UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF CONGRESSIONAL AND
INTERGOVERNMENTAL RELATIONS

The Honorable Lamar Smith
Chairman
Committee on Science, Space, and Technology
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Thank you for your August 7, 2014, letter and the opportunity to respond to the questions for the record from the House Committee on Science, Space, and Technology's Subcommittees on Oversight and Environment hearing on July 16, 2014, entitled ***Status of Reforms to EPA's Integrated Risk Information System.*** Please find our responses in the attached document.

Again, thank you for your letter. If you have further questions, please contact me, or your staff may contact Christina J. Moody, in the EPA's Office of Congressional and Intergovernmental Relations, at moody.christina@epa.gov or at (202) 564-0260.

Sincerely,

Nichole Distefano
Deputy Associate Administrator

Enclosures

cc: The Honorable Paul Broun, M.D.
The Honorable David Schweikert
The Honorable Dan Maffei
The Honorable Suzanne Bonamici

HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON OVERSIGHT
&
SUBCOMMITTEE ON ENVIRONMENT

Hearing Entitled
Status of Reforms to EPA's Integrated Risk Information System
July 16, 2014

QUESTIONS FOR THE RECORD

Dr. Kenneth Olden
Director, National Center for Environmental Assessment
U.S. Environmental Protection Agency

Questions submitted by Chairman Broun and Chairman Schweikert

1. In 2011, the NAS recommended that EPA provide clear guidelines for study selection. In a true systematic review, one must develop criteria in advance, and use these criteria to evaluate study quality. Is this the correct approach? Do you believe the recent draft IRIS assessments that are currently undergoing review or will soon be reviewed (ammonia, trimethylbenzenes, ethylene oxide) transparently provide these criteria? Should systematic review be a priority for all draft assessments?

Answer: EPA agrees with and is implementing the 2011 National Research Council (NRC) recommendations regarding systematic review. Consistent with the advice of the NRC in their "Roadmap to Revision" in Chapter 7 of the 2011 NRC formaldehyde review report, EPA is implementing the recommendations using a phased approach. Specifically, NRC stated that "the committee recognizes that the changes suggested would involve a multiyear process and extensive effort..." In implementing the recommendations in a phased approach, EPA has stated that the most extensive changes are being made to documents that are in earlier steps of the assessment development process. For assessments that are in the later stages of development, such as ethylene oxide, EPA is implementing some of the recommendations without taking the assessments backwards to earlier steps in the process.

In May 2014, the NRC released their report reviewing the IRIS assessment development process. In this report, the NRC commends EPA's efforts to improve IRIS and found that the program has moved forward steadily in planning for and implementing changes in each element of the assessment process. The report also noted that EPA has made substantial improvements to the IRIS Program in a short time. The report noted that, "overall, the changes that EPA has proposed and implemented to various degrees constitute substantial improvement in the IRIS process" and that "if current trajectories are maintained, inconsistencies identified in the present report are addressed, and objectives still to be implemented are successfully completed, the IRIS process will become much more effective and efficient in achieving the program's basic goal of

developing assessments that provide an evidence-based foundation for ensuring that chemical hazards are assessed and managed optimally." Of note, the committees agreed that the new document structure for IRIS assessments improves the organization of and streamlines the assessments, and the evidence tables and graphic displays of study findings increases clarity and transparency. These changes have been implemented in the draft ammonia and trimethylbenzenes assessments. The report stated that this approach brings IRIS assessments more in line with the state of practice for systematic reviews.

Additionally, we are actively working to develop, where necessary, and implement methodologies for the application of systematic review to all IRIS assessments. This topic will be discussed at the upcoming October 15-16, 2014 NRC Recommendations Workshop (http://www.epa.gov/iris/irisworkshops/NRC_workshop/index.htm). The workshop will include focused discussions with scientific experts on refining systematic review methodologies, as well as the systematic integration of evidence streams.

2. What is the most significant improvement to the IRIS program, and what continues to be the most pressing challenge?

Answer: Strengthening and streamlining the IRIS Program is an ongoing priority for EPA. On July 31, 2013, EPA announced a series of enhancements to help meet the goal of producing high quality scientific IRIS assessments in a timely and transparent manner. These enhancements focused on: 1) improving the scientific integrity of assessments; 2) improving the productivity of the program; and 3) increasing transparency so controversial or complex science issues are identified and debated early in the process. These changes are consistent with recent recommendations provided by the National Research Council.

