4621 S. Cooper Street # 131-332
Arlington, TX 76017
www.foxfirescientific.com

(ph) 877-433-2029
(fax) 877-433-2492
info@foxfirescientific.com

September 27, 2018

Gerald George
Davis Wright Tremaine LLP
505 Montgomery Street, Suite 800
San Francisco, CA 94111

Re: Third-party review of Homestake Actions pursuant to NRC Confirmatory Order

Dear Mr. George,

Foxfire Scientific was engaged by Homestake Mining Company of California (HMC) as an independent third party consultant to assist with completion of action items contained in the March 28, 2017 Confirmatory Order issued by the Nuclear Regulatory Commission (NRC) to Homestake. In particular, there were several action items assigned to be performed by a third party consultant. Those actions were:

- Condition 1: Review HMC's root cause protocol and provide a qualification statement for the third party reviewer.
- Condition 4: Review and evaluate HMC's assessment of its compliance with NRC requirements. The review will include:
    - Identification of all areas assessed
    - Scope of the assessment
    - Method used to perform the assessment
    - Results of the assessment
    - Any proposed corrective actions
    - Evaluation of the effectiveness of any actions proposed by HMC.
- Condition 4a: Submit name and qualifications for HMC to submit to the NRC.

In addition to these items specifically required by the Confirmatory Order, HMC elected to have Foxfire review HMC's root cause analysis for the apparent violations identified in NRC October 4, 2016 letter. Condition 2 of the Confirmatory Order requires the root cause analysis but does not require third party review of the Confirmatory Order. HMC also requested that Foxfire review a license amendment request they intended to submit to the NRC as one of the corrective actions from the regulatory compliance assessment.

On April 10, 2017, Foxfire submitted a qualifications statement to HMC which subsequently submitted it to the NRC. The NRC requested clarification of specific items in the qualifications statement and clarification of conflict of interest issues. After further clarification and modification of personnel assigned to this project, Foxfire was accepted as the third party reviewer by the NRC on May 3, 2017.

On May 26, 2017, HMC sent its root cause protocol to Foxfire for its review. Foxfire sent it's review comments to HMC on June 6, 2017. The essence of those comments was that the root cause protocol was completely inadequate. That letter is contained in Attachment A. In response to those comments, HMC rewrote its root cause protocol essentially from a clean slate and submitted the revised root cause protocol for review on June 27, 2017. The revised protocol selected the "5 Whys" root cause analysis method. Foxfire performed a review of the revised protocol and sent comments to HMC on July 16, 2017. Those comments noted that the root cause protocol was acceptable but did include recommended improvements in the protocol. This letter is contained in Attachment B.

On August 16, 2017, HMC sent Foxfire the draft results of their root cause analysis of the apparent violations identified in NRC's October 4, 2016 letter. On August 21, 2017, Foxfire sent HMC comments on the draft root cause analysis. This letter is contained in Attachment C. On September 2, 2017, HMC sent Foxfire a revised root cause analysis resolving the comments. Foxfire emailed and had a conference call with HMC regarding the comment resolutions but no additional formal response to the comment resolutions was prepared.

At about the same time, HMC sent an initial regulatory compliance assessment to Foxfire for review. Before Foxfire had begun significant work on the review, HMC withdrew the assessment and indicating they were changing contractors and starting over. In May and June 2018, HMC had discussions via both email and conference calls with Foxfire regarding the technical approach being used for the regulatory assessment for feedback on whether the proposed approach was acceptable. The key feature of the proposed approach with which they sought concurrence was the "binning" of non-compliances into common groups upon which the root cause analysis process would proceed since the number of non-compliances was in the 100s and separate analysis for each would lead to excessive duplication. Foxfire expressed general concurrence with this approach but cautioned that even after completion of that process, each specific non-compliance should still receive one more review to ask "Is there anything else specific to this noncompliance not common to the other non-compliances binned together with this one."

