

FINAL MEETING SUMMARY

Community Environmental Working Group

“Striving for Continuous Environmental Improvements at Intel”

Date: June 19, 2019
Time: 5:15–7:00 p.m.
Location: Corrales Senior Center

Members Attending

John Bartlit, NM Citizens for Clean Air & Water
Mike Williams, NM Citizens for Clean Air & Water

Hugh Church, American Lung Association in New Mexico
Dennis O’Mara, Corrales resident, Corrales Residents for Clean Air and Water

Non-Members Attending

Alexander Lowry, Intel
Erika Edgerly, Intel, Corrales resident

Dr. Louis Scuderi, University of New Mexico
Carolyn O’Mara, Corrales resident

Jessie Lawrence, Facilitator

CJ Ondek, Recorder

HANDOUTS

- CEWG Draft Agenda
- May 15 Draft Meeting Summary
- June EHS Activity Report
- Action-Item Progress Report

PROPOSED AGENDA

- Welcome, Introductions, and Brief Items
- Standing Agenda Items
- Louis Scuderi
- UNM Cancer Study
- Intel NMED Emissions Permit Presentation
- Action Item Progress Report
- Adjourn

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WELCOME, INTRODUCTIONS, ANNOUNCEMENTS, BRIEF ITEMS

John Bartlit opened the meeting by stating the CEWG mission, which was to make environmental improvements at Intel, reduce chemical emissions at Intel, and improve community dialogue. Introductions were made.

Agenda—Revisions and Approval

No comments.

Meeting Summary—Revisions and Approval

No comments.

Other Announcements

Dennis O'Mara informed about an article in *The Guardian* that discussed data from a review by the Forum of International Respiratory Societies' Environmental Committee on the damaging effects of air pollution on the human body (article link:

<https://www.theguardian.com/environment/ng-interactive/2019/may/17/air-pollution-may-be-damaging-every-organ-and-cell-in-the-body-finds-global-review>). The data suggested that air

pollution impacted every cell and organ in the body and was harmful acutely and chronically.

Mr. O'Mara said these data enforced his concern that no one fully understood the potential harm of air pollution to the body, even when the concentrations of pollutants are very small. The obvious response, he said, was to minimize emissions at all costs.

Public Comment

Dennis O'Mara said that he recently read an obituary in the *Corrales Comment* where the family requested memorial donations be made to the national ALS office. He learned through Jeff Radford that the deceased person lived about two miles directly north of Intel. Also, he said he had finally read NM Senate Bill 185 to establish a neurological disorder monitoring program at the New Mexico Department of Health. The bill was to appropriate \$100,000 to start the program in 2020 but did not discuss which neurological disorders would be monitored. The bill was postponed indefinitely.

STANDING AGENDA ITEMS

EHS Report

- Alex Lowry provided Intel's EHS report. He said Intel had crane work happening onsite, and noted a wastewater permit renewal application and two required reports—the monthly Ammonia Discharge report and the semi-annual Wastewater Analytical report. Also the annual VOC and HAP test protocol was submitted in advance of required testing. He said Intel received several calls on stormwater management from neighbors in Zones 2 and 3. Erika Edgerly added that she said she would share finalized minutes from a meeting about the issue with the CEWG.

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ACTION ITEM: Erika Edgerly would share finalized meeting minutes with the CEWG.

- Alex Lowry said Intel received a call from a neighbor in Zone 2 on Sunday morning about smelling a coffee odor. This complaint was not on this month's EHS report but would be on the July report. He said Sarah Chavez would be reaching out to this person upon her return to New Mexico from vacation.

Regulatory Engineering

Alex Lowry updated attendees on the upcoming NMSU competition. August was the deadline to submit concepts. In addition to drones, other potential ideas were robotic monitoring for leaks and vapors for emergency purposes.

LEPC Update

Dennis O'Mara said an LEPC meeting was scheduled for July. He said he never got minutes from the last meeting, which he was not able to attend due to a scheduling conflict, so he didn't know the date of the July meeting. He promised to inform Jessie Lawrence as soon as he knew the date. Jessie Lawrence said she would add it to the July agenda.

