An even more specific question is about cancer risks near a particular nuclear facility (e.g., Hoffmann et al. 2007). The specificity of these questions necessitates focusing on one nuclear facility or groups of facilities even if quantifying exposures and responses in neighboring populations is difficult.

Design of epidemiologic studies. Although usually nonexperimental, most epidemiologic studies are based on the model of an experiment in which subjects are randomized to be exposed or not, and all other conditions are kept identical in the two groups, including the assessment of responses. Although it is not necessary to know the mechanisms by which the exposure produces the response, knowledge about mechanisms is important for choosing factors to measure, measuring them correctly, and deciding the extent to which results support the hypothesis that the exposure causes the response. As in an experiment, sample size must be chosen so that the response occurs with sufficient frequency to permit comparison of the groups.

However, because exposures cannot be randomized in nonexperimental studies, large sample size does not provide confidence that other conditions that influence the response are similarly distributed in the exposed and unexposed groups, and these potential confounders must be considered in the data analysis and interpretation of results. Studies of cancer risks around nuclear facilities typically adjust for demographic factors that may differ between nearby populations and groups to which they are compared but do not collect information on other potential confounders.

Descriptive versus analytic studies. Studies of disease trends and spatial patterns that do not focus on a specific etiologic agent are sometimes referred to as descriptive studies. Authors of some papers about cancer risks near nuclear facilities have labeled their studies descriptive, implying that they do not address a hypothesis (Laurier and Bard 1999; Laurier et al. 2008). However, studies of disease in populations surrounding a specific type of facility are of interest only if something released by that type of facility could cause the disease. Cancer risks near nuclear facilities are only of scientific interest because these facilities emit radiation and because ionizing radiation causes cancer. Calling a study descriptive does not remove the rationale for its conduct or reduce the importance of creating testable hypotheses about exposure and risk.

Assumptions Required for Testable Hypotheses

An epidemiologic hypothesis might be that the response is higher in the exposed than the unexposed group. However, the scientific value of the hypothesis is not merely numerical; it depends on assumptions about the level of the exposure, the shape and magnitude of the exposure-response relationship, and the sample size, all of which affect the study power.

Dose assumptions. A testable hypothesis requires a nontrivial difference in exposure between the groups being compared; the magnitude of difference that is nontrivial is a function of the dose response. Some studies of cancer around nuclear facilities have been conducted under the assumption that the exposure is too low to cause the response. For example, Jablon et al. (1991) quote U.K. researchers: "The increased occurrence of cancers in persons living near nuclear facilities could not have resulted from radioactive emissions from the facilities" because the doses were too low. Hatch et al. (1990) reported elevated cancer incidence in downwind areas after the 1979 radiation releases from the Three Mile Island unit 2 reactor but went on to study stress as an alternative explanation (Hatch et al. 1991) because radiation doses were "a fraction of the average U.S. exposure." Kaatsch et al. (2008a), who reported elevated childhood cancer risk near German nuclear facilities, concluded, "The observed positive distance trend remains unexplained," noting that "radiation exposure near German nuclear power plants is a factor of 1,000–100,000" below background. In a technical report they state that radiation must be excluded as a cause of the observed dose-response relationship on "fundamental grounds" (Kaatsch et al. 2008b).

All these authors assumed that radiation exposures were too small to cause a response. They did not expect to find positive relationships (Kaatsch et al. 1998). When they did, they could not conclude that the evidence supported rejection of the null hypothesis. British epidemiologist Geoffrey Rose described this situation in the Sellafield inquiry in the United Kingdom: "We were given information (which, it later transpired, was incorrect) of the total radioactive emissions from the plant, but the exposure levels of the children were a matter of speculation. The radiation experts on the committee calculated 'best estimates' and they concluded, on theoretical grounds, that these could not have caused any major excess risk: 'It couldn't have happened, so it didn't happen'" (Rose 1991).

Assumptions about doses to populations near nuclear facilities are based on estimated releases, environmental dispersion, human uptake, and estimates of the relative biological effectiveness of different forms of radiation. Except in the case of short-term exposures

during an accident, environmental assumptions involve average emission estimates, distances from facilities, and sometimes prevailing winds. Most epidemiologic studies of populations near nuclear facilities have not considered the spatial pattern of ingestion of radionuclides from food or water, nor have they measured radiation doses to individuals. All have been based on emission estimates that come from industries responsible for the releases and agencies responsible for regulating them.

Dose-response assumptions. The consequence of assumptions about dose levels depends on another assumption, the dose response: the increase in cancer for each unit increase in radiation dose. When excess cancer near nuclear facilities cannot be interpreted as evidence of an effect of releases, it is because the expected response from the estimated dose is too small to detect. For example, authors of the Three Mile Island study cited an average whole-blood gamma dose in the range of 0.1–0.25 mSv in the 5-mile area around the plant (Hatch et al. 1990). The expected relative risk of cancer at this dose level, according to NAS BEIR V (Biological Effects of Ionizing Radiation, Health Effects of Exposure to Low-Level Ionizing Radiation) (National Research Council 1990) estimates available around the time of the study, which were primarily based on studies of acute penetrating radiation exposures of A-bomb survivors, would be less than 1.0005. Unless the dose estimates, the dose-response estimates, or both were considered to be questionable, and by a combined factor of orders of magnitude, no results from the study could have been interpreted as supporting the hypothesis that emissions caused cancer (Wing et al. 1997).

Past debate about obstetric X rays and childhood cancer illustrates the potential problem of overconfidence in the state of knowledge about a dose-response relationship. Although it is now widely assumed that the effect of fetal irradiation on childhood cancer risk is orders of magnitude higher (on a relative risk scale) than the effect of adult exposure (Wakeford 2008), early evidence that obstetric X rays cause childhood cancer (Stewart et al. 1956) was rejected, primarily based on studies of acute penetrating radiation exposures of A-bomb survivors. The Life Span Study of A-bomb survivors is important because of its large size and inclusion of females and males of all ages. However, the cohort was assembled 5 years after exposure, and cancer incidence data are not available until 12 years after exposure. There are no data for early childhood, the time period of most interest in studies of cancer risk near nuclear facilities. Difficulties of quantifying impacts of selective survival, dose misclassification, residual radiation, fallout, and other possible confounding factors on

dose–response estimates suggest that caution should be used in extrapolating studies of acute radiation exposures in the Life Span Study to populations near nuclear facilities that may be chronically exposed to inhaled or ingested radionuclides.

Study power: sample size and measurement of exposure and outcomes. The power or sensitivity of a study depends on the magnitude of the effect, the sample sizes in the exposure groups, and the ability to accurately measure exposures and outcomes. The weaker the relationship, the larger the sample size needed to detect it. If the effect of exposure is small, combining populations near multiple U.S. nuclear facilities is important for a study of cancer risks near nuclear facilities. However, if an exposure–response relationship does exist, it will be underestimated and may not be detected at all if people in the exposed and unexposed groups are mixed together. Large sample size is important, but when large sample size comes with poor exposure classification, the consequence is a statistically precise, biased estimate of effect.

Similarly, inability to track the response creates low study power. Assessment of cancer incidence (diagnosis) rather than death is important because many patients do not die of their cancers, and because the time between diagnosis and death increases the opportunity for people to move between communities with and without nuclear facilities (sometimes as a result of their diagnosis). However, the lack of cancer registries with catchment areas covering populations residing near most U.S. nuclear facilities during their entire operating history presents a serious barrier to studying risks for all facilities during their entire periods of operation.

Next Steps in Research on Cancer Risks near Nuclear Facilities

Many studies of cancer near nuclear facilities have been conducted since the 1990 NCI study. An update of that study should build on what has been learned. Two recent childhood cancer studies have relatively large sample sizes: the meta-analysis of childhood leukemia in proximity to nuclear facilities conducted by Baker and Hoel (2007) and the *Kinderkrebs in der Umgebung von Kernkraftwerken (KiKK)* case–control study of childhood leukemia (Kaatsch et al. 2008a, 2008b) and childhood cancer (Spix et al. 2008) in the vicinity of German nuclear facilities. These studies are of particular interest because of the high radiosensitivity of the embryo, fetus, and infant, the use of incidence rather than mortality data, and the ability to discriminate populations in close proximity to nuclear reactors (Fairlie 2009a, 2009b, 2010; Nussbaum 2009). After intake,

two radionuclides emitted by nuclear reactors, ^3H (tritium in the form of heavy water) and ^{14}C , are distributed throughout the body, and concentrations are 50–60% higher in fetal than in maternal tissues (Stather et al. 2002). Nuclear reactors routinely emit tritium and ^{14}C , and spikes are observed during refueling (Fairlie 2010). From these observations, we suggest several key considerations for research on cancer risks near U.S. nuclear facilities.

Exposure assessment. Studies of cancer risks around nuclear facilities under routine operations have focused on distance of residence from the facilities as the primary measure of exposure. Baker and Hoel (2007) focused on populations within 16 km (10 miles) of nuclear facilities. Studies based on large administrative districts, such as U.S. counties, including the 1990 NCI study (Jablon et al. 1991), do not have sufficient spatial specificity to produce meaningful findings.

The KiKK study compared the distance from the nearest nuclear facility of the residences of childhood cancer cases at the time of diagnosis and distances of residences of disease-free controls in high geographic resolution (100 m) (Kaatsch et al. 2008a; Spix et al. 2008). KiKK researchers analyzed risk as a continuous function with an *a priori* model of the reciprocal of distances ≤ 70 km, but the effects primarily reflect excesses in the vicinity of approximately 10 km of nuclear facilities. Several authors have emphasized the KiKK study's precise distance measures as an advantage of the study (Fairlie 2010; Nussbaum 2009). Although such precision is desirable, the KiKK study did not analyze residence at birth or conception, which would be more relevant to fetal dose, nor did it evaluate residential history from conception to diagnosis, which would be relevant to exposure history. Other case–control studies should be designed to obtain such information.

However, residential distance is not a measure of dose, nor is it a good proxy unless all nuclear facilities have the same quantities and types of releases, pregnant mothers and children stay at home all the time, house construction and time outdoors do not affect exposure, and wind direction and diet are unimportant. These factors could be considered by conducting dose reconstructions based on environmental data for each facility and behavioral data from the populations being studied. This type of approach has been taken to a greater or lesser extent in some studies of single facilities (Davis et al. 2004, 2006; Hatch et al. 1990), but great effort and adequate data would be required to make such assessments for many facilities over long periods of time. An alternative strategy would be to classify exposure based on residential histories and to use mixed regression models to model the interfacility variability in distance–cancer relationships.

Measuring exposure during the correct time period is critical. Studies of young children have an advantage in this regard because the lag time between exposure and diagnosis of cancer is restricted compared with adults and there is less opportunity for children to change residences. Especially in studies of childhood cancer, the operations history of a facility must be considered. For example, a child diagnosed with cancer at 4 years of age who lived near a nuclear power plant that began operations 2 years earlier could not have experienced *in utero* exposure to emissions from that plant. Similarly, air emissions from an operating reactor could not affect a child diagnosed at 4 years of age if the plant ceased operation 5 years earlier, but drinking water contaminated by radionuclides with sufficient half-lives could be important from conception through the date of diagnosis. These scenarios underscore the need to consider time periods of operation, releases, environmental pathways, uptake, and internal doses, including the physical half-lives, environmental transformations, and biokinetics of radionuclides of interest. Such efforts have been made for studies of cancer risks near Chernobyl and Hanford (Davis et al. 2004, 2006), although not without problems (Hoffman et al. 2007).

Outcome assessment. Studies of cancer risks near nuclear facilities should rely on incidence data; however, only mortality data are available nationally for the locations and time periods of operation of all nuclear facilities in the United States. Unlike some countries where this research question has been addressed, the United States lacks a medical insurance system that could be used to track cancer incidence nationally. States have instituted cancer registries at different times and with varying degrees of regional coverage and quality. A new study should be restricted to locations and time periods for which adequate cancer incidence data can be assembled. Additionally, because the ability to ascertain incident cancers among people who live near nuclear facilities declines with time and movement outside areas covered by state cancer registries, the short exposure lag for children improves the prospects for complete ascertainment of childhood cancers.

Dose response. The inability of previous investigators to interpret positive findings as evidence in support of the hypothesis under investigation results, in part, from the belief that the dose response is too small to be detectable. One remedy for this problem is to select a sensitive subpopulation for investigation. In their meta-analysis, Baker and Hoel (2007) included only populations < 25 years of age, and they focused on children < 10 years of age. The KiKK study includes only children < 5 years of age. The focus on young ages is justified because of theory and evidence of greater risks from *in utero* and

childhood than adult exposures, and because previous studies have found the strongest associations for children.

Sample size. Childhood cancer occurs infrequently, so nuclear facilities with few children nearby cannot contribute many cases to an epidemiologic study. However, population size has little effect on the effort required to evaluate historical releases and environmental pathways. The most efficient expenditure of time and money would be to give priority to inclusion of facilities with larger nearby populations. Although population size is an important consideration, selection of facilities with larger nearby populations could be problematic if it led to systematic exclusion of facilities with larger estimated releases (Körblein and Hoffmann 1999).

Potential confounders. Other causes of cancer could bias estimates of cancer risk from nuclear facilities if they are more or less common among populations around nuclear facilities than in comparison populations. One advantage of restricting a study to children is that they are less exposed to potentially confounding occupational and lifestyle carcinogens than are adults. Although the KiKK study did not achieve a high enough response rate among control children to use data on other cancer risk factors in primary analyses, ambient pesticide exposure, medical X rays (child and mother, diagnostic and therapeutic), fertility treatment, infections, medical drugs during pregnancy, and hair dye use were not associated with distance from nuclear power plants (Kaatsch et al. 2008b). Measurements of medical radiation, other sources of radiation, or other carcinogenic exposures, even if they are obtained from independent surveys, could be used to evaluate whether these factors are strongly enough correlated with nuclear facilities to result in an appreciable bias that could create or mask distance-cancer relationships observed in an epidemiologic study.

Although not yet identified, viruses may play a role in the development of childhood leukemia. Studies of time in day care during infancy, a measure of potential viral exposure, show protective effects for childhood leukemia (Petridou et al. 1993; Urayama et al. 2008), whereas studies of in-migration to rural areas, another possible source of viral exposure, suggest that population mixing increases risk (Kinlen et al. 1995; Wartenberg et al. 2004). A case-control study could obtain history of day-care exposures, and in-migration could be evaluated in either a case-control or area-based design.

Another method of evaluating confounding is to measure cancer incidence near nuclear facilities during the time period preceding startup. If one or more confounding factors, known or unknown, is associated with proximity, a relationship between proximity and

cancer would be observed before startup. The prestartup dose-response estimate, which quantifies the degree of confounding under the assumption that the spatial distribution of the confounding factors is the same before and after startup, can then be subtracted from the poststartup dose response to control this source of bias (Hatch et al. 1990; Wing et al. 1997).

A Bayesian perspective. One way to minimize problems of circular logic in the interpretation of epidemiological results (the null hypothesis cannot be rejected because we assume the exposure was too small to cause an effect), and to better inform power calculations for any future study, is to encourage investigators to explicitly state their prior beliefs. In a Bayesian framework, assumptions about dose and dose response are made explicit in prior distributions and then updated based on new evidence. If the investigators hold strong prior beliefs about the magnitudes of dose and the dose effects, then it may be helpful to recognize at the outset that a proposed study may have little ability to shift posterior estimates of effect. Then researchers could avoid conducting studies that have little ability to affect strong prior convictions about the association of interest.

Conclusions

The NRC has asked the NAS to study mortality from all types of cancer, cancer at all ages, and cancer at sites where nuclear facilities might be licensed in the future. The considerations reviewed here suggest that such an approach could lead to an excessive number of comparisons. Effects in subgroups of interest could be discounted if considered in the context of a large number of extraneous comparisons. Fortunately, the NRC has also asked the NAS to evaluate radiation doses to off-site populations and to recommend the best epidemiologic study design.

The only scientific reason to conduct studies of cancer around nuclear facilities is to evaluate whether radiation doses to neighboring populations result in a detectable increase in cancer risk. It is not logical to test a hypothesis of elevated cancer near facilities if it is decided *a priori* that results cannot be interpreted as evidence in support of the hypothesis. Such an exercise would amount to a public relations effort masquerading as a scientific study. Authors of a study of doses from the 1979 radiation releases at Three Mile Island were explicit about the intent of their methodology, which they described as having been developed "for educational, public relations and defensive epidemiology purposes" (Gur et al. 1983). This is apparently the scenario that is envisioned by Ralph Andersen of the Nuclear Energy Institute in reference to the NRC's request to the NAS: "These types of studies simply cannot even imply causality, and I would be disappointed if this study undertook

to believe that it was a study of causality" [Andersen 2010; see Supplemental Material for audio recording of the 15th meeting of the Nuclear and Radiation Studies Board of the National Academies, Washington, DC, 26 April 2010 (doi:10.1289/ehp.1002853)].

On the contrary, we believe the only reason to conduct a study is to address causal hypotheses regarding cancer risks near nuclear facilities. To preserve the integrity of scientific research in this area, there must be careful engagement with issues of the physical and biological mechanisms of interest and selection of populations for study based on the ability to obtain adequate measurements and sample sizes.

REFERENCES

- Andersen R. 2010. Nuclear Industry Perspectives on the Study Request and Task. Presentation to the National Academy of Sciences Nuclear and Radiation Studies Board, 26 April 2010, Washington, DC. Available: <http://nationalacademies.org/newsroom/alerts/20100426.html> [accessed 2 December 2010].
- Baker PJ, Hoel DG. 2007. Meta-analysis of standardized incidence and mortality rates of childhood leukemia in proximity to nuclear facilities. *Eur J Cancer Care (Engl)* 16(4):355-363.
- Davis S, Day RW, Kopecky KJ, Mahoney MC, McCarthy PL, Michalek AM, et al. 2006. Childhood leukemia in Belarus, Russia, and Ukraine following the Chernobyl power station accident: results from an international collaborative population-based case-control study. *Int J Epidemiol* 35(2):386-396.
- Davis S, Kopecky KJ, Hamilton TE, Onstad L. 2004. Thyroid neoplasia, autoimmune thyroiditis, and hypothyroidism in persons exposed to iodine 131 from the Hanford nuclear site. *JAMA* 292(21):2600-2613.
- Fairlie I. 2009a. Childhood cancers near German nuclear power stations: hypothesis to explain the cancer increases. *Med Confl Surviv* 25(3):206-220.
- Fairlie I. 2009b. Childhood cancers near German nuclear power stations: the ongoing debate. *Med Confl Surviv* 25(3):197-205.
- Fairlie I. 2010. Hypothesis to explain childhood cancer near nuclear power plants. *Int J Occup Environ Health* 16(3):341-350.
- Gur D, Good WF, Tokuhata GK, Goldhaber MK, Rosen JC, Rao GR, et al. 1983. Radiation dose assignment to individuals residing near the Three Mile Island nuclear station. *Proc Pa Acad Sci* 57:99-102.
- Hatch MC, Beyea J, Nieves JW, Susser M. 1990. Cancer near the Three Mile Island nuclear plant: radiation emissions. *Am J Epidemiol* 132(3):397-417.
- Hatch MC, Wallenstein S, Beyea J, Nieves JW, Susser M. 1991. Cancer rates after the Three Mile Island nuclear accident and proximity of residence to the plant. *Am J Public Health* 81(6):719-724.
- Hoffman FO, Ruttenber AJ, Apostoloi AI, Carroll RJ, Greenland S. 2007. The Hanford Thyroid Disease Study: an alternative view of the findings. *Health Phys* 92(2):99-111.
- Hoffmann W, Terschueren C, Richardson D. 2007. Childhood leukemia in the vicinity of the Geesthacht nuclear establishments near Hamburg, Germany. *Environ Health Perspect* 115:947-952.
- Jablón S, Hrubec Z, Boice JD Jr. 1991. Cancer in populations living near nuclear facilities. A survey of mortality nationwide and incidence in two states. *JAMA* 265(11):1403-1408.
- Kaatsch P, Kaletsch U, Meinert R, Michaelis J. 1998. An extended study of childhood malignancies in the vicinity of German nuclear power plants. *Cancer Causes Control* 9(5):529-533.
- Kaatsch P, Spix C, Schmiedel S, Schulze-Rath R, Mergenthaler A, Blettner M. 2008b. Vorhaben StSch 4334: Epidemiologische Studie zu Kinderkrebs in der Umgebung von Kernkraftwerken (KiKK-Studie), Teil 2 (Fall-Kontroll-Studie mit Befragung). Salzgitter-Bundesamt für Strahlenschutz.
- Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, Blettner M.