The most significant improvement to the IRIS program is increased early engagement with the public to ensure that EPA identifies and addresses any controversial scientific issues earlier in the assessment development process. This early scientific engagement is anticipated to strengthen the overall quality of IRIS assessments. The most significant challenge facing the IRIS Program is meeting the needs of the agency in a timely manner. It is anticipated that enhanced stakeholder and public engagement will play a crucial role in ensuring transparency and the use of the best available science throughout the IRIS assessment process. As a result, the IRIS Program will be able to complete assessments in a timelier manner in the future.

3. In 2013, GAO reported that EPA's most recent evaluation of demand for IRIS assessments was a decade old. EPA had no plans to perform another evaluation, but recognized that due to changing conditions over the last 10 years, the 2003 evaluation was not applicable to current conditions.

a. What progress has EPA made in identifying and evaluating demand for IRIS toxicity assessments, and what report or study, if any, has EPA produced on current demand?

Answer: In June 2014, the IRIS Program began an agency-wide effort to determine program and regional office needs for current and future assessments (including the type of IRIS product

needed). The results of this survey will inform the next multi-year IRIS workplan. The IRIS workplan will enable the program to achieve a consistent and sustainable workflow that produces high-quality chemical assessments that are timely and responsive to agency needs. The IRIS Program anticipates making the new multi-year workplan publicly available as early as Fall 2014.

b. Given EPA's challenges in completing enough IRIS toxicity assessments to meet their annual goals (e.g., EPA completed 4 IRIS toxicity assessments in fiscal year 2012, falling short of its goal of completing 40 assessments for that year), how has EPA considered its current resource constraints when identifying how it will meet demand?

Answer: As noted above, EPA is conducting an evaluation of program and regional office needs for current and future IRIS assessments. Resource constraints will be considered as we develop the multi-year workplan and schedule for upcoming assessments from that survey. The survey of needs and the associated resource-loaded workplan provide agency planners with the information they need to ensure that appropriate resources are placed against the highest priority need.

EPA expects to complete more high quality IRIS assessments per year as a result of the July 2013, IRIS enhancements. Numerous assessments are at various stages of development, including public opportunities for discussion of chemical-specific assessment plans, literature searches and evidence tables, and draft assessments. In practice EPA expects that each assessment will take a shorter period of time to complete as significant science issues are better understood and are resolved earlier in the assessment development process.

4. According to data on EPA's website, 90% of the 560 completed IRIS assessments are more than 10 years old and 75% are more than 20 years old. However, over those intervening years, new data on many of these chemicals may have emerged, and certainly the methods for assessment have changed over these years (for example, as identified in EPA's 2005 Cancer guidelines). In 2009, EPA instituted a project to update older assessments, and the manager of that program (Dr. Chon Shoaf) was quoted as saying that the program would need to do 300 updates each decade just to keep from falling further behind. Has this program continued? In addition, organizations are urging the IRIS program to undertake assessments of yet additional chemicals not already on the list. What is the size of the current IRIS workload, and how do you propose to address it?

Answer: The IRIS Program has primarily focused on improving the assessment development process associated with its health assessments. These improvements have been geared towards addressing the NRC recommendations in 2011. As the focus has been on making substantial improvements to the process, the IRIS Program is only now beginning discussions on how to update older assessments. As these discussions continue, EPA will evaluate the potential options within the context of other agency needs identified by the multi-year workplan and other resource constraints. Since the July 2013 enhancements, the program has been actively

working on 21 assessments. This number includes 3 completed assessments (methanol (noncancer), biphenyl, 1,4-dioxane) and 18 that have gone to a public step as part of the IRIS Process. Additional assessments will be added over time to the existing workload in accordance with agency needs and in consideration of IRIS Program resources. The multi-year workplan will be instrumental in identifying priorities and scheduling assessments.