DR. LOUIS SCUDERI

Dr. Louis Scuderi, Professor of Geology, Department of Earth and Planetary Sciences at the University of New Mexico (UNM), gave a presentation called "Assessing Vegetation Change in the Vicinity of the Rio Rancho Intel Plant."

- Dr. Scuderi gave an overview on his background. He said he earned his PhD from UCLA and was a professor at the University of New Mexico (UNM) since 1994. He explained that his research had focused on using remote sensing tools in the environmental sciences, and he had over 40 years of experience in remote sensing and image processing using aerial platforms and satellite imagery, including in private industry where he operated a laboratory at Hughes Aircraft devoted to development of image processing tools for many different applications. In 2003 he established the Center for Rapid Environmental Assessment and Terrain Evaluation (CREATE) at UNM with funding from NASA. CREATE used satellite data to monitor environmental conditions, and change in those conditions, worldwide. CREATE operated a 4.5-meter antenna sitting on the roof of a building that grabbed satellite data across a broad area from southern Canada across the US and Hawaii and down to Panama. He was also part of a global network that allowed him to gather data on vegetation around the world. From analyzing this data he was able to see that the six major desert areas (in Australia, South America, South Africa, etc.) around the world were simultaneously experiencing extreme plant die off. He also worked on remote sensing of the Martian surface from orbit as a collaborator with the Mars Science Laboratory, Curiosity Rover project. At UNM he also taught classes in Geographic

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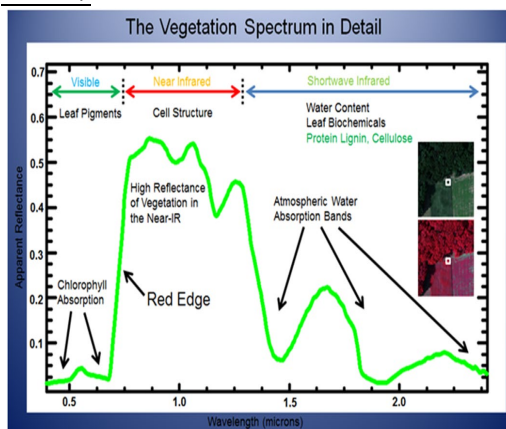
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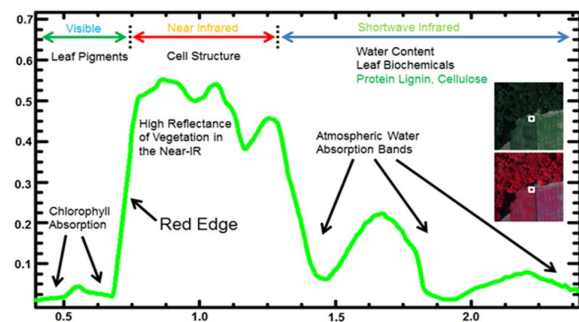
Information Systems (GIS) and Image Processing as well as contributing to the department's Environmental Science curriculum. Dr. Scuderi said his current research was focused on vegetation change and monitoring the impacts of climate change on different plant communities with a primary focus on desert and alpine ecosystems.

- Dr. Scuderi said he was at the CEWG meeting to present ideas on how to use changes in vegetation to assess whether there were any cumulative impacts of emissions from the Intel facility over the past few decades. He said that in his research he had heard that Intel's monitoring data were partial, or in many cases missing completely. He referred to local vegetation as "monitors" that were in place from before the Intel facility was constructed. He said the primary tool used to assess vegetation health/change is termed the Normalized Vegetation Difference Index (NDVI), which can be calculated using available satellite imagery. This multispectral satellite imagery provided the means to assess vegetation health going back to the 1970s.
- Dr. Scuderi next explained how NDVI worked and what it showed. He said when sunlight strikes objects, certain wavelengths were absorbed and other wavelengths were reflected. The pigment in plant leaves, chlorophyll, strongly absorbed visible light (0.4 to 0.7 μm) for use in photosynthesis. The cell structure of the leaves, on the other hand, strongly reflected near-infrared light (0.7 to 1.1 μm). The more leaves a plant had, the healthier a plant was, the more these wavelengths of light were affected, respectively; the ratio was high showing high NDVI values. Damaged leaves showed low NDVI values. He referred to graphs on slides 7 and 8, seen below, to depict the process.