- 2008a. Leukemia in young children living in the vicinity of German nuclear power plants. *Int J Cancer* 122(4):721–726.
- Kinlen LJ, Dickson M, Stiller CA. 1995. Childhood leukemia and non-Hodgkin's lymphoma near large rural construction sites, with a comparison with Sellafield nuclear site. *BMJ* 310(6982):763–768.
- Körblein A, Hoffmann W. 1999. Childhood cancer in the vicinity of German nuclear power plants. *Med Global Surv* 6(1):18–23.
- Laurier D, Bard D. 1999. Epidemiologic studies of leukemia among persons under 25 years of age living near nuclear sites. *Epidemiol Rev* 21:188–206.
- Laurier D, Jacob S, Bernier M, Leuraud K, Metz C, Sampson E, et al. 2008. Epidemiologic studies of leukemia in children and young adults around nuclear facilities: a critical review. *Radiat Prot Dosimetry* 132(2):182–190.
- National Research Council, Committee on the Biological Effects of Ionizing Radiation. 1990. *Health Effects of Exposure to Low Levels of Ionizing Radiation: BEIR V*. Washington, DC:National Academy Press.
- National Research Council, Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation. 2006. *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2*. Washington, DC:National Academies Press.
- NCI (National Cancer Institute). 1990. *Cancer in Populations Living near Nuclear Facilities*. 017-042-00276-1. Washington, DC:Superintendent of Documents, U.S. Government Printing Office.
- NRC (Nuclear Regulatory Commission). 2010. *NRC Asks National Academy of Sciences to Study Cancer Risk in Populations Living near Nuclear Power Facilities*. NRC News No. 10-060, 7 April 2010. Washington, DC:NRC.
- Nussbaum RH. 2009. Childhood leukemia and cancers near German nuclear reactors: significance, context, and ramifications of recent studies. *Int J Occup Environ Health* 15(3):318–323.
- Petridou E, Kassimos D, Kalmanti M, Kosmidis H, Haidas S, Flytzani V, et al. 1993. Age of exposure to infections and risk of childhood leukaemia. *BMJ* 307:774; doi:10.1136/bmj.307.6907.774 [Online 25 September 1993].
- Rose G. 1991. Environmental health: problems and prospects. *J R Coll Physicians Lond* 25(1):48–52.
- Sheron B. 2010. Request to the National Academy of Sciences for a Study of Cancer Risk in Populations Living near Nuclear Facilities. Available: <http://dels.nas.edu/resources/static-assets/nrsb/miscellaneous/NRCRequest.pdf> [accessed 2 December 2010].
- Spix C, Schmiedel S, Kaatsch P, Schulze-Rath R, Blettner M. 2008. Case-control study on childhood cancer in the vicinity of nuclear power plants in Germany 1980–2003. *Eur J Cancer* 44(2):275–284.
- Stather JW, Phipps AW, Harrison JD, Eckerman KF, Smith TJ, Fell TP, et al. 2002. Dose coefficients for the embryo and fetus following intakes of radionuclides by the mother. *J Radiol Prot* 22(1):7–24.
- Stewart A, Webb J, Giles D, Hewitt D. 1956. Malignant disease in childhood and diagnostic irradiation *in utero*. *Lancet* 268:447.
- Urayama KY, Ma X, Buffler PA. 2008. Exposure to infections through day-care attendance and risk of childhood leukemia. *Radiat Prot Dosimetry* 132(2):259–266.
- Wakeford R. 2008. Childhood leukemia following medical diagnostic exposure to ionizing radiation in utero or after birth. *Radiat Prot Dosimetry* 132(2):166–174.
- Wartenberg D, Schneider D, Brown S. 2004. Childhood leukaemia incidence and the population mixing hypothesis in U.S. SEER data. *Br J Cancer* 90(9):1771–1776.
- Wing S, Richardson D, Armstrong D, Crawford-Brown D. 1997. A reevaluation of cancer incidence near the Three Mile Island nuclear plant: the collision of evidence and assumptions. *Environ Health Perspect* 105:52–57.

From: Kosti, Ourania
Sent: 26 Feb 2015 13:58:30 -0500
To: Brock, Terry
Subject: 202 334 3506

This is my office number...in case you did not write it down.
Ourania (Rania) Kosti, Ph.D.
Senior Program Officer
Nuclear and Radiation Studies Board
The National Academies
email: okosti@nas.edu
phone: 202 334 3066

From: Kosti, Ourania
Sent: 6 Apr 2011 14:23:32 -0400
To: Brock, Terry
Subject: a couple of questions

Terry,

We need to respond to the Academies as to why the tour to Dresden -although a data gathering procedure- is not practically open to the public. Can you please call me at your convenience, I wanted to consult you on a couple of things.

Thank you –

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kosti, Ourania
Sent: 28 Oct 2014 13:09:10 -0400
To: Brock, Terry
Subject: Accepted: Cancer Risk Study Effluent Report Status Meeting

From: Barnes, Robin
Sent: 8 Mar 2011 12:05:59 -0500
To: Brock, Terry
Subject: Account Settlement Report for G6000
Attachments: G6000_NRC-04-10-152.pdf

Hi Again Terry!

Here is your account settlement report for G6000.

Robin T. Barnes
Management Analyst
US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Division of Program Management, Policy Development & Analysis
Procurement Oversight & Funds Control Team
Phone: 301-251-7401



Automated Standard Application for Payments ACCOUNT SETTLEMENT REPORT

ALC/Region : 31000001/
Recipient ID : 1120482
Account ID : NRC-04-10-152
Transaction Date From : 08/17/2010

Short Name : NRC
Short Name : NAS

Through : 03/08/2011

Settlement/Applied Date	Transaction Type	Authorizations	Draws/RP/BE	Account Balance
08/17/2010	BL FWD			\$0.00
08/26/2010	AU	\$631,000.00		\$631,000.00
09/28/2010	AU	\$405,653.00		\$1,036,653.00
10/07/2010	PY		-\$6,330.53	\$1,030,322.47
11/12/2010	PY		-\$18,907.52	\$1,011,414.95
12/22/2010	PY		-\$18,671.66	\$992,743.29
01/24/2011	PY		-\$22,740.61	\$970,002.68
Totals :		\$1,036,653.00	-\$66,650.32	

From: Crowley, Kevin
Sent: 22 Apr 2010 09:12:03 -0400
To: Crowley, Kevin;Greenleaf, Toni;Wingo, Erin
Subject: Additional information for Monday's NRSB meeting

Dear NRSB meeting speakers:

The NRSB meeting session on "Cancer Risk in Populations Living Near Nuclear Power Plants," which begins at 2:10 pm on Monday, April 26, will be audiowebcasted. The link to the audio webcast is

<http://video.nationalacademies.org/ramgen/broadcast/live.rm>

The link will become active starting about 15 minutes before the session begins. A digital copy of the webcast will be posted on the board's website following the meeting.

If you are planning to use any other audiovisuals (e.g., PowerPoint slides) during your presentation, we will also be asking for your permission to post those materials on our website following the meeting.

See you on Monday.

Regards,

Kevin

Kevin D. Crowley, Ph.D.
Director
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001 USA
+1-202-334-3066 (voice)
+1-202-334-3077 (fax)
kcrowley@nas.edu

From: Brock, Terry
Sent: 4 May 2011 17:59:12 +0000
To: 'Kosti, Ourania'
Cc: 'Crowley, Kevin'
Subject: ATSDR and NFS contacts

Rania,

The CDC's Agency for Toxic Substances and Disease Registry (ATSDR) offered up Dr. Steve Dearwent at 770-488-3665. He's an epidemiologist that can discuss ATSDR's process for deciding whether or not to perform an epidemiology study around fixed sites with contamination issues. They usually start by investigating sources of contamination, pathways of exposure, and likely doses to people. They use that information to make a decision on whether or not to do an epidemiology study. I think the committee would profit from hearing from Dr. Dearwent at the Atlanta meeting on ATSDR's systematic approach to addressing public health concerns around facilities that are very similar to concerns heard around nuclear facilities.

The Nuclear Fuel Services contact is

Mark P. Elliott, Director
Quality, Safety & Safeguards
Nuclear Fuel Services, Inc
1205 Banner Hill Road
Erwin, TN 37650
o 423-743-1705
c (b)(6)
f 423-743-2315

Thanks,
Terry
Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Kosti, Ourania
Sent: 7 Mar 2011 17:41:44 -0500
To: Brock, Terry
Cc: Crowley, Kevin
Subject: biomarker discussion

Dear Terry,

We have contacted our media officer and discussed the misinterpretation of the biomarker discussion (human versus environmental). Our media officer will contact the reporter and clarify that what the committee may consider to pursue is a biomarker in humans and not an environmental biomarker.

Thank you -

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kosti, Ourania
Sent: 29 Jun 2011 12:04:30 -0400
To: Brock, Terry
Cc: Crowley, Kevin;Greenleaf, Toni
Subject: call with Terry Brock

Terry, thank you. Kevin and I will call you 11 am tomorrow, Thursday June 30.
Rania

From: Greenleaf, Toni
Sent: 18 Mar 2013 10:03:11 -0400
To: Bush-Goddard, Stephanie;Crowley, Kevin;Brock, Terry
Subject: Cancer Risk Phase II Budget Draft June 2013 through October 2013
Attachments: Budget draft for 5 month start up.pdf

Stephanie, Kevin Crowley asked me to send you our estimate for the first 5 months, June 1 through October 31, 2013 which is \$276,054. The balance would then be \$288,546 for the last 7 months. This totals the official proposal budget that was sent over earlier this year in the amount of \$564,600.

If this is acceptable we will send you the formal proposal that has to go through our contract office. Please do let us know if you have any questions.

Toni Greenleaf
Nuclear and Radiation Studies Board
202/334-3066
Fax: 202/334-3077

-----Original Message-----

From: Bush-Goddard, Stephanie [<mailto:Stephanie.Bush-Goddard@nrc.gov>]
Sent: Friday, March 15, 2013 2:12 PM
To: Crowley, Kevin; Brock, Terry
Cc: Greenleaf, Toni
Subject: RE: Today's meeting

Yes the formal budget will help in my understanding of the cost of the project.

If I understand correctly: Total for the pilot study is approximately \$600K. April 2013 - April 2014???

You need \$300K by June 1 and \$300K by Sept/Oct???

Also, can this money be obligated and spent by March 2014. I need to know to see what funding streams and I pull from.

Thanks
-Stephanie

From: Crowley, Kevin [KCrowley@nas.edu]
Sent: Friday, March 15, 2013 11:01 AM
To: Bush-Goddard, Stephanie; Brock, Terry
Cc: Greenleaf, Toni; Crowley, Kevin
Subject: RE: Today's meeting

Thanks Stephanie.

In terms of timeline and budget: we need to start the phase 2 project no later than June 1, 2013. We would need about half of the funding (\$280K) to get started, assuming that NRC could provide the second half of the funding early in the next fiscal year. I can send you a formal budget if you need one.

Regards,

Kevin

-----Original Message-----

From: Bush-Goddard, Stephanie [<mailto:Stephanie.Bush-Goddard@nrc.gov>]

Sent: Friday, March 15, 2013 10:11 AM

To: Crowley, Kevin; Brock, Terry

Subject: RE: Today's meeting

Kevin,

Your presentation was stellar. It was informative, your slides were interesting and at the appropriate level.

Important to note is that the stakeholders that did not want to move into phase II (HPS, NEI, etc), had the same concerns that the Committee presented as challenges to the study. That was very well said.

Finally your comments at the end were very balanced (what the NRC has to do, what the Committee struggled with and your own personal observations).....and you help make up time. THANK YOU.

With regards to the study, I need to get from you (thru Terry I guess) the amount of the grant and a timeline of when you need money to 1) get it started and 2) keep it moving steadily. I need to get this as soon as possible.

I am working to make this happen!

Thanks
-Stephanie

From: Crowley, Kevin [KCrowley@nas.edu]

Sent: Thursday, March 14, 2013 7:50 PM

To: Bush-Goddard, Stephanie; Brock, Terry

Subject: Today's meeting

Stephanie and Terry:

Thanks again for the invite to today's RIC session. I don't think I did a particularly good job on my presentation (it was ok but not stellar). I tried to rush to make up some time from John Boice's presentation.

I did talk with Kathy Gibson after the session. I told her that we needed to be underway with Phase 2 by June 1, otherwise I would not have staff available for the project. I also suggested that we could take the funding for the study over two fiscal years if that would help with your sequester problem. Kathy told me that she thought June 1 was "doable."

Please let me know if there is anything else I should do.

Thanks,

Kevin

Sent from my iPad

THE NATIONAL ACADEMIES

NATIONAL ACADEMY OF SCIENCES
INSTITUTE OF MEDICINE

NATIONAL ACADEMY OF ENGINEERING
NATIONAL RESEARCH COUNCIL

DIVISION ON EARTH AND LIFE STUDIES
NUCLEAR AND RADIATION STUDIES BOARD

Proposal No. 10001387

**ANALYSIS OF CANCER RISKS IN POPULATIONS NEAR NUCLEAR
FACILITIES: PHASE 2**

USNRC Summary Estimate of Costs

6/1/13 to 10/31/13

	AMOUNT
Direct Labor	\$84,258
Overhead	\$50,833
Overhead Cost of Money	\$2,104
Travel	\$80,548
Technology/Communication	\$7,720
Meeting Expense	\$4,000
Other Direct Costs	<u>\$1,743</u>
Subtotal:	\$231,206
General and Administrative Costs	\$41,617
G&A Cost of Money	\$526
Subagreements/Flow-Thru	\$2,600
Subagmt./Flow-thru Admin.	\$105
Total:	\$276,054

Amount Requested From USNRC

\$276,053

Footnote: These major cost categories reflect the billing structure used by the National Academy of Sciences. Cost and rate data are attached as background information and for use in the negotiation process. Please be advised, however, that all costs are systematically collected in our accounting system and are available for audit through arrangements with the Defense Contract Audit Agency and our cognizant Administrative Contracting Officer at the Office of Naval Research.

ESTIMATION DETAILS PROVIDED FOR NEGOTIATION PURPOSES ONLY

THE NATIONAL ACADEMIES

NATIONAL ACADEMY OF SCIENCES
INSTITUTE OF MEDICINE

NATIONAL ACADEMY OF ENGINEERING
NATIONAL RESEARCH COUNCIL

DIVISION ON EARTH AND LIFE STUDIES

NUCLEAR AND RADIATION STUDIES BOARD

Proposal No. 10001387

**ANALYSIS OF CANCER RISKS IN POPULATIONS NEAR NUCLEAR
FACILITIES: PHASE 2**

Estimate of Costs

6/1/13 to 10/31/13

5 months

DIRECT LABOR, ON-SITE	Percent of Time	Annual Salary	Total Salary	Project Totals
EXEMPT				
Sr. Staff Officer	75%	\$90,000	\$28,125	
Board Director	10%	\$172,000	\$7,167	
Financial/Admin Associate	15%	\$77,500	\$4,844	
Post Doc	30%	\$57,100	\$7,138	
TOTAL EXEMPT				\$47,274
NON-EXEMPT				
Sr. Project Assistant	40%	\$44,600	\$7,433	
Sr. Project Assistant	30%	\$49,000	\$6,125	
TOTAL NON-EXEMPT				<u>\$13,558</u>
Total Salaries				\$60,832
Salary Adjustments [1]				<u>\$1,521</u>
Total Direct Labor, On-Site (2)				\$62,353
Fringe Benefits @	35.13% of Salaries			<u>\$21,905</u>
TOTAL DIRECT LABOR, ON-SITE, PLUS FRINGE				\$84,258
SUBTOTAL (On-site Overhead Base)				\$84,258
OVERHEAD, On-site	60.33%	of Base		\$50,833
COST OF MONEY (Labor)	2.4972%	of Base		\$2,104
TOTAL OVERHEAD, On-Site (3)				<u>\$52,937</u>

OTHER DIRECT COSTS

Travel Expenses (Domestic)

	#Pers.	#Mtgs	Days/ Mtg	#Per X Mtg.	Mtg Cost	\$\Mtg	Subtotal
Committee	7	2	2	14	\$1,605	\$22,470	
Experts	7	1	3	7	\$2,110	\$14,770	
Experts	1	2	1	2	\$1,100	\$2,200	Investigator Mtgs
Experts	1	2	1	2	\$1,100	\$2,200	Other site
							\$41,640
Invitees	5	1	2	5	\$1,605	\$8,025	
							\$8,025
Staff	2	1	1	2	\$1,100	\$2,200	Chair
Staff	1	6	1	6	\$1,100	\$6,600	
Staff	3	1	3	3	\$2,110	\$6,330	
Staff	1	2	1	2	\$1,100	\$2,200	Investigator Mtgs
Staff	1	3	1	3	\$1,100	\$3,300	Other site
							\$20,630
Chair	1	1	2	1	\$1,605	\$1,605	
							\$1,605
Total Domestic Travel							\$71,900

Travel Expenses (International)

Experts

From	To	#Pers	#Mtg.	Fare R/T	Subtotals
Manchester, UK	Washington	1	1	\$1,800	\$1,800
Manchester, UK	Hartford, CT	1	1	\$1,900	\$1,900
Manchester, UK	Lansing, MI	1	1	\$2,600	\$2,600
					\$6,300
Experts					
Per Diem	#Days	#Pers	#Mtg.	Rate	
Washington, DC	4	1	1	\$295	\$1,180
Hartford, Ct	4	1	1	\$160	\$640
Lansing, MI	4	1	1	\$132	\$528
					\$2,348
Total International Travel					\$8,648

Total Travel

\$80,548

Other Costs

Photocopies (6)	\$50 /mo	\$250
Postage and Delivery		
Project	\$35 /mo	\$175
Technology/Communications		
Long Distance Telephone	\$25.00 /mo	\$125
Conference Calls	2 @ \$125.00	\$250
Technology Services (7)	\$1,469.00 /mo	\$7,345
Office supplies	\$200 /mo	\$1,000

Meeting Expenses		\$4,000
Books and Periodicals (e.g., newsletters, interlibrary loan)		\$318
Total Other		\$13,463
TOTAL OTHER DIRECT COSTS		\$94,011
SUBTOTAL		\$231,206
General & Administrative Co:	18.00% of Net Direct Labor, Overhead, and Direct Costs.	\$41,617
Cost of Money	0.2273% of Net Direct Labor, Overhead, and Direct Costs.	\$526
TOTAL GENERAL AND ADMINISTRATIVE COSTS (8)		\$42,143
SUBAGREEMENTS AND/OR OTHER FLOW-THRU		
	Radiation Research Society (Conference)	\$1,000
	Risk Assessments Course	\$1,600
	Subtotal	\$2,600
Subagreements/Flow-thru Admin (9)	4.047%	\$105
Total Subagreements/Flow-Thru		\$2,705
TOTAL ESTIMATED COST		\$276,054
	Amount Requested From USNRC	\$276,053

It is requested that the award will provide for payment via Letter of Credit or electronic transfer.