5. At the Committee's request, the EPA Inspector General issued a report last year on the use of the IRIS database by EPA program offices and regions. According to the IG's report, approximately "one-third (34 percent) of the survey respondents reported that they have used an alternate source for toxicity values when an IRIS value was available. The primary reason selected for using an alternate source was that the alternate source was more up-to-date with current scientific practice or information." Does it concern you that some of your colleagues at EPA don't use IRIS values and what will it take to fix this internal disconnect?

Answer: In the Office of Inspector General's report, 85 and 81 percent of respondents indicated that they used IRIS as their primary source of cancer and noncancer values, respectively. The IRIS Program believes this indicates that the values developed in IRIS assessments are of general utility to our program office and regional stakeholders. Thirty-four percent of the respondents indicated that they had experienced "a situation" in which they used an alternate source of toxicity values when an IRIS value was available; the primary reason for the use of an alternative source was because a more up-to-date value was available (68%). The agency is aware of the use of alternate sources of toxicity information and we believe that efforts to establish a multi-year workplan, as well as discussions to identify assessments that may have newer information, will ultimately reduce the frequency with which a program would feel the need to select a cancer or noncancer value from an alternative source of toxicity values.

6. In light of GAO's listing of IRIS on the "High Risk" list and the acknowledgement by EPA that it needs to both reform the program and produce/update more assessments, why did the President propose to reduce funding for the program in FY2015?

Answer: The agency is committed to effectively implementing its mission to protect public health and the environment, which depends on credible and timely assessments of the risks posed by chemicals. As such, we are committed to focusing resources on ensuring that the IRIS Program produces high quality assessments in a timely and transparent manner. Likewise, we are committed to continuing the development of high profile assessments of public health critical chemicals (such as inorganic arsenic, formaldehyde, hexavalent chromium, polychlorinated biphenyls, and ethylene oxide). The $1.5M FY2015 budget reduction will affect primarily the development and timing of new assessments. It will not impact the development of the public health critical chemicals, which will be protected from budgetary impacts. The IRIS Program is also currently evaluating the chemical assessment demands across the Agency to address GAO's recommendations related to fully documenting the capacity needed to meet demands.

7. What is the projected cost of a typical IRIS assessment?

Answer: The resources required to complete IRIS assessments vary due to the size and complexity of the database underlying the toxicity of a given chemical. The cost of an IRIS assessment ranges from $400,000 to $2,500,000 in extramural funds and four to fifteen FTE's.

8. A common criticism of IRIS assessments is the tendency to be "public health protective," which can lead to unrealistically conservative assessments, which, in turn, can lead to overstated environmental risks and bad regulation. We have heard the oft-repeated mantra that IRIS assessments are purely scientific and not regulatory, but doesn't a bad risk assessment restrict a risk manager's options, ultimately forcing him or her to make a bad risk management decision?

Answer: IRIS assessments are intended to accurately and impartially reflect the science that details a chemical's toxicity. When critical information is lacking, IRIS assessments use approaches that help risk managers make decisions that are consistent with the agency's mission to protect human health and the environment. Ultimately, in the absence of data, the use of uncertainty factors and other "default" approaches is a valuable strategy to protect human health, including sensitive populations.

All the information included in an IRIS assessment, including the selection of modeling approaches and uncertainty factors, is reviewed by the Science Advisory Board (SAB) Chemical Assessment Advisory Committee (CAAC). A significant benefit of the SAB-CAAC is its independent review of the decisions made during development of the draft assessment.

A strong, scientifically rigorous IRIS Program is of critical importance and we are ensuring that IRIS assessments transparently and accurately address scientific issues and uncertainties, including the presentation of alternative analyses (e.g. modeling approaches) where appropriate. Presentation of alternative approaches in the supplemental information of an IRIS assessment informs risk managers and facilitates decision-making.

9. In 2009, you were part of a Bipartisan Policy Center report that unanimously recommended that "studies used in the formulation of regulation should be subject to data access requirements... regardless of who funded the study." Do you still agree with this statement? And how has this recommendation been implemented in the IRIS and National Ambient Air Quality Standard-setting process in your office?

Answer: Yes. This question addresses two important issues relevant to the development of IRIS assessments as well as the Integrated Science Assessments (ISA) that inform the development of the National Ambient Air Quality Standards: data access and funding source.