On August 2, 2018, the finished regulatory compliance self-assessment was sent to Foxfire for review with a request for us to finish our review by August 24, 2018. The submitted documents included the main body of the assessment report and appendices containing the identified non-compliances separated by regulatory agency (NRC, OSHA, NMED). Detail regarding those regulations and regulatory requirements with which HMC determined they were in compliance were not provided. The review of the self-assessment was conducted by reviewing the provided documents. In particular, the discussion of the identified root causes and the provided examples were reviewed. Given the nature of the provided documents and the time available, no independent confirmation of the accuracy of the self-assessment's determinations regarding which regulations and regulatory requirements with which HMC is or is not in compliance with was not made. Those determinations were accepted at face value and the third party review concentrated on review of the root causes that were identified. The results of that review were sent to HMC on August 24, 2018 and contained general comments regarding the process used, 3 specific comments regarding the main body of the report and an additional 35 comments

regarding specific non-compliances with NRC requirements. This letter is contained in Attachment C.

As part of the self-assessment HMC conducted a safety culture review. As stated in our August 24, 2018 letter, Foxfire's opinion is that the self-assessment identified two root causes (no safety culture and inadequate resources) and then jumped ahead in the 5 Whys process to assigning safety culture trait deficiencies as all the contributing causes. Foxfire had expected to receive detailed 5 Whys presentations as were previously received in the root cause analysis of the apparent violations identified in the NRC October 4, 2016 letter. Without presentation of the details of the 5 Whys asked, it is not possible to concur with the determination that the two identified root causes are the only root causes.

In response to our comments, HMC's contractor stated that the team chose not to prepare documentation describing each Why question given the commonality of the answers. They also stated that they conducted the individual review of each noncompliance but they were not revising the report to document that review. Without that documentation, Foxfire cannot render an opinion regarding the completeness of the self-assessment. Foxfire's review is thus limited to opining regarding the accuracy and appropriateness of the material that was provided, namely whether the identified root and contributing causes are truly root and contributing causes for the identified non-compliances. Given the broad nature of the safety culture traits, Foxfire has no doubt that numerous safety culture deficiencies actually are contributing causes of the regulatory non-compliances and that the two identified root causes are actually root causes.

The report includes action items to take to resolve the identified non-compliances and to address the identified root and contributing causes. It is Foxfire's opinion that the listed actions items can address the identified non-compliances and to address the identified root and contributing causes. That being said, as is often the case, success of the action items depends largely on the effectiveness of the implementation of those action items. Since the action items have largely not been implemented to date and Foxfire has not had an opportunity to review the effectiveness of implementation, our opinion regarding their effectiveness, as required by the Confirmatory Order, is limited to stating that the identified action items are appropriate to address the identified non-compliances and to address the identified root and contributing causes. Any additional effectiveness review, if needed, must occur at a later date when the action items have been implemented and their effectiveness and completeness can be determined.

On August 7, 2018, HMC sent Foxfire a proposed NRC license amendment request which included a revised Radiation Protection Program (RPP) for review. That license amendment request was reviewed after completion of the review of HMC self-assessment and comments were sent to HMC on September 10, 2018. Foxfire opined that it felt that the license amendment request was reasonable but that a key point to address was what and whose approval would be needed to make changes to the RPP. Part of the license amendment request was to shift the license from a prescriptive license to one that is more performance-based. This requires NRC to trust HMC's internal processes to review and approve changes, trust which NRC may not have at this time. In addition, 81 specific comments about the contents of the RPP were provided. The transmittal email and attached table are provided in Attachment D.

If you have any additional questions or need more information, please feel free to contact me at 817-995-6762 or arno@foxfirescientific.com.

Sincerely,

Matthew Arno, PhD, PE, CHP

Attachment A

4621 S. Cooper Street # 131-332
Arlington, TX 76017
www.foxfirescientific.com

(ph) 877-433-2029
(fax) 877-433-2492
info@foxfirescientific.com

June 6, 2017

Gerald George
Davis Wright Tremaine LLP
505 Montgomery Street, Suite 800
San Francisco, CA 94111

Re: Homestake Mining Company Root Cause Analysis Protocol Review

Dear Mr. George,

On May 9, 2017, Foxfire Scientific was sent a root cause protocol for our review and comment as partial fulfillment of Condition 1 of the March 28 Confirmatory Order issued to Homestake Mining Company of California by the NRC. We have completed our initial review. When the NRC receives a document such as a license application for review, they conduct an initial review to determine whether the document is acceptable for review. If it is, they proceed to review it. If it is not, they summarily reject it without providing any detailed comments. If this protocol was submitted to the NRC, it would be rejected as unacceptable for review.