From: Kosti, Ourania
Sent: 12 Jan 2015 13:24:49 -0500
To: Brock, Terry
Cc: Kosti, Ourania
Subject: Cancer Risk Study: Pilot Execution

Terry:

I wanted to give you a heads up that this week I will be submitting internal documents for NAS approval of the next step for the Cancer Risk Study; the Phase 2 pilot execution. Then I will be sending to the NRC the proposal and associated budget. I should be able to do that as early as end of January.

Let me also apologize for the hiccup in the release of the Phase 2 pilot planning report. As far as I understand from interested members of the public and other individuals that are on our listserv the early release of the report did not raise any concerns.

I wish you and your family a happy 2015.

Rania

Ourania (Rania) Kosti, Ph.D.
Senior Program Officer
Nuclear and Radiation Studies Board
The National Academies
email: okosti@nas.edu
phone: 202 334 3066

From: Crowley, Kevin
Sent: 4 Jan 2011 09:35:34 -0500
To: Brock, Terry
Cc: Whetstone, Shauntee;Wingo, Erin;Greenleaf, Toni;Crowley, Kevin
Subject: Cancer Risk Study

Terry:

A quick update and question concerning the cancer risk study.

Update: We are gathering the last few acceptances for the committee. Once we have those in hand we will announce the committee membership and post the member bios for the required 20-day public comment period. I hope to do that before the end of this week. I'll give you at least 24 hours advance notice before we post.

Question: I am trying to set the date for the first committee meeting. Committee calendars are really ugly for January and most of February. The best days to meet are February 24-25. I haven't even begun to develop the meeting agenda, but I expect that part of the first day would be open session. Would the USNRC be prepared to provide briefings on that day (February 24)? Please let me know asap.

I am around this week if you want to discuss.

Thanks,

Kevin

From: Kosti, Ourania
Sent: 1 Apr 2011 15:32:19 -0400
To: Brock, Terry
Subject: conceptualizing meeting #3, Atlanta

Terry,

We have started talking meeting #3. Any suggestions on what location to hold it at? Kevin mentioned that I should ask you where your regional headquarters are and maybe look at that area. Any suggestions are welcome –

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kosti, Ourania
Sent: 10 Aug 2011 13:08:20 -0400
To: Brock, Terry
Subject: CORRECTION RE: request from the dosimetry working group; NAS study

Terry,
The N Anna report is for 1984 and not 1974. Thank you.
Rania

From: Kosti, Ourania
Sent: Wednesday, August 10, 2011 9:39 AM
To: 'Brock, Terry'
Subject: request from the dosimetry working group; NAS study

Dear Terry Brock,

The committee would appreciate your help with retrieving the following reports:

- 1974 N. Anna environmental report. If you cannot find that, the 1977 Oconee environmental and effluent reports can be substituted

The committee is also looking for information on effluents, environmental monitoring and MEI doses in the late 1970s and early 1980s to compare with similar info in reports they have covering recent years and they would like to request:

- document of 1989 and/or 1979 NFS license renewal that reviews effluent and environmental data (The 1999 report they have for NFS is titled: Environmental Assessment for Renewal of Special Nuclear Material License :No. SNM-124 Nuclear Fuel Services, Inc. Erwin, Tennessee Docket 70-143U)
- similar to above but for Portsmouth or Paduca

One member says that he looked through all the effluent reports they got from NRC but many of them did not mention MEI doses at all. It is not clear whether they were even required to report MEI doses in the 1970s. When were MEI doses first required to be reported and is there any summary of annual MEI doses going back to the 1970s that NRC is aware of.

Thank you in advance for your time.

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077

email: okosti@nas.edu

From: Crowley, Kevin
Sent: 10 Jun 2010 21:00:34 -0400
To: Brock, Terry
Subject: Friday meeting

Terry:

We practice casual Friday so don't dress up on my account tomorrow.

See you at 1:00.

Kevin

Kevin D. Crowley, PhD
NRSB/National Academies
202-334-3066; kcrowley@nas.edu

From: Crowley, Kevin
Sent: 19 Apr 2011 20:32:28 -0400
To: Brock, Terry
Subject: FW: AFP story on yesterday's meeting

From yesterday's meeting.

Studying life in the shadow of nuclear plants

April 19th, 2011 in Medicine & Health / Health

The girl's voice shook as she stood in front of some of the world's top scientists and told them "I am one of the statistics that you will be studying."

Sarah Saurer was seven years old when she was diagnosed with [brain cancer](#).

Her parents soon found out that several other children in their small town -- which sat just miles away from two troubled Illinois nuclear power plants -- had been diagnosed with brain cancer and leukemia.

Then news broke that one of the plants had been leaking [radioactive water](#) for years before it was detected. A quick survey by concerned mothers found that every single home within a quarter mile of the spill housed someone who'd been diagnosed with cancer.

"I want to remind you how important it is to protect people from the harmful things that are being put into our environment," Sarah Saurer told the scientists, her short stature and child-like face showing little sign of her 17 years.

"I hope that in this study you will remember who you are doing this study for. It is for me and all of the other kids and people who live near nuclear power plants."

The scientists were meeting in a Chicago suburb Monday as they work to design a major study to analyze the cancer risks associated with living near nuclear power facilities.

It's a topic that has long worried residents and is particularly timely given the renewed concerns about nuclear power in the wake of the ongoing meltdown at Japan's tsunami-crippled Fukushima plant.

The answers will be a long time coming.

"These are tough questions," said John Burris, a biologist who is chairing the study board established by the [National Academy of Science](#).

It will take the board at least until the end of the year to develop the methodology for how to design the study.

Then -- if the Nuclear Regulatory Commission provides funding for the second phase -- the real work of collecting and analyzing the data begins.

One of the biggest challenges will be teasing out whether cancer incidents are linked to low-level radiation discharges by nuclear plants or if they were caused by other factors, Burris said.

That will likely take years.

In the meantime, nuclear regulators and operators struggle to reassure the public that US plants are safe.

Viktoria Mitlyng grew up in Kiev and her childhood was scarred by the Chernobyl disaster and her own bout with leukemia.

She now handles public relations for the Nuclear Regulatory Commission in Illinois and is convinced that the US government is doing everything it can to protect the public.

The undetected leak at the Braidwood plant should never have happened and certainly should have been detected sooner, Mitlyng said.

But it was the only spill which has ever occurred outside of one of the country's 65 nuclear power sites. And the amount of radioactive trillium which leached into the groundwater was just a fraction of acceptable levels.

"To date, there is no scientific evidence that very low levels of radiation can cause health issues," Mitlyng said on the sidelines of the conference.

"That's why this study is being commissioned."

Saurer's parents don't need to wait for the study results.

Her father, a practicing gynecologist with a degree in biomedical engineering, did his own study and is convinced that her cancer was caused by low-level radiation from the plants.

Using public data, he compared cancer rates of people living within 15 miles of the troubled Dresden and Braidwood plants and found they were significantly higher than state-wide averages.

He told the study board that he tried submitting the results to local health officials and nuclear regulators, but got sent to lawyers instead of scientists for review.

"The world has been focused on the devastation in Japan. It has brought a lot of focus on the risk of living near a nuclear plant," Joseph Saurer said.

"I am more worried about the daily man-made disasters at these plants. Over time, these are taking a great toll on the public."

President Barack Obama ordered a comprehensive review of US nuclear safety in the wake of the March 11 quake and tsunami that knocked out power at the Fukushima Daiishi nuclear complex, shutting down systems for cooling radioactive fuel rods.

A similar review was conducted in the wake of the terrorist attacks of September 11, 2001 to ensure that the plants were safe from sabotage or attack.

"We'll go as far as we need to go to make sure the plants are as safe as possible," said Mitlyng of the Nuclear Regulatory Commission.

"Less than one percent (of radiation exposure) comes from industries such as nuclear power. If this fraction is shown to have a direct impact on human health then our effluent limits would have to change."

When it comes to broader issues of nuclear safety the commission is committed to doing everything it can to protect the public from a potential meltdown, she said.

(c) 2011 AFP

From: Brock, Terry
Sent: 17 May 2011 17:08:56 +0000
To: Kosti, Ourania
Subject: FW: how's this for a title page?
Attachments: NAS NRC talks UR May 2011.pptx

Rania,

Here's the uranium recovery talk for the May 23 meeting in Atlanta. It's 14 MB, let me know if it makes it.

Terry

From: Kosti, Ourania
Sent: 11 Oct 2011 14:17:38 -0400
To: Brock, Terry
Subject: FW: NFS Agenda/Directions
Attachments: General Agenda NAS Tour.docx, Directions to NFS.DOC

Attached, the message as it came directly to me from Marie with attachments. Below is what I sent to the committee following a couple of clarifications from Marie on what buildg 440 and Northsite are.

- 1:00 pm Arrive NFS Training Center
- 1:30 pm Overview from Upper Parking Area
- 1:45 pm Process through EECP (Entry/Exit control point)
- 2:00 pm Discussion of Environmental Monitoring Program
 - Overview of plant site
 - Review of gaseous effluent monitoring
 - Review of liquid effluent monitoring
 - Ambient Air Sampling monitoring
 - Ground water monitoring
 - Other Environmental media
- 3:00 pm WWTF Tour (Waste Water Treatment Facility)
- 3:30 pm GWTF Tour (Ground Water Treatment Facility)
- 3:45 pm Building 440 Tour (Optional)

Building 440 was placed on the agenda as optional, depending on the priorities of our visitors. The building is a processing facility located within the Protected Area at NFS. Low enriched uranium is received, blended, sampled, and loaded into shipping containers at this facility. This facility was chosen for ease of access and the ability to view an active operational area.

- 4:00 pm Tour of Northsite

The Northsite is an area of the NFS site that is undergoing Decommissioning. NFS has been working for the last several years to remove waste that was allowed to be disposed of onsite during the 60's and 70's by the NRC. All waste have been removed at this time and we are in final stages of the D&D effort.

- 4:20 pm Driving Tour Environmental Sampling
- 5:00 pm Return to NFS Training Center

Attire: dress comfortably with full coverage shoes with maximum heel height of 1.5 inches. You will potentially be walking on rough terrain and climbing open metal stairways

Do not forget: your valid government issued picture identification. You will be asked to give your Social Security Number for background checks.

From: Moore, B. Marie [mailto:BMMoore@nuclearfuelservices.com]

Sent: Sunday, October 09, 2011 4:30 PM

To: Kosti, Ourania

Subject: NFS Agenda/Directions

If you have any comments on our proposed agenda please let me know, Mark is out of the plant until Wednesday.

~~This message is intended only for the individual or entity to which it is addressed and contains information that is proprietary to Nuclear Fuel Services, Inc., a subsidiary of The Babcock & Wilcox Company, and/or its affiliates, or may be otherwise confidential. If the reader of this message is not the intended recipient, or the employee agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the sender immediately by return e-mail and delete this message from your computer. Thank you.~~

General Agenda for NFS Tour

- 1:00 pm Arrive NFS Training Center
- 1:30 pm Overview from Upper Parking Area
- 1:45 pm Process through EECF
- 2:00 pm Discussion of Environmental Monitoring Program
 - Overview of plant site
 - Review of gaseous effluent monitoring
 - Review of liquid effluent monitoring
 - Ambient Air Sampling monitoring
 - Ground water monitoring
 - Other Environmental media
- 3:00 pm WWTF Tour
- 3:30 pm GWTF Tour
- 3:45 pm Building 440 Tour (Optional)
- 4:00 pm Tour of Northsite
- 4:20 pm Driving Tour Environmental Sampling
- 5:00 pm Return to NFS Training Center

Note: Please dress comfortably with full coverage shoes with maximum heel height of 1.5 inches. We will potentially be walking on rough terrain and climbing open metal stairways.

Directions to NFS

- From Johnson City, Take I-26 east, headed toward Asheville/Erwin.
- Take exit (Exit 40). Make a left turn from the exit ramp onto the Jackson-Love Highway.
- Drive about $\frac{3}{4}$ mile. Turn left onto Banner Hill Road at the NFS Training Center. Turn into the Training Center parking lot and go inside the building. A Security Guard will be there to assist you with getting processed into the facility.
- For those of you using a GPS, the address of the NFS Training Center 1650 Jackson Love Highway, Erwin TN, 37650
- Please have picture ID with you when you arrive
- Please note that cellular phones, cameras and computers will not be allowed inside the protected area. Be prepared to leave them in your vehicle.

From: Brock, Terry
Sent: 11 Jul 2011 18:55:27 +0000
To: 'Rogers,Alice (DSHS)'
Subject: FW: NUREG-0837 excerpt
Attachments: NUREG-0837 Vol 16 No 4 Program Description.pdf

Here's a TLD report from 1996—this has to be one of the last reports for this program. Still searching for more stuff.

Terry

From: Shaffer, Vered
Sent: Thursday, May 12, 2011 8:49 AM
To: Brock, Terry
Subject: FW: NUREG-0837 excerpt

I struck gold!

From: Struckmeyer, Richard
Sent: Thursday, May 12, 2011 7:38 AM
To: Shaffer, Vered
Subject: NUREG-0837 excerpt

Vered,

The attachment includes the description of the program and the data for the first site alphabetically, Arkansas. It is 30 pages long. The actual published report with all of the monitored sites included was about 300 pages.

Rich

From: Barnes, Robin
Sent: 8 Dec 2010 08:27:26 -0500
To: Brock, Terry
Subject: G6000 Account Settlement Report
Attachments: G6000_NRC-04-10-152.pdf

Good morning Terry!

Hope you are doing well. Please see your account settlement report for the above referenced account.

Thanks!

Robin T. Barnes
Management Analyst
US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Division of Program Management, Policy Development & Analysis
Procurement Oversight & Funds Control Team
Phone: 301-251-7401



Automated Standard Application for Payments ACCOUNT SETTLEMENT REPORT

ALC/Region : 31000001/
Recipient ID : 1120482
Account ID : NRC-04-10-152
Transaction Date From : 08/17/2010

Short Name : NRC
Short Name : NAS
Through : 12/07/2010

Settlement/Applied Date	Transaction Type	Authorizations	Draws/RP/BE	Account Balance
08/17/2010	BL FWD			\$0.00
08/26/2010	AU	\$631,000.00		\$631,000.00
09/28/2010	AU	\$405,653.00		\$1,036,653.00
10/07/2010	PY		-\$6,330.53	\$1,030,322.47
11/12/2010	PY		-\$18,907.52	\$1,011,414.95
Totals :		\$1,036,653.00	-\$25,238.05	

From: Kosti, Ourania
Sent: 6 Oct 2014 15:16:56 -0400
To: Brock, Terry
Subject: Heads up

Terry:

I wanted to give you a heads up that later this week we will be releasing the Request for Information and making public the Q+A that we generated for the cancer risk study.

Thanks,

Rania

Ourania (Rania) Kosti, Ph.D.
Senior Program Officer
Nuclear and Radiation Studies Board
The National Academies
email: okosti@nas.edu
phone: 202 334 3066

From: Kosti, Ourania
Sent: 14 Jun 2011 10:26:00 -0400
To: Brock, Terry
Subject: hotel in LA

Terry,

FYI, below is the link to the hotel where committee members and presenters will be staying.

<http://www.irvine.hyatt.com/hyatt/hotels/>

The open session of July 21 will be taking place at the Beckman Center.

http://www.nasonline.org/site/PageServer?pagename=BC_home

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kosti, Ourania
Sent: 31 Mar 2011 17:07:29 -0400
To: Brock, Terry
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

I have not heard back from him and I am planning on calling him again tomorrow. I will let you know of the outcome, if there is no outcome, please do talk to him about our invitation.

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Thursday, March 31, 2011 5:05 PM
To: Kosti, Ourania
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

Did you get a hold of Willie Harris? I'm scheduled to be on a call with him next week on an unrelated manner. Do you want me to say something?

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Thursday, March 31, 2011 5:00 PM
To: Brock, Terry
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

Cheers –
Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Thursday, March 31, 2011 5:00 PM
To: Kosti, Ourania
Subject: Illinois pediatric cancer study and contact info Tiefu Shen

Study attached.

Tiefu Shen, MD, PhD, Chief
Division of Epidemiologic Studies
Illinois Department of Public Health
605 W. Jefferson
Springfield, IL 62761

Phone 217-785-1873
Fax 217-524-1770
Email tiefu.shen@illinois.gov

From: Brock, Terry
Sent: 1 Apr 2011 17:43:51 +0000
To: 'Kosti, Ourania'
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

Good to hear.

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Friday, April 01, 2011 1:43 PM
To: Brock, Terry
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

I just talked to Willie Harris and he will let me know when he hears back from his boss. I hope it works out!

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Thursday, March 31, 2011 5:05 PM
To: Kosti, Ourania
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

Did you get a hold of Willie Harris? I'm scheduled to be on a call with him next week on an unrelated manner. Do you want me to say something?

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Thursday, March 31, 2011 5:00 PM
To: Brock, Terry
Subject: RE: Illinois pediatric cancer study and contact info Tiefu Shen

Cheers –

Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Thursday, March 31, 2011 5:00 PM
To: Kosti, Ourania
Subject: Illinois pediatric cancer study and contact info Tiefu Shen

Study attached.

Tiefu Shen, MD, PhD, Chief
Division of Epidemiologic Studies
Illinois Department of Public Health
605 W. Jefferson
Springfield, IL 62761

Phone 217-785-1873

Fax 217-524-1770

Email tiefu.shen@illinois.gov

From: Kosti, Ourania
Sent: 5 Apr 2011 17:36:41 -0400
To: Brock, Terry
Subject: RE: in case of government shutdown

Cheers -

-----Original Message-----

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Tuesday, April 05, 2011 5:32 PM
To: Kosti, Ourania
Subject: RE: in case of government shutdown

Yes, please proceed without us. The tour will probably be cancelled, but we'll check with Exelon to see if they would host without NRC if the govt. shuts down. I'll let you know.

From: Kosti, Ourania [OKosti@nas.edu]
Sent: Tuesday, April 05, 2011 5:16 PM
To: Brock, Terry
Subject: in case of government shutdown

Hello Terry,

We have been thinking of the scenario in which there is a government shutdown. Our thought is that we will move forward with the meeting in Chicago since we have committed financially but not just. Unfortunately, the agenda has to be adjusted as we will be losing the U.S.NRC presenters and the epidemiology expert Martha Linet (NCI). Also, we understand that the tour will not happen as we need to be accompanied by the U.S.NRC, correct? Let me know if you have any thoughts.