Transparency and scientific integrity are very important to the agency's work. Transparency is a critical element in EPA's Scientific Integrity Policy, which states, "To enhance transparency with the agency, this policy...facilitates the free flow of scientific information. The agency will continue to expand and promote access to scientific information by making it available online in open formats in a timely manner, including access to data and non-proprietary models underlying agency policy decisions." Both IRIS assessments and ISAs make information available about the

studies that inform the development of the documents through the Health Effects Research Online (HERO) database. Here, the general public can see information on the studies used in an assessment, primarily journal articles and technical reports, while adhering to distribution limitations due to copyright. Additionally, modeling code and output used in the development of an assessment is made available so that the public can see how decisions were made. The agency is currently exploring ways to make more of the underlying data available, acknowledging that in many cases, journal articles do not include the raw data supporting published results. In other cases, with human data, additional steps are essential to maintain the privacy of the personal health information of individuals who have participated in these studies.

With respect to funding source, all relevant, well-conducted, and peer-reviewed studies, regardless of funding source, and regardless of whether the results are positive or negative, are considered in the development of both IRIS assessments and the ISAs. In their 2014 review of the IRIS Process, the National Research Council (NRC) recommended that evidence evaluation and risk-of-bias analysis be conducted using methods that are "transparent, reproducible, and scientifically defensible." The NRC also recommended that funding sources be considered in systematic reviews conducted for IRIS assessments. Decisions made in IRIS assessments and ISAs continue to be based on the best available science. These topic will be discussed with systematic review experts and the public at an upcoming IRIS workshop to be held October 15-16, 2014.

10. While EPA often relies on scientific data produced by or funded by other government agencies in its assessments, those raw data are not made available to external reviewers and the public for independent evaluation. Stakeholders have tried many approaches to get these data through the Freedom of Information Act, but often come up short and if data are provided, it is not provided in a timely manner to help inform comments on the assessments. Will you ensure that all the data the IRIS program uses in its assessments are made accessible to all stakeholders (assuming appropriate privacy protections, etc...)?

Answer: EPA remains committed to transparency and scientific integrity, and the IRIS Program will continue to explore ways to increase access to the scientific information underlying its assessments. However, it is important to note that IRIS assessments typically rely on the "data" included in peer-reviewed journal articles, not the "raw data" underlying those publications and in the possession of the researcher(s). As such, the "data used in an assessment" is available in the assessment's references. In the rare cases where EPA obtains a researcher's dataset and reanalyzes the data for an IRIS assessment, the data is available when access to it is not restricted by applicable privacy requirements, confidential business claims, or similar restrictions via the IRIS website.

EPA's policy with respect to data will continue to be consistent with existing obligations to avoid disclosing material that may be confidential business information (as directed under the Trade Secrets Act and under OMB Circular A-130). In addition, the agency is committed to protecting citizens' privacy and preventing the release of personal information that could, directly or indirectly, be traced to specific individuals.

11. IRIS assessments routinely identify one or more reference values below which no bad effects in humans are expected, and these are provided to other EPA offices and other agencies as a guide for the establishment of regulations that often require control of the chemical down to the level the IRIS program has established. Several of the chemicals under the purview of the IRIS program, including methanol and formaldehyde, are produced naturally by the human body.

In the recent final assessment of methanol, your office published a reference level that, in the case of 20% of the U.S. population, is exceeded by that person's naturally-produced methanol and is also equal to the amount of methanol that is contained in just 25 ounces of orange juice.

a. **Should EPA examine these kinds of naturally-occurring chemicals differently from other chemicals, perhaps by looking more closely at the safety margins that are built into these reference values and asking whether the resulting reference values are realistic? Do you have a plan to do so?**

Answer: EPA is planning to convene a scientific workshop to discuss issues related to assessing the human health risks of exposure to environmental chemicals that are also produced in the body through normal biological processes (known as "endogenous chemicals"). IRIS assessments are developed to provide information on health effects associated with exposure to chemicals from sources over which EPA has regulatory authority, including some chemicals that occur naturally, either in the environment or are endogenously produced. The assessment of health risks associated with exposure to environmental chemicals that are also produced endogenously deserves careful consideration because there are many natural products of metabolism that can have toxic effects at high enough levels. The fact that they are naturally produced does not necessarily make them "safe" at all doses. The risk evaluated for a chemical is typically the risk of an increased effect beyond the effects observed in the "unexposed" group or population. IRIS values generally already take into account amounts commonly produced by our own bodies in how they are derived.