Slide 7:



Slide 8:



$$\text{NDVI} = \frac{(\text{NIR} - \text{Red})}{(\text{NIR} + \text{Red})}$$

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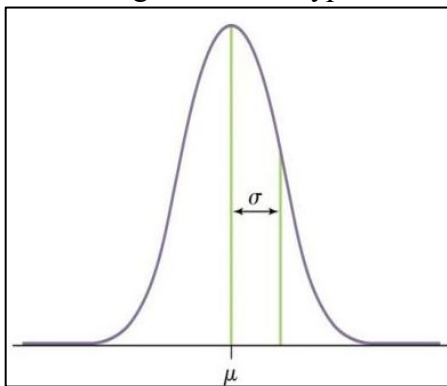
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Difference of red and infrared radiances divided by their sum

- Dr. Scuderi depicted the area he wanted to study on Slide 9. It went from Albuquerque in the south up to the Jicarilla Apache Reservation in the north and part of the Navajo Nation to the west. He said he would look at the range of vegetation to see if they were changing in a regular way, which would denote a trend. For example, he would be able to see die-off from drought.
- Dr. Scuderi said Slide 16 showed the growth season in June by individual year 2000 on a graph. The LANDSAT satellites had been continuously observing the area since 1972 and provided spectral data in the visible, near infrared and thermal infrared. For the year 2000 alone there were nearly 100 cloud free scenes of the study area from which NDVI could be calculated, and there were over 1800 cloud-free scenes available for the Corrales/Rio Rancho area since 1980. He said this averaged more than one image every 10 days. Recent satellite platforms like Sentinel (2017-present) produced one image every three days that were publically available. Slide 17 showed NDVI health signals over the study area, with green connoting positive, yellow neutral, and red negative. Dr. Scuderi said that he could remove effects such as long-term change to show difference in vegetation from year to year, which he showed in an image on Slide 18.
- In Slide 19, Dr. Scuderi discussed his hypothesis and testing. He said he would take into account species differences, regional trends due to drought, and land use change, and would look at natural vegetation not disrupted by human activity. In his testing approach, he said he would calculate NDVI values for all pixels; remove background regional trends from all pixels; remove pixels, which showed evidence of land use change; and determine if remaining pixels show change over time and account for statistical distribution of this change. The null hypothesis: No significant vegetation change over time.



Expected

- Dr. Scuderi said if the change was normally distributed around a mean of 0 (which signified no change) with most values close to the mean (highly peaked distribution with minimal tails—high kurtosis) then he would accept the null hypothesis.

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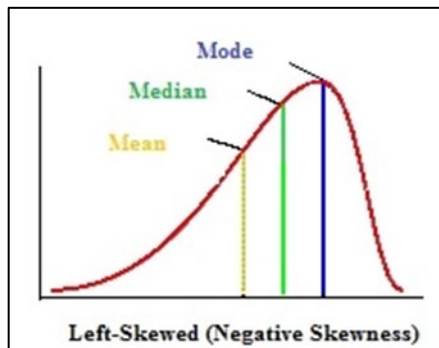
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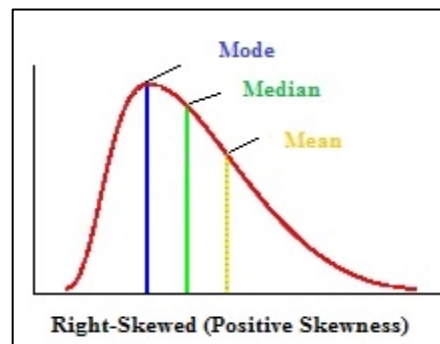
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- Dr. Scuderi said if the distribution was strongly skewed low for NDVI values or bimodal, as shown in the graphs on Slide 20 (see below), then he would reject the null hypothesis, generate alternative hypotheses, isolate pixels that displayed abnormal behavior, analyze these pixels for temporal and spatial distributions, and test the alternative hypotheses.