I suggest we touch base again on this subject Thursday.

Thank you -
Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Brock, Terry
Sent: 16 Feb 2011 17:47:50 +0000
To: 'Kosti, Ourania'
Subject: RE: instead of Boice, how about . . .

Ok, I should be able to get you the slides by Tuesday . . .still under review.

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Wednesday, February 16, 2011 12:43 PM
To: Brock, Terry; Crowley, Kevin
Subject: RE: instead of Boice, how about . . .

Hello Terry,

This is a good suggestion, Kevin and I will discuss and see how we can act, given that there is only a week left till the committee meets.

Also; we will need the NRC power point presentations to forward to the webcast team. Please provide us with the slides by Tuesday 22nd.

Thank you. Hope all is well –
Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Wednesday, February 16, 2011 12:05 PM
To: Kosti, Ourania; Crowley, Kevin
Subject: instead of Boice, how about . . .

Kevin/Rania,

I spoke to John Boice today and he definitely can't make it for the 2/24th meeting—I tried, but (b)(6) before his upcoming trip to Japan on the 26th. I asked Martha Linet of NCI if she could send someone to answer questions and she had no one. John suggested you either invite Clark Heath of the American Cancer Society, Don Pierce of Oregon State University, or Art Upton to attend. They were all on the peer-review committee for the original study and John felt they could all speak clearly about the work to the committee.

I hope this helps,
Terry

From: Kosti, Ourania
Sent: 30 Mar 2015 13:03:13 -0400
To: Brock, Terry
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Ha! I sort of did the same although I took as many years of French as I did of English....but never practiced French!

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Monday, March 30, 2015 12:52 PM
To: Kosti, Ourania
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Thanks. Google translator is very helpful. My high school level Spanish was no help!

Terry

From: Kosti, Ourania [OKosti@nas.edu]
Sent: Monday, March 30, 2015 12:34 PM
To: Brock, Terry
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:
I have the attached program (in French). Rania

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Monday, March 30, 2015 12:28 PM
To: Kosti, Ourania
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Do you have the formal meeting announcement I can look at please?

Thanks

From: Kosti, Ourania [OKosti@nas.edu]
Sent: Monday, March 30, 2015 12:14 PM
To: Brock, Terry
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:
The topic of the meeting is "Ionizing radiation and leukemia risk." I have been invited to present on the recommended study designs. Former committee member Andre Bouville has been invited to present on the dosimetry.
Rania

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Monday, March 30, 2015 11:53 AM

To: Kosti, Ourania

Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Hi Rania,

Since this is our regulatory counterpart let me find out if this is appropriate for a contractor to present the study.

Thanks,

Terry

From: Kosti, Ourania [OKosti@nas.edu]

Sent: Monday, March 30, 2015 11:02 AM

To: Brock, Terry

Subject: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:

I wanted to give you a heads up that I have been invited to present on the Cancer Risk Study at a meeting organized by the French Nuclear Safety Authority scheduled for June 9 in Paris.

Thanks,

Rania

From: Kosti, Ourania
Sent: 30 Mar 2015 13:12:52 -0400
To: Brock, Terry
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:

I will be presenting on a NAS study that is already complete--I do not see a problem with that and neither does my management. Also, as you know, I am not using USNRC funding to attend.

As you understand the meeting is by invitation only. Margot Tirmarche contacted me directly to invite me to present.

I plan to start making my travel arrangements Wednesday this week.

Thanks,

Rania

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]

Sent: Monday, March 30, 2015 1:06 PM

To: Kosti, Ourania

Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

I don't think there will be a problem with you going. I just want to give everyone a heads up. I may be asked to go to learn something/monitor.

Terry

From: Kosti, Ourania [OKosti@nas.edu]

Sent: Monday, March 30, 2015 1:03 PM

To: Brock, Terry

Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Ha! I sort of did the same although I took as many years of French as I did of English....but never practiced French!

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]

Sent: Monday, March 30, 2015 12:52 PM

To: Kosti, Ourania

Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Thanks. Google translator is very helpful. My high school level Spanish was no help!

Terry

From: Kosti, Ourania [OKosti@nas.edu]

Sent: Monday, March 30, 2015 12:34 PM

To: Brock, Terry

Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:

I have the attached program (in French). Rania

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Monday, March 30, 2015 12:28 PM
To: Kosti, Ourania
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Do you have the formal meeting announcement I can look at please?

Thanks

From: Kosti, Ourania [OKosti@nas.edu]
Sent: Monday, March 30, 2015 12:14 PM
To: Brock, Terry
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:
The topic of the meeting is "Ionizing radiation and leukemia risk." I have been invited to present on the recommended study designs. Former committee member Andre Bouville has been invited to present on the dosimetry.
Rania

-----Original Message-----

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Monday, March 30, 2015 11:53 AM
To: Kosti, Ourania
Subject: RE: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Hi Rania,

Since this is our regulatory counterpart let me find out if this is appropriate for a contractor to present the study.

Thanks,
Terry

From: Kosti, Ourania [OKosti@nas.edu]
Sent: Monday, March 30, 2015 11:02 AM
To: Brock, Terry
Subject: Invitation to present on the cancer risk study at the French Nuclear Safety Authority

Terry:
I wanted to give you a heads up that I have been invited to present on the Cancer Risk Study at a meeting organized by the French Nuclear Safety Authority scheduled for June 9 in Paris.
Thanks,
Rania

ANNEXE

Informations sur le séminaire

Le séminaire se déroulera :

le mardi 9 juin 2015
de 9h00 à 17h30
au siège de l'ASN, 15 rue Louis Lejeune
92120 Montrouge

Il réunira 60-80 participants.

Ce séminaire portera sur les **risques de leucémies (chez l'adulte et l'enfant) associés à l'exposition aux rayonnements ionisants**.

La langue du séminaire sera le français avec possibilité pour les orateurs qui le souhaitent de s'exprimer en anglais.

La durée des interventions pourrait être de 20-25 mn, suivi de 5-10 mn de discussion (après la présentation ou regroupée en fin de session).

La synthèse de la journée sera assurée par des rapporteurs et sera suivie par une discussion générale.

A l'issue de cette journée, les actes du séminaire seront publiés et mis en ligne sur le site internet de l'ASN.

Projet de programme et orateurs pressentis

SESSION 1	
Leucémies de l'adulte et de l'enfant et expositions aux rayonnements ionisants	
<i>Généralités sur les leucémies</i>	
❖ Point sur les leucémies en France	Marc Colonna
❖ Les différents types de leucémies de l'adulte et de l'enfant et leur étiologie	Marc Maynadie
<i>Leucémies et expositions aiguës aux rayonnements ionisants</i>	
❖ Enseignements d'Hiroshima Nagasaki et autres accidents nucléaires	Elisabeth Cardis
❖ Leucémies post-radiothérapie	Pierre Bey
<i>Leucémies et expositions chroniques aux rayonnements ionisants</i>	
❖ Cohortes des travailleurs de l'industrie nucléaire, mineurs...	Klervi Leuraud
❖ Dosimétrie des rayonnements ionisants et leucémies - Calcul de la dose à la moelle	Isabelle Thierry-Chef

SESSION 2**Leucémies infantiles et rayonnements ionisants**

- | | |
|--|------------------|
| ❖ Leucémies infantiles et scanner – Etudes françaises et internationales | Ausra Kesminiene |
|--|------------------|

Leucémies infantiles et radioactivité naturelle

- | | |
|---|----------------|
| ❖ Etudes françaises (GEOCAP...) | Denis Hémon |
| ❖ Etudes internationales (radon et rayonnement gamma) | Maria Blettner |

Leucémies infantiles et proximité des INB

- | | |
|--|-------------------|
| ❖ Bilan des études nationales et internationales et conclusions de MELODI 2012 | Dominique Laurier |
| ❖ Protocole de l'étude américaine | Ourania Kosti |
| ❖ Dosimétrie des rejets des INB | André Bouville |

Leucémies infantiles et autres facteurs de risques

- | | |
|--|-------------------|
| ❖ Etudes nationales et internationales | Jacqueline Clavel |
| ❖ Etiologie des leucémies de l'enfant - Présentation des études initiées par BfS | Bernd Grosche |

From: Kosti, Ourania
Sent: 30 Nov 2011 15:19:40 -0500
To: Brock, Terry
Subject: RE: John B and the RIC

I did, and he is available March 14 and 15. Please let me know when the presentation will be.
(I will come back to you shortly with the time for the conference call.)

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Wednesday, November 30, 2011 3:14 PM
To: Kosti, Ourania
Subject: John B and the RIC

One more thing, did you confirm with John if he could speak at our 2012 RIC (sometime between March 13-15) ? I need to get all the paperwork in for him by Dec. 12.

Thanks,
Terry

From: Brock, Terry
Sent: Wednesday, November 30, 2011 2:33 PM
To: 'Kosti, Ourania'
Subject: RE: phase 1 report comment resolution

Hello,

Tomorrow at 1 or 2 would work or later in the afternoon.

Terry

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Wednesday, November 30, 2011 9:14 AM
To: Brock, Terry
Subject: RE: phase 1 report comment resolution

Dear Terry,
I hope this email finds you well. Are you available Thursday or Friday to talk on the phone and continue the discussion on the phase I comments? If yes, please suggest a couple of time options.
Thank you –
Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Wednesday, November 16, 2011 6:04 PM
To: Crowley, Kevin; Kosti, Ourania
Subject: phase 1 report comment resolution

How about Monday? This public comment reconciliation seems to be a high priority on NRC management's mind.

I think a path forward is for the committee to post a "draft" phase 1 report in pdf format on the study website and solicit public comments for 2 months instead of publishing a final report and then asking for public comments knowing a priori you are not going to change the report regardless of what is commented on—for reference, ICRP and NCRP hold a public comment period before finalizing their documents. After the comment period have the committee reconcile the comments and change or not change the report depending on their judgment of the value of the comment on their work. Once the comments are addressed and all committee members are satisfied with the draft then you would start the formal internal NAS process of peer review and approval to publish the final report. The final report would include an appendix for public comment disposition. I think it would be more efficient and less confusing to NRC, the public, and the future phase 2 committee to do all this in one report than to develop an additional report that only addresses the public comments and may technically disagree/contradict with the phase 1 recommendations.

We'll have to tweak the schedule a bit, but there should be enough funds to do this since there is no planned 6th meeting. The 6th meeting could be the comment reconciliation gathering. A less desirable alternative is that we don't submit the report for public comment and NRC lives with the report as intended by the committee. I think the least desirable alternative is that NAS request comments but the committee does not formally respond. I think that will put NRC and NAS staff in a difficult position to defend and respond to comments on a document not authored by either entity—possibly and unnecessarily casting a shadow over the technical quality of phase 1 recommendations and making it more difficult for NRC to proceed with phase 2.

Let's try and discuss soon.

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Kosti, Ourania [<mailto:OKosti@nas.edu>]
Sent: Wednesday, November 16, 2011 3:16 PM
To: Brock, Terry; Crowley, Kevin
Subject: RE: 2012 RIC presentation on cancer study

Dear Terry,

Thank you for the message regarding RIC and the update.
Regarding the issue of handling of public comments: it seems that we will have to wait till after thanksgiving to discuss. Kevin and I are working on sending the updated report draft to the committee today and as I mentioned, Kevin is traveling next week. If you want, to keep the conversation moving, we could try to resolve some of the issue by email; Kevin's participation in the discussion is important.

Thank you –

Rania

From: Brock, Terry [<mailto:Terry.Brock@nrc.gov>]
Sent: Wednesday, November 16, 2011 3:11 PM
To: Kosti, Ourania; Crowley, Kevin
Subject: RE: 2012 RIC presentation on cancer study

Incoming news: I just heard we don't need a RIC confirmation for John until Dec. 1, 2012. Kevin- if you remember from last year there is a form you have to sign confirming your participation. I'll get the form to you once John is confirmed or if you have another idea for a speaker.

Thanks and I look forward to hearing from you,
Terry

From: Brock, Terry
Sent: Wednesday, November 16, 2011 2:26 PM
To: 'Kosti, Ourania'; 'Crowley, Kevin'
Subject: 2012 RIC presentation on cancer study

Hi Kevin/Rania,

I left a message for both of you. The 2012 NRC Regulatory Information Conference (RIC) planning has begun and is scheduled for March 13-15, 2012. This year we plan to have one talk on the cancer study in a broader radiation protection and health effects session. I tentatively put down John Burriss as a possible speaker to discuss the results of phase 1—It should be out for review by then and he can provide an overview of the committee findings and recommendations. Please let me know if there are any issues with him presenting, but after how well he did at the NFS meeting I think he is ready for prime-time.

We got word the Commission is not planning on having a public briefing on the phase 1 study results so I strongly suggest we use the RIC venue to get the word out on the results.

Also, let me know a good time to talk about the handling of public comments on the phase 1 report.

Thanks,
Terry

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Kosti, Ourania
Sent: 18 Mar 2011 10:44:08 -0400
To: Brock, Terry
Subject: RE: Joliet, IL

Thank you –
Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Friday, March 18, 2011 10:35 AM
To: Kosti, Ourania
Subject: RE: Joliet, IL

Sorry, no I haven't lived there in 17 years. Since it is a bigger city I thought your odds of finding a place would be better than at some of the smaller towns adjacent to the reactors.

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Friday, March 18, 2011 10:32 AM
To: Brock, Terry
Subject: Joliet, IL

Terry,
You suggested Joliet as a meeting location. Do you have any specific hotel recommendations? That would be very helpful.
Thank you –
Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kost, Ourania
Sent: 23 Dec 2014 11:44:38 -0500
To: Brock, Terry
Subject: RE: Leftover funds: Pilot Planning

About \$75,000.

Thanks for checking. Rania

From: Brock, Terry [mailto:Terry.Brock@nrc.gov]
Sent: Tuesday, December 23, 2014 7:46 AM
To: Kost, Ourania
Subject: RE: Leftover funds: Pilot Planning

A no cost extension would probably be easier than initiating a new grant. Let me check with management. How much is left?

Terry

Terry Brock, Ph.D.

Office of Nuclear Regulatory Research

U.S. Nuclear Regulatory Commission

Washington D.C. 20555

Mail Stop CSB-3A07

phone: 301-251-7487

From: Kost, Ourania [mailto:OKosti@nas.edu]
Sent: Monday, December 22, 2014 12:38 PM
To: Brock, Terry
Cc: Kost, Ourania
Subject: Leftover funds: Pilot Planning

Terry:

As you may know there will be some leftover funds from the current study step. I would like to discuss whether there are ways to carry over the funds (or part of the funds) to use to finalize the study proposal and budget and do any modifications that you may request to the proposal. I assume that this request comes too late to consider a no-cost extension. I was thinking maybe some sort of bridge-award before the next step starts (if it starts)?

If you have time we can discuss options tomorrow.

Rania

Ourania (Rania) Kost, Ph.D.

Senior Program Officer

Nuclear and Radiation Studies Board

The National Academies

email: okosti@nas.edu

phone: 202 334 3066

From: Crowley, Kevin
Sent: 7 Apr 2010 17:12:53 -0400
To: Brock, Terry
Subject: Re: letter

Thanks Terry.

Kevin D. Crowley, PhD
NRSB/National Academies
202-334-3066; kcrowley@nas.edu

From: Brock, Terry <Terry.Brock@nrc.gov>
To: Crowley, Kevin
Sent: Wed Apr 07 15:59:05 2010
Subject: RE: letter

Hi Kevin,
Attached is some input we received from Paul Gunter and others for consideration. The Epstein e-mail directly referenced the Gunter letter. Nothing new there as I read it again. Here's a link to an op/ed piece he wrote on the study for the HuffingtonPost
http://www.huffingtonpost.com/samuel-s-epstein/nuclear-power-causes-canc_b_251057.html

Also attached is an article submitted to NRC by Rudi Nussbaum in October, 2009 (a signatory on the Gunter letter).

Terry

From: Crowley, Kevin [mailto:KCrowley@nas.edu]
Sent: Wednesday, April 07, 2010 1:23 PM
To: Brock, Terry
Subject: letter

Terry:

The letter that you just mentioned from Epstein and Gunter: It would be helpful if you could send that to me sooner rather than later so I can see what the concerns are.

If you only have a paper copy my fax number is 202-334-3077.

Thanks,

Kevin

From: Brock, Terry
Sent: 14 Apr 2011 14:21:03 +0000
To: 'Kosti, Ourania'
Cc: Whetstone, Shauntee
Subject: RE: lunch at Exelon

We plan to go to the cafeteria where people can select and pay for what they want. We'll return to the auditorium to eat and listen to the NRC inspector.

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Thursday, April 14, 2011 9:01 AM
To: Brock, Terry
Cc: Whetstone, Shauntee
Subject: lunch at Exelon

Terry,
Is there anything we need to do regarding the working lunch during the tour? Do we just buy food from the cafeteria there or we need to pre-order?
Thanks –
Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Brock, Terry
Sent: 20 May 2011 11:34:15 +0000
To: 'Kosti, Ourania'
Subject: RE: May 20th_version of agenda
Attachments: Overview Nuclear Fuel Cycle 0523 REGION II Version PUBLIC.PPTX

Hi Rania,

Attached is the fuel cycle presentation. Please take Dennis Damon off the agenda and change John M. Pelchat's organizational affiliation to Region II

The HQ staffer on the bridge-line for you to call is Greg Chapman of the Office of Nuclear Material Safety and Safeguards at 301-492-3106.

From: Kosti, Ourania [mailto:OKosti@nas.edu]
Sent: Thursday, May 19, 2011 8:14 PM
To: Brock, Terry
Subject: May 20th_version of agenda

Terry,

Attached is the current version of the agenda, please share with your colleagues. It will be made public tomorrow.

Please let me know of any confirmed changes to the presenters and I will make sure they are announced the day of the meeting.