The root cause protocol that was submitted for our review was a direct cut and paste of a powerpoint presentation on root cause analysis rather than a procedure or protocol (See https://www.nrc.gov/docs/ML1109/ML110960258.pdf). Although archived in the NRC ADAMS system, it is not clear who authored the source presentation. Given the powerpoint slide format, it appears it was not authored by NRC staff but may have been prepared by an NRC contractor. As a presentation, it is more of an outline of topics and things to consider during a root cause analysis than an actual protocol. It is our opinion that the "protocol" the NRC is expecting to see should be thought as the procedure for performing the root cause analysis. You could also think of it as the charter for the root cause analysis team defining what it is they are supposed to do, their responsibilities, and their authority. This document does not provide that procedure or charter.

The draft protocol lists 5 possible root cause analysis techniques that could be used. Homestake needs to pick one and draft the protocol to implement that methodology. The Fault Tree method is extremely complicated to implement and is more appropriate for equipment failures. The Hazard-Barrier-Target method is also not well suited to the current situation. Change Analysis or MORT are appropriate. The structure of MORT may lend itself best to ensuring that a thorough review and analysis is performed. A primer on using MORT is available from the New Mexico Environmental Department at https://www.env.nm.gov/aqb/Proposed_Regs/Part_7_Excess_Emissions/NMED_Exhibit_18-Root_Cause_Analysis_for_Beginners.pdf. The protocol should "flesh out" the process for performing the "Four Major Steps" listed on the second page of this PDF, i.e., data collection, causal factor charting, root cause identification, and recommendation generation and

implementation. Another helpful summary is the "Basic Steps of RCA" presentation prepared by the North Dakota Health Care Review, especially pages 7 through 15 available at http://www.health.state.mn.us/patientsafety/toolkit/rca_ndpresentation.pdf. These steps could form the core of your protocol. A valuable aid to implementing the MORT process is the MORT User's Manual available at http://www.nri.eu.com/NRI1.pdf and the accompanying Risk Tree available at http://www.nri.eu.com/NRI2.pdf

The "Procedures for Conducting Root Cause Investigations" section of the draft protocol provides what amount to section headings for some of this but no supporting detail. The "Presentation of Findings" section and subsequent sections are useful direction and guidance that should be incorporated into your final protocol.

We look forward to reviewing the revised protocol when it is ready for further review. If you have any additional questions or need more information, please feel free to contact me at 817-995-6762 or arno@foxfirescientific.com.

Sincerely,

Matthew Arno, PhD, PE, CHP

Attachment B

4621 S. Cooper Street # 131-332
Arlington, TX 76017
www.foxfirescientific.com

(ph) 877-433-2029
(fax) 877-433-2492
info@foxfirescientific.com

July 16, 2017

Gerald George
Davis Wright Tremaine LLP
505 Montgomery Street, Suite 800
San Francisco, CA 94111

Re: Homestake Mining Company Root Cause Analysis Protocol Review 2nd draft

Dear Mr. George,

On June 27, 2017, Foxfire Scientific was sent a second draft of a root cause protocol for our review and comment as partial fulfillment of Condition 1 of the March 28 Confirmatory Order issued to Homestake Mining Company of California by the NRC. This second draft was sent in response to our June 6 letter indicating that the first draft was in need of significant or even total revision. We have completed our review and comment on this second draft. In summary, this document is an acceptable root cause protocol. Our comments attached and below are simply recommended improvements to the protocol.

The main body of the protocol was provided to Foxfire in MSWord "docx" format. A redline markup of the provided protocol is attached with specific edits and suggestions for additions and changes. In addition, templates and examples were provided in PDF format. The below comments are for the supporting documents provided in PDF form.

1. Problem Statement Template – Add rows to address:
   - Who was responsible for the task?
   - What procedures were involved and followed or not followed?
   - What is the operational history? Were changes made and when?
   - What is the authorization basis (license conditions) allowing or requiring this task?

2. 5 Whys Template – Add a note at the bottom to use additional pages and continue asking Why until it is not possible to continue further.

