



**From:** Maestas, Ricardo, NMENV  
**Sent:** Friday, June 26, 2015 8:32 AM  
**To:** Allen, Pam, NMENV  
**Subject:** FW: Exhaust Stion

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**From:** George Basabilvazo [mailto:george.basabilvazo@cbfo.doe.gov]  
**Sent:** Friday, October 10, 2014 3:44 PM  
**To:** Skibitski, Thomas, NMENV; George Basabilvazo - WIPPNet; LucasKamat, Susan, NMENV  
**Cc:** Kliphuis, Trais, NMENV; Blaine, Tom, NMENV; Maestas, Ricardo, NMENV; Kieling, John, NMENV  
**Subject:** RE: Exhaust Stion

Tom,

Based on my experience and the radiological data (decay of the energy level on the filters) I believe Wednesdays and today's readings are related directly to atmospheric radon and can be attributed to changes in the meteorological parameters at and around WIPP, such as the cooler nights (diurnal temperature changes), humid mornings and a weather cold front coming into our area and changing barometric pressure. Not sure if you recall but after the February 2014 events, we placed portable CAMs around the Salt Shaft and Air Intake shaft and we would periodically get CAM alarms and we responded as if they were from TRU isotopes but we quickly deduced that those alarms were radon.

In the fall and spring the cool air (because it is heavier) sinks into the underground and as the air warms up in the morning (warm air is lighter) it flows up the shafts resulting in what we call up casting and that is what we have been experiencing the past couple of weeks (typical for the fall and spring). When I was the Director of Site Operations at the WIPP site from 2004-2008, in the fall and spring (diurnal temperature variations and meteorological variable affecting radon air concentrations) I recall experiencing this phenomena and our CAMs would alarm in the mornings and we would respond by procedure to the alarms but after evaluation of the energy levels and quick decay rate we identified that it was radon.

Below are a couple of links that you may want to peruse on the internet. The bottom line from the literature and 1990 studies at WIPP is that there is very little increase of radon concentrations in the WIPP underground as the air moves from the surface into the underground. The radon monitoring results and radioisotopic analyses of salt samples at the WIPP both support that the salt formation of the WIPP repository is not likely to contribute additional radon than what is brought in from the surface air.

[https://inis.iaea.org/search/search.aspx?orig\\_q=RN:22086158](https://inis.iaea.org/search/search.aspx?orig_q=RN:22086158) article by Pendlebury, L.S et. al I believe he used the results from his master thesis study at WIPP to write this article

[https://www.aarst.org/proceedings/1988/1988\\_54\\_Weather\\_Factors\\_Affecting\\_Soil-Gas\\_Radon\\_Concentrations\\_at\\_a\\_Single\\_Site\\_in\\_the\\_Semiarid\\_Western\\_US.pdf](https://www.aarst.org/proceedings/1988/1988_54_Weather_Factors_Affecting_Soil-Gas_Radon_Concentrations_at_a_Single_Site_in_the_Semiarid_Western_US.pdf)

The abstract for the link above is included below:

R.R. Schumann, **D. E.** Owen, and S. Asher-Bolinder  
**U. S.** Geological Survey  
P.O. Box 25046, MS 939, DFC  
Denver, Colorado 80225-0046



## ABSTRACT

Concentrations of radon-222 in soil **gas**, measured at a long-term radon monitoring site on the Denver Federal Center (**DFQ**, Colorado, vary by **as** much as an order of magnitude in response to short- and long-term **weather** variations. The primary weather factors influencing soil-gas radon concentrations are precipitation and barometric pressure, with lesser effects attributed to temperature and, possibly, **wind**. Soil characteristics are highly significant in determining the magnitude and extent of the soil's response to weather changes. The **soil** at the **DFC** site is clay rich and develops an extensive system of desiccation cracks that impart a moderate permeability to what would otherwise be a relatively impermeable **soil**. A capping effect caused by frozen or unfrozen soil moisture is a primary radon concentrating mechanism.

This abstract is on soil gas, and it indicates that temperature has a lesser effect on soil radon gas, however temperature changes (diurnal) affects the natural flow in and out of mines (and caves) and as I described above the fall and early spring diurnal temperature changes along with precipitation, barometric pressure changes affect radon concentrations.

Also see the following reference: Marley, F. *Investigation of the Air Pressure Characteristics Influencing the Variability of Radon Gas and Radon Progeny in Domestic Vernacular Buildings*. Health Phys. 81:57-69; 2001. A summary point from this paper (Marley 2001) is that the variability of radon concentrations in air is related to the meteorological parameters, the atmospheric variables of barometric pressure, vapor pressure and wind variations. (Marley, 2001).

