

National Infrastructure Advisory Council

Meeting Minutes for the March 14, 2016 Quarterly Business Meeting

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NATIONAL INFRASTRUCTURE ADVISORY COUNCIL

QUARTERLY BUSINESS MEETING AGENDA

March 14, 2016

1:30 PM –3:30PM PM EDT

1310 N Courthouse Road, Arlington, VA 22201

Department of Transportation, 3rd floor, Virginia Room

- I. OPENING OF MEETING** *Lisa Barr, Designated Federal Officer (DFO), National Infrastructure Advisory Council (NIAC), Department of Homeland Security (DHS)*
- II. ROLL CALL OF MEMBERS** *Lisa Barr, DFO NIAC, DHS*
- III. OPENING REMARKS AND INTRODUCTIONS**
- Constance H. Lau, NIAC Chair*
- Caitlin Durkovich, Assistant Secretary for Infrastructure Protection, DHS (invited)*
- Suzanne Spaulding, Under Secretary, National Protection and Programs Directorate (NPPD) (invited)*
- Stephanie Morrison, Director, Critical Infrastructure Protection Policy, National Security Council (NSC) (invited)*
- IV. APPROVAL OF DECEMBER 2015 MINUTES** *Constance H. Lau, NIAC Chair*
- V. STATUS UPDATE ON WATER RESILIENCE WORKING GROUP** *Jack Baylis, Working Group Chair*

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VI. OPEN DISCUSSION AND PUBLIC COMMENT

Lisa Barr, DFO, NIAC, DHS

VII. CLOSING REMARKS

Constance H. Lau, NIAC Chair

Caitlin Durkovich, Assistant Secretary for Infrastructure Protection, DHS

Stephanie Morrison, Director Critical Infrastructure Protection Policy, NSC

VIII. ADJOURNMENT

NIAC MEMBERS PRESENT IN ARLINGTON:

Mr. Jack Baylis, Mr. Robert Carr, General Albert Edmonds (ret), Ms. Margaret Grayson, Ms. Constance Lau, Ms. Joan McDonald, Mr. Thomas Noonan, Mr. Keith Parker

NIAC MEMBERS ATTENDING VIA CONFERENCE CALL:

Dr. Beverly Scott, Mr. Michael Wallace

MEMBERS ABSENT:

Mr. David Bronczek, Mr. David Grain, Mr. Philip Heasley, Mr. James Murren, Mr. James Reid, Mr. Bruce Rohde

SUBSTANTIVE POINTS OF CONTACT PRESENT IN ARLINGTON:

Mr. Richard Houck with Ms. Constance Lau

SUBSTANTIVE POINTS OF CONTACT OBSERVING VIA CONFERENCE CALL:

Mr. Clark Dumont for Mr. James Murren

OTHER DIGNATARIES PRESENT:

Ms. Caitlin Durkovich, IP, DHS; Mr. Robert Kolasky, IP DHS; Ms. Stephanie Morrison, NSC

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I., II. OPENING OF MEETING, ROLL CALL

*Lisa Barr, Designated Federal Officer (DFO),
National Infrastructure Advisory Council
(NIAC), Department of Homeland Security
(DHS)*

Ms. Barr introduced herself as the Designated Federal Officer of the National Infrastructure Advisory Council, acting under the appointment of the Undersecretary of the National Protection and Programs Directorate at the Department of Homeland Security. She welcomed Members of the NIAC, both in Arlington and on the phone. She also welcomed Ms. Stephanie Morrison from the National Security Council staff as well. Addressing the members of the public, Ms. Barr said that the NIAC is a Presidential Advisory Council created by Executive Order 13231 and amended by Executive Order 13652, which is dated September 30, 2015. The NIAC is composed of Members appointed by the President and includes senior expertise throughout the critical infrastructure sectors identified by Presidential Policy Directive 21. The Council provides the President, the Secretary of Homeland Security and other relevant agency leadership with advice on security and resilience of the nation's critical infrastructure. During its more than 10 year history, this Council has conducted and completed 27 studies, all of which have been made available to the public. These studies have ranged in matters from the cooperation and partnership between the public and private sector, and policies and strategies in risk assessment of the nation's critical infrastructure. She said she would now call the roll for the benefit of the Council's record. The meeting attendance can be seen on page 2. After taking roll call, Ms. Barr noted that the floor would be open to pre-registered comments from members of the public during part 6 of the agenda, as explained in the Federal Register Notice. She said members of the public who did not register prior to today's meeting and are in attendance are requested to register with the Secretariat or to flag the DFO during that part of the meeting in order to minimize any disruptions. She said that comments must be relevant to the agenda items for this meeting or other topics that the NIAC has studied in the past and are limited to three minutes per person pending any questions from the Members of the Council following the comment. Pursuant to her authority as Designated Federal Officer, she called to order this NIAC meeting, the first for 2016. She then introduced the Chair, Ms. Constance Lau and the Vice Chair, Dr. Beverly Scott. She then turned the meeting over to Ms. Lau.

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III. OPENING REMARKS AND INTRODUCTIONS

Constance H. Lau, NIAC Chair

Caitlin Durkovich, Assistant Secretary for Infrastructure Protection, DHS (invited)

Suzanne Spaulding, Under Secretary, National Protection and Programs Directorate (NPPD) (invited)

Stephanie Morrison, Director, Critical Infrastructure Protection Policy, National Security Council (NSC) (invited)

Ms. Lau welcomed everyone. Dr. Scott apologized for not being there in person, as she had just returned from South Africa. Ms. Lau said she would like to introduce the newest members of the NIAC and read their background pieces for the record. She began with Mr. Keith Parker. Mr. Parker is the General Manager and Chief Executive Officer of the Metropolitan Atlanta Rapid Transit Authority (MARTA), the nation's 9th largest transit system which includes heavy rail, bus and paratransit services. MARTA provides over 400,000 passenger boardings a day. Mr. Parker took the helm of MARTA on December 10, 2012. Mr. Parker's career has included public and private sector experiences in diverse communities around the country, including Virginia, California, Washington State, North Carolina and Texas. Most recently, Mr. Parker served as CEO for transit systems in San Antonio and Charlotte. Under Mr. Parker's leadership, the San Antonio and Charlotte transit systems enjoyed some of the highest ridership increases in the country, while maintaining some of the lowest costs. The transit agencies won numerous local, state, and national awards in areas such as safety, maintenance, environmental innovations, and overall excellence. Mr. Parker won Texas CEO of the year awards in 2011 and 2012. Mr. Parker holds a MBA from the University of Richmond, as well as a Master of Urban and Regional Planning and a BA in Political Science from Virginia Commonwealth University. He also holds professional certification with the American Institute of Certified Planners. Ms. Lau welcomed Mr. Parker and the Council applauded.

Ms. Lau then introduced new Member, Mr. Robert "Bob" Carr, the Founder and Chief Executive Officer of Heartland Payment Systems. Mr. Carr helped to form the Payments Processing Information Sharing Council. Before starting Heartland, Mr. Carr was a software consultant. He founded Credit Card Software Systems, Inc. in 1987. He began his career at Parkland College in Champaign, Illinois as a Math and Computer Programming Instructor. He also worked as an Executive at the Bank of Illinois in Champaign. He wrote a book called "Through the Fires: An American Story of Turbulence, Business Triumph and Giving Back". Mr. Carr established the

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Give Something Back Foundation that provides mentoring and college scholarships to students from modest means, partnering with high schools and colleges in Illinois, New Jersey, Delaware and Pennsylvania. Mr. Carr earned a B.A. in Mathematics and Computer Science from the University of Illinois. Ms. Lau welcomed Mr. Carr and the Council applauded.

Ms. Lau then welcomed Ms. Stephanie Morrison from the National Security Council. She is the Director of Critical Infrastructure Protection Policy. Ms. Morrison said that security and resilience for critical infrastructure continues to be a focus for the President even though it is the last year of his Administration. She said many of the Members may be aware that the Canadian Prime Minister visited last week and as part of the joint statement that came out of that visit, there was an announcement that an agreement was made to develop a joint US-Canadian strategy for strengthening the security and resilience of the electric grid. The exact verbiage was “to work together to strengthen the security and resilience of the electric grid, including against the growing threat from cyber-attacks and climate change impacts.” She said they were very excited by that news. She feels it is a great stride and will be very effective. She said lastly they are very much looking forward to hosting the Water Sector Resilience Working Group the following day (March 15) at the Eisenhower Executive Building and are looking forward to seeing everybody there.

Ms. Lau thanked Ms. Morrison. Ms. Lau then clarified that it was communicated in the weeks before the meeting that Members of the Council who are not Members of the Water Resilience Working Group, are also invited to join that meeting as an observer of the Committee’s work. Ms. Lau then announced that Assistant Secretary Caitlin Durkovich notified the Council that she will be a few minutes late, therefore, Ms. Lau will interrupt the meeting in order to allow her to give opening remarks.