12. Could you tell us what an "adverse effect" means to you? Does EPA have any guidance on the definition of an "adverse effect," and does the IRIS program follow this guidance?

Answer: The IRIS Program adheres to the following definition of an adverse effect: "A biochemical change, functional impairment or pathologic lesion that affects the performance of the whole organism, or reduces an organism's ability to respond to an additional environmental challenge." This definition is available online at: http://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&vocabName=IRIS%20Glossary.

13. To what extent does having multiple toxicity assessment sources for the same chemical present challenges for ensuring consistent risk management across the nation, and what steps has EPA taken to either minimize or explain reasons for any

differences?

Answer: EPA's IRIS Program is the only federal program devoted solely to the evaluation of health hazard and dose response information for the purposes of developing cancer and noncancer chronic toxicity values for the oral and inhalation pathways of exposure for the protection of public health. In addition, the IRIS Program qualitatively evaluates cancer information to ascertain human cancer potential. EPA's program and regional offices combine information from IRIS assessments with relevant exposure information for a chemical to assess the public health risks of environmental contaminants. EPA decision-makers use these risk assessments, along with other considerations (e.g., statutory/legal requirements that can include cost-benefit information, technological feasibility, and economic factors) to inform risk management decisions. The values derived by other federal health agencies are developed in response to different mandates and for different purposes. For example, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) are developed in response to a mandate under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), to provide toxicological profiles of hazardous substances found at National Priorities List sites. According to the ATSDR website (http://www.atsdr.cdc.gov/mrls/index.asp), these values are intended to serve as screening levels, and are used by ATSDR health assessors to identify contaminants and potential health effects that may be of concern at hazardous waste sites. ATSDR further states that "it is important to note that MRLs are not intended to define cleanup or action levels for ATSDR or other Agencies." EPA has a Memorandum of Understanding with ATSDR, working closely on some assessments to ensure our work in developing human health assessment is complementary and to share data and information on specific assessments. Within EPA, the Office of Solid Waste and Emergency Response has outlined a hierarchy of toxicity values to be used in making decisions at Superfund sites (http://www.epa.gov/oswer/riskassessment/pdf/hhmemo.pdf). This directive indicates that IRIS is the preferred choice of toxicity values in Superfund risk assessment activities, and it points to other sources of toxicity values, including those developed by ATSDR and California Environmental Protection Agency, that one can use in the event that an IRIS assessment is not available for a given chemical of concern.

14. Many of the well-known pollutants of concern apparently up for assessment revision by IRIS have been previously assessed by other federal health agencies-OSHA, the National Institute for Environmental Health Sciences, ATSDR, as well as other entities like the National Academy of Sciences, the World Health Organization, or the chemical industry.

a. What is particularly essential about the IRIS Assessment updates that justify this new batch of assessments? What health benefit might be gained?

Answer: As indicated above, EPA's IRIS Program is the only federal program devoted solely to the evaluation of health hazard and dose response information for the purposes of developing cancer and noncancer chronic toxicity values for the oral and inhalation pathways of exposure. In addition, the IRIS Program qualitatively evaluates cancer information to ascertain human cancer potential. Risk management issues, such as technical feasibility or limits of detection, which are sometimes considered in the development of toxicity values by other federal agencies, are developed separately from IRIS toxicity values. IRIS assessments are the scientific foundation