Best regards,  
George

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**From:** Skibitski, Thomas, NMENV [<mailto:thomas.skibitski@state.nm.us>]  
**Sent:** Friday, October 10, 2014 1:06 PM  
**To:** George Basabilvazo; George Basabilvazo - WIPPNet; LucasKamat, Susan, NMENV  
**Cc:** Kliphuis, Trais, NMENV; Blaine, Tom, NMENV; Maestas, Ricardo, NMENV; Kieling, John, NMENV  
**Subject:** RE: Exhaust Stion

Thank you, George, for the explanation. Taking the time to speak with Martin about the process is appreciated.  
Thanks,  
TS

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**From:** George Basabilvazo [<mailto:george.basabilvazo@cbfo.doe.gov>]  
**Sent:** Friday, October 10, 2014 12:45 PM  
**To:** Skibitski, Thomas, NMENV; George Basabilvazo - WIPPNet; LucasKamat, Susan, NMENV  
**Cc:** Kliphuis, Trais, NMENV; Blaine, Tom, NMENV; Maestas, Ricardo, NMENV; Kieling, John, NMENV  
**Subject:** RE: Exhaust Stion

Tom,

I am in the office even though this is my day off and have been running around walking correspondence through our approval process and was in a different room reviewing deliverables and trying to get deliverables out etc. The response to the point brought up by Martin is straight forward and can be discussed today; call me or I can call you to discuss (234-7488 or on my cell 706-0083).

To help foster the discussion it is important to understand the process and the history and origin of radon. The process for filter change includes the rad tech entering the building where Station A filters are located, then they call the CMR and then open the flexible disconnect to probe the filter paper. If the alpha reading is approaching or >2000dpm (or > 10,000 dpm beta-gamma) they will stop at that point, exit the room, post the room as an ARA, don the appropriate PPE

and then return to pull and process the filter paper. The probe of the filter paper represents the U/G air, not the room air. The filter paper is removed and then put on the tenelec and counted. If it decays "quickly" and the ratio of beta to alpha remains consistent they can ascertain that the reading is from radon.

The alpha reading on Wednesday morning that Martin noted to you was taken on the filter paper at Station A after the flexible disconnect. The initial reading of the Station A filter paper (represent the u/g air) on Wednesday morning was about 1700 dpm alpha (approaching 2000 dpm) and the four hour count was about 200 dpm alpha (clearly indicative of radon decay). After that, they can continue to count for 72 hours (radon has a half-life of about 3.8 days) to continue to confirm. Since I have been here and during this time of year fall (cool nights, warm days and humid) I have seen high radon readings. Radon is one of the products from the decay of uranium and thorium (and radium) and is ubiquitous, even the sedimentary rocks (e.g., Paleozoic/Mesozoic and Tertiary sands, silts, shale, etc.) that are deposited in southeast New Mexico have uranium because they are erosion products ancestral mountains/highlands that were composed of granitic and volcanic rocks. We conducted studies in the 1990's and illustrated that there was essential no difference in the radon readings on the surface and the underground. This time of year (transition from summer to fall) and with the humid conditions or temperature inversion radon readings can and often increase. The other point to note is that because of the experience of the rad techs, they will look at the ratio of alpha to beta on the direct frisk of the filter paper and if beta is higher than alpha (approximately 4 to 1) that is indicative, but not diagnostic, of radon and the rad techs are observing that today. However, they will continue to follow their process to evaluate the filter paper readings and determine if the readings are radon or likely transuranic.

The trigger points in our radiological program for posting and PPE requirements for a high contamination area/airborne radiation area (HCA/ARA) are > 2000 dpm alpha or >10,000 dpm beta-gamma. There are also underground Safety Basis operational restrictions and interim controls linked directly to the activity levels of a direct frisk of the filter paper at Station A.

I think it will help and I would like to offer that I can visit with Martin and makes sure he understands the radiological procedures and processes and the history of the radiological conditions at WIPP. I can also get someone real smart on this stuff and we can sit down and discuss this with Martin further.

Please call me at 234-7488 or on my cell 706-0083, I will be here most of the day.

Best regard,  
George

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**From:** Skibitski, Thomas, NMENV [<mailto:thomas.skibitski@state.nm.us>]  
**Sent:** Friday, October 10, 2014 10:55 AM  
**To:** George Basabilvazo - WIPPNet; LucasKamat, Susan, NMENV  
**Cc:** Kliphuis, Trais, NMENV; Blaine, Tom, NMENV; Maestas, Ricardo, NMENV; Kieling, John, NMENV  
**Subject:** FW: Exhaust Stion

George,  
Please see the forwarded note below regarding today's alpha measurements at Station A. This event follows on the high measurements recorded on Wednesday and suggests more than atmospheric radon is the cause. I know you are not in the office today however we need to talk about this on Tuesday. It would be great if we could have some information during the 1:00 PM call. What do the CAMS record and is there any activity measured in the underground that would help explain these measurements?  
Thanks,  
TS

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**From:** Simon, Martin, NMENV  
**Sent:** Friday, October 10, 2014 10:40 AM

**To:** LucasKamat, Susan, NMENV; Skibitski, Thomas, NMENV  
**Subject:** Exhaust Stion

Susan and Tom

While exchanging filters at Exhaust B at 0810, I was informed by the radtech that the filters at Station A3 had already been pulled and replaced at 0600 because the alpha levels were approaching the 2000 dpm limit. Later I was told that the A2 skid was put into operation at 0830 and would run simultaneously with A3. At that time both were being designated as "backup". At 0910 I was told that the second A3 filter was replaced at 0900. I was informed that most likely the filters would continue to be replaced every 3 – 4 hours probably for the near future. I am going back to WIPP to deliver additional A3 and A2 filters to cover the 3-day weekend.

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