MINUTES
of the
SECOND MEETING
of the
RADIOACTIVE AND HAZARDOUS MATERIALS COMMITTEE

July 12, 2016
Rotunda Room, University of New Mexico Science and Technology Park
801 University Boulevard SE
Albuquerque

The second meeting of the Radioactive and Hazardous Materials Committee (RHMC) was called to order by Representative Cathrynn N. Brown, chair, on Tuesday, July 12, 2016, at 10:03 a.m. in the Rotunda Room at the University of New Mexico (UNM) Science and Technology Park in Albuquerque.

Present
Rep. Cathrynn N. Brown, Chair
Rep. Eliseo Lee Alcon
Sen. Ted Barela
Sen. Carlos R. Cisneros
Rep. Stephanie Garcia Richard
Rep. G. Andrés Romero
Rep. Larry R. Scott
Rep. James G. Townsend

Absent
Sen. Daniel A. Ivey-Soto, Vice Chair
Sen. Gay G. Kernan
Sen. Carroll H. Leavell
Sen. Richard C. Martinez

Advisory Members
Sen. Nancy Rodriguez
Rep. Jim R. Trujillo
Sen. William F. Burt
Rep. David M. Gallegos
Sen. Ron Griggs
Sen. Stuart Ingle
Rep. Rod Montoya
Sen. William H. Payne
Sen. John Pinto
Rep. Nick L. Salazar
Sen. Clemente Sanchez

Staff
Gordon Meeks, Legislative Council Service (LCS)
Monica Ewing, LCS
Renée Gregorio, LCS

Guests
The guest list is in the meeting file.

Handouts

Handouts and other written testimony are in the meeting file.

Tuesday, July 12

The chair recognized UNM Provost Chaouki T. Abdallah and invited him to welcome the committee. He spoke of a groundbreaking for Innovate ABQ that was occurring that day and said he would like to update the RHMC in three topic areas: academic, innovation and economic development. He reported that although enrollment remains a challenge, UNM is focused on student success and is projecting a graduation rate of 60% within the next few years. He highlighted UNM's innovation efforts, which include partnerships among the state, private organizations and the university; and an innovation district in the city that will offer an integrated place to live, work and play, with its mission being to strengthen the economic base. He spoke of an innovation academy that engages UNM students and companies in creative projects and that began with 125 students in its first year and will increase to 200 in the second. The university also recently hosted the U.S. Department of Energy (DOE) regional forum, and he said that regional partnerships among its participants will be announced in September. The DOE will fund collaborations, and UNM's goal is to be at the center for the region.

The chair asked committee members to introduce themselves before they engaged in questions. Then, committee members asked questions, and the following points arose:

- issues with remediation, the impact on graduation rate and a new interactive system that allows for immediate feedback and much better results;
- the role of the national laboratories in Innovate ABQ, which includes connecting to businesses, sharing intellectual property, joint research and education and joint hiring;
- declines in enrollment and issues around attracting quality out-of-state students, extending the territory beyond the member states in the Western Interstate Commission for Higher Education and concerns for the business model at UNM, which would not work well if all students were paying in-state tuition; and
- interest in touring the UNM facility, which contains a small nuclear reactor.

DOE Forum and Nuclear Research at UNM

Ed Blandford, assistant professor in the Department of Nuclear Engineering at UNM, presented the RHMC with highlights of the DOE's Southwest Regional Innovation Forum, which took place on July 5 and featured U.S. Secretary of Energy Ernest Moniz. The forum included broad participation from regional universities and the national laboratories, with a stated goal of exploring clean energy challenges, especially how to address these challenges through public-private partnerships, and with a strong focus on materials technology for clean energy.