for EPA decisions to protect public health, and our primary clients are the program and regional offices who nominate chemicals for addition to the IRIS agenda. IRIS assessments undergo a very rigorous review process involving the public and stakeholders at various steps in the assessment development process, as well as internal agency scientists, scientists from other federal agencies, and rigorous independent external peer review. As indicated above, the values derived by other federal health agencies (e.g., ATSDR, NIOSH, OSHA) are developed in response to different mandates and for different purposes. For example, NIOSH acts under the authority of the Occupational Safety and Health Act of 1970 and develops Recommended Exposure Limits (RELs) for hazardous substances that are found in the workplace. RELs are intended to limit the concentration of the potential hazard in the workplace air to protect worker health. As stated on the NIOSH website http://www.cdc.gov/niosh/topics/cancer/pdfs/1995_NIOSHRELpolicy.pdf), NIOSH RELs are based on risk evaluations using human or animal health effects data, and on an assessment of what levels can be feasibly achieved by engineering controls and measured by analytical techniques. OSHA's Permissible Exposure Limits (PELs) are issued in response to a mandate under the Occupational Safety and Health (OSH) Act of 1970. As stated on their website (https://www.osha.gov/dsg/topics/pel/), OSHA sets enforceable PELs to protect workers against the health effects from airborne exposure to hazardous substances. OSHA PELs are based on 8-hour exposures in the workplace. While values derived by other federal agencies may be appropriate for the workplace, for example, EPA's mandate is for public health which is a broader and, for vulnerable populations, a more complex undertaking.

b. What IRIS users/customers are calling for these new assessments?

Answer: IRIS assessments are the scientific foundation for EPA decisions to protect public health, and our primary clients are the program and regional offices who nominate chemicals for addition to the IRIS agenda. For example, IRIS is the first source of toxicity information used by the agency to make decisions and set cleanup levels.

c. Given that "science is science," why is an IRIS assessment superior to other assessments, including those of professional societies and industry?

Answer: The IRIS Program provides high quality, publicly available information on the toxicity of chemicals to which the public might be exposed. As indicated above, EPA's IRIS Program is the only federal program devoted solely to the evaluation of health hazard and dose response information for the purposes of developing cancer and noncancer chronic toxicity values for the oral and inhalation pathways of exposure. IRIS assessments undergo a very rigorous review process, involving the public and stakeholders at various steps in the assessment development process, as well as internal agency scientists, scientists from other federal agencies, and rigorous independent external peer review.

15. You have implemented a standing set of bi-monthly meetings to address chemical specific scientific issues as well as to have discussions about problem formulation. At the most recent June meeting, it appeared that many NGOs boycotted the meeting due to concerns they said were related to not knowing about the meetings and concerns regarding too much industry representation. It is our understanding that these meetings

have all been announced on the IRIS webpage, registration is open to everyone, and anyone who wishes to speak can get a slot on the agenda. Is this a fair representation of your actions to ensure that all representatives of the public are welcome to provide an input to the IRIS process, or do the arguments for the boycott have merit?

Answer: Yes – this is a fair representation of our actions to ensure the public has the opportunity to participate in our meetings. The IRIS Program welcomes anyone who is interested in participating or discussing scientific issues at our public meetings. We recognize that obtaining different perspectives on scientific issues is important, and for that reason, we have been exploring new mechanisms to invite scientists who might be interested in scientific topics to our meetings. We also recognize that not all of our stakeholders have the resources to travel to Washington, DC, to participate in a meeting. For the past year and a half, every public meeting held by the IRIS Program has also been available by webinar. This has been a successful model in that we often have 50-100 individuals participating by webinar from outside of Washington, DC. We are working to better ensure that webinar participants can more fully engage in our meetings, including encouraging webinar participants to actively participate in discussions remotely (i.e., via telephone). EPA also moderates these discussions to facilitate equal participation among both virtual and in-person attendees.

16. Should standard protocols be developed to enable all studies to be independently judged based on their quality, strength, and relevance, regardless of the author affiliation or funding source? If so, will you make development of these standard approaches a priority?

Answer: We have fully embraced the concepts of systematic review, and are committed to implementing the principles of systematic review in IRIS assessments as recommended by the NRC. The refinement of standard protocols to independently and transparently judge the quality and strength of a study identified through a literature search is a priority for the IRIS Program. In their 2014 review of the IRIS Process, the NRC recommended that evidence evaluation and risk-of-bias analysis be conducted using methods that are "transparent, reproducible, and scientifically defensible." The NRC also recommended that funding sources be considered in systematic reviews conducted for IRIS assessments. These topics will be discussed with systematic review experts and the public at an upcoming IRIS workshop on the 2014 NRC recommendations to be held October 15-16, 2014.