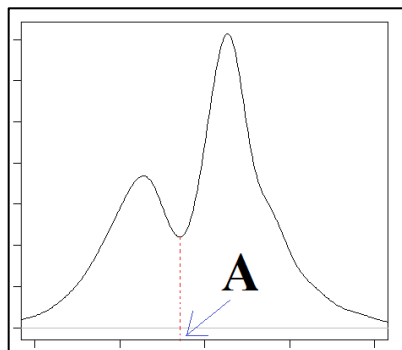
Slide 20: Alternative distributions



Poor Growth



Excellent Growth



Multiple Populations

- Dr. Scuderi outlined the tasks involved in his research. He said he completed the background geographic information system (GIS) layers for Southern Sandoval and Northern Bernalillo counties, including roads and vegetation maps. He was working to compile imagery. He had to download the 1800 scenes and already completed 150 downloads. This task was tedious and time consuming. For each image downloaded he would calculate NDVI, calculate regional trends and subtract from the NDVI images, calculate differences between consecutive images, and determine whether any pixels in the study area exhibit anomalous change to test null hypothesis. If the null hypothesis were rejected then he would analyze any spatial and temporal patterns of change. Last he would

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write a report on his findings, and he would share that report with the CEWG. In terms of a timetable, he estimated the project would take about a year to complete. He said that putting the data set together for this kind of project was time consuming. He had to organize the data in a way that was repeatable. The study was ambitious and would take time but he might be able to recruit students to help compile data. He said he was interested in the problem and had the skill set to investigate it.

- Mike Williams asked if he would be able to look at the roads and nearby vegetation, since there might be things to remove. Dr. Scuderi said he could do this, and what he presented was a basic outline. Lots of other pieces would fall into place as he looked into the data, including climate change. He would start with millions of pixel and most likely eliminate about two-thirds of them and only look at the remaining areas.
- Alex Lowry asked how urban activity was weighted around the Intel facility, which had a lot more activity, versus more rural areas such as Jemez. Dr. Scuderi said that was one of the reasons why he built buffer layers. He would create a buffer of a certain distance around the Intel facility. He said that to do a study that focused on the area around Intel he needed to see the regional picture and trends. Something that affected vegetation across the entire region could not be blamed on Intel. He would establish trends for the buffer area as well as trends for the region.
- Erika Edgerly asked if he could take into account “when.” Dr. Scuderi said yes, he could. He said he had read about the heavy chemicals that flowed down drainage lines. So he could calculate drainage patterns and look at these areas especially intently to see if there were any changes in vegetation. He could also take into account prevailing winds and build a buffer accordingly. Also he could account for elevation levels. Dr. Scuderi said he could look at it in many different ways. This was an exploratory study, he cautioned, and he did not have any preconceived notions as to what the study might result in. He had to see definitive proof before he took the next step to investigate what was happening.
- John Bartlit said the CEWG had conducted some studies around airflow patterns that might be helpful. Dr. Scuderi said he could take those results and produce a layer over them and look for changes within those airflow patterns. He said he would be looking at cumulative exposure and was confident he could see changes in both long-term and short-term events.
- John Bartlit asked how Dr. Scuderi felt about interacting with the CEWG. Dr. Scuderi said he felt strongly about it and wouldn’t be at the meeting if he didn’t. His proposed research was the type of research that really interested him, and he brought a different perspective to the issues that the CEWG looked at. Mr. Bartlit suggested he read through the CEWG’s crystalline silica study to get an idea of how the CEWG worked.