Mr. Blandford highlighted the issues covered by four panels, which included hydrogen technology, advancements in photovoltaics, electrical energy storage and advancements in nuclear materials. The key take-away from the panels focused both on challenges and

opportunities, which Mr. Blandford discussed. Challenges include the fact that nuclear materials are unique because the time required to qualify them is often quite long and the cost is high, both of which are key barriers to developing, demonstrating and licensing new materials. Also, advances made in nuclear fuel and materials significantly affect both current and future costs of reactors and technologies. The opportunities that exist, despite these stated barriers, include establishing a research and development program with funding that focuses on cost reduction and reducing the duration of materials development, testing and licensing; making nuclear material science capabilities more widely available to scientific users at a lower cost; establishing stronger integration between nuclear materials and fuels modeling and simulation; and creating solid synergies with other clean energy sectors as related to materials science. Mr. Blandford ended by saying that the panels are developing a report for the DOE that would specify the elements of a regional partnership in materials for clean energy technology research and development. (For an overview of UNM's Department of Nuclear Engineering activities, please refer to the handout, as this was not presented.)

Committee members engaged in questioning, and the following points arose:

- the definition of clean energy, which includes coal, nuclear fuels and traditional renewables;
- potential benefits and challenges of recycling of nuclear fuels;
- the strategic approach with small nuclear reactor technology, which focuses on packaging and size and uses existing materials to reduce capital costs and production time lines;
- encouraging UNM's involvement with the Eddy-Lea Energy Alliance for interim storage;
- the viability of extracting uranium from sea water as a long-term, sustainable option;
- the economics of recycling spent nuclear fuel; and
- the challenges scientists face in effecting change within current political environments.

Gold King Mine Discharge Update

Trais Kliphuis, director, Water Protection Division; Dennis McQuillan, chief scientist; and Diane Agnew, hydrologist, all from New Mexico's Department of Environment (NMED), gave an update on the Gold King Mine spill and its continuing effect on New Mexico. Mr. McQuillan spoke of the continued need to protect water quality and the efforts of the response team appointed by the governor to monitor the effects of the mine waste spill. He described the Animas River watershed as a complex hydrologic system where ground and surface water near the river interact. He reviewed actions taken by the NMED since the spill on August 5, 2015, which involved shutting down drinking water intakes, testing private wells and observing fish and wildlife mortality. Seasonal ground water surveys are being funded by the NMED, with the Bureau of Geology and Mineral Resources at the New Mexico Institute of Mining and Technology accomplishing the work. He added that there is still concern about contaminants reaching private wells.

Mr. McQuillan spoke of several efforts that the NMED led to ensure a regional response, which included installing sondes into the Animas and San Juan rivers to obtain real-time water quality data, developing a spring runoff preparedness plan and sampling river sediment, which prove that heavy contamination exists. He emphasized that many entities, including tribes and local and state authorities, have come together in agreement about ways to proceed, even though the $6 million grant application to the U.S. Environmental Protection Agency (EPA) that would fund long-term monitoring has only been approved for $465,000. Ms. Kliphuis stressed how critical this funding is and how unacceptable the lack of support from the EPA is.

A risk and exposure dashboard has been compiled, Mr. McQuillan said, to communicate levels and areas of risk to the public. He mentioned that many people have been affected by the spill and are not being treated as participants in the process; in many cases, the poor and homeless along the river have been left unprotected, turning this into an environmental justice issue alongside all of the other issues at hand. The dashboard highlights the pathways of exposure to risk, the risk level and an explanation of the current state of each pathway. Several areas fall under a cautionary risk level, such as public drinking water supplies, private domestic wells, river and ditch sediment and recreational activities. One area that is marked as unsafe is river water for domestic supply — untreated river water should never be used for domestic supply, even if contamination is not visible. (See the handout for a more detailed explanation of each risk category, rating and explanation.)