Also, as we discussed, tomorrow I will have from you the:

- fuel cycle presentation
- name, number of the person will be calling in

Best,
Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu



United States Nuclear Regulatory Commission

Protecting People and the Environment

Overview of the Nuclear Fuel Cycle

Presentation to the National Academy of Sciences Committee for
Analysis of Cancer Risks in Populations near Nuclear Facilities

John M. Pelchat, Senior Fuel Facility Inspector

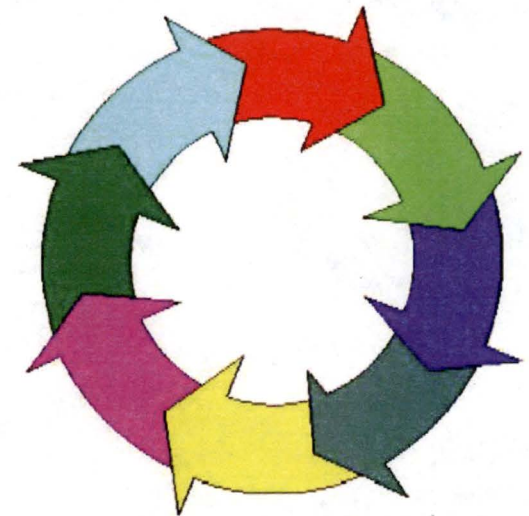
U.S. NRC Region II



Division of Fuel Facility Inspection

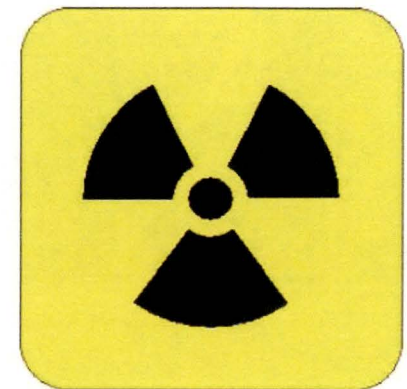
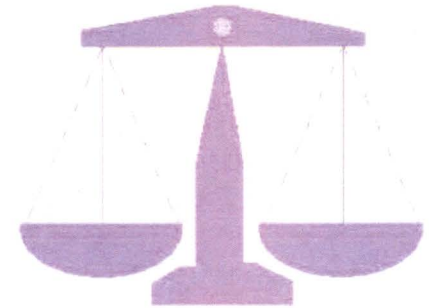
Outline

- Nuclear Fuel Cycle & Major Facilities
- Federal Laws & NRC Regulations

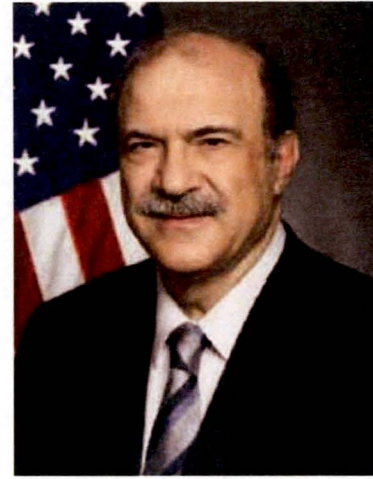
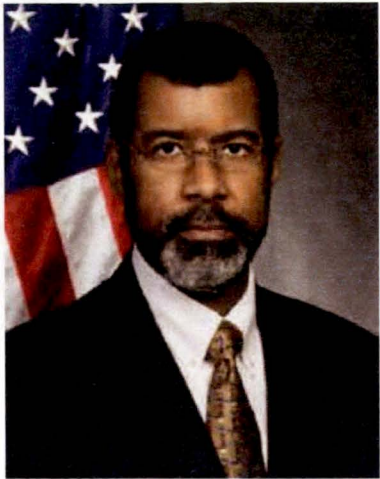


Applicable Laws

- Atomic Energy Act
- Energy Reorganization Act
- Nuclear Waste Policy Act
- Energy Policy Act



Mission of the NRC



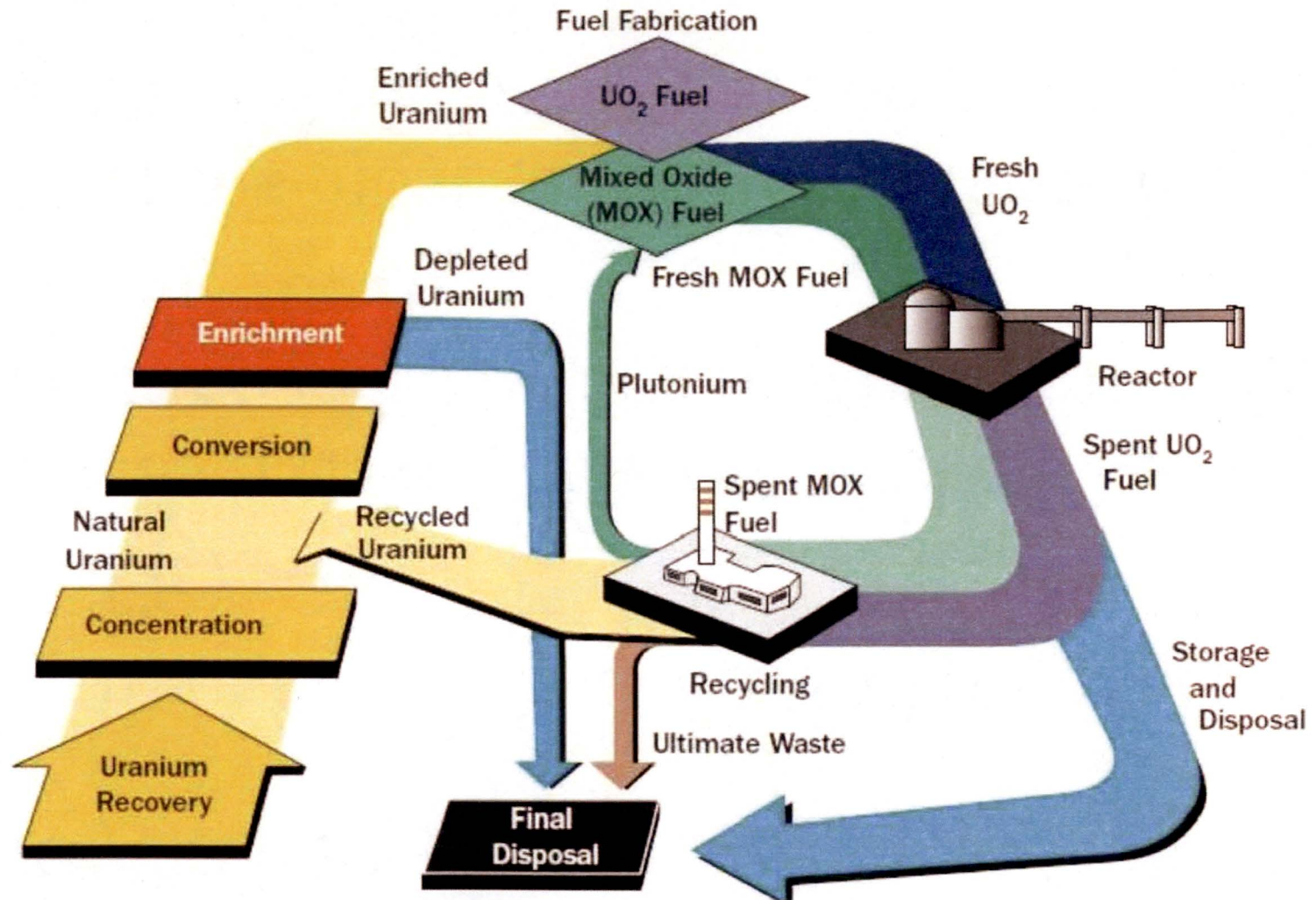
- **Ensure adequate protection of public health and safety.**
- **Promote the common defense and security.**
- **Protect the environment.**

Fuel Cycle Facility Regulations in General

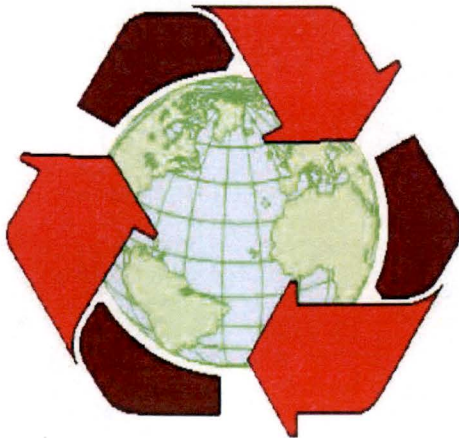
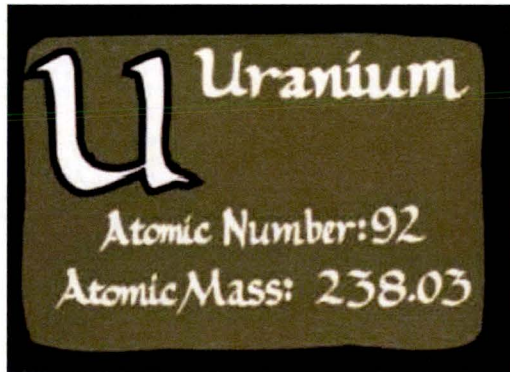
- Title 10 of the Code of Federal Regulations (10 CFR)
- Facilities are very different from one another and are covered by different parts: 10 CFR, Parts 40, 70, 76
- All facilities must comply with radiation protection standards, including public dose limits in 10 CFR 20

Nuclear Fuel Cycle

Figure 31. The Nuclear Fuel Cycle



Steps of the Fuel Cycle



- Mining of the uranium ore
- Milling to remove rock & refine
- Conversion to UF_6
- Enrichment of ^{235}U
- Fuel Fabrication
- Reactor Use (Fuel Burn)
- Storage of Spent Nuclear Fuel
- De-conversion of depleted U

Mining

- Where it all begins
 - Open pit and deep mines – uranium oxides in ores
 - In-situ Leach (ISL) method – uranium in solution
- Most U.S. uranium is imported
- Dominant radiation hazards from radon and progeny



Milling

- Refining and concentrating the uranium
- Input: rock/concentrate + chemicals
- Product: yellowcake (U_3O_8)
 - Not always yellow
 - Gray and brown common too
- Most domestic mills now are closed



Conversion

- Regulated under 10 CFR 40
- Single U.S. facility - Metropolis, IL
- Input: yellowcake in 55-gallon drums
- Output: UF_6 in 14-ton cylinders
- Dry Conversion Process
- Dominant chemical hazard: hydrogen fluoride



Enrichment

- Boosting concentration of ^{235}U vs. ^{238}U (0.71% \rightarrow 5%)
 - Input: UF_6 at natural enrichment (0.7% ^{235}U)
 - Product: Low-Enriched UF_6
(3-5% ^{235}U)
 - Byproduct: Depleted U (0.2% ^{235}U)

- Gaseous diffusion plants:
 - Paducah GDP in Paducah, KY (operating)
 - Portsmouth GDP in Piketon, OH (in cold shutdown)

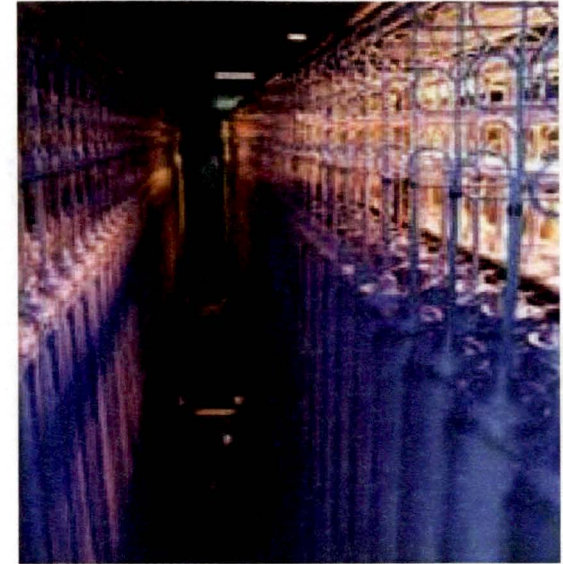


Enrichment

- Gas centrifuge plants:
 - USEC – Piketon OH
 - LES – Eunice, NM
 - AREVA – Eagle Rock Facility
Bonneville County, ID

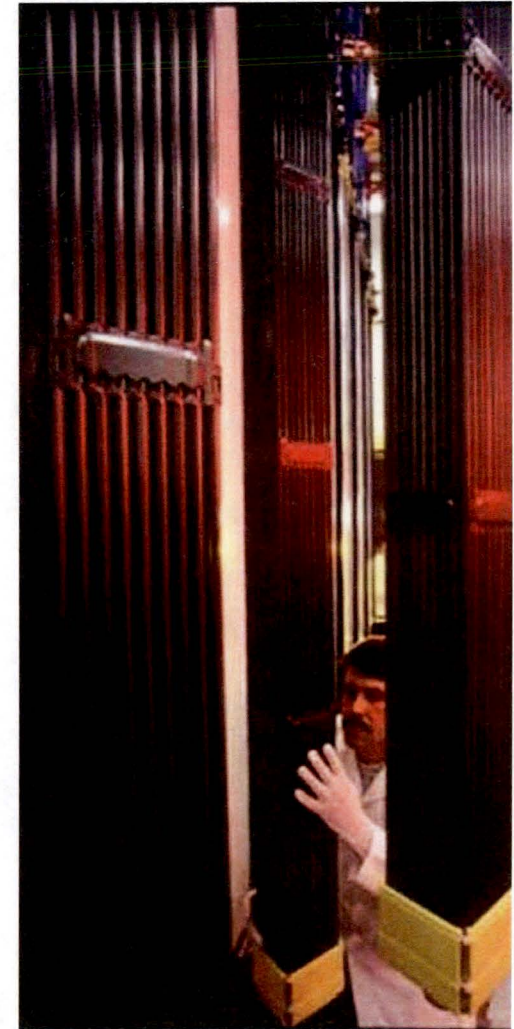
- Laser enrichment facility – GE Hitachi in
Wilmington, NC

- Deconversion of depleted Uranium --
International Isotopes in Hobbs, NM



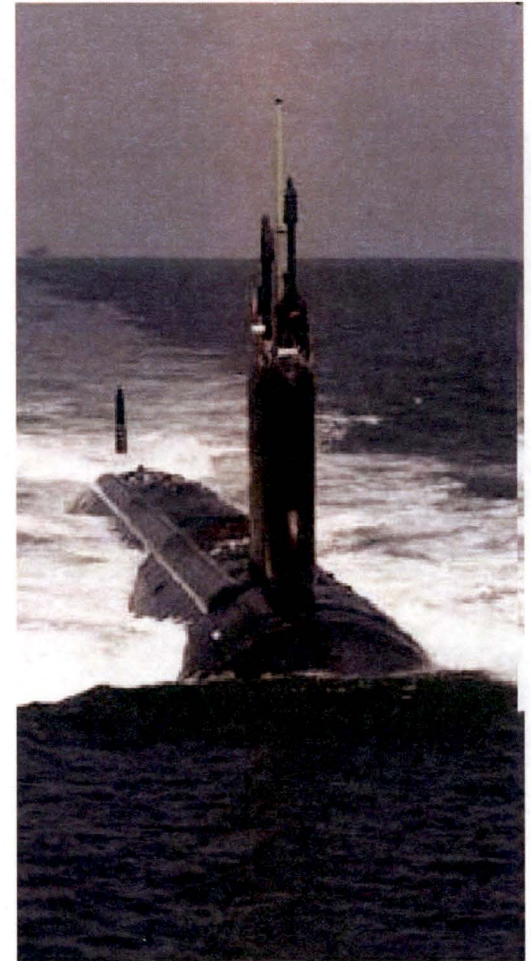
Fuel Fabrication

- To produce low-enriched uranium packaged as fuel
- Input: Low-enriched UF_6 in 30-B Cylinders (2.5 tons)
- Product: Uranium dioxide (UO_2) ceramic pellets in fuel assemblies, 4 - 5% assay typically
- 3 U.S. commercial (LEU) fuel fabrication facilities currently operating



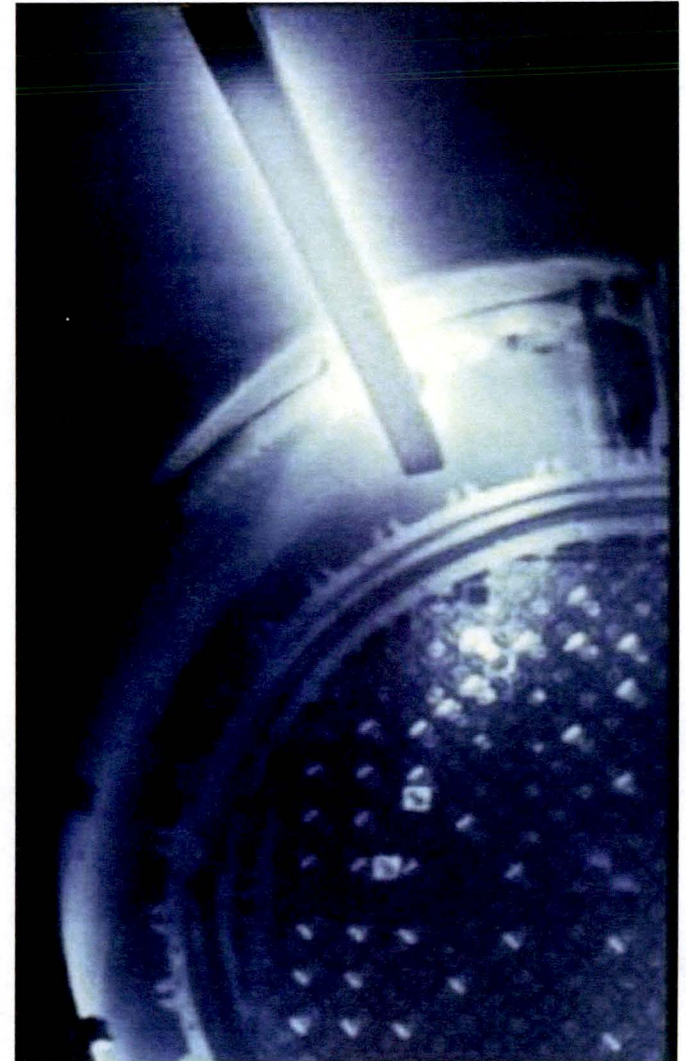
High-Enriched Uranium (HEU)

- HEU enrichment typically involves > 90 wt % ^{235}U
- NRC licenses two HEU fuel facilities
- Support naval nuclear propulsion program and research reactors
- No current enrichment program for HEU

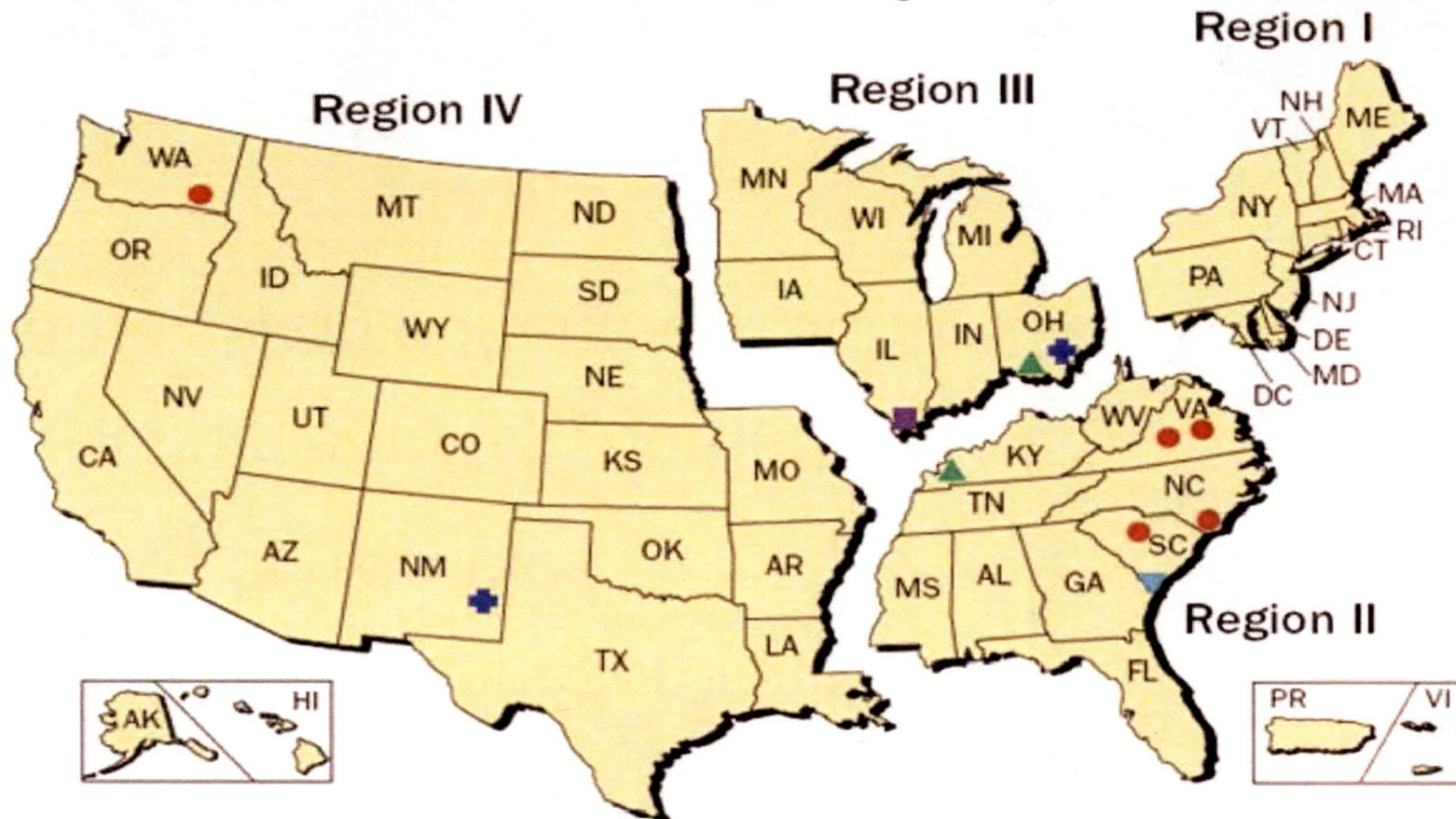


The Rest of the Fuel Cycle

- Mixed (U+Pu) Oxide (MOX) fuel
 - MOX fuel fabrication facility being constructed
 - Test assemblies “burned” in an existing commercial light-water reactor