17. The science of hazard assessments has become complex in recent years. Does IRIS have the requisite staff and expertise in all the needed disciplines to draft assessments efficiently and quickly? Would a more qualified staff lead to more concise and accurate assessments, partially because much of the information in these 1,000+ page assessments could be eliminated?

Answer: Yes, IRIS staff have expertise in the disciplines necessary to develop quality assessments quickly and efficiently. Aided by the 2013 enhancements to the IRIS process, the capacity of IRIS staff to draft assessments will benefit from increased upfront planning and early engagement with stakeholders and the public. The distribution of preliminary materials and early discussion of scientific issues will help IRIS staff better understand

differing viewpoints and allow for those issues to be better presented in draft assessments. Along with the public and stakeholder interaction that occurs at the bimonthly public science meetings, the IRIS Program is developing a means of augmenting the scientific expertise available during these public meetings with eminent scientific experts identified by the NRC. These individuals will help ensure scientific issues are properly and more fully addressed early in draft development.

18. Following up on our discussion in the hearing when you said you would get back to the Committee with specifics, do you anticipate the first couple of IRIS assessments that will incorporate all of the NRC recommendations to be on new chemicals, and if so, which ones, or will they be updates of old assessments?

Answer: I stated that it would be 3-5 years before we complete implementation of all the NRC recommendations. Given those timelines, we anticipate that the first assessments to fully incorporate all the NRC recommendations will be inorganic arsenic and formaldehyde.

19. How does EPA intend to approach more challenging IRIS reforms such as evidence integration and weight of evidence? When will EPA develop guidelines or integrate a consistent approach in actual assessments?

Answer: The IRIS Program is working toward developing standardized systematic review methods for selecting and evaluating studies as well as methodologies for evidence integration and weight-of-evidence determinations. To move forward in this area, in August 2013, the EPA convened a public scientific workshop focused on approaches for evaluating individual studies, synthesizing evidence within a particular discipline, and integrating evidence across different disciplines to draw scientific conclusions and causality determinations. Another workshop will be held on October 15-16, 2014, to discuss systematic integration of evidence streams from human, animal, and mechanistic studies, as recommended by the NRC in their 2014 review of the IRIS process.

Also in 2013, the IRIS Program began development of a handbook to describe standard protocols and processes for staff to use when developing an IRIS assessment. This draft handbook represented our initial thoughts on several topics relevant to systematic review, including evidence integration and evaluating the evidence for a given effect. The draft handbook was provided to the NRC committee reviewing the IRIS process to inform their deliberations. The NRC noted in the 2014 report that elements of the draft handbook address many of the concerns over evidence evaluation raised by the NRC formaldehyde report. At the same time, the NRC encouraged further development and completion of the handbook as the IRIS program identifies best practices that facilitate the application of systematic review to IRIS assessments. Development of the draft handbook is ongoing.

The IRIS Program is continuing to evolve and the more challenging reforms noted above are under active consideration by the program. The 2014 NRC report commended the agency's efforts to improve the IRIS Program, and that the program had made substantial progress in the short time since release of the formaldehyde report. The IRIS Program anticipates that

completion of the recommendations presented in the 2011 and 2014 reports, including those on evidence integration, will be completed in three to five years.

20. The testimony from Mr. Walls noted that even though EPA documents are peer reviewed, the EPA staff that write the assessments are judge and jury of which comments from the public and from peer review experts are accepted and rejected. In fact, it was brought to our attention that in the recently finalized methanol document, EPA staff used the response to comments to describe a new policy position and approach to address endogenous exposures.

a. Do you support such actions? Should there be an independent entity, similar to the role a journal editor plays, to review how EPA staff respond to comments before the document is finalized?