Mr. McQuillan made clear that the EPA and the State of Colorado are not making the needed efforts to keep to a high standard of cleanup of this contamination. A citizens' advisory committee was set up by the NMED in 2015 and meets monthly to determine appropriate corrective action. He added that the NMED originally thought that the EPA would step up to the plate when the spill happened, but this did not occur. He asserted that the responses of both the EPA and the State of Colorado are grossly inadequate and that the EPA has been lying; therefore, what is needed is independent, unbiased monitoring. Mr. McQuillan said that the EPA's own data show that the river water is contaminated, that the Animas River is used for drinking water, both public and private, and that water systems have to comply with the EPA's standards. Although the EPA has asserted that the metals in the surface water and sediment have returned to pre-event conditions, the Animas and San Juan watersheds contain over one million pounds of metals that were not present before the spill. Even the EPA's monitoring data, although sometimes misleading, show that the level of metals has not returned to pre-spill status. Also, the EPA has set a screening level for lead in soil post-spill that exceeds many other levels set across the country by the EPA; for example, the recreational exposure level is set at 20,000 parts per million. Mr. McQuillan insisted that the NMED will not allow children to be exposed to more than 500 parts per million of lead in soil in their yards. He added that these recreational standards are not appropriate for people who live on a river daily. He also spoke of the contamination of the irrigation ditches that cannot be shut down by the NMED, that farmers continue to irrigate with this water and that there is evidence of chlorosis in the water, making it impossible for crops to be safe for consumption.

Mr. McQuillan stated that the NMED has initiated litigation against the EPA and the State of Colorado due to all of these complaints. He said that these are delineated on the NMED's website.

The Bonita Peak Mining District has been proposed by the EPA for Superfund status, Mr. McQuillan indicated, and the NMED supports this listing. He then spoke of the comments that the NMED submitted to the EPA, with a list of demands to be met that includes full funding to the states and tribes to do independent monitoring without EPA interference; involving downstream stakeholders in the Superfund process; using good science; and communicating clearly, truthfully and in a timely fashion.

Ms. Agnew discussed the NMED's long-term monitoring plan, stating the importance of understanding the movement of contaminants into New Mexico. She said that even without any mining being done in this area, there is a natural occurrence of metals in the watershed. It is necessary to differentiate contamination from the spill and legacy contamination. With concern for spring runoff and the potential for releasing sediment into New Mexico, the NMED has tracked runoff daily, she added. In addition, there is ongoing monitoring for turbidity, pH and temperature. Heavy metal concentrations are measured as well through this sampling. Ms. Agnew remarked that Farmington has been proactive in monitoring its intake to ensure that no water is delivered with a high concentration of lead.

Ms. Agnew spoke of the relationship between ground water levels and the quality of water in the wells, saying that Aztec found a band of mineralized sediment where 2,400 parts per million of lead was found. The "running hypothesis" on what causes this, she added, is that this happens as the river loses its reach and the ground water moves out to the aquifer. Mapping the mineral area to determine how extensive the reach is and its age is the work that remains to be done. The NMED also wants to map out where, and what kind of, sediment is all along the Animas River, which can be accomplished with hand-held analyzers. UNM can then characterize what minerals are present in the sediment. Ms. Agnew said that jarosite is a characteristic metal at the Gold King Mine, which is not stable at a high pH, and as it moves downstream to New Mexico, it will become unstable and dissolve, releasing all of its heavy metals, which are lead, zinc and aluminum, into the water. In ending, Ms. Agnew reiterated that there is no evidence of unusual livestock or wildlife mortality.

Committee members asked the panel questions, and the following points were discussed:

- Utah's intent to sue the EPA;
- the EPA's negligence in not initially scheduling a Superfund meeting in New Mexico;
- a treatment facility at the Gold King Mine site;
- the impact of multiple mine sites on the Animas River and the potential for similar events occurring from legacy contamination in the future;
- Colorado's negligence over time, not just in the case of the Gold King Mine spill;
- the readiness of experts in Socorro to study other mines;

- when the sediment formed at the Aztec drinking water diversion channel;
- the availability of the data from sampling on the NMED's website;
- the EPA's questioning of unallocated federal funds to New Mexico, which has already been allocated for drinking water programs;
- the availability of historical data prior to the spill;
- Utah's monitoring of heavy metals from the San Juan River into Lake Powell, whose levels have significantly increased;
- emergency orders mandating Morningstar's water system to connect to Farmington's by July 15;
- what causes the yellow in the photographs of the river;
- the status of the mining companies that have been sued and that are still corporate entities, even though mining operations have ceased; and
- an estimate of two dozen mines out of hundreds to be monitored through the Superfund investigation.