Locations of Fuel Cycle Facilities



- ▼ Mixed-Oxide (MOX) Fuel Fabrication Facility
- Uranium Fuel Fabrication Facility
- Uranium Hexafluoride Production (Conversion) Facility
- ▲ Gaseous Diffusion Enrichment Facility
- ⊕ Gas Centrifuge Enrichment Facility

Major U.S. Fuel Cycle Facilities

Licensee/Facility	Location	Type
AREVA NP, Inc. (Decommissioning)	Lynchburg, VA	Uranium Fuel Fabrication
AREVA NP, Inc.	Richland, WA	Uranium Fuel Fabrication
Babcock & Wilcox Nuclear Owners Group BWX Technologies Nuclear Products Division	Lynchburg, VA	Uranium Fuel Fabrication
Global Nuclear Fuel-Americas, LLC	Wilmington, NC	Uranium Fuel Fabrication
Honeywell International, Inc.	Metropolis, IL	Uranium Hexafluoride Production (Conversion)
Louisiana Energy Services National Enrichment Facility (begun initial operations, construction continues)	Eunice, NM	Gas Centrifuge Uranium Enrichment
Nuclear Fuel Services, Inc.	Erwin, TN	Uranium Fuel Fabrication
Shaw AREVA MOX Services, LLC Mixed Oxide Fuel Fabrication Facility (in construction)	Aiken, SC	Mixed-Oxide Fuel Fabrication
U.S. Enrichment Corporation Paducah GDP	Paducah, KY	Gaseous Diffusion Uranium Enrichment
U.S. Enrichment Corporation Portsmouth GDP (cold shutdown)	Piketon, OH	Gaseous Diffusion Uranium Enrichment
USEC Lead Cascade and American Centrifuge Plant (under construction)	Piketon, OH	Gas Centrifuge Uranium Enrichment
Westinghouse Electric Company, LLC Columbia Fuel Fabrication Facility	Columbia, SC	Uranium Fuel Fabrication

Part 40 Facilities Effluent Reporting

- Applicable FCFs: Honeywell MTW (40-3392)
- Reporting Frequency: Semiannually per 10 CFR 40.65
- Sample Facility: Honeywell MTW (6 mo)
- Typical Gas Effluents: Typical Liquid Effluents:
 - Uranium (Nat.) 10^{-2} Ci 10^{-1} Ci
 - ^{226}Ra 10^{-5} Ci 10^{-3} Ci
 - ^{230}Th 10^{-4} Ci 10^{-3} Ci
- Example Reports in ADAMS: ML102460374;
ML100630663

Part 70 Facilities Effluent Reporting

- Applicable FCFs: AREVA NP Lynchburg (70-1201), AREVA Richland (70-1257), B&WNOG Lynchburg (70-1113); GNF Wilmington (70-1113; 70-7016); **LES Eunice (70-3103)**; NFS Erwin (70-3098); **USEC ACP Portsmouth (70-7004)**; WEC Columbia (70-1151)
- Reporting Frequency: Semiannually per 10 CFR 70.59
- Sample Facility: GNF (6 mo)
- Typical Gas Effluents:

□ ^{234}U	10^{-6} Ci
□ ^{235}U	10^{-7} Ci
□ ^{236}U	10^{-8} Ci
□ ^{238}U	10^{-7} Ci
- Typical Liquid Effluents:

10^{-2} Ci
10^{-4} Ci
10^{-5} Ci
10^{-3} Ci
- Example Reports in ADAMS: ML110420257; ML102380226

Part 76 Facilities Effluent Reporting

- Applicable FCFs: USEC: Paducah Gaseous Diffusion Plant (70-7001), **Portsmouth Gaseous Diffusion Plant (70-7002)**
- Reporting Frequency: Upon renewal per 10 CFR 76.35 (~ every 5 years)
- Sample Facility: USEC: Paducah GDP
- Typical Gas Effluents:

<input type="checkbox"/> U:	1.5×10^{-2} Ci/y
<input type="checkbox"/> ⁹⁹ Tc	1×10^{-2} Ci/y
<input type="checkbox"/> ²³⁰ Th:	3×10^{-5} Ci/y
<input type="checkbox"/> ²³⁷ Np:	2×10^{-4} Ci/y
<input type="checkbox"/> ^{239/240} Pu:	1×10^{-6} Ci/y

Typical Liquid Effluents:

10 ug/l U (Nat.) ²³⁵ U	0.2 wt. %,
10 pCi/l	
0.1 pCi/l	
0.1 pCi/l	
0.1 pCi/l	
- Example Reports in ADAMS: ML081070229; ML071490110; ML070610332

QUESTIONS

From: Crowley, Kevin
Sent: 25 Mar 2010 09:10:14 -0400
To: Brock, Terry
Subject: Meeting?

Hi Terry:

I'm back from Vienna—would you like to meet to discuss the NPP study? I'm around tomorrow and all of next week, so please suggest a couple of times that work for you.

Thanks,

Kevin

From: Kosti, Ourania
Sent: 31 Oct 2011 10:20:33 -0400
To: Brock, Terry
Subject: Millstone report; received

Thank you. Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Crowley, Kevin
Sent: 2 Apr 2010 13:46:33 -0400
To: Brock, Terry
Subject: My schedule next week

Terry:

I'll be working at home on Monday (writing performance reviews for my staff). I'll be monitoring my e-mail, but if you need to speak with me please feel free to call: (b)(6) I'll be on duty from 8:30 am – 6:00 pm.

I'll be in the office on Tuesday-Friday.

Kevin

From: Interested parties list for activities pertaining to the Cancer Risk project on behalf of Greenleaf, Toni
Sent: 24 Oct 2013 06:28:52 -0400
To: CANCERRISKSTUDY@LSW.NAS.EDU
Subject: NAS Announces Provisional Committee Membership for Cancer Risk Pilot Planning Study

Dear Interested Parties:

The National Academy of Sciences (NAS) announced on its webpage the names and brief biographies of the nine experts selected to carry out the planning of the pilot study titled *Analysis of Cancer Risks in Populations near Nuclear Facilities*. The slate of provisional committee appointments is open to public comment for 20 calendar days. Members of the public can provide comments here:

<http://www8.nationalacademies.org/cp/CommitteeView.aspx?key=49579>

NAS will perform the pilot study of cancer risks in populations near seven U.S. Nuclear Regulatory Commission (U.S.NRC)-licensed nuclear facilities using two epidemiologic study designs: (i) an ecologic study of multiple cancer types of populations of all ages and (ii) a record-linkage-based case-control study of cancers in children. The pilot study will have two steps: Pilot Planning and Pilot Execution. NAS has started the Pilot Planning step which is estimated to take one year to complete.

The seven nuclear facilities that are part of the pilot study are:

Dresden Nuclear Power Station, Morris, Illinois
Millstone Power Station, Waterford, Connecticut
Oyster Creek Nuclear Generating Station, Forked River, New Jersey
Haddam Neck, Haddam Neck, Connecticut
Big Rock Point Nuclear Power Plant, Charlevoix, Michigan
San Onofre Nuclear Generating Station, San Clemente, California
Nuclear Fuel Services, Erwin, Tennessee

The study is sponsored by the U.S. Nuclear Regulatory Commission. It is a continuation of a previous study that was completed in May 2012. The report from that first study can be found here: http://www.nap.edu/catalog.php?record_id=13388

The National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council make up the National Academies. They are independent, nonprofit institutions that provide science, technology, and health policy advice under an 1863 congressional charter. Panel members, who serve pro bono as volunteers, are chosen by the Academies for each study based on their expertise and experience and must satisfy the Academies' conflict-of-interest standards. The resulting consensus reports undergo external peer review before completion. For more information, visit <http://national-academies.org/studycommitteprocess.pdf>

Please direct comments and questions to the project email: crs@nas.edu. If you would like to be removed from the list please send us an email with the title REMOVE FROM LIST. If you are member of the press and have questions regarding this message, please contact Jennifer Walsh, media relations officer, at jwalsh@nas.edu or 202-334-2183.

Please do NOT respond to this email.

Ourania (Rania) Kosti, Ph.D.
Senior Program Officer
Nuclear and Radiation Studies Board
The National Academies
email: okosti@nas.edu
phone: 202 334 3066



From: Kosti, Ourania
Sent: 22 Apr 2011 16:07:10 -0400
To: Schaffer, Steven
Cc: Brock, Terry
Subject: NAS cancer risk study

Dear Steven,

I would like to ask your permission to post your presentation on our website.

Thank you –

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

Analysis of Cancer Risks in Populations near Nuclear Facilities in the United States

The U.S. Nuclear Regulatory Commission (USNRC) has requested the characterization of cancer risks near the nuclear facilities that it regulates for use in communicating with the public about health risks around these facilities. This requested characterization is being carried out in three National Academy of Sciences studies:

1. The Phase 1 study (2010-2012) identified appropriate study designs to carry out an analysis of cancer risks near nuclear facilities in the United States. The Phase 1 report recommended two study designs appropriate for assessing cancer risks near nuclear facilities. It also recommended a pilot study of seven nuclear facilities to assess the technical feasibility of the recommended study designs.
2. The Phase 2 pilot planning study (2013-2014) assessed the availability of data to support the studies recommended in the Phase 1 report. The Phase 2 pilot planning report provides advice on general methodological considerations for carrying out the pilot study.
3. A Phase 2 pilot execution study (currently unfunded) would evaluate the technical feasibility of implementing the two study designs recommended in the Phase 1 report by performing the proposed pilot study of cancer risks in populations near seven USNRC-licensed nuclear facilities.

The methods developed and tested in the pilot study, if found to be feasible, could be used to conduct a nationwide study of cancer risks in populations near USNRC-regulated nuclear facilities.

This pilot study would examine the feasibility of two epidemiologic study designs:

1. A population-level or ecologic study of cancer incidence and mortality in populations living in census tracts within approximately 50 kilometers of the nuclear facilities. This examination would include all relatively common cancer types at all ages in populations potentially exposed to radiation from nuclear facility operations.
2. A linkage-based case-control study that would assess whether children younger than 15 years of age born close to nuclear facilities are at higher risk of developing cancer compared to those who were born farther away but within a 50 kilometer radius of the facilities. This study would attempt to provide a more focused assessment of the association between pediatric cancers and early life exposure to radiation.

These study designs were recommended in the Phase 1 report based on scientific merit, a preliminary analysis of their technical feasibility, and their suitability for addressing public concerns about cancer risks near nuclear facilities.

The pilot study would use existing health and effluent release data. No new data (e.g., from interviews, environmental radiation measurements) would be collected. The pilot study would likely reveal the difficulties with accessing the information needed to perform a nationwide study of cancer risks in populations near USNRC-regulated nuclear facilities.

A request for funding to carry out the pilot study was submitted to the USNRC in January 2015. A decision about whether to proceed with the study is expected later this year.

ANALYSIS OF CANCER RISKS IN POPULATIONS NEAR NUCLEAR FACILITIES IN THE UNITED STATES

**Presentation to the French Nuclear Safety Authority
June 9, 2015
Paris**

**Ourania Kosti
Senior Program Officer
Nuclear and Radiation Studies Board**

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

NATIONAL ACADEMIES ORGANIZATION

The National Academies

- National Academy of Sciences (NAS)
- National Academy of Engineering (NAE)
- Institute of Medicine (IOM)
- National Research Council (NRC)

Congressionally chartered (1863)

Private & nonprofit

“Advisors to the Nation on Science, Engineering,
and Medicine”

STUDY REQUEST

U.S. Nuclear Regulatory Commission (USNRC) approached the Academies to update the 1990 National Cancer Institute study which:

- Compared rates of cancer deaths in counties with a nuclear facility to those without
- Had no data on radiation exposures
- Included only facilities that were operational as of 1982

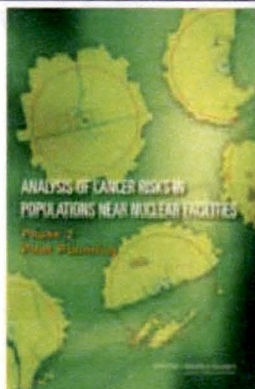
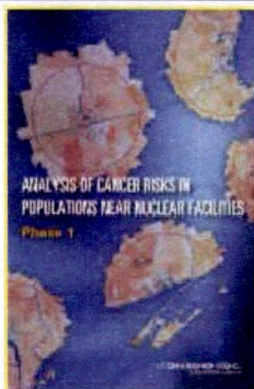
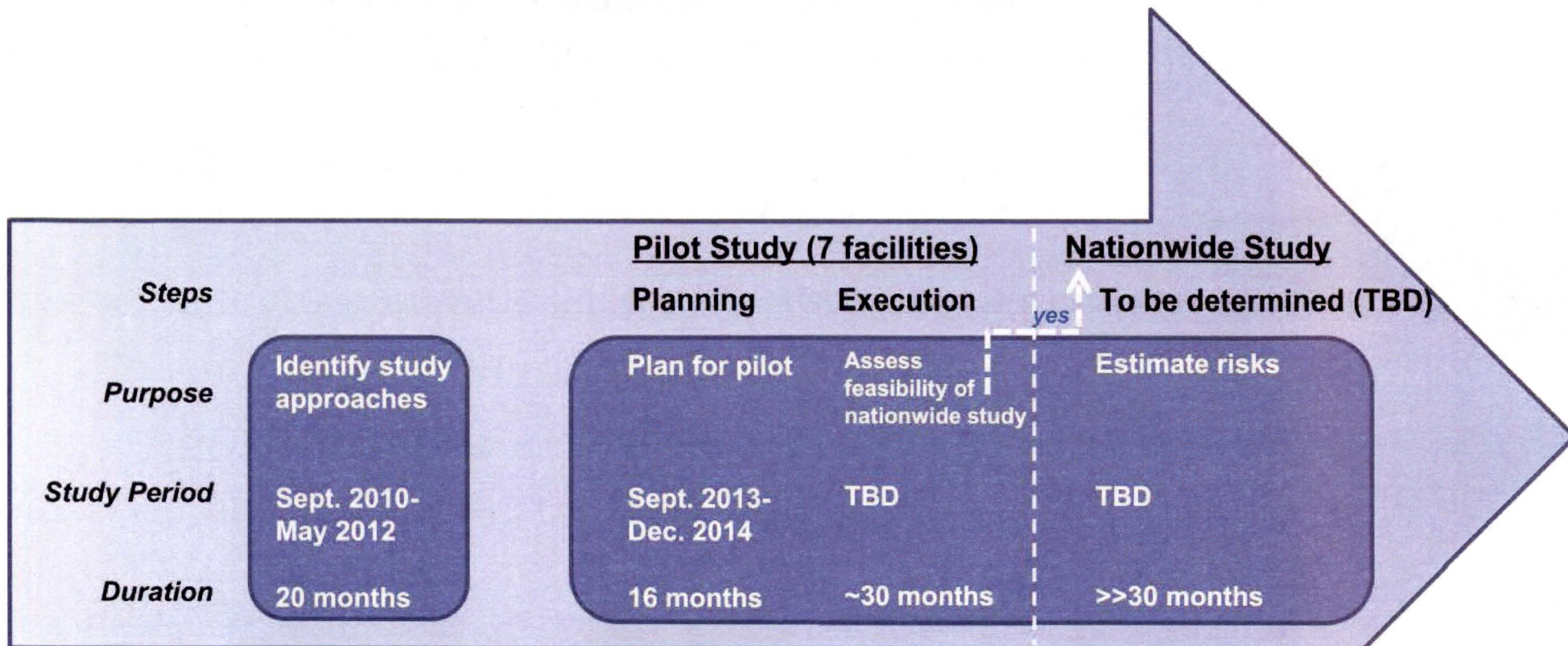
The Academies agreed to carry out a two-phase study

- Phase 1: Scoping study to identify scientifically sound approaches for carrying out the cancer risk assessment
- Phase 2: Cancer risk assessment informed by Phase 1 results

STUDY PHASING

Phase 1

Phase 2



PHASE 1 COMMITTEE MEMBERSHIP

John E. Burris, Chair, Burroughs
Wellcome Fund

John C. Bailar, III, University of Chicago
(retired)

Harold L. Beck, Environmental
Measurements Laboratory (retired)

~~**Andre Bouville**, National Cancer Institute
(retired)~~

Phaedra S. Corso, University of Georgia

Patricia J. Culligan, Columbia University

Paul M. DeLuca, Jr., University of
Wisconsin

Raymond A. Guilmette, Lovelace
Respiratory Research Institute

George M. Hornberger, Vanderbilt
Institute for Energy and Environment

Margaret Karagas, Dartmouth University

Roger E. Kasperson, Clark University
(retired)

James E. Klaunig, Indiana University

Timothy Mousseau, University of South
Carolina

Sharon B. Murphy, University of Texas
Health Science Center (retired)

Roy E. Shore, Radiation Effects
Research Foundation

Daniel O. Stram, University of Southern
California

~~**Margot Tirmarche**, Institute of Radiation
Protection and Nuclear Safety~~

Lance Waller, Emory University

Gayle E. Woloschak, Northwestern
University

Jeffrey J. Wong, California
Environmental Protection Agency

PHASE 2 PILOT PLANNING COMMITTEE MEMBERSHIP

Jonathan M. Samet (IOM), University of
Southern California

Harold L. Beck, Independent Consultant

Steven M. Becker, Old Dominion University

~~**Andre Bouville**, National Cancer Institute
(retired)~~

Jean D. Brender, Texas A&M Health Science
Center

Christie R. Eheman, Centers for Disease
Control and Prevention

R. William Field, University of Iowa

Daniel O. Stram, University of Southern
California (USC)