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- John Bartlit asked how the CEWG could participate in the research process. Dr. Scuderi said he was not beholden to anyone; he was just doing it as a scientist using methodology to see what he could find. Mr. Bartlit said that was similar to what the CEWG was trying to do. Mike Williams said he was curious about the effects of hydrogen flouride on the east slope and the point of emissions. Dr. Scuderi said he could layer the data in many different ways to look at plumes, stack heights timing, etc.
- Dennis O'Mara said it might be useful to recollect the range of activities at Intel to share with Dr. Scuderi. John Bartlit said a couple came to mind, such as stack heights, changes in herbicide usage at Intel, vegetation change to save water, air dispersion modeling, etc. Dr. Scuderi said any information on timing or location, using maps or point information, would be useful for him to create layers. Mike Williams asked about getting information from Intel on changes in scrubbers etc. Alex Lowry said they should be able to provide that information.
- Jessie Lawrence asked if there was a deadline to get him this information. Dr. Scuderi said he did not want to create bias so would prefer to create the database and files first. If he found something, then he would like to add additional layers. He said downloading data took several months, and he would not be ready to look at anything else until the year's end. He expected the study to be completed in one year.
- John Bartlit asked about the best way to interact with Dr. Scuderi. Dennis O'Mara offered to be the liaison and provide updates. Dr. Scuderi agreed that was a good idea. He also reiterated that the best way for the CEWG to help was to collect information on when and where things happened. Location was important. He also added that he did not know if he would find anything but it would be interesting to see what the data showed.

ACTION ITEM: The CEWG will discuss how they would like to move forward with supporting Dr. Scuderi on his research project.

UNM CANCER STUDY

Jessie Lawrence gave an update on UNM cancer study. Chuck Wiggins had informed her that Dr. Landen had some revisions, and the study report might not be ready until August. She said she would continue to keep in touch with Dr. Wiggins on progress.

INTEL NMED EMISSIONS PERMIT PRESENTATION

Alex Lowry presented next on Intel's NMED emissions permit, picking up from the previous month. Sarah Chavez had already presented on the first half of the permit up to page A15. Mr. Lowry reminded that the permit followed a tabular format set by NMED. He said now they were moving into the semi-conductor portion of the permit, which he described as being more "meaty."

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- Alex Lowry discussed boilers (A800 Boilers) as covered on page A15 in the permit (Slide 5). Mr. Lowry went through the boiler requirements as listed in the permit. The first requirement was that Intel needed to comply with emission limits for boilers. Monitoring, recordkeeping, and reporting were associated with this requirement. Technicians conducted boiler inspections monthly; data collected during inspections had to be retained onsite at Intel. The second requirement was that boilers were required to comply with opacity limits (federal rule 40 CFR 60, Subpart Dc, which said if firing fuel or diesel there was an obligation that opacity was below 20%; natural gas burned clean). Monitoring, recordkeeping, and reporting were associated with this requirement. A certified third party independent contractor paid by Intel measured opacity and used diesel fuel during testing to check opacity. Mr. Lowry said the method used to test opacity was observation/naked eye through a certified technician. Intel reported the opacity observations annually to NMED. Requirement three was for Intel to comply with boiler emission limits (similar to the first requirement). When the boilers were first acquired Intel was required to test and for CO and NOx and report the results to NMED. Requirement four stipulated that natural gas must be used with boilers, but it was permitted to use diesel during emergencies and testing. Monitoring, recordkeeping, and reporting were associated with this requirement. Intel recorded the annual hours of operation on diesel and retained records onsite.
- Alex Lowry moved on to discuss A803 Ammonia Treatment Systems (page A19) and A804 BSSW Treatment System (page A19), the latter of which was not onsite at Intel. He said he was skipping sections A801 and A802, regarding thermal oxidizers and scrubbers, for Sarah Chavez to present and discuss when there was more time. For the Ammonia Treatment Systems, the permit required that Intel comply with emission limits. The monitoring, recordkeeping, and reporting associated with this requirement were to operate them according to standard operating procedures as provided by the manufacturer and maintain performed maintenance and/or repair records onsite. Requirements for the BSSW Treatment System were identical to that of the Ammonia Treatment System.
- Alex Lowry next talked about A805 Cooling Towers (page A19). The permit required that Intel comply with emission limits. The monitoring, recordkeeping, and reporting associated with this requirement were to record monthly and annual conductivity/TDS on a 12-month rolling basis and retain records onsite.

REVIEW ACTION ITEM PROGRESS REPORT

Jessie Lawrence said Sarah Chavez had several items pending, to be discussed more at the next meeting.

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ADJOURN

NEXT MEETING: July 17, 2019, 5:15 pm to 7:00 pm, Corrales Senior Center.

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