Committee members next discussed a letter written a year ago to the EPA expressing concern about it not holding to high standards in its responses to the Gold King Mine spill. No response was received, the chair noted. Ms. Kliphuis stated that legislative support is crucial to the NMED, whether the EPA responds or not. A motion was made that the RHMC submit another letter to the EPA, noting that an inquiry was made a year ago and not answered and expressing continued concern over its mishandling of cleanup efforts related to the spill. The motion was seconded and approved.

Approval of Minutes

On a motion and a second, the minutes of the June 1 meeting were also approved.

Kirtland Air Force Base (KAFB) Bulk Fuel Spill Status

Kathryn Roberts, director, Resource Protection Division, NMED, introduced a panel, composed of the following individuals, to present a status update on the bulk fuel spill at KAFB: Mr. McQuillan; Ms. Roberts; Adria Bodour, technical project lead, Air Force Civil Engineer Center, United States Air Force (USAF); Kate Lynnes, USAF; Mary Lou Leonard, director, Environmental Health Department, City of Albuquerque; and Maggie Hart Stebbins, county commissioner, Bernalillo County, and chair, Albuquerque-Bernalillo County Water Utility Authority (WUA) Board.

In addressing the RHMC, Mr. McQuillan stressed the importance of partnership in solving the issues surrounding the fuel leak, with a special nod to the support received from Albuquerque's neighborhood associations. He discussed regulatory background as related to responsibility for dealing with such issues and cited both the federal Safe Drinking Water Act of 1974 (SDWA) program and the federal Resource Conservation and Recovery Act of 1976 (RCRA) program, both of which the NMED administers. It is imperative that public water systems deliver water to consumers that meets the standards under the SDWA, and KAFB must also comply with the RCRA hazardous waste permit. KAFB submits work plans to the NMED,

which it then approves (or not). He reminded the RHMC that the NMED is the regulator and KAFB is the permittee. Mr. McQuillan reviewed the goals of the strategic plan, which include a monitoring and wellhead protection program; characterizing and remediating light nonaqueous phase liquid; collapsing the ethylene dibromide (EDB) plume; and providing the opportunity for public comment throughout the process.

Mr. McQuillan reviewed a model of the site that shows that the water table has been dropping because of ground water depletion. He explained that a leak at the pipeline had migrated to the east because of the permeability of the layers of soil. Monitoring wells were installed to track and document the contamination. The supply of drinking water is being protected, he added, through monthly testing and monitoring and the establishment of well nests between the contaminated and drinking water wells that provide early warning of any migration of the plume. No drinking water wells show any sign of containing contaminants, he said. Also, sentinel wells are tested quarterly.

He reviewed the RCRA's time line from 2015 through 2017 and added that the USAF is about to submit a report that summarizes all of the data thus far, which is a required element of the hazardous waste permit. Public input is part of the process, followed by corrective measures, and interim corrective measures have been accomplished over the past 15 years, he pointed out.

Mr. McQuillan reported that since last year, when the first extraction well was installed, two more wells have been installed and are operating. Also, since last year, the USAF has installed a full-scale ground water treatment system. In addition, a pilot test is under way to inject treated water back into the aquifer. There is now a "cone of depression" in the extraction zone, which is great news and the first milestone in the process of collapsing this plume, he said.

In discussing the anatomy of the fuel plume, Mr. McQuillan said that the composition of the plume is different depending on where one is in the plume, and different technologies are required to assess this. He added that in the source area, the bacteria have been respirating and the EDB is getting destroyed. Beyond the source area, the downgradient portion shows evidence of hydrolysis through stable isotope testing and data. This shows that EDB has been degrading chemically through hydrolysis. He said that the fact that EDB is subject to chemical degradation is good news in that there is a natural degeneration of EDB occurring.

He said that three extraction wells were drilled last year and that the success of collapsing the plume is going to be measured in terms of how the water table is depressed. The water is pumped out, put into the pipeline and taken into a massive ground water system, the largest and most robust ground water system in the state, he stated. The "cone of depression" that occurred from the first three wells shows that the ground water contaminated with EDB has been removed. Mr. McQuillian indicated that this water would be considered potable anywhere else and is now being used for golf course irrigation.