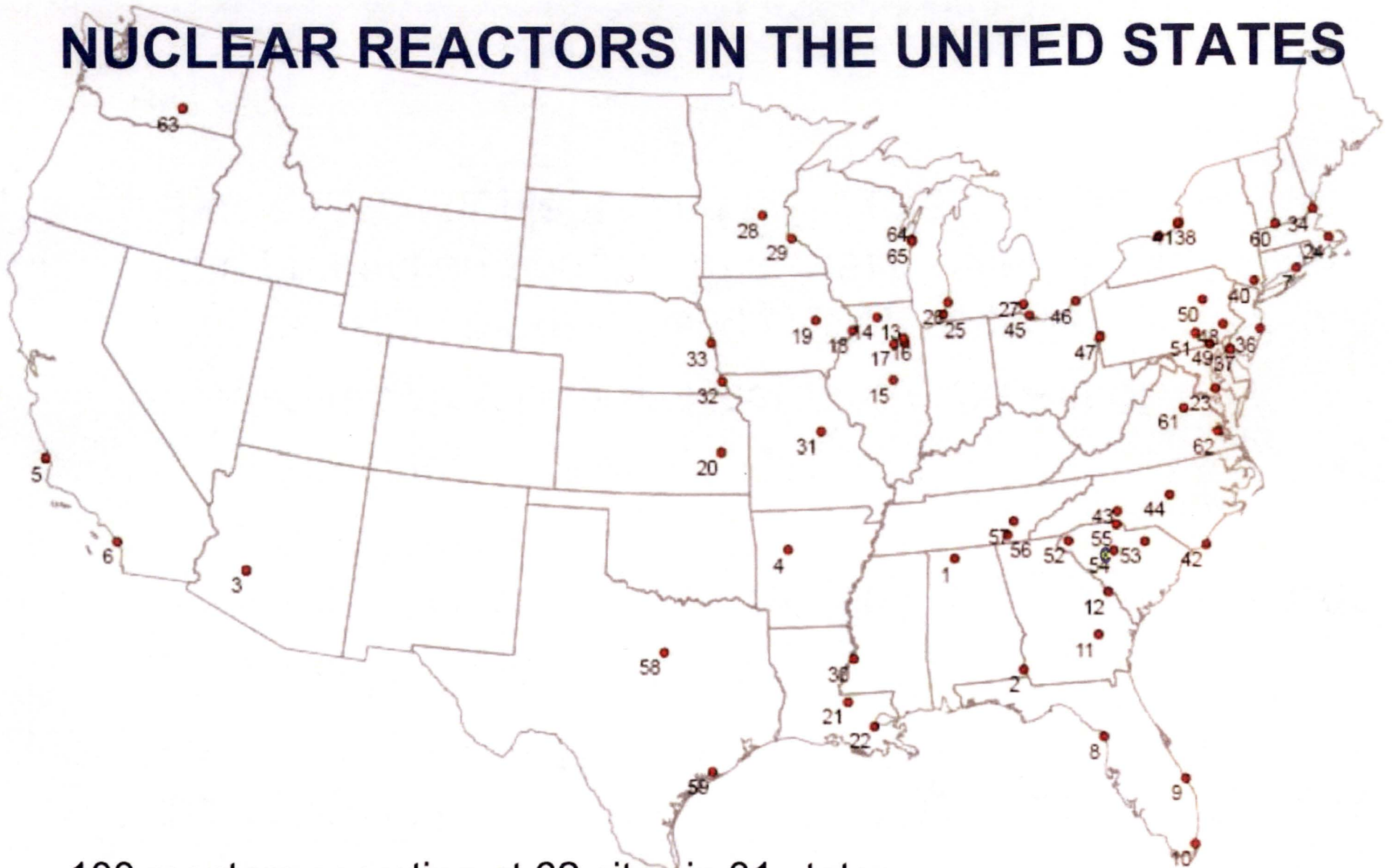
~~**Margot Timmarche**, Nuclear Safety Authority
of France~~

Jonathan C. Wakefield, University of
Washington

STUDY SPONSOR

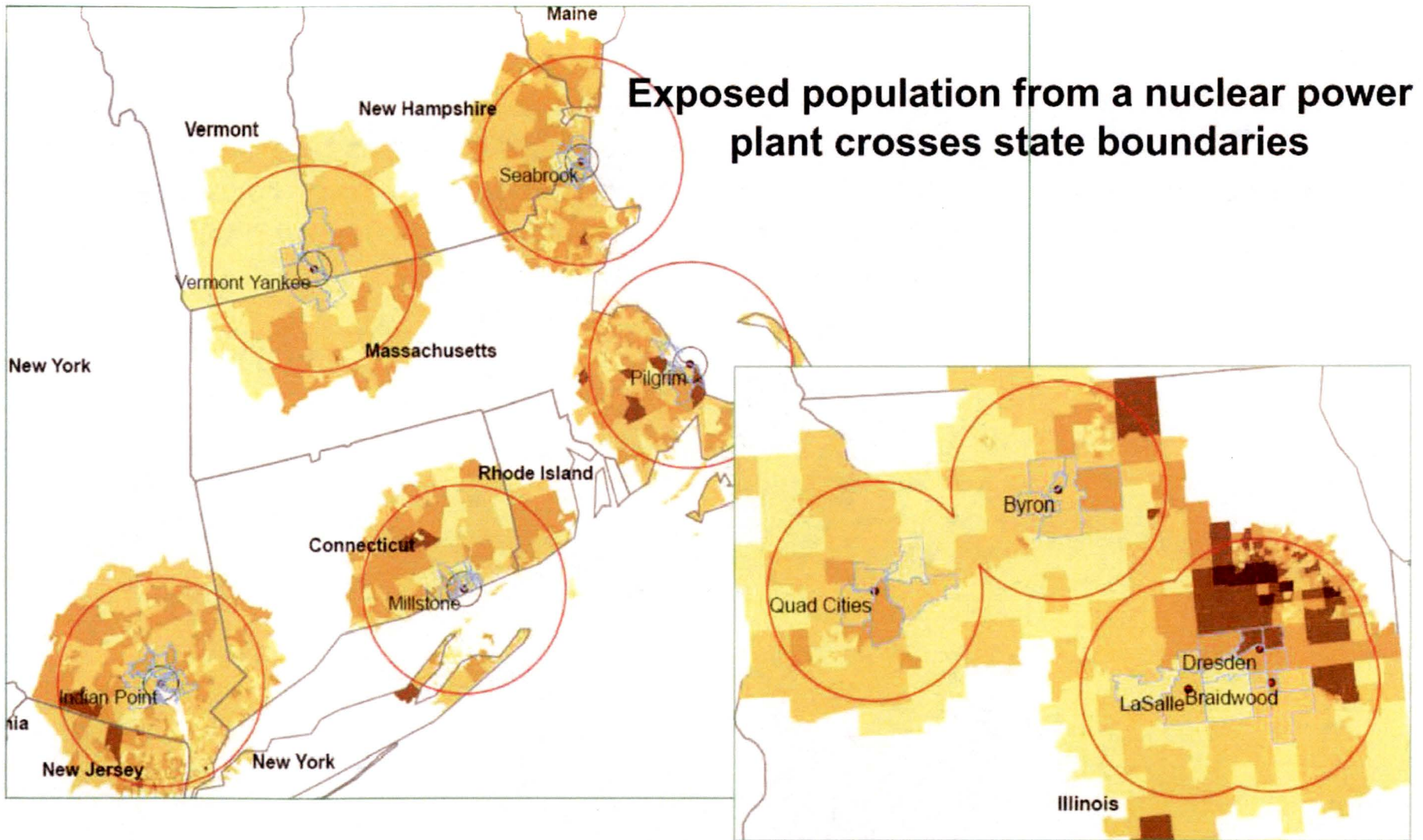
- Study requested by the U.S. Nuclear Regulatory Commission (USNRC)
 - A “small” independent federal agency
 - ~ \$1 billion annual budget (90% through fees billed to licensees)
 - ~4,000 full-time equivalent staff
 - Created by the Energy Reorganization Act of 1974
 - Responsible for regulating civilian activities related to the production and use of nuclear materials, including nuclear power plants and fuel cycle facilities

NUCLEAR REACTORS IN THE UNITED STATES



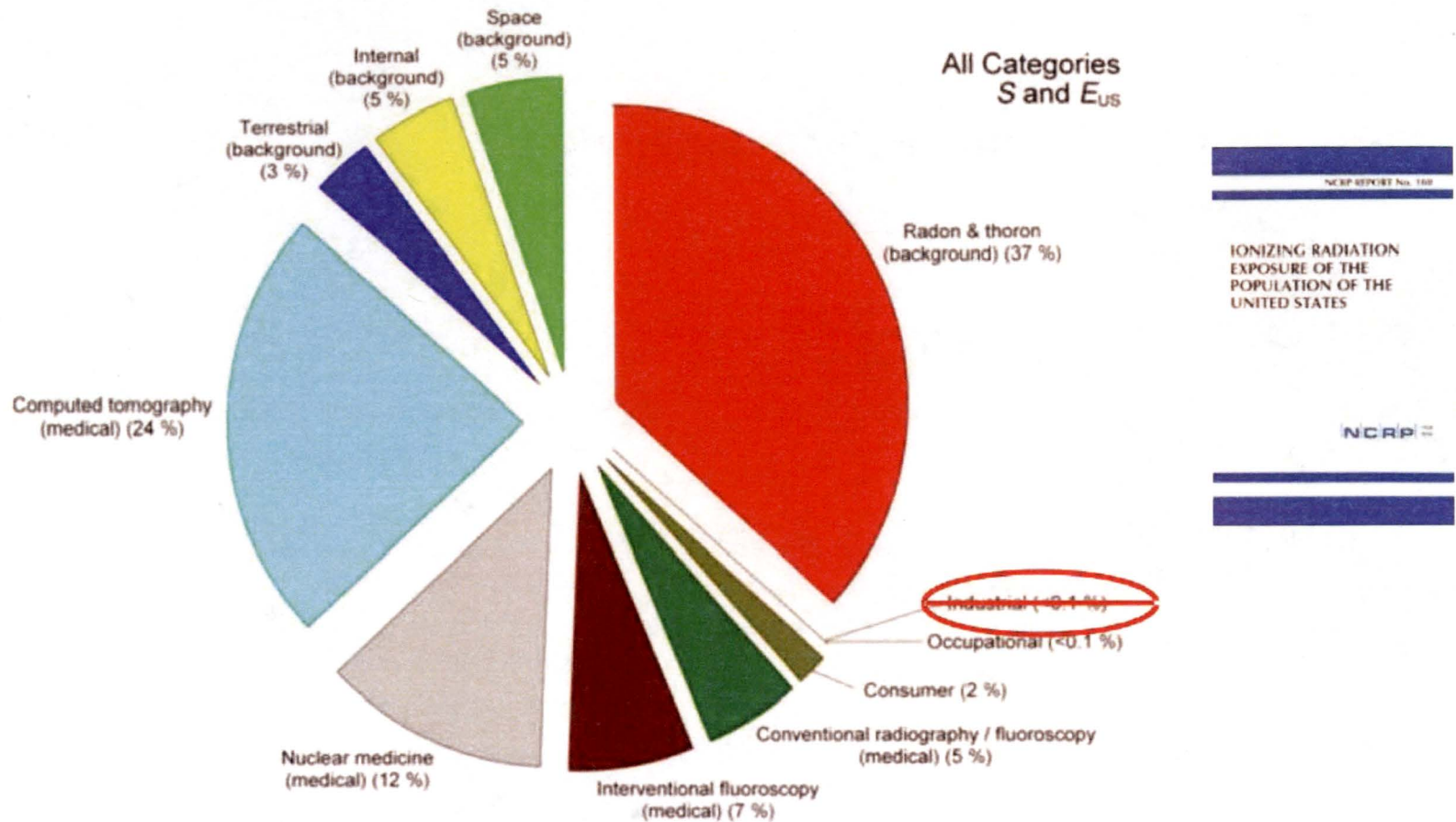
-100 reactors operating at 62 sites in 31 states

-Approximately 1 million people live within 8 km of operating nuclear power plants in 2010; over 45 million people live within 50 km.



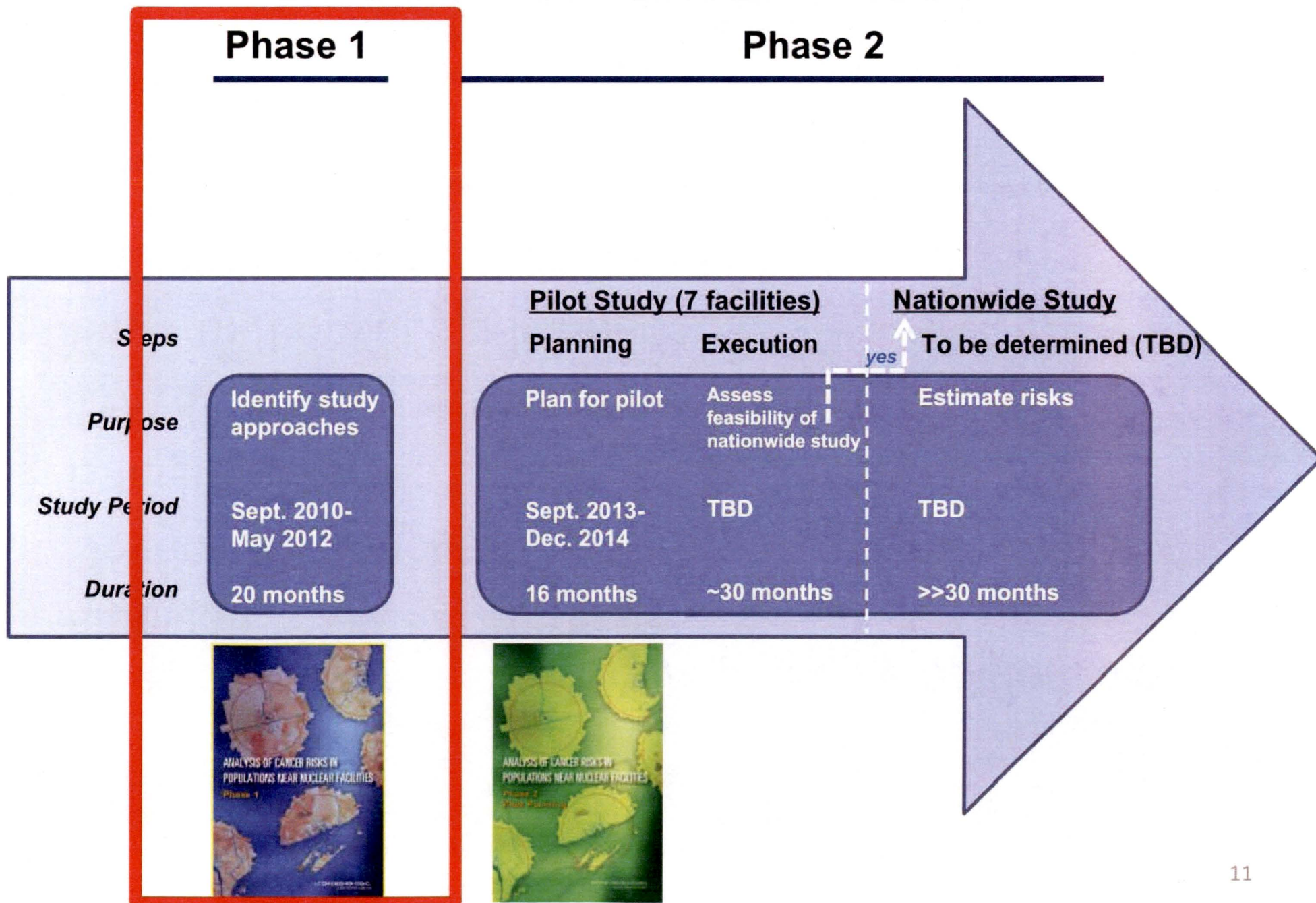
Population overlap among nuclear power plants

RADIATION EXPOSURE *OF THE U.S. POPULATION*



- On average, a person living in the United States receives 6.2 mSv total effective dose annually
- On average, 3 mSv comes from background radiation and 3 mSv from medical diagnostic procedures (1 CT scan is on average 8 mSv)
- The U.S. Environmental Protection Agency estimates exposure of populations near nuclear facilities <0.01 mSv

STUDY PHASING: Phase 1



KEY MESSAGES FROM PHASE 1

- Several challenges for carrying out the epidemiologic studies.
- Several approaches possible.
- Effluent releases suitable for dosimetry.
- Two study designs recommended.
- **Feasibility** pilot study needed.
- Stakeholder engagement important.

ABOUT THE PILOT STUDY DESIGNS

1. A *population-level, or ecologic*, study of cancer incidence and mortality in populations living in census tracts within ~50 km (30 miles) of the nuclear facilities.

- All cancer types
- All ages
- All years of operation (as early as 1957)
- Exposure based on geographic centroid of census tract where diagnosed or died

2. A *linkage-based case-control* study of children younger than 15 years of age born within ~50 km (30 miles) of the nuclear facilities.

- Pediatric cancers
- In utero – 15 years old
- About 1995 - today
- Exposure based on address where the mother lived at time of delivery



ABOUT THE PILOT SITES

Dresden, Illinois

Millstone, Connecticut

Oyster Creek, New Jersey

Haddam Neck , Connecticut

Big Rock Point, Michigan

San Onofre, California

Nuclear Fuel Services, Tennessee

ABOUT THE PILOT: PROCEDURE

- NAS will contract with appropriate individuals/organizations to carry out the pilot.
- NAS and a NAS advisory committee will oversee the work.
- NAS and its contractors will make use of existing health information and data from the facilities.
 - no interviews
 - no new measurements



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: opa_resource@nrc.gov Site: www.nrc.gov

Blog: <http://public-blog.nrc-gateway.gov>

No. 12-117

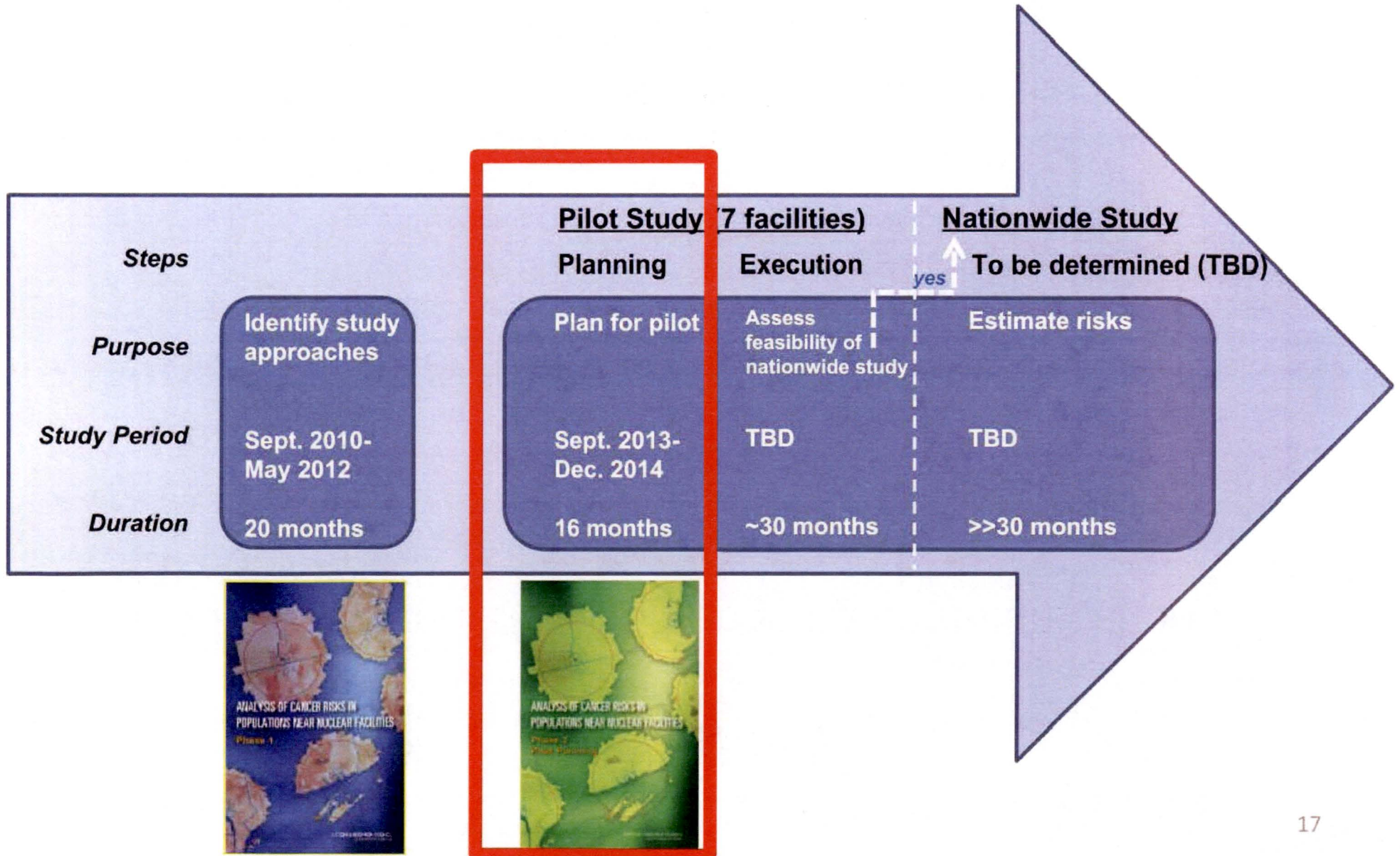
October 23, 2012

**NRC SPONSORING NATIONAL ACADEMY OF SCIENCES EFFORT TO CARRY
OUT PILOT OF CANCER RISK STUDY**

STUDY PHASING: Phase 2 Pilot Planning

Phase 1

Phase 2



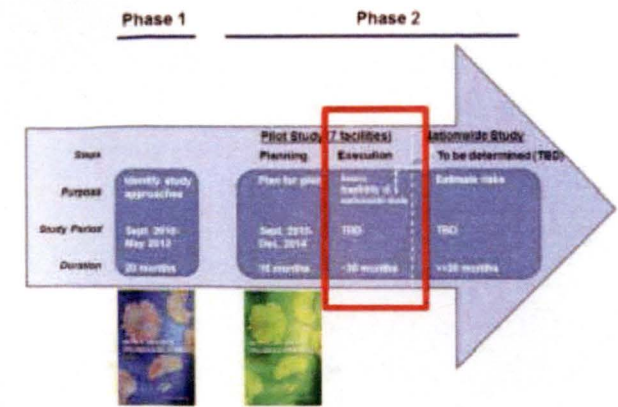
KEY MESSAGES FROM PHASE 2 PILOT PLANNING

- Need for transparency and ongoing communication with stakeholders.
 - Need for comprehensive discussion of assumptions and uncertainties.
 - Need for independent validation of dosimetry data.
 - **Need caution with presenting risk estimates from the pilot study, if such a decision is made.**
 - **Feasibility of ecologic study may be compromised.**
- The ecologic study should not have as detailed dosimetry as the case-control study.

THE COMMITTEE EMPHASIZES THAT:

It is possible that even if feasible, the nationwide study will have low statistical power to detect any excess cancer risks in populations near nuclear facilities, if they exist. In that case the recommendation to proceed with the nationwide study will require weighing the potential for false positive associations together with the value of communicating with the public that the best information available, even if limited, is being used to answer its questions about cancer risks near nuclear facilities.

CURRENT STATUS



- Per USNRC's request NAS submitted a proposal for the pilot execution step to USNRC in January 2015.
- The total estimated cost for the pilot execution is ~ \$8 million in 39 months. The estimated cost was informed by cost estimates provided by:
 - Responders to a request for information.
 - State cancer registries and vital statistics offices.
 - Geocoding experts.
- **USNRC's decision to fund the pilot is pending.**

QUESTIONS, COMMENTS, OR SUGGESTIONS?

Please contact:

Ourania (Rania) Kosti, study director
okosti@nas.edu

Phone: 202-334-3066

Website: <http://dels.nas.edu/global/nrsb/CancerRisk>

If you would like to be added on the study listserv and receive updates,
send us an email at crs@nas.edu

From: Crowley, Kevin
Sent: 22 Apr 2011 12:59:19 -0400
To: Brock, Terry
Cc: Kosti, Ourania
Subject: NAS study

Terry:

Thanks again for your help with this week's committee meeting, especially the USNRC presentations and Dresden/Braidwood tours. The committee was very happy with the meeting, as was I.

We have already begun organizing the next meeting in Atlanta. The committee wants to hear from the ORAU group on the reports that they produced for you. Who would you recommend that we contact to set up a briefing?

Kevin

From: Interested parties list for activities pertaining to the Cancer Risk project on behalf of Greenleaf, Toni
Sent: 26 Nov 2013 12:00:46 -0500
To: CANCERRISKSTUDY@LSW.NAS.EDU
Subject: National Academy of Sciences' Pilot Planning Study of Cancer Risks in Populations Near Seven Nuclear Facilities: Public Meeting, December 11, 2013, in Washington, DC
Attachments: Public Agenda Draft, 11-26-2013.pdf

Dear Interested Parties:

The National Academy of Sciences (NAS) Committee tasked with planning the pilot study of *Analysis of Cancer Risks in Populations near Nuclear Facilities* is scheduled to hold a public meeting at 2-4 PM on Wednesday, December 11, 2013, at the National Academy of Sciences Building located at 2101 Constitution Avenue, NW (Room 125). A draft agenda for the public meeting is attached.

Members of the public that wish to attend the meeting should contact Erin Wingo at 202 334 3066 or crs@nas.edu. Members of the press who wish to attend the meeting should contact Lauren Rugani at 202 334 3593 or LRugani@nas.edu. Seating is limited.

Members of the public and press unable to attend may listen to the meeting through a toll-free telephone line or view the presentations via WebEx. Members of the public interested in calling in or viewing the WebEx should contact Erin Wingo at 202 334 3066 or crs@nas.edu by December 9 for instructions.

Study at a Glance

NAS will perform the pilot study of cancer risks in populations near seven U.S. Nuclear Regulatory Commission (U.S.NRC)-licensed nuclear facilities using two epidemiologic study designs: (i) an ecologic study of multiple cancer types of populations of all ages and (ii) a record-linkage-based case-control study of cancers in children. The pilot study will have two steps: Pilot Planning and Pilot Execution. NAS has started the Pilot Planning step which is estimated to take one year to complete.

The seven nuclear facilities that are part of the pilot study are:

Dresden Nuclear Power Station, Morris, Illinois
Millstone Power Station, Waterford, Connecticut
Oyster Creek Nuclear Generating Station, Forked River
New Jersey Haddam Neck, Haddam Neck, Connecticut
Big Rock Point Nuclear Power Plant, Charlevoix, Michigan
San Onofre Nuclear Generating Station, San Clemente, California
Nuclear Fuel Services, Erwin, Tennessee

The study is sponsored by the U.S. NRC. It is a continuation of a previous study that was completed in May 2012. The report from that first study can be found here:
http://www.nap.edu/catalog.php?record_id=13388

The National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council make up the National Academies. They are independent,

nonprofit institutions that provide science, technology, and health policy advice under an 1863 congressional charter. Panel members, who serve pro bono as volunteers, are chosen by the Academies for each study based on their expertise and experience and must satisfy the Academies' conflict-of-interest standards. The resulting consensus reports undergo external peer review before completion. For more information, visit <http://national-academies.org/studycommitteprocess.pdf>

Please direct comments and questions to the project email: crs@nas.edu. If you would like to be removed from the list please send us an email with the title REMOVE FROM LIST. If you are member of the press and have questions regarding this message, please contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu.

Please do NOT respond to this email.

Ourania (Rania) Kostj, Ph.D.
Senior Program Officer
Nuclear and Radiation Studies Board
The National Academies
phone: 202 334 3066

=====

Toni Greenleaf
Administrative/Financial Associate
Nuclear and Radiation Studies Board
202/334-3066
Fax: 202/334-3077

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

Nuclear and Radiation Studies Board

500 Fifth Street, NW
Washington, DC 20001
Phone: 202 334-3066
Fax: 202 334-3077
www.nationalacademies.org

Analysis of Cancer Risks in Populations near Nuclear Facilities: Phase 2 Pilot Planning

MEETING AGENDA DRAFT*

First Committee Meeting: December 11, 2013

**National Academy of Sciences Building
2101 Constitution Avenue, NW
Room 125**

- 2:00 PM **Call to order and welcome**
Introductions of committee and staff
Jon Samet, committee chair
- 2:10 PM **Analysis of cancer risks in populations near nuclear facilities: study background**
Rania Kostj, study director
- 2:30 PM **Planning for the pilot of analysis of cancer risks near nuclear facilities**
Jon Samet, committee chair
- 2:40 PM **Analysis of cancer risks in populations near nuclear facilities—Phase 2 Pilot Planning study request**
Brian Sheron, Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission; Terry Brock, Senior Program Manager, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission
- 3:00 PM **Questions and Discussion**
- 3:15 PM **Congressional Comments (TBD)**
- 3:30 PM **Questions and Discussion**
- 3:40 PM **Public Comments**
- 4:00 PM **Adjourn Session Open to the Public**

Members of the public that wish to attend the meeting should contact Erin Wingo at 202 334 3066 or crs@nas.edu. Members of the press who wish to attend the meeting should contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu. Seating is limited.

Members of the public and press unable to attend may listen to the meeting through a toll-free telephone line or view the presentations via WebEx. Members of the public interested in calling in or viewing the WebEx should contact Erin Wingo at 202 334 3066 or crs@nas.edu by December 9 for instructions.

*This draft is subject to change. For updated information please visit the National Academy of Science's website.

From: Interested parties list for activities pertaining to the Cancer Risk project on behalf of Greenleaf, Toni
Sent: 7 May 2014 15:39:15 -0400
To: CANCERRISKSTUDY@LSW.NAS.EDU
Subject: National Academy of Sciences' Pilot Planning Study of Cancer Risks in Populations Near Seven Nuclear Facilities: Public Meeting, June 4, 2014, Toms River, NJ

Interested Parties:

A subgroup of members of the National Academy of Sciences' Committee on Analysis of Cancer Risks in Populations near Nuclear Facilities: Pilot Planning will be hosting a public comment session on Tuesday, June 4, 2014, from 6:30 PM-8 PM.

The meeting will take place at:

Ramada Toms River (Ballroom 1)
2373 Highway 9
Toms River
NJ 08755

Remote participation at this meeting via WebEx will not be available.

The members of the committee subgroup will be touring the Oyster Creek Generating Station the day following this evening session. (The public will not be able to attend this tour because of security restrictions and space limitations.) At the beginning of the evening public comment session there will be a presentation describing the objectives of the study and a description of what the subgroup anticipates to see during the tour.

On-site parking is available at the hotel for this evening session. Directions to the hotel can be found here:

<http://www.ramada.com/hotels/new-jersey/toms-river/ramada-toms-river/hotel-overview>

Members of the public that wish to attend the meeting should contact us at crs@nas.edu.

Members of the press who wish to attend the meeting should contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu.

Toni Greenleaf
Nuclear and Radiation Studies Board
202 334 3066
crs@nas.edu

From: Interested parties list for activities pertaining to the Cancer Risk project on behalf of Greenleaf, Toni
Sent: 12 Feb 2014 16:17:54 -0500
To: CANCELRISKSTUDY@LSW.NAS.EDU
Subject: National Academy of Sciences' Pilot Planning Study on Cancer Risks in Populations Near Seven Nuclear Facilities: Conference call on February 18, 2014, at 12-1 PM

DO NOT REPLY TO THIS EMAIL ALL RESPONSES NEED TO BE SENT TO CRS@nas.edu.
Thank you.

Dear Interested Parties:

The National Academy of Sciences Committee tasked with planning the pilot study on Analysis of Cancer Risks in Populations near Nuclear Facilities is scheduled to hold an information-gathering teleconference session via WebEx on Tuesday, February 18, 2014, at 12-1 PM (ET). The topic of the conference call is "Geographic information system applications for health data analysis."

Link to WebEx:

<https://nationalacademies.webex.com/nationalacademies/j.php?ED=238778897&UID=501354922&RT=MIMxMQ%3D%3D>

Invited Speakers

Drs. F. Benjamin Zhan, Professor and Director, Texas Center for Geographic Information Science
Francis P. Boscoe, Research Scientist, New York State Cancer Registry

Sample questions for discussion

Geocoding tools

- What is, in your opinion, the best tool for geocoding? What are the strengths and limitations of this tool compared to others?
- Do states typically geocode their information in-house and if yes, what tools do they use?
- What are the advantages of geocoding information from all states using the same tool and rules? What are the disadvantages if you do not?
- Do you have any insights whether cancer data and other state data (e.g., census tract info) will be geocoded differently between the states?
- How expensive is geocoding?

Available variables

- What socioeconomic variables and lifestyle factors (e.g., potential confounders) can investigators access at the census tract level and what are the sources of this information?

(The committee is interested in variables such as age distribution, gender, ethnicity, urban/rural area, income, education, access to health insurance, smoking.)

- From your experience with analyses of health data, what other available variables/possible confounders should the analysis of cancer risks near nuclear facilities consider?
- Are there restrictions in accessing these variables in census tracts with small counts?
- Does availability and access to these variables differ by geographic unit of analyses (e.g., county, census tract, or zip-code level)?
- Are data available for every decade or for smaller time periods as well?

Other

- In your experience, how much does the size, demographic characteristics, and other factors of a census tract change with time?
- What do you anticipate will be the greatest obstacle for performing such a study?

Study at a Glance

NAS will perform the pilot study of cancer risks in populations near seven U.S. Nuclear Regulatory Commission (U.S.NRC)-licensed nuclear facilities using two epidemiologic study designs: (i) an ecologic study of multiple cancer types of populations of all ages and (ii) a record-linkage-based case-control study of cancers in children. The pilot study will have two steps: Pilot Planning and Pilot Execution. NAS has started the Pilot Planning step which is estimated to take one year to complete.

The seven nuclear facilities that are part of the pilot study are:

Dresden Nuclear Power Station, Morris, Illinois
Millstone Power Station, Waterford, Connecticut
Oyster Creek Nuclear Generating Station, Forked River
New Jersey Haddam Neck, Haddam Neck, Connecticut
Big Rock Point Nuclear Power Plant, Charlevoix, Michigan
San Onofre Nuclear Generating Station, San Clemente, California
Nuclear Fuel Services, Erwin, Tennessee

The study is sponsored by the U.S. NRC. It is a continuation of a previous study that was completed in May 2012. The report from that first study can be found here:
http://www.nap.edu/catalog.php?record_id=13388

The National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council make up the National Academies. They are independent, nonprofit institutions that provide science, technology, and health policy advice under an 1863 congressional charter. Panel members, who serve pro bono as volunteers, are chosen by the Academies for each study based on their expertise and experience and must satisfy the Academies' conflict-of-interest standards. The resulting consensus reports undergo external peer review before completion. For more information, visit <http://national-academies.org/studycommitteeprocess.pdf>

Please direct comments and questions to the project email: crs@nas.edu. If you would like to be removed from the list please send us an email with the title REMOVE FROM LIST. If you are member of the press and have questions regarding this message, please contact Lauren Rugani, media officer, at 202 334 3593 or LRugani@nas.edu.

Please do NOT respond to this email.

Toni Greenleaf
Nuclear and Radiation Studies Board
202 334 3066

From: Kosti, Ourania
Sent: 26 Aug 2011 12:11:24 -0400
To: Brock, Terry
Subject: Next Week's Cancer Risk Committee Meeting is CANCELLED

Dear Terry Brock:

I regret to inform you that the **August 29 meeting of the Committee on Analysis of Cancer Risks in Populations Near Nuclear Facilities has been CANCELLED** because the approaching hurricane (Irene) will make air, train, and automobile travel to the Washington, DC, region difficult if not impossible mid Saturday through most of Sunday and the committee members will not be able to travel.

We are trying to reschedule this meeting as soon as possible. I hope that this last-minute cancellation has not caused any undue hardships for you. Please forward this email to your colleagues that were scheduled to present.

Thanks,

Rania

Ourania (Rania) Kosti, Ph.D.
Program Officer
Nuclear and Radiation Studies Board
The National Academies
500 Fifth Street, NW
Washington, DC 20001
phone: 202 334 3066
fax: 202 334 3077
email: okosti@nas.edu

From: Kosti, Ourania
Sent: 5 Oct 2011 11:02:08 -0400
To: Brock, Terry
Subject: NFS contacts

Mark P. Elliott, Director

Quality, Safety & Safeguards

Nuclear Fuel Services, Inc

o 423-743-1705

c (b)(6)

f 423-743-2315

mpelliott@nuclearfuelservices.com

Marie Moore

4237431737

BMMoore@nuclearfuelservices.com

Ourania (Rania) Kosti, Ph.D.

Program Officer

Nuclear and Radiation Studies Board

The National Academies

500 Fifth Street, NW

Washington, DC 20001

phone: 202 334 3066

fax: 202 334 3077

email: okosti@nas.edu

From: Brock, Terry
Sent: 14 Jun 2011 21:18:48 +0000
To: 'Kosti, Ourania'
Subject: NFS in the news

FYI: <http://www.johnsoncitypress.com/News/article.php?id=91420>

Terry Brock, Ph.D.
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington D.C. 20555
Mail Stop CSB-3A07
phone: 301-251-7487

From: Kosti, Ourania
Sent: 24 Jun 2011 13:15:48 -0400
To: Brock, Terry
Subject: NFS public meeting

Terry,

John Burris has a conflict that day and thus will not be able to participate at the September 8th meeting. So, we are left with the other options that you mentioned.

Rania

From: Brock, Terry
Sent: 22 Feb 2011 21:41:59 +0000
To: 'Kosti, Ourania'
Subject: NRC-NAS Analysis of Cancer Risks Study_Feb24_2011.pptx
Attachments: NRC-NAS Analysis of Cancer Risks Study_Feb24_2011.pptx

Hi Rania,

Attached are the NRC slides for the Thursday, 2/24 meeting. See you at the meeting.

Terry