3. Hypothetical Fishbone Analysis for SP2 exceedance element 1 – A sub fishbone is needed for each factor. For example:
   a. For "people," operators made mistakes was listed and the second point addresses the "why" of the operators not being properly trained. This brings into play the "who, what, where and how factors (training recurrence frequency or lack thereof), who trains, and their qualifications and a cadre of more sub fishbones).
   b. For "equipment". Why wasn't the equipment maintained and if so what is the preventative maintenance schedule? Is there one? Whose responsibility is it? Is it defined and if so where?

c. For “site conditions”, who, why or how or what is affected by “the SAG groundwater more variable or worse than expected”. Due to weather, e.g. heavy rain, snow, ice etc.?
d. For “Control”, “Treatment plant not properly constructed,” review the license commitments and compare to the present configuration (proper parts, equipment, people, training, safety, were corners cut? Was there a validation and verification process? Properly operated: staff trained and qualified? By who? Properly maintained? QC procedures, equipment PM, cycle and frequency.
e. “Planning” Were contingency plans and standard operating procedures (SOPs) in place to produce acceptable water quality or to stop injection of unacceptable water quality”. Focus on or address the 5 whys. For example, by whom were results reviewed? Was there a secondary review or senior management review? For equipment- electronic monitoring, are engineering levels set at a certain percentage of the regulatory limit (10%, 50%, 90%)?

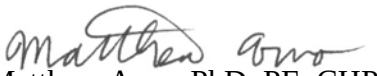
4. Hypothetical Fishbone Analysis for SP2 Exceedance Element 2 – Additional questions to ask to dig deeper into the described factors should include:
    a. SP2 Analytical Results. Were lab results not properly transmitted or transcribed (manual or automatic)? Were samples not properly handled by the lab or Site staff (chain of custody, who what where when and why)? Were procedures authorized in the license? Were they or did they require NRC approval? Were samples not collected properly or in accordance with the license?
    b. Compliance.
        - “License did not designate clear authority for assuring compliance” should really state “License did not delineate clear basis for determining compliance.” What does the license state? Is/was it being followed?
        - When was the last audit to review the program? Was there even one done?
        - “Licensee did not understand compliance requirements.” This leads to a training fishbone. Training by who? The RSO? By in house training staff?
        - “License language ambiguous”. If there was a question over interpretations were there any verbal discussions with NRC staff? Yes or no. One should never ASSUME!
    c. Control. “Treatment plant process was not properly adjusted based on performance data.” Who checks them and how often? Are there verification audits and by whom? Were engineering levels set below regulatory values?
    d. Regulatory Oversight. “Past inspections or review of annual reports did not address exceedance issues. Performance based inspection are qualitative in nature taking a snap shot of the program. Any apparent non-compliance identified qualitatively will initiate a change to compliance based and intensified record review, even going back in time. Licensees must be vigilant and don’t assume past clear inspections are indicative as good to go.

5. Hypothetical 5 Whys Analysis examples for SP2 Exceedances – Additional questions to ask to dig deeper into the described factors should include:

a. Element 1 #1. Equipment performance
    - Add proper/correct seal, shelf life expired (old seals may breakdown over time- what does the manufacture specs state?)
    - Equipment QC on pumps, PMs.
    - More discussion is needed regarding operator training, both initial and recurrent. Is staff dedicated or rotating? Are they certified and if so by whom?
    - SOPs: How are they developed and reviewed? Are they compared to license representations and conditions? If so, by whom?
b. E1 Operations Planning – Are contingency plan identified? Lack of contingency plans leads to the wishful thinking or belief that effluents and SAGs would always be lower than the limits. If so, then documentation of the hard data (QC) to show this is the case is required. Otherwise it is fantasy and will be dimly viewed by NRC.
c. E2 Compliance. Ensure that license representations address the regulations. If a caveat or requested deviation is submitted to NRC and NRC "Misses it", do not assume it's approved ***tacitly***. Regulations (Title 10 part 40) always supersedes the license conditions. The license can be more restrictive, never less unless an explicit waiver is provided.

If you have any additional questions or need more information, please feel free to contact me at 817-995-6762 or arno@foxfirescientific.com.