Answer: Public comment and robust expert peer review is an important part of the agency's scientific work, and responding to public and peer review comments is an important step in completing a scientific product. It is not our intention to incorporate new policy positions in responses to comments. A core value of the IRIS Program is to appropriately address comments received from the public and external peer review. Following external peer review, EPA revises draft IRIS assessments to respond to public and peer review comments. The revised draft assessment is then reviewed by agency scientists who do not work in the IRIS Program; additionally, it is reviewed by scientists from other federal agencies and the Executive Office of the President. Each IRIS assessment documents the responses to public and peer review comments in an appendix that is publicly available. With the 2013 IRIS enhancements, EPA established a new Science Advisory Board (SAB) Chemical Assessment Advisory Committee (CAAC). The CAAC will provide independent review of IRIS assessments. A significant benefit to the IRIS Program from the standing SAB panel is the continuity it will provide across multiple assessments, and the capability to ensure that peer review comments across assessments are similarly and adequately addressed.

21. The National Research Council recommends that the IRIS handbook be peer reviewed. Has this happened? Will it? If so, when, and if not, why not?

Answer: No, the IRIS handbook has not yet been peer reviewed because it is still under development as we consider the recommendations of the NRC's 2014 report, and consider forthcoming discussions on their recommendations at the upcoming October 15-16 IRIS workshop. The handbook will be peer reviewed in the future, but the form of the peer-review may vary depending on how the handbook is developed. The handbook is considered to be an evolving, "evergreen" document that will be updated to incorporate new approaches when the IRIS Program identifies best practices in applying systematic review to IRIS assessments. At this time, we anticipate that as parts of the handbook are completed and implemented in the development of a given chemical assessment, they will be sent for peer review along with the assessment. In this way, the handbook in its entirety would be peer reviewed. Portions of the handbook may also be discussed at IRIS bimonthly public science meetings to gather additional feedback.

22. You have recently developed a subpanel of the EPA Science Advisory Board to review IRIS assessments.

a. Will this panel be asked to review cross-cutting issues, like assessments of chemicals below background or endogenous exposures?

Answer: Yes the CAAC will be consulted on cross-cutting scientific issues in the course of their assessment reviews.

a. Will you take public comment on the "charge questions" asked of this panel?

Answer: Yes. As part of the IRIS enhancements, in step 4 of the IRIS process, the draft assessment and a draft of the peer review charge are released for public comment and discussion at an IRIS public science meeting. The draft charge or assessment may be revised prior to being released to peer review in order to be responsive to public comments.

c. Consistent with the Environmental Research, Development, and Demonstration Authorization Act, which authorizes the Science Advisory Board, will you allow this panel to answer any and all questions sent by this Committee?

Answer: The SAB is a federal advisory committee established by the EPA Administrator and, as with all EPA federal advisory committees, is subject to "administrative guidelines and management controls" established by the EPA Administrator. (See, FACA section 8(a)). As required by FACA, the EPA Designated Federal Official calls each meeting and approves the agenda for each meeting.

EPA and staff of the House Science, Space and Technology committee are developing a process for managing questions on which the specific congressional committees would like SAB advice.

23. The National Research Council recommends that EPA should provide technical assistance to stakeholders who don't have resources to provide input. How is EPA implementing or planning to implement this proposal fairly so that one class of stakeholders isn't overly assisted?

Answer: In the 2014 NRC review of the IRIS process, the committees commended our initiatives to engage with stakeholders and the public, while noting that differences in scientific and financial resources may contribute to an imbalance in public input to the IRIS Program. The IRIS Program already conducts significant outreach activities to ensure that potential stakeholders are made aware of upcoming IRIS activities. These activities include the use of webinars to expand access to individuals unable to travel to the D.C. area; email and social media, particularly to professional societies and disease interest groups; and IRIS

and Human Health Risk Assessment program bulletins that are sent to several thousand individuals. Reaching out through a variety of methods broadens the array of stakeholders and helps to ensure that no one group of stakeholders is uninformed.

Additionally, the IRIS Program is developing a proposal by which technical assistance can be provided through the National Research Council. The intent of this proposal is to engage the NRC to identify, evaluate, and arrange for scientific experts to participate in IRIS public meetings. The primary benefits of this arrangement are that it is expected to improve access to subject matter experts and provide a wider range of scientific perspectives. Individuals participating through this NRC augmentation of the IRIS public science meetings will not represent any specific group of stakeholders, but their presence will enhance and focus public discussion on key scientific issues. The IRIS Program anticipates that access to these subject matter experts early in the assessment development process will also enhance the quality of IRIS assessments.