Ms. Durkovich arrived during Agenda Item V (on page 9), at which point Mr. Baylis paused his presentation to allow Ms. Durkovich to make her opening remarks. Ms. Durkovich apologized for being late and said it was wonderful to be at the NIAC’s quarterly business meeting. She said she knows that there is a lot to discuss including the water study. She said she would like to take time to acknowledge all of the Members for the important work that they do. In increasing forums around this country, it is amazing to hear people acknowledge the importance of having senior executives and members of the “C-Suite” involved in this conversation about security and resilience. She feels the NIAC has paved the way for this. She said it is wonderful to be able to point to the work that the NIAC has done that has endorsed this concept long before many others have arrived to it. She said more importantly, the fact that the Members are here and that they “roll up their sleeves day-in and day-out” to accomplish studies is great. Ms. Durkovich said the clarification to the CEO report (“Executive Collaboration for the Nation’s Strategic Infrastructure”) has been submitted to the White House. She said this is another topic that increases the notion of the intersection and dependencies and interdependencies of these lifeline functions. These studies are getting recognition at conferences such as RSA and NERC and continue to build on the work of the ESCC in terms of bringing CEOs to the table. She said they often wonder how they arrive at the composition of the NIAC, but having the Members

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participation across these lifeline sectors is so critical to the work as they move forward across these strategic initiatives. She again thanked the members.

Ms. Durkovich said she wanted to provide an update on the National Critical Infrastructure Security and Resilience (CISR) Research and Development (R&D) Plan, which was released last December. It directed DHS to initiate the development of an implementation roadmap to align to Federal R&D activities and develop annual performance measures to track progress. This plan identifies 5 key areas for collaboration and draws upon the input of the public and the private sector to include the NIAC. She said they have established a subcommittee under the National Science and Technology Council structure to facilitate this interagency coordination. The roadmap is expected to be completed later this year.

Ms. Durkovich said she was very interested to hear about the progress of the water study. She said she thinks it is fantastic that the final findings will be deliberated in Los Angeles in June. She said they will also spend some time at this meeting as well, as in subsequent meetings, talking about next steps in the study topics. She said they have solicited some great ideas from the Members and regardless of what path they head down, there are some promising topics to turn attention to in the coming months.

Ms. Durkovich said the best part of her opening remarks was getting to recognize the new Members. She welcomed Mr. Keith Parker and Mr. Robert Carr. She also recognized that Mr. Tom Noonan was able to attend in person, which he has not in a while and said it was great to have all of them there. She thanked the Members and the meeting returned back to Mr. Baylis' update on the water study (page 9).

IV. APPROVAL OF DECEMBER 2015 MINUTES

Constance H. Lau, NIAC Chair

Ms. Lau said they will now move on to the approval of the meeting minutes from December 1, 2015. She asked if there were any changes. Ms. McDonald said that she was not listed as present though she did attend the meeting. Mr. Clark Dumont also emailed the NIAC Secretariat that Mr. James Murren was also left off the attendance list. In addition, prior to the meeting, Ms. Lau submitted corrections to typographical (non-substantive) errors. Ms. Lau asked if there were any other changes or amendments. Hearing none, she asked for a motion to approve the minutes as amended. Mr. Baylis said, "So moved". General Edmonds seconded. Ms. Lau asked for all in favor to please say "aye". Everyone in the room and the phone said "aye". No one said "no" and the minutes were approved.

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V. STATUS UPDATE ON WATER RESILIENCE WORKING GROUP

Jack Baylis, Working Group Chair

Ms. Lau said the highlight of the meeting's agenda will be the status update from the Water Resilience Working Group that is being chaired by Mr. Baylis. She said after Mr. Baylis' presentation, in the open discussion section of the agenda, the Members will have the opportunity to give input on what future studies the NIAC may do as the water resilience study is the last of the four studies in the lifeline sectors. There have been many topics that have been talked about and they would like to get input on what the Council might study next after water resilience. She then turned the meeting over to Mr. Baylis.

Mr. Baylis said he appreciated everyone's attention and participation at the meeting. He said he would be giving a brief overview of the project thus far. Since the December QBM, the Working Group has continued to gather information and expert insights. The Working Group is comprised of NIAC Members. In addition, there is a very extensive Study Group with 16 members who are supporting this effort. The Study Group is on track to complete their task by the end of the month. Mr. Baylis acknowledged and thanked his fellow Working Group Members: General Edmonds, Ms. Grayson, Mr. Murren, Ms. McDonald and Dr. Scott. He said today's presentation will include a status update and outline of the progress of the Working Group and Study Group. He will also present the Study Group findings and talk about next steps to complete the study by June 2016 in Los Angeles. He said the study charge they were given is to test and validate the usefulness of the NIAC goals framework, to uncover key water resilience issues and identify potential opportunities to address them. Specifically, they want to understand some of the key interdependencies between water and the other sectors and how that affects national resilience.

Mr. Baylis said the Working Group has been fortunate to have a great mix of experience and expertise. He said that Dr. Scott brings years of experience and expertise in the Transportation Sector in dealing with resilience issues, and that Dr. Scott has been stressing that even though they have been dealing with national level issues, they need to focus on the community, its workforce and how national ideas and actions can have a local impact. He said General Edmonds has been crucial to conversations, including how to ensure the information they are receiving has impact and will result in actionable recommendations to the White House. He said Ms. Grayson often brings financial perspectives to the discussion. Her institutional knowledge of previous NIAC recommendations and how the Council has handled issues in the past has been invaluable. He said Ms. McDonald, one of the newest NIAC members, was the New York State Department of Transportation Commissioner during Superstorm Sandy. She has brought a fresh perspective and insights on effective models in the Water Sector that they can leverage. In addition, Mr. Murren has been sharing innovative ideas on how to address some of the barriers to resilience in the Water Sector. Mr. Baylis said he is eager to continue discussions with the Working Group and how they can turn these ideas into actionable recommendations to the White House.

In regards to the study status, Mr. Baylis said as the Members know, each NIAC report has two information streams working in parallel. He said they give a specific tasking to the Study Group,

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which conducts interviews, panel discussions and research, and prepares findings, conclusions and a final report to the Working Group. Meanwhile the Working Group has been collecting its own information and data, through interviews from national leaders, subject matter experts, government representatives, as well as gathering news and research. The final Study Group report will be the next deliverable which is expected to be presented next week. The Working Group has been working on its preliminary findings and sharpening recommendations. They are also wrapping up government presentations, with a scheduled interview with FEMA next week. He emphasized that they have been very busy. Since December they have conducted seven high quality interviews in addition to the five they completed before December. He said a list of previous interviews is included in the Appendix. He said they have talked to senior level representatives of agencies with a major role in water, including experts in critical infrastructure, cybersecurity and economics. In addition to weekly meetings, the Working Group has conducted two in-person work sessions, once in December, and once in the morning before the current QBM.

Mr. Baylis said he would now like to say a few things about the Flint, Michigan water crisis. He said the Flint situation unfolded during the course of their study. It is a very unfortunate and serious health incident and he said he believes all of the Council feels for the health and wellness of the people forever impacted. He said the Working Group is using this situation to gain insights on how water service can break down and impact communities, businesses and government. He said they will make something good out of the Flint situation. The Analytical Support Team has made a factsheet and timeline of the Flint water crisis, and has provided the Working Group with weekly news updates and articles on Flint that are particularly relevant to the study. A portion of the February 4th Working Group meeting was devoted to a discussion on Flint and its relationship to water resilience. He said from what they know, the Flint situation resulted from a confluence of bad decisions. While the Flint water crisis does not seem directly related to a gap in infrastructure resilience, the conditions, decisions and failures presented in Flint have much in common with some of the Working Group's initial findings. These include the fact that perceptions of the condition of some of the infrastructure and water quality were different among public officials, technical experts and community residents. An inability or unwillingness to raise rates to improve infrastructure, and the impacts on high water rates on low income populations were also a factor. Smaller communities face challenges to have the technical expertise, financial resources and work force capabilities to address emerging risk. It includes limited cross jurisdictional coordination, which may have caused utilities to act without consideration for a regional collaborative solution. He said the Working Group report will include an appendix on the Flint incident, and it will discuss how recommendations can help to avoid another situation like Flint.

Mr. Baylis then discussed the Study Group. He said the group is diverse and has deep expertise. The Study Group Members are 16 professionals with expertise in planning, financing, construction, operations, regulations, and evaluation of water and wastewater systems. They represent public utilities, state, municipal government agencies, academia, private sector companies and national laboratories. To develop their findings and conclusions, the Study Group interviewed 56 subject matter experts in eight panel discussions focused on sector risk,

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dependencies, planning and investment, extreme weather, emergency management, cybersecurity, next generation resilience and financial solutions. They also reviewed more than 150 documents. As part of their tasking, the Study Group examined five disruption scenarios focused on natural disasters, cybersecurity, and energy disruptions to identify dependencies, gaps and challenges, and opportunities. They include the 2008 Midwest floods, Superstorm Sandy and a fictional scenario of a New Madrid, MO earthquake. For cybersecurity, the Study Group evaluated a fictional scenario based on “Cyber Storm 4”, which is an Evergreen Exercise. They included evaluating energy disrupters. The Study Group also examined the 2003 Northeast Blackout. A summary of the case study webinar will be part of the Study Group’s final report.

Mr. Baylis next provided an overview of the findings of the Study Group. He said the Study Group Chair, Adel Hagekhalil, is present at the QBM and Mr. Baylis may ask him some questions during his presentation. Mr. Baylis said he would like to note that the Working Group is still in the midst of refining preliminary recommendations. He said they are seeing significant alignment on what the Study Group found. While the Study Group and Working Group work independently of each other, it has been surprising how close in alignment their findings and recommendations are. The Study Group provides the Working Group with a utilities and operations perspective, while the Working Group is focused on national level impacts and opportunities, yet the findings are very similar. The Study Group findings fall under six key themes: 1) Water receiving priority as a critical sector, 2) Undervaluation of water services, 3) Underinvestment in water resilience, 4) A changing risk environment, 5) Regional collaboration to improve resilience, and 6) Federal support for resilience.

The first Study Group finding is the criticality of water services is not sufficiently recognized by the public, Federal, state and local decision makers, nor stakeholders. In particular, the Study Group found the potential cascading impact of a major water disruption are not fully understood (at this point, Assistant Secretary Durkovich arrived to the meeting and her opening remarks can be read on pages 5-6). Multiple sectors are critically dependent on water, and water is not well understood. Water is arguably the most important resource for community health and well-being. If there is a major water disruption, hospitals and manufacturing operations would shut down. Without water and wastewater services, work places, restaurants, shopping malls, and other public areas would be forced to close until services were restored. This can have significant public health and economic impact.

The second finding of the Study Group is that water services are often undervalued, if not simply taken for granted. The infrastructure is largely out of sight, services are rarely disrupted, and rates have been historically low. This means that investing in existing water infrastructure is not given a high enough priority as decision makers balance other obligations. This results in a lack of support for infrastructure investment despite the fact that investing before an incident can produce a magnitude of savings compared to responding after an event.

The Study Group’s third finding is that the Water Sector is unique in that it is highly localized and the majority of its assets are publicly owned. This structure makes it difficult to set rates, particularly if increasing rates will burden disadvantaged communities, low income and

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underserved neighborhoods. The sector also needs to attract and retain qualified personnel with specialized skills to operate systems.

The Study Group's fourth finding is that the Water Sector varies in capabilities. There are some large leading edge utilities, as well as small utilities that do not have the bandwidth or capability to address new or expanding threats. These threats include cyber-attacks, aging and moving populations, and increasingly severe weather events. There are a number of tools, analysis and research available but they are not broadly viewed across the sector. This is particularly due to the amount of investment and outreach to raise awareness and consolidation to make it easy to find and access information. The sector understands its risks and dependencies, but may not adequately address them in practice. For example, the Water Sector may underestimate the duration of events and the existing supply chain planning for electricity, critical chemicals and fuels may be inadequate. Disasters are not single sector events. There may be other demands on the resources and supplies the sector needs. Because of this, the Study Group found that joint lifeline sector planning is essential. Utility personnel often have limited cybersecurity awareness and the number of Water Sector cyber experts is insufficient for the current needs. In general, utilities are often constrained in offering competitive packages to attract top cybersecurity experts.

The Study Group's fifth finding is that when an incident happens, its impacts are felt across jurisdictions. There are some examples of regional collaboration within the Water Sector, but it is not widespread. The Study Group reported that a shared approach to a framework of regional goals, resource sharing, and performance metrics could help foster regional coordination and collaboration. Given the localized nature of the sector, the effect of most disruptions is felt locally or regionally, but attention needs to be given to the risk of large scale national disruption and the impacts it could have.

The Study Group's sixth finding is that resilience is well established in Federal policies such as Presidential Policy Directive (PPD)-8, but it often takes time to translate that policy into programing and funding. The Study Group found that the Federal government needs to better incorporate its regulation and activities and improve the collaboration across agencies. However, current authorities, regulations and reporting requirements and funding mechanisms do not promote a uniformed response to the sector's needs. Regulatory requirements also constrain the Water Sector's flexibility to operate during an emergency. For example, during the last QBM, Kevin Donnelly, the Deputy Commissioner for New York City, explained how NYC was required to continue to operate pumping stations during Sandy. As a result, those pumping stations received significant damage that increased costs. If they had been taken down properly, they could have been operational again in a day or so once the water receded.

Mr. Baylis next went over the study timeline. As discussed at the start of the presentation, he said the Study Group's work is almost complete and they are on track to provide their final report to the Working Group by the end of the month. The Working Group has developed some preliminary findings which it will continue to refine. It has also started working on recommendations to address those findings. The draft report is scheduled to be ready this spring,

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with the final report ready for the June 24th QBM in Los Angeles. He said the Working Group needs to finalize its findings, develop recommendations and prepare the final report. These will be presented to the Council for deliberation at the June 24th QBM. He said he would again like to thank the Working Group Members and the Study Group Members. He then asked if Mr. Adel Hagekhalil and Mr. Adam Krantz, who are Members of the Study Group and in attendance in the audience if they had any comments. They had no additional comments.

Mr. Baylis then opened it up to the full Council and Administration if they had any questions or points they would like to raise. Ms. Durkovich said that the first Study Group finding is something that they hear a lot. The Water Sector Coordinating Council also raised it in their sector-specific plan, that water is not seen as a lifeline function or given as high of a priority as other sectors. Ms. Durkovich asked Mr. Baylis why he thought that was the case. Mr. Baylis said he thinks most people would say “of course” if you asked them if water was a lifeline sector. However, the Working Group is coming up with a very similar conclusion as there appears to be an overconfidence in the Water Sector because it is so reliable -- “when you turn on your water, the water comes on, when you flush your toilet, it flushes”. He said if there was an event and the power goes out, people get out candles. But if the toilet does not flush, people start to panic, but it does not often happen. He said the same is true for expecting clean water out of the tap. Most communities have clean water that is not disrupted, the cost is lower than cable, etc. This has all caused overconfidence in the hidden infrastructure. Ms. Durkovich then asked about the Study Group’s third finding (“Greater investment is needed to improve Water Sector resilience”) and asked how Flint changes this and what the impact will be. Mr. Baylis said he thinks it is like a “bright yellow line”. He said he thinks Flint was a result of a combination of lack of good communication, lack of the right people in charge, and bright lines. He said he does not think there will be a lot of Flints, however there will be more because the infrastructure is underground. He said people do not understand that there is a lot of lead pipe in the US. He feels most people would be surprised by that, however water officials have known that “forever” and have come up with cheap solutions such as coating it, rather than replacing it. He said he thinks with Flint, it is such a tragedy, especially the children impacted, that it shows that equipment underground is not safe. He said there was a time when they were cross-partisan about water. The first Clean Water Act was a big joint cross-partisan effort, and it was recognized how important water is across communities. He feels now water is simply taken for granted. He said he hopes Flint illustrates that it is not something to be taken for granted. He said they need very smart people to pay attention.

Mr. Noonan said if he understands the business model of water correctly, it is also consumption based. People consume water and pay a bill. He asked if there are any models out there that might look at that differently given where they are with their infrastructure to say if they are developing and inputting more demand on a fixed capacity system effectively, there should be some type of fee or cost developed, among other things that might build a capability for the water authorities to have money allocated towards resiliency. In other systems, such as electricity, there are peak demand charges. He said these help the regulated power companies deal with the fact that on a 105 degree day, everyone will still get power even if they pay a bit more for it. They throw Auxiliary Power Units (APUs) on line and start up additional plants. In

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the water business, it is not there. It is consumed linearly and he wondered if the study might look at business models on how to enhance this for the future. Mr. Baylis said with water there are set costs. In the west they are working on getting people to reduce their water use, and they are significantly. But the cost largely remains the same. There are fixed costs in the business model that have to be there. Also, another issue that comes up a lot is the water industry recognizes that there is plenty of money out there. Private sector money and public sector money is ready to be there. But they are rate based, so eventually it comes down to the rate payer. The rates are artificially low because they address the underserved neighborhoods. They do not want to increase rates on those underserved neighborhoods. That prevents them from increasing rates to adequately pay for newer infrastructure. He said that in the Working Group's meeting before the QBM, they discussed how to address underserved neighborhoods to keep their rates low and still raise rates to reflect the actual cost going forward. He said there are other models. The French are famous because they have gone across the world to commoditize water, the US has traditionally resisted that. The US sees water as a right and it has stayed in the public domain for many good reasons. He said they have to find ways for the public to recognize they have to pay a bit more in order to go through and improve infrastructure.

Mr. Noonan said he would encourage some "out of the box" thinking on the business model because of the consumption business model. He said rates can be raised for people who can afford it and not for others, but new demand hits the water system every time 15,000 homes or 5 new skyscrapers are added and a forest gets cut out. He said to the best of his knowledge there is no incremental cost to the revenue of the water authority, they just wait for the consumption before they get paid. Mr. Baylis asked Mr. Hagekhalil if he could address what he would do if there was a new high-rise in Los Angeles. Mr. Hagekhalil introduced himself as the Study Group Chair. He said there is a connection fee, and he would further discuss the clean water side, which is the wastewater side. If a developer comes in to develop a property, there is a one-time charge they have to pay to basically buy into the system and then they pay based on the demands over time. He said traditionally at one time the industry used volumetric fees. However, they are now seeing a huge change to do both at a fixed rate like the power industry, especially since there is a lot more water conservation and a reuse of water onsite so it ends up as something similar. It is taking a whole shift to both demand and fixed charge in new developments and new properties which he feels makes a lot of sense. He said they need to look into it more, as they pay a one-time connection fee that goes into the expansion of the system to allow for upgrades. The maintenance of the existing system a lot of times has to come mainly from the sewer fees. He said he felt Mr. Baylis made a good point about the utilities that they are tight in raising enough revenue to invest because of what it means on the impact on the underserved communities. He said that is a finding the Study Group has made. Mr. Baylis said that was a great question and he would end it with one story on DC Water. The General Manager is George Hawkins, and he brought in a new Chief Financial Officer (CFO) from the Office of the Deputy Controller of New York. He said this was a very smart finance person who did not "grow up" in the water or wastewater industry. Mr. Baylis explained that they were looking at a tunnel in DC and the public had said they are not going to give another rate increase. This CFO looked at assets and said "why are you depreciating at 20 years and financing at 30 years when it is going to last 100 years". Mr. Baylis said he believes DC Water is the first water agency to use a 100-year bond, a

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century bond, which is something common in vertical construction. However, he said water is traditionally very conservative. He said a process and a plant should only depreciate 20 years. He said there are certain things that have a life cycle, and the CFO felt if the infrastructure was going to last 100 years, it should be bonded for 100 years. He was trying to use a logical business model. It is a very conservative industry that does not want to pass on costs to their grandkids. They really try to champion the lowest cost water to the people and target underserved neighborhoods. Mr. Baylis said it really comes down to the rates and the need to address them. He said that is something that can happen at a national level.

Mr. Kolasky asked who the actor is in this and what they can do through executive authority and if they need legislation, where should it be, such as at the community level. Mr. Kolasky also asked how they get that collective action to inspire tangible results. Mr. Baylis said Mr. Kolasky asked a great question, and that the Working Group had talked about having joint exercises because water is something that is very local. Even with a myriad of Federal regulations from FEMA, the US Army Corps of Engineers (USACE), etc., water is delivered and treated at a local level. He said they talked about having joint exercises with local agencies and a myriad of actors in order to distill what they need to do. Ms. Lau said that although there is so much talk about rates she was struck that in her understanding of the situation in Flint, they used the water rates to subsidize what should have been increases in property tax. She asked what is factored into the equation. Mr. Baylis said the Flint situation is an example of everything being done wrong. There was a lot of miscommunication. He said traditionally, water rates are only used for that sector and the agency. He said he cannot explain what was going on in Michigan, especially when experts say that they have to worry about the lead pipes. He said that is why the Working Group and Study Group both thought Flint is such a good exercise to be a “companion” to the report because a lot of people are wondering what happened in Flint. It is not just one issue or one person, but a theme. He thinks anytime they drive things from a cost perspective, every answer is, “let’s lower costs, let’s do it that way”. Ms. Durkovich said that the cost-benefit has to play out. She said either the New York Times or the Washington Post had a story on the decision making that happened in Flint, describing the breakdown of decision making across the board. At the end of the day, costs drove so many of the decisions but no one sat down to think about the benefit in the long run, money that is averted from a disaster, or just the brand and the reputational hit that they have taken and how they calculate that. That was not in anyone’s calculation when they were making these very tactical decisions of “hooking up or not hooking up” and it was all about saving a dollar. Mr. Baylis said it was focused on short term costs, not long term costs, but the monthly cash call. He said they “somehow got dominated by a wall-street perspective” and he reckons that is not smart business in the long term. Mr. Noonan said the frightening thing is, while they all hope it is a “black swan”, every municipality is confronted with the same constraints today and “who knows what is lurking under the iceberg”. Mr. Baylis said that luckily, “As you meet officials like Mr. Hagekhalil, Mr. Krantz and others across the US as I have, (Mr. Hagekhalil in addition to working for Los Angeles, is the President of NACWA, a group in DC of all the water agencies across the US), most of these people would stand up to that type of pressure and say that it is not safe.” He said there are health departments that check on this. There are a lot of questions some agencies have on “how did this happen and

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how did the health department not catch this”. There are multiple people that check the safety and quality.

General Edmonds said in the study, they have been trying to find specifics to deal with. He said one of the things they have found is that because there are many different sizes of water companies, some are private and some are public, they need to talk about public-private partnerships. They are trying to find 1-3 projects that they can recommend based on their knowledge of Flint and other things, which they can perhaps get the government and some of the agencies in government to work on a project. He said they are trying to give direction to the Study Group which has a lot of information, a lot of data and a lot of interviews to try projects. He said it seems to him “water is coming out of the cold. It is out there dangling and people are complaining about it.” He referenced Mr. Baylis, saying “everyone expects it, it is a God given right”. However General Edmonds said, “We do not know how to deal with it”. He gave an example of data centers which rely on large amounts of water for cooling, and people rely on the data centers. He said the toughest part of all of this is the first step, but it is time to start a project of some sort that will fix what the water experts say are the biggest problems. He said he does not care what it is, as long as something is done. He said all winter lead pipes have been bursting, so new pipes with sensors on them are being put in to detect the cracks before they burst. He said he hopes that their study will give an idea on things to look at first, with one or two agencies. He said the exercise the Electricity Sector did paid huge dividends. He said they need some recognition that people do not pay attention to water, and for once water needs to be paid attention. He feels something will come out of that and hopes more will come. Starting someplace is the most important. Mr. Kolasky thanked General Edmonds and said he thinks that it would be incredibly powerful for them to have that tool so they can start taking some action. Mr. Baylis said Mr. Kolasky’s quest was good because the strength of the water agencies is that they are so disaggregated. The system cannot be easily disrupted because they are not connected. The disconnection is strength and a weakness. Mr. Baylis then turned the meeting over to Ms. Lau.

Ms. Lau asked if Mr. Hagekhalil or Mr. Krantz had any more comments, as well as any other Study Group members in attendance. Mr. Baylis suggested that they describe the water agencies such as the National Association of Clean Water Agencies (NACWA) and the Association of Metropolitan Water Agencies (AMWA). Mr. Hagekhalil said he would try to answer the question of why water is not a priority. He said it is “out of sight, out of mind”. He said people take water for granted and only have a relationship with water when something goes wrong. He said that relationship needs to change and is a big issue they are looking at. NACWA has a coalition trying to educate about the value of water and what it means. That is a shift in what everyone needs to do; the Federal government, private sector, utilities, etc. need awareness in the importance of water. He said a lot of things could have been prevented in Flint. He said it is being dealt with everywhere. Aging systems can be managed as a way of managing lead and all that. He said one of the things the Study Group put in its findings and the communication to the Working Group is this utility-to-utility regional collaboration. They need to all be talking to each other. He said LA should be working together with the people and utilities around the region to support one another. Flint should have been in communication with other utilities in support of

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information and discussion and that will help that effort. He said that is something the Water Sector needs to do and the trade associations play a big role. He explained that he is the President of NACWA and Mr. Krantz is the CEO. He said their role is to advocate on behalf of the agencies, as well as share best practices to learn and support each other. He said it creates a support system for everyone to talk to each other and not “reinvent the wheel”. The same thing happens with AMWA. He said that is something they need to continue to build on and collaborate on and bring in that ability. There are 50,000 water systems in the country. There are 16,000-17,000 water treatment plants and they all need to be reached out to. Building the utility-to-utility partnership and collaboration, and regional partnership is critical. He feels that is very important. The funding question is huge. They do not expect the Federal government to come, cover, and pay \$1 trillion investment in infrastructure.

Mr. Hagekhalil said what he thinks they are looking for is flexibility to implement regulations. He said as an example, if they are building something to address water quality in an area, maybe there is a way to build equivalent projects with multiple benefits such as flood control, storm water capture, filtration for reuse, creating water supply. It needs to be done in a treatment plant for wastewater. The money can be taken and invested across the region in a watershed approach. Resources can be leveraged, but the ability and flexibility to allow that whether it is at the Administrative level or interpretation of the law such as the Clean Water Act and how that is interpreted and allow that flexibility to be in place. He said he thinks there are a lot of things that can be worked on. The issue has huge impact on low income and disadvantaged communities. He said he sees it every day because the rates that they need are not set on need, but the prices people can afford. He feels that that is wrong and if they keep doing that, they need to discuss the lifecycle cost. There is a cost to not doing something and investing proactively is a huge benefit compared to the cost of paying reactively. What happened in Flint demonstrates this. The cost of fixing it could have been much cheaper if done in a proactive way and that applies across the nation. He said he appreciates the effort put into this study and that it will really move the sector forward. He feels looking at Flint is an awakening for the sector to start having dialogues. He said he is glad they are moving forward.

Ms. Lau said that as she listened to Mr. Hagekhalil at the QBM, as well as when she observed the Working Group session, she referenced that he was also talking about the fact that the Federal government does not necessarily provide most of the funding, it is done at state level or local level. She said since NIAC is a Presidential advisory council, what she is hearing Mr. Hagekhalil say is that perhaps in the area of regulation and flexibility, there probably would be more of an impact from the Federal side beyond funding. Mr. Hagekhalil said on his end, it is the prioritization of what they are focusing on. There is a limited amount of money that they can spend at the local level, so they have to prioritize what they are doing in a smart way. He said in any business model they need to invest in a way that gives the maximum amount of benefit and leverage the resources to get a lot of benefits. But, if there is no other way, it becomes a lot more difficult to do, and “you are basically layering costs over costs over costs”, which becomes unaffordable. He feels they need to change that and could help relationships by allowing that flexibility, which is critical. He also said dealing with the funding side and maintaining the state revolving fund (SRF) is critical for a lot of smaller utilities that cannot afford to bond and do a

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lot of rate increases. He also said that if they are somehow able to take care of the disadvantaged communities, it can free the utilities. The return on investment for that one dollar invested could be huge. It could be hundreds, if not thousands of dollars because they are taking care of the lower impact subsidy. It is going to free utilities to set the rates based on what they need, which will change the game and the dynamics. He summarized saying addressing low impact disadvantaged communities and allowing for more flexible regulations can really make a change.

General Edmonds said they have also talked about regional projects, not just state and local. He said that is where the Federal government could probably play a better role if it is something that impacts several states in a geographical region. He gave an example of flooding in the south and droughts in the west. He said if they think in terms of not just water companies, but regional problems, given the resources like the US Army Corps of Engineers and those types of entities, they could (for example) distribute water from the Chattahoochee River to Alabama and Georgia. With that type of investment, a single water company does not have to try to get rate increases to solve that problem. Mr. Baylis said that is still being done. Water supply and waste water treatment is at a rate based, local level. In Los Angeles there is the LA Corps of Engineers and the LA River which brings Federal money which also helps the watershed, so there are opportunities for the Federal government such as FEMA. He said in the 1970s when the Clean Water Act was passed, the Federal government did enable funding to update all the wastewater plants. He said it was not even just loans, but grants. However, that has stopped and the local agencies no longer think that is possible. Mr. Krantz said he would like to speak to that topic. Mr. Baylis said the other issue he would like to bring up is the utilities recognize that if they continue to receive capital money but no operating money, they do not want it. General Edmonds said they need help sorting it out because there are so many pieces to it, it is like “chasing a rabbit down a rabbit hole”. He said when they put money towards something they can do, such as Cyber Control systems and mutual assistance to adjacent communities put money towards it. He said he feels that is the real value here. Mr. Baylis agreed.

Mr. Krantz said he would like to give a short history of the Clean Water Act (CWA). Originally, the Federal government in passing the CWA provided about \$61.2 billion to build wastewater treatment plants in the US back in the 1970s. It was the largest single public works program ever, environmentally, in the history of the nation. It was a very important program. Later in about 1987, they decided to move away from the grants program and instead provided loan funding through a metric formula to all the states for low interest loans. Now they are starting to ask whether or not the loan program has seen the end of its useful life and where it should go. He feels the basic picture now is the municipal governments are paying about 97 % of the cost for clean water. The municipal governments are putting in over \$100 billion a year into water and wastewater, compared to a \$3 billion figure from the Federal government. The states are all virtually broke, and perhaps they can bond in a couple of states where they really need it. An example is California, they can bond, but by and large the states do not have resources to do anything. At the local level, the biggest problem in his view is a political one that they need to address. It is what Mr. Hagekhalil discussed, “how can they raise rates when there is an increased wealth gap in virtually every urban and rural area?” It is not just an urban problem, it is also a rural problem. He said if the Federal government continues to view water, whether

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drinking water or wastewater, as significant enough to regulate and legislate over, they should find a way to provide some political cover for municipalities to go about raising the rates that they need. He said there is the capacity to do this on a pilot basis. Representative Fudge from Ohio has a bill about finding 10 communities where some level of funds can be provided to subsidize rate increases at the local level for low-income people, thereby incentivizing state and local funding. He said he would also like to address the notion that somehow “water is out of sight and out of mind”. He does not believe this is correct and could be expressed differently. He said, “We all bathe our children, we all go swimming, we all drink water, we all drink everything, we know more than any other infrastructure out there how important it is.” He said the problem is the importance is linked to a ready abundance. It is not so much that is taken for granted, but because there is so much of it out there and it is so integral to everything done, and therefore it should be cheap because it is so basic and “it falls from the sky in a miraculous way”. However they are now 40 to 50 years out of that initial Federal investment. He said when you invest in a house, the house has a useful life and ultimately they have to go back in. Therefore, he said he would not underemphasize Flint or call it a “Black Swan”. He said he would not be surprised to see more “Flints”. There may be a lot of “finger pointing” as to what the root cause may be and who is at fault and how the lead got into the water. For example, was it lead paint in old houses where the same lead lines exist? It is going to become a growing problem simply because there is a political issue at the local level. He said utilities cannot talk about it the way he can talk about it because they do not want to scare their public communities and make them worry, but it is a major national issue that the NIAC is touching on, which is important and only going to become more obvious in the public eye.

Ms. Lau asked if anybody on the phone had comments on this topic. Dr. Scott said that everything had been covered well, but she had a few points she would like to emphasize. She said in terms of looking for synergies that are already there, there are some recommendations that Mr. Murren made, in terms of looking at leveraging land grant institutions. Next she said she would like to address Flint and said partially it was because of cost, but there was also a major deficit in understanding. There were people in places who were making decisions, who were not bad people, but they did not understand. She said the land grant institutions are there and that is one of their roles, to help confirm public information and knowledge in that decision making process. She said there is also potential for tremendous partnerships in this sector moving forward. She then said in terms of the financial aspect, it is interesting how water is “set in its ways”. She said that resonates with her experience in the Transportation Sector. On the operation side, she has learned how the Water Sector qualifies as a capital expense. She said in transportation they went through some major changes in the late 90s. They broadened the definition on the transit side to be comparable to highways or anything that was labor that actually went into the preservation of the asset became a capital calculation. She said the recommendation in terms of taking a “deeper dive” into the study and looking at what may be tools in the toolkit on the financial end, struck her and spurred her to first ask the question “what really qualifies as a capital expense in the Water Sector?” She said she sometimes assumes that all the sectors do things the same way, though she knows they do not. In addition she said she has been awed by the complexity of the Water Sector and particularly the issue of its abundance. She said when something happens on the water side, it is devastating to overall public confidence

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in government and their ability to deliver. She said she now feels that water is the most critical of the lifeline sectors and therefore it is an honor for her to be a part of the Working Group to become more familiar with the sector. She also said that the workforce is one of her primary areas of focus and that she feels the same way about the Water Sector. She said what makes the sector different is that because it is localized, they face tremendous workforce challenges because the expertise required is so deep. She said they are losing institutional knowledge because of that extremely unique local character with the Water Sector. She said those are her only additional comments. She mentioned that Mr. Baylis and the entire team have done a wonderful job, as well as members of the Study Group and thanked them.

Ms. Lau said she would like to ask Mr. Baylis a clarifying question. She said when Dr. Scott made the statement about financing and when Mr. Baylis said earlier that there is a lot of money available, she wondered whether the money is capital markets money. Mr. Baylis said that was exactly right. Ms. Lau said she was thinking about how that goes back to rates. She said the only reason the capital markets are open for infrastructure is because they can put in cost-based rates, and recover it over time. Mr. Baylis said that was a good clarification and exactly what he meant. He said the private sector is always ready. They have money, and they do not charge that much for it. The challenge for the utilities is if they take the capital money, 1) how will they pay for it other than increasing rates or 2) the debt is going to go out farther. He said smaller agencies can be inebriated with that opportunity. He said if the Federal government could or would address capital and operating and maintenance (O&M) costs, that would be great. He said he thinks the agencies just do not think it is coming. Mr. Krantz confirmed. Ms. Lau told Mr. Krantz she was curious about that because in the Electricity Sector they capitalize labor costs, just like Dr. Scott talked about. She asked whether water did that as well. Mr. Baylis said the operating long-term costs can be bigger than the actual capital costs of the infrastructure. Mr. Hagekhalil said he thinks it is what they can capitalize. For example, if workers are doing repair on a sewer (not just cleaning it, but replacing it or lining it), that is capital. He said if they are cleaning the sewer, that is maintenance and they cannot capitalize on that. There are definitions and guidelines on what they can capitalize on and what they cannot. He said he is currently dealing with green storm-water infrastructure, which is an area they are going into. He said it is not like building a building, it is building a work plan. A work plan is constructed and it has plans. He said when they finish construction, it is not ready to do its job. It takes two-to-three years to become effective. He said he is dealing with a lot of people who look at the finances, accounting, auditing, to learn what qualifies for capital. He said as long as the project is not doing its job and they are still trying to optimize it, that is “capitalize-able”. He said he got the bond council to approve it, however he is being questioned about it. He said it is a challenge for his organization, especially with new infrastructure, because that is the big thing they are doing across the country. It is not the same as constructing a building or a sewer. They are building something that is going to take time to grow and that is a challenge.

Mr. Hagekhalil then referenced Dr. Scott’s comments about people and the workforce and said that it is a big issue. They need to make sure that people are ready to come and are trained. He said they are working with people across the industry to bring new people into the industry and make it attractive. Mr. Krantz said that he did not know all the “ins and outs” of capital versus

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O&M, but the broad national trend that they are finding now is what used to be capital expenditures of the vast majority of utilities budgets, “back in the day” where most stuff was being spent on putting things in the ground, expansion, updating, and upgrading -- now it is the opposite. The last US Conference of Mayors report on this had 60-65% O&M, with capital being much less and much more money going into debt servicing. Utilities are starting to reach their debt ceiling. He said as Mr. Baylis has been talking about, the only way they are able to do more capital is if they go back to the bond market. However he said if they are starting to reach their debt ceilings, they cannot do that. If the rate payer is not ultimately willing to pay the additional rates to pay back that capital, then there is no way. Mr. Baylis said it is not that they would turn down “free money”, but the money has strings attached.

Mr. Parker asked in the study, when they looked at governments and how they procure, most are stuck in a “low bid” situation and wondered if the Working Group found that to be a problem if there were more flexibility in how governments could award contracts, where they can award innovation, is a problem that needs to be addressed. General Edmonds said it was never intended to be that way. He said it is counter-productive to just go with the low price bids. The best value is always about getting the most for your money, rather than spending the least amount of money. He said he thinks the solution will have to come from Congress to give instruction back to the government because there is a contracting officer who “thinks it is the greatest thing in the world, but it is the worst possible way to do procurement.” He said they do not get the best solution or the best product, and they should be able to do that. General Edmonds said he was the head of contracting activity and he trusted his contract officer to give the best value. He said there were thresholds, but if someone offered a superior product for a higher price, they would absolutely consider them. He said the contracting officer supported those types of procurements. He said it is a big problem for Federal procurement. Mr. Hagekhalil said it is a difficult issue and his organization still looks at low-bid. He said they have worked around it many times, putting in a request for proposal rather than a contract bid. He said they are doing a lot more design-build operations, which are more creative. He agrees that they need to reinvent the procurement process. They are trying to be creative and work around it, but they are still a very public agency and have to “put it on the table” and show what it means. Sometimes the lowest bid does not give the lowest price at the end. He said the completion of the project could cost a lot more, and not have the same result. However, he still feels one of the important recommendations of the Study Group is looking at overall costs and there is a value for that. They are doing pre-qualifications now and looking at value added and a lot of ideas to provide alternatives, but construction is still driven by low-bid. However he thinks it is starting to change, especially in innovative areas. He said creative thinking is being done and he agrees they need to do something different.

Mr. Parker then asked a second question regarding consumption. He said when he was a child, there was a big emphasis on not littering. The Federal government came up with anti-littering messages that were everywhere and entered into one’s subconscious. He said now when he looks at highways and roadways, they look so much better than they used to. People used to just toss their trash out of the car window when they were driving without thinking about it. Now that is frowned upon. However, in his own neighborhood he sees people with sprinklers on when it is raining. He said that many people turn on the shower, walk away until it warms up and come

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back a few minutes later. He wonders if that is a big piece of the challenge with water consumption and waste. He said he cannot think of a natural resource that is wasted more. He wondered if innovation such as instant hot water can help prevent that type of waste. However, there is not a lot of education that goes along with it and wondered if that is highlighted in the study. Mr. Hagekhalil said he is not sure if it is in the Study Group report, but they do talk about people's relationship with water. He said in California, the drought has caused a change in the relationship with water. He has seen the impact in LA over the past year. There has been a 20% reduction in water consumption. They are using the same amount today as 40 years ago. He said it a huge shift and they are looking for more things to do such as new regulations for green building codes and making sure water is not wasted. They are also giving incentives for replacing lawns with native plants. Mr. Baylis said there are days where it is illegal to water your lawn in LA. Mr. Hagekhalil said a new business, Turf Terminators, has grown over the past three years from a few people to a \$700 million industry. They go to homes and replace the turf and get the rebate from the city. He said the children understand the problem. He gave an example of his daughter who was watching him trying to repair a water filter that had no pressure and was just dripping. His daughter thought there was no water pressure because of the drought. He said education is a big thing. In June, when the NIAC goes to LA they will see the Environmental Learning Center (ELC). The ELC has a partnership with the LA Unified School District and 20,000 children visited in the last year to learn about the water cycle and what it means to save water. There are special exhibits, for example there is one that shows what happens when a shower is adjusted and the impact it has on water. He said these things are important and they need to increase awareness about the value of water. Mr. Krantz said that a national goal in terms of water conservation and efficiency is using less water. However, the problem becomes twofold: 1) the less you use, the less revenue is coming to the utilities; 2) On the wastewater side, the less water that is being used in homes and businesses, the less dilute the wastewater concentration is which means the more expensive it becomes to treat. In some cases, the less dilution there is, the more likely there is to be a health and welfare-related problem. He said ultimately there is a third problem, where they will have to ask people to pay more to use less, which seems counterintuitive, but it costs the utilities more to have the features for people to use less water. He said they need to find ways to both incentivize the right behavior in a drought area, while expecting even more revenue to come from that appropriate behavior, which is not what the American culture is based on.

General Edmonds said that their interviews with US Army Corps of Engineers (USACE) "went down that same line". They are in the business of building dams and saving water. He said when President Eisenhower signed the bill for the interstate highway system, the two lane highway became nearly extinct except in the back woods. However the new roads are safer and allow for coast to coast travel in a reasonable amount of time. Gas is pumped all the way across the country, but water is not done that way. There are droughts and floods, the big picture is to think about how to start redistributing water to those states that need it. In California, the northern area is flooded, and the southern part has droughts. He suggesting pumping water from one state to another state, but unless there is a major river involved and the USACE get in the middle of it, or if there is a lawsuit, "we do not think about it because it is too big to start, but you have to start the first step". He said this is the case whether it's regional, local, or statewide, they have to start

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somewhere. He said one year from now, people will be talking about the same thing, how to reuse the water they have. He gave an example of Wake Island in the Pacific. There is a lagoon in the middle and when it rains they collect the rainwater and they pump it to get fresh water. He said they have to think outside of the pipes in the ground and the local supply, to pump the water someplace. He suggested starting with a 100 mile pump, rather than a 300 mile pipe. Mr. Baylis said the biggest energy users in California are the pumps owned by The Department of Water Resources (DWR) and the Delta. When they turn them on, instead of going out to San Francisco Bay, water turns around Sherman Island and flows down south. He said they built those systems when energy was cheap and water was plentiful. It was intended for farmers. After wildlife, farmers use 80% of the water in California and consumers 20%. They are growing crops that 20-50 years ago made sense, but today crops, such as almonds, have become a very sensitive topic in California. A lot of farmers are subsidized because energy was cheap and water was plentiful. Now the hardest hit in California are the farmers and farm workers. They are going to drip irrigation, but it is a big challenge because for generations water was plentiful and energy was cheap, so great agriculture was built in California, but now it looks like it is going to change. It is not going to be easy. General Edmonds suggested pumping it out of the city and into the farms. Ms. Lau said that really raises questions of the business model again. She said that California decoupled electric rates and perhaps they will decouple water rates as well.

VI. OPEN DISCUSSION AND PUBLIC COMMENT

Lisa Barr, DFO, NIAC, DHS

Ms. Lau said that the conversation would now move into the next topic on the agenda, which is where the NIAC should focus its efforts going forward to make the biggest contribution to the President and the Federal Government. Ms. Lau acknowledged that Dr. Scott feels they should focus on workforce issues. Ms. Lau said she is not sure if that should be a separate study, but it has been one of the themes that has come up over and over again in many of NIAC's studies. She said one thing they could talk about is whether they take all the issues that have come up multiple times and do a study in that area. She said she knows cybersecurity is another one of those themes that come up often, as well as regionalization. Ms. Lau said they did do a regional resilience study, but now as they have done some of the lifeline sectors, they keep hearing that there needs to be some forum where they can bring the critical infrastructure sectors together. She commented that Mr. Wallace's CEO Engagement Working Group recommended that there be five sectors, the lifelines in addition to financial services, be connected together in a Strategic Infrastructure Executive Council. However, there is lack of clarity of whether or not that recommendation will move. She then asked Dr. Scott for her opinions.

Dr. Scott acknowledged that she often speaks about the workforce issue. She said she knows there has been some initial work done on the workforce and she thinks it is time for them to revisit and see what has occurred since. She said she would also take it a step further and use the foundational piece on this, going back to 2001 where the Government Accountability Office (GAO) identified workforce as being critical because of the lack of doing any real strategic human resource planning across the Federal government. It is one of the highest risk areas. She said there has been some movement, but nowhere near what they think there should be. She said

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every one of the infrastructure sectors they look at, as soon as they go to look at the sector, if they are not someone who works in the sector and they look at the top issues that CEOs have identified as being major challenges facing them, workforce challenges are on the list. She said there seems to be a “hodgepodge” of what they know about what is actually taking place to address the similarities and best practices. She said she also believes in an executive council on workforce issues because it is urgent. She said she knows there are similarities among the sectors and they have the same types of issues in terms of the pipelines and the explosion of new technologies for current employees, which is a whole concept of continuous learning. She said this is not something that is altruistic and she could show for a fact that when looking at the Transportation Sector and the issues of safety and performance, which are the most fundamental, that people issues predominate in terms of causes of accidents, and deterioration of performance. Therefore, she feels it is one of those issues they talk about, but are too often considered more isolated incidents or given the short shrift. It is seen as “one of those things that takes care of itself” and when there is a problem, they do not “run around”, but bring in a more scientific approach to it, which she feels is critical.

Ms. Lau said she thinks they all agree that all of the infrastructure sector reports talked about the importance of the workforce. She said she is trying to look at it from the NIAC perspective of where can the Federal government be particularly helpful in that. She asked Dr. Scott if she had some thoughts about the areas of study that they should look at specifically. Dr. Scott said she thinks this topic is one where the Federal government could be particularly helpful. She said she very seldom sees or hears, except when there is a major forum or initiative where there is a “lightbulb moment”, where the sectors realize that they should be working with partners from the Department of Labor and Department of Education. Therefore, she thinks some type of executive order should be put in place. She does not feel it is an issue of needing more resources, as much as better coordination and knowing what is out there. She said she does not believe it is something that just needs to be approached from “this is the Electric Sector, this is the Transportation Sector, this is the Telecommunications Sector, etc.” She said she absolutely believes, but has never seen what the core competencies across some of these sectors are. She said perhaps they could be talking about moving to an “introduction to infrastructure”, understanding that people will specialize as opposed to saying so much within selective groups and taking that bigger view. She thinks the Federal government can be very helpful in that regard. She said she is not sure if it is a resource issue, as much as it is a silo issue, and once again, particularly in the infrastructure area, “we are so brick, mortar, widgets, wires” that the issue of people is not one that is intrinsically part of the process. She clarified that she is speaking generally and that there are people who are doing great work. She feels they need to identify where those people are so they can be replicated, but typically it has not been part of their “DNA”. She said as fundamental as the issue of asset management, and asset management often becomes an exercise in looking at the “physical side of the house”, with very little in terms of tools to help take a much more scientific approach to looking at the “people readiness capacity”. She said she feels those are things that could be very helpful to bring a national focus to. Ms. Lau thanked Dr. Scott and asked if anyone else had comments on what they think NIAC should focus on going forward.

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Dr. Ernesto Avila, a subject matter expert on the phone said he would like to make a public comment on the Water Sector study. Ms. Barr then formally opened up the meeting for public comment. She said at the conclusion of the public comment session, written comments will still be accepted and provided to NIAC members and posted without alteration to regulations.gov, including any personal information provided. She said public commenters have three minutes to make their comments, pending any direct questions from the Council members. She acknowledged that Mr. Krantz and Mr. Hagekhalil who spoke earlier had registered for public comments. She then asked any individuals who have not registered their public comments to state their name and organization so that it can be documented and they can be called upon. Ms. Lau said they could now take Mr. Avila's comments. Mr. Avila said he is a Principal with Avila and Associates Consulting Engineers. He is also the Program Director for the Multi-State Salinity Coalition, which represents 20 different water agencies working on desalination in the southwestern United States. Mr. Avila said that while listening to the meeting, he heard many incredible and insightful comments. He said it is fantastic to see how well the comments have moved the group forward and how brilliant the Members' insights are. He congratulated Mr. Baylis on putting together an incredible group with great commentary and findings. Mr. Baylis thanked Mr. Avila. Mr. Avila said that Mr. Baylis may have heard some of these comments from the interview, and that he also appreciates the discussion on workforce development. He said in areas where there is aging infrastructure, the three key cost-drivers for utilities are labor, chemicals, and power. He said anything that can facilitate or add efficiency to those three areas provide tremendous opportunity to pass on those cost-savings back to the ratepayers. He said incentive programs could be provided or developed by the facilitator, which would be more efficient and reduce cost to utilities and be very helpful at the Federal level.

Mr. Avila said in terms of areas that have a lot of infrastructure needs because they are still in development, clearly the financing element is a very critical part. They need to make sure they can finance that in some way. The lack of capital in not wanting to reduce rates is always a critical element. He said surcharges and connection fees have always been the best ways to try to facilitate that type of work. He said what he heard at the meeting that he felt was really important is "if you want to encourage mutual facilitation, I think tax incentive programs that provide an incentive vehicle to encourage that goes a long way on what might be helpful long term at the Federal level." He said tax incentives or easier sources of capitalization or bond funding, which is integrated into the overall project, would be a very positive way to open more doors to various water agencies working together towards more regional solutions. He reiterated that he thought that would be very beneficial. He said the other thing he thinks is important, because it is something his organization discovered over fifteen years of legislation sessions at their desalination summit is the following. They have had Senators and Congressmen speak for them many times. He said what they learned is that in the environment that they live in, which is very political, creating a revenue neutral mechanism is very important for getting bilateral support for any tax incentive or financing program that may develop. He feels that any movement moving forward from a financing perspective, that it would be greatly beneficial to have a member of the IRS, or people who can create a more revenue neutral program or add a financial aspect or financial opinion because it would recognize the reason for using money at the Federal level. He said that was the conclusion of his public comments and he thanked the Council for the

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opportunity. He concluded by telling Mr. Baylis to “keep up the great work”. Ms. Lau thanked Mr. Avila and said his comments were very insightful and that the Working Group will take them into account. She then asked if there were any other members of the public who would like to comment on the water study. Hearing none, she said they would continue their discussion on future NIAC topics.

Mr. Baylis asked if the NIAC has looked at how climate change has impacted infrastructure. He said he knows ports around the US are looking at that, such as NY and LA. He said the impact of climate change might be an interesting topic. Ms. Lau said she does not think the NIAC has looked at this topic before. Mr. Baylis said it is probably a sensitive topic. Ms. McDonald said she had two thoughts as winter is ending and hurricane season is nearing. She referenced Mr. Baylis’ earlier comment on Superstorm Sandy and said the long term and short term disruptions of the fuel subsectors was really an electric issue (pumping the fuel at gas stations) and an availability issue (the tankers were lined up in the Port of NY/NJ but because of the impact on the ports and on the land lines, that fuel could not get to the ports and subsequently to the gas stations.). She said New York enacted some legislation requiring service stations to have alternate generators. However, she said she does not know if the supply chain is a national issue compared to electricity issues which are regional in nature. She said they had hosts of issues when it came time to bring oil in. Different standards between PA, NY, NJ, CT, caused issues in getting the fuel in, in addition to the harbor issues. She said her other thought is whether it is time to do a critical evaluation of the Sector Coordinating Councils (SCCs) as an objective way to look at these groups. She said all day they have been talking about clean water. The Clean Water Act has been in existence for a long time, but often time is not taken until they have to respond to something that they ask if the mission is still the right mission. She said for these coordinating councils, “Are they still made up of the right entities, are they missing somebody, are their missions still in line with what they should be doing, etc.?”

Ms. Durkovich said that all of these suggestions have some foundational work that the NIAC could leverage. She said with the regional resilience assessment programs there are at least three that come to mind where the aging workforce has been a finding. She feels it is tied to the notion that infrastructure is taken for granted and has been underinvested in. She said she thinks if there was a national campaign to modernize infrastructure and make it appealing, just like the technology sector, it may be in an area people will look at in terms of professional growth. She said her office has done a lot around climate change and extreme weather. It is a very politically sensitive topic. She said states and localities are looking for Federal leadership on this. They have done a Regional Resiliency Assessment Program, (RRAP) in Maine. They have also done work in Charleston based on their rising sea levels, as well as work in Tampa. She credited Ms. Barr with spearheading the climate change topic. She said part of this is how do they give tools to state and local planners to think about what the world is going to look like 50-60 years from now and how do they help people come together in a climate where a mayor or governor is worried about their short-term legacy. She said there has been a lot of work done around fuel post-Sandy. There have been a number of RRAPs that look at the fuel supply chain or the dependency on fuel, oil, natural gas and cyber. She reiterated that a lot of foundational work has been done in that area. She said all of these topics are important. However, she said relating to

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the SCCs, in the National Infrastructure Protection Plan (NIPP) 2013 rewrite, they took this on. They looked at the SCCs and the Cross-Sector Council. They mandated that the sectors have charters and they needed to be inclusive as opposed to exclusive. She said she thinks some of this depends on what happens with the NIAC proposed Strategic Infrastructure Executive Council (SIEC). She said she thinks there are bigger strategic issues that the NIAC could take on as opposed to looking at the SCCs.

Mr. Carr said this is his first meeting and he is very impressed. He thinks the work is very serious. He said that there is the physical world and the cyber world and that it seemed the NIAC viewed them as one entity. He said he hoped to understand that better. He said in his view, cybersecurity impacts everything. The “internet of things” is taking off big time. The systems that are in the Water Sector today are going to be upgraded to become more dependent on IT. He said “the carpenter always wants to fix things with a hammer because he knows what a hammer is.” Mr. Carr said he has been in Information Technology (IT) his entire life and knows a lot about cybersecurity. He feels it would be interesting to talk about the baseline tools of what is necessary in the advancing world to make sure people are protected. There are tools available that are not being used throughout the country, such as encryption and tokenization, which he feels are instrumental and should be absolutely required to become a part of scanners. He said they are not very costly. He thinks it would be interesting for NIAC to take on the task of what it is they need to do to secure the physical world from cybersecurity attacks. Ms. Lau said she also thinks about dual authentication. Mr. Carr said that is for access, but once the “bad guys” get in, firewalls are not the answer. Once they break through the firewall, there are still ways to protect the data so nothing bad can be done with it. Mr. Noonan said, “History has been littered with the path of bones of the companies that have failed at single sign-on, encrypted, and the old proprietary approaches”. However, today there is the ability to make network and security breaches irrelevant. He said it is not cheap, because the data is not accessible. It is encrypted at rest, it is encrypted in motion and it is encrypted while it is being processed, up to and including searchable utilities against encrypted information. He said he thinks the next decade gives an opportunity to make an enormous leap forward in this area because “we will not stop intrusions, we will not stop our networks from being compromised, but we can stop the impact of the damage caused by dealing with advances in cryptography,” which he feels this country is pioneering, which are being proven, not just file level encryption but data encryption and encryption against structured and unstructured data sets. He said whether the drawing is unstructured, or it is unstructured data in a data base, it is the one area he feels critical infrastructure needs to start getting serious about. He said they have spent the last 20 years building barriers and monitoring capabilities and other things. Now the “death blow” is to make the breaches irrelevant because they cannot get at the data.

Ms. Durkovich said if the NIAC was to go down the cyber route, which she feels is certainly worth a conversation, she thinks they will need to think about what will differentiate what the NIAC does from what the Cybersecurity National Action Plan (CNAP) commission does, what the Homeland Security Advisory Council (HSAC) is doing, etc. She said there are a lot of groups out there. It is certainly the big topic. She said at RSA everyone is talking about industrial cyber and the convergence of information technology (IT) security, operational technology (OT), and

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physical security. It is out there but it has to be a study from the other commissions and councils that are looking at cyber. Mr. Carr said it would focus on the physical world. Mr. Noonan suggested they take something as fundamentally simple as industrial control security systems, which control power, water, transportation, etc. They utilize all types of proprietary protocols over IP. Therefore all the traditionally built internet protocol (IP) security fundamentally does not see those protocols, which is where the exposure is. Yet, in dealing with those sectors, most of the security technology has been deployed against the IP network, such as laptops, iPads, servers, business networks. However on the OT side, where there are industrial control systems, the country has a great amount of progress that can be made in those areas. They have not traditionally been internet accessible, but they are all internet accessible now. They have not traditionally had any type of institutional grade security because no one has understood them. Ms. Durkovich agreed that IT and OT do not talk to each other. She said increasingly they are seeing the convergence of those things. Mr. Noonan said organizationally they do not talk to each other either. He said there is a great rift that occurs, especially in the Energy Sector as to who is responsible for the security of the plant.

General Edmonds said what bothered him more than anything else is when they talk about resilience in the sectors, they cannot stop at just the brick and mortar and the service itself. He said he constantly talks about the control systems. He said in recalling the early days and the problems and studies they had, every time that Amtrak would have a problem, someone would go into the operating system of Amtrak. He agreed with Mr. Noonan that what most companies have focused on is affordability, on the internet, intranet, PCs, PDAs, and other systems. Rather than integration systems, there are backup systems. He said they could do the waste treatment plant control systems. He said those are the concerns that are more important and where the vulnerability is really coming from. He said the NIAC's studies recently recognize the fact that those things exist. He said he thinks there needs to be formal recognition of the concerns.

Mr. Baylis asked whether they had to decide at the meeting. Ms. Lau said they did not have to decide at the meeting and the conversation is going to continue. Ms. Lau asked for it to be put on the agenda for the next QBM and to do a prioritization exercise. Ms. McDonald said that one of the things that was brought up in dealing with infrastructure investment and recovery aspects were some of the contracting and procurement issues. She said she is not sure if it is within NIAC's mission, but wondered if there had been a look at macro-level, post-Katrina, post-Sandy, lessons learned on what were the procurement policies that allowed communities to come back quickly and what are some of the procurement policies that are barriers to communities coming back quickly. She said when they are in the recovery effort, they are dealing with FEMA, USACE, US DOT, DHS, etc. and each have different procurement policies. Some allow quick response, and some take a very long time. She referenced General Edmond's point of "what is the best value" when they are trying to quickly bring these communities back on their feet.

Ms. Lau said this conversation would be continued and said if anyone has any further thoughts, send them to her or Ms. Barr or Ms. Norris. She said she knows Ms. Durkovich has many thoughts on these issues as well. She said she would turn the meeting over to Ms. Durkovich for closing remarks.

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VII. CLOSING REMARKS

Constance H. Lau, NIAC Chair

*Caitlin Durkovich, Assistant Secretary for
Infrastructure Protection, DHS*

Ms. Durkovich thanked Ms. Lau and clarified that they did not intend to come to a resolution on future study topics at this meeting. She said if there were further analysis, they would like DHS to do in terms of studies that are being done by other councils and commissions; she thinks they have a great list of potential topics. She said as always it is wonderful to see all of the Members and participate in the conversations to have an opportunity to comment on the fantastic work. She welcomed Mr. Carr and Mr. Parker and commended them for “jumping right in”. She said she is looking forward to the next meeting in Los Angeles. She feels it will be a very beneficial meeting. She thanked all the Members for making this possible, despite their full time jobs. She said it shows in the reports that they have also made NIAC a full time job. She thanked the Council again.

Ms. Lau thanked Ms. Durkovich for her role in making the Council as successful as it is. Mr. Baylis said he looked forward to seeing everyone in LA. Ms. Durkovich said she was looking forward to it. Ms. Lau said she wanted to commend the Water Resilience Working Group. She said that she had the opportunity, along with Mr. Carr and Mr. Parker, to sit in on their meeting in the morning. She said they are doing an amazing job and it has come together very quickly. She said she thinks they should do a “lessons learned” on this working group in how to move studies as quickly as the Water Working Group is moving. She said she believes much of it is attributed to getting the right people on the Study Group and a tremendous involvement by all. Mr. Baylis thanked Ms. Barr, Ms. Norris, the Secretariat Team and Analytics Team. Ms. Lau again welcomed Mr. Carr and Mr. Parker and said it was great to have Mr. Noonan in attendance as well. She commended Ms. McDonald for jumping right into her first study, as well as people such as Ms. Grayson and Mr. Wallace who have been with NIAC since the start, for about 14 years now. She then thanked those who called in on the phone. She lastly thanked Mr. Baylis for his great leadership.

VIII. ADJOURNMENT

Constance H. Lau, NIAC Chair

Ms. Lau asked if there were any final comments. Hearing none, she adjourned the meeting.