Sincerely,



Matthew Arno, PhD, PE, CHP

Attachment C

4621 S. Cooper Street # 131-332
Arlington, TX 76017
www.foxfirescientific.com

(ph) 877-433-2029
(fax) 877-433-2492
info@foxfirescientific.com

August 21, 2017

Gerald George
Davis Wright Tremaine LLP
505 Montgomery Street, Suite 800
San Francisco, CA 94111

Re: Homestake Mining Company Root Cause Analysis Review

Dear Mr. George,

We have completed our review of the draft root cause analysis you sent to us on August 16. Based on these comments, you may wish to ask NRC for additional time to complete the root cause analysis. They should be amenable to a reasonable extension such as two weeks especially with the justification that Homestake provided the root cause analysis to us for review and comment. The time for us to complete that review and comment and then for Homestake to resolve those comments justifies the extension. The NRC has previously indicated that they had intended for there to be an independent 3rd party review of the completed root cause analysis but had forgotten to include that in the Confirmatory Order (CO). If you do wish to ask for an extension, you should do so promptly rather than wait until the due date.

Specific comments are included in the attached markup of the root cause analysis. In general, there are three main issues to be addressed.

1. HMC did not understand the NRC licensing and license compliance process, i.e., that the license conditions must be met until explicitly changed regardless of inspection results, regardless of statements made in other regulatory correspondence, and regardless of NMED/EPA regulatory requirements and compliance.

2. HMC did not understand that documents incorporated by reference into the license become a part of the license, including all commitments made in those documents. Commitments include all statements made regarding site operation and equipment configurations.

3. Staffing issues. What was the existing staffing? Who was responsible for what? Was HMC corporate aware of site issues? If not, why?

This second point is especially important to address during the compliance review required by CO condition #3.

If you have any additional questions or need more information, please feel free to contact me at 817-995-6762 or arno@foxfirescientific.com.

Sincerely,

Matthew Arno, PhD, CHP, PE
Foxfire Scientific, Inc

Attachment D

Matthew Arno

From: Matthew Arno
Sent: Monday, September 10, 2018 4:54 PM
To: George, Gerald; McCarthy, Michael
Subject: Foxfire comments on the LAR and RPP
Attachments: RPP comments.docx

Gerry,

The actual changes to the license are reasonable. The key is in the details of the substituting document(s). Attached are our comments on the LAR and RPP.

What is not clear is if the RPP is a document that Homestake may change itself through your SERP process or if it becomes a license tiedown condition which would require NRC approval to change. If the former, similar to what we indicated in the review of the compliance assessment, we are not sure if NRC trusts Homestake enough to allow them to change the RPP without NRC review. You are deleting NRC commitments which require their approval to change, and replacing them with commitments you could modify without their prior approval, assuming a SERP determined it was acceptable.

Your statement in the LAR transmittal letter that the RPP is being provided for their review seems to imply that changing the RPP would require NRC approval but that individual SOPS are not. I suggest you make sure you and the NRC both have a clear understanding and agreement regarding which documents Homestake can change through the SERP process and which require prior NRC approval to change.

Matthew Arno, Ph.D., P.E., CHP
Vice-President, Partner
Foxfire Scientific, Inc.
4621 S. Cooper Street # 131-332
Arlington, TX 76017
office: +1 877-433-2029
direct: +1 817-563-0579
cell: +1 817-995-6762
fax: +1 877-433-2492