Mr. McQuillan explained that potential risk occurs when a human or ecological receptor is exposed to contamination and that at KAFB, there are no such exposure pathways. There are contaminants in the ground water and in the soil, but not in the exposure pathway that leads to humans, he added. He then reviewed the risk levels (none) for drinking water, surface soil and water, vapor intrusion, gardens and recreational activities, all of which are considered safe. He added that there are more than 500 wells in the area, with four years of really good data, and that some of these wells have never shown the presence of any contamination.

Ms. Bodour discussed the technologies being used for soil vapor extraction and gave details of what has been extracted to date. Over 12 years, 750 gallons of fuel contaminants have been removed. She explained that there was a need to evaluate the effectiveness of a system that had been operating for so long, so it was decided to turn off the system, collect and analyze data and monitor the rebounding of hydrocarbon and in-situ respiration. Then, vapor trends could be evaluated and new technologies identified, such as bioventing.

Ms. Bodour gave details of what occurred during the shutdown when data were collected and analyzed and looked at over time. She gave specifics on how degradation occurs. She then spoke of bioventing, which she described as the opposite of the soil vapor process because bioventing involves air injection. Bacteria is enhanced by the injection of oxygen so that the bacteria can do its job, she explained, and when fuel hydrocarbons are degraded, EDB is metabolized. She then talked about the anaerobic degradation process. A work plan on this process will be submitted in July to the NMED, she said.

She described the three phases of the implementation of the pilot testing in detail, which involves baseline testing, biostimulation and bioagumentation. She indicated that the strategic plan for 2016 is even more ambitious than the previous year's and includes pilot testing work, a fourth extraction well, aquifer testing, data gap monitoring wells, ground water treatment system expansion and meetings of the technical working group.

Ms. Leonard gave her perspective on the progress being made at KAFB, which she attributes largely to both the NMED and the USAF providing the best personnel to take the lead on cleanup efforts. She said, "When heads of agencies are bold enough to give the best to a troubled project, that makes the game change". She applauded the efforts of Secretary of Environment Ryan C. Flynn, the USAF, the water utility authorities, the federal government and the state legislature in getting behind this project in daring ways so that great technical progress could be made.

Commissioner Hart Stebbins spoke next with her WUA hat on, saying that the authority is serious about its response to protect the water supply. The WUA wants to make sure it and the public understand how the fuel spill happened, the extent of the contamination and how to prevent it from reaching the water supply. She added that the WUA has conducted water sampling for EDB, aviation gas and jet fuel constituents, and it has not found any contaminants related to the jet fuel spill. Actions that the WUA took included installing an early warning

system if contamination reaches water and hiring its own remediation expert to ensure an independent review. She said that the WUA realizes that the people in the community are justifiably concerned and that the WUA continues to monitor and support cleanup efforts. She concluded by stating that the WUA has seen tremendous progress, with a good flow of information, community engagement and transparency between the USAF and the NMED.

Ms. Lynnes said that Congresswoman Michelle Lujan Grisham wanted her to be involved in the KAFB fuel spill remediation, and Ms. Lynnes came on board last September. She said that her involvement is evidence of the USAF's commitment to this community, and she spoke of how visible this project is to the USAF and how committed it is to continued work and funding.

Committee members asked several questions of the panel, and the following points arose:

- how difficult it is to determine the size of the leak;
- that the USAF owns the water rights and also pays for cleanup, contract and core oversight costs;
- the NMED's three-year memorandum with the USAF that reimburses it at $250,000 per year, which covers its costs;
- costs absorbed by the WUA's ratepayers;
- issues around private water systems that are still subject to federal law;
- EDB's danger as a carcinogen;
- the thickness of the plume and how long it will take to collapse;
- the array of public meetings to address community concerns;
- the excavation of the most heavily contaminated soil; and
- praise for this "all-star team" and the potential for this cleanup to be written up and turned into a motion picture.

Adjournment

There being no further business, the committee adjourned at 3:08 p.m.