#	Section	Page	Comment
1	Many		There are many places in the RPP and the associated SOPS where “should” is used in instances where “shall” is more appropriate. Conduct a generic review of all uses of “should.”
2	General		A statement should be made in the RPP that minors are not employed at the site due to the radiological and chemical risk that exist at the site.
3	General		Information on declaring a pregnancy and the dose recommendations/limits for declared pregnant workers should be included. A form for declaring a pregnancy should be added to an SOP or to the RPP.
4	General		A form should be developed that facilitates the collection of prior occupational dose history for the current calendar year and should be used to collect that data when new employees are hired. This form and this requirement should be discussed in the RPP.
5	General		A form for a termination bioassay should be added to an SOP or the RPP. This form should request information on how to contact the employee in the future (in case their termination bioassay sample has a positive result and additional bioassay is required).
6	2.2	4	Since you are conducting workplace air monitoring and especially breathing zone monitoring, these should be factored into your internal dose assessment. In addition, although no doses or radon concentrations are provided, it appears that occupational radon doses may exceed the measured external doses. Since the NRC is requiring you to conduct new occupational exposure monitoring, that monitoring should include internal dose, especially since it may provide more dose than external pathways.
7	2.2	4	Why would you discontinue the occupational air monitoring program based on the high-volume air sampling to determine the airborne particulate concentration? That is a much more sensitive option for evaluating potential intakes and can be used to show that the worst-case dose is minimal. If the measured airborne concentrations continue to remain at background levels, then that would preclude internal monitoring via urine bioassay. Elimination of urine bioassay would eliminate the problem of results above the action level, which often appears to be due to lab errors or sample contamination. The air sampling route is most likely the least expensive approach, too.
8	3.1, RSO	5	The RSO should have dotted line reporting to a leader at Homestake Mining Company of California.
9	3.1, RST	6	When is it appropriate for the RST to skip the RSO and report directly to the Site Closure Manager?
10	3.1	6	Site workers: Are all site workers considered to be Radiation Workers? Are only those that enter controlled or restricted areas considered to be Radiation Workers? Are none of the site workers considered to be Radiation Workers? This should be clarified.
11	3.2.2	7	The Radiation Safety Training should include discussion of the information found in 10CFR19. This was one of the gaps identified in the gap analysis. Radiation safety training provides an excellent opportunity to discuss many of these items.
12	4.1.2	8	Annual leak tests are performed on all sealed sources. You cannot leak test a plated source, which is what several of your check sources are.

13	4.2.1, bullet 2	9	Restricted areas may be needed for routine (recurrent) tasks. Delete "due to non-routine…" Similarly, the controls are described as temporary. Are there no areas where permanent controls are needed?
14	Table 1	10	Be consistent with units. Use mrem/hr instead of uR/hr for the external gamma administrative limit.
15	4.2.3 #3	11	There should be a requirement that only single-use containers should be used for drinking in the Controlled Area. This will prevent re-use of a container that has become soiled and potentially contaminated.
16	4.2.3 #4	11	Most of the SOPs contain little to no description of PPE needed. This is a major shortcoming of the SOPS. Each SOP should describe the PPE needed for the various tasks covered by the SOP.
17	4.2.3 #6	11	There should be mention of when one is required to submit a "baseline" or "termination" bioassay sample. These requirements can be discussed in more detail elsewhere, but the need for these types of samples should be addressed here too.
18	4.2.3 #7	11	This use of breathing zone air sampling should be included in the discussion in the 2nd paragraph of Section 2.2. the use of breathing zone air samples to monitor potential intakes by workers is much more sensitive than urine bioassay
19	4.2.3 #9	11	Who is allowed to complete exit surveys? This really should be performed by the RST or RSO as most workers do not have a proper understanding of how to complete a proper contamination survey.
20	4.2.3 #10	12	Who is allowed to perform decontamination in accordance with SOP 12? Any survey completed after decontamination should be performed by the RSO or RST as most other employees are not going to perform a proper survey.
21	4.2.3 #11	12	There is nothing here about workers, the RST, or the RSO having stop work authority when radiological hazards are identified. This authority should be clearly stated here.
22	4.2.5, footnote 4	12	One of the assumptions in your contamination control process is that the Controlled Area outside of restricted areas is clean and thus surveys are not needed for exit of personnel and equipment from the Controlled Area. However, this footnote is describing an exception to that assumption. This deserves more than a footnote. This should be its own Section 4.2.X describing the specials controls to be used for this boneyard area(s). It sounds like the boneyard should be a permanent restricted area. Is the contaminated equipment in the boneyard plastic wrapped or otherwise sealed to prevent the spread of contamination? What are the contamination control provisions used?
23	4.2.6	13	What constitutes a potential for significant exposure to radioactive material?
24	4.2.8	13	What is the frequency of the periodic inspections and audits? This is not stated in the RPP unless this is referring to the monthly ALARA audits and the annual ALARA audit. Continual inspection by the RST shouldn't be considered as an audit/inspection.
25	4.3 # 3)	13	Is there an SOP for this? Task-related surveys are described in various provided SOPs, but not routine surveys of "clean" areas to monitor for contamination.

26	4.3.1	14	The frequency of visual inspections should be included here as well as how those inspection will be documented. Reference to a procedure that outlines these inspections would be appropriate, too. The maintenance schedule should also be discussed or a reference provided to a document where the schedule can be found. The section states that records of these inspections/audits will be documented. Who will maintain those records for review?
27	4.3.4	14	Any RWP requiring personnel exit surveys should include establishment of a temporary restricted area.
28	4.3.4	14	Are the individual workers allowed to complete their own exit surveys? This is concerning as most employees do not know how to perform a proper survey.
29	4.3.6	15	What is the survey frequency for designated eating/drinking or "clean/areas" inside the Admin Building? Who will perform these surveys? Where will the records be stored? Who will review the survey results?
30	4.4	17	The logic behind limiting routine dosimetry and bioassay sampling is reasonable. Has the site considered the value of continuing with dosimetry and breathing zone sampling as a bare minimum? There is a value in a "negative" result.
31	4.4.2.2	20	This Section says that TEDEs will be calculated, but SOP 13 says CEDE and thus TEDE will not be calculated.
32	4.4.2.3	21	While it is hard to determine the dose from positive routine sampling if a specific intake date is not known, the data can be used to determine the potential internal dose from a chronic exposure over one's entire career. This is a positive aspect of routine sampling that should be considered. Another option is to perform RWP based breathing zone air sampling and use that to determine the potential internal dose to employees. One or the other should be used, but both would be redundant.
33	4.6.3.1	24	Radon will flow hydrologically downgradient under calm or near-calm wind conditions. Otherwise, it will flow with the prevailing wind.
34	4.7.2	25	Reference is made to routine QC measurements. We would expect these measurements to include trending in instrument performance, but SOP 16 includes no such provisions. (Need forms)
35	4.7.2.1	25	The procedures which use instruments should explicitly include a check to make sure the calibration is not expired. While the date is recorded, instruction to not use an expired calibration is not present.
36	4.7.2.2	26	The process to conduct these QC measurements and compare to the 20% uncertainty criteria over time is not present in SOP 16 or EDF-13. The SOP and form need improvement to include the process to do this trending.
37	SOP 11	71	Delete "air" from the SOP title since OSL dosimetry is included in the SOP.
38	SOP 11	73	General considerations bullet 3: air monitoring is not a control since no real-time measurements are made. Delete word "contro."
39	SOP 11	73	Beginning and ending flowrates (on pressure differentials) should be in the list of information to be recorded.
40	SOP 11	73	Hi-Vol sampler use: What is the target flow rate?
41	SOP 11	74	The procedure says to exchange hi-vol filters weekly or more as needed depending on dust loading. However, there is nothing in the SOP which

			would states that check the dust loading on the filters more often that when exchanged. How would the worker know a filter is loaded with dust? Some sort of routine check is needed.
42	SOP 11 (and others)	74, 75	BZ monitoring (and other lo-vol sampling): We suggest you switch to using pre-loaded filter cassettes. That will eliminate much of the handling required for the filters. It also allows the filter to be sealed simply by replacing the cap while leaving it attached to the sampling pump rather than the complicated process of removing it and putting it in a baggie during breaks.
43	SOP 11	75	The BZ sampling process does not include any requirement to record beginning or ending flowrates.
44	SOP 11	76	If the recount of a BZ filter indicates a DAC values less than 10%, then what should be done?
45	SOP 11	78	A recounted radon sample has less precision than the original count. What is done if the recounted result in less than 10% DAC? Also, to allow for recounts, the first count needs to be performed towards the beginning of the 40-90 minute window.
46	SOP 11	79	TC1 only controls for transit dose in one direction. Other SOPs indicate there is a TC1 and a TC2. A better option would be to use one transit control and store it in a shielded box when not in transit to control for transit dose in both directions.
47	SOP 12	4	What dose "contamination survey failure" mean? Do you mean detected contamination above applicable release limit? Does that apply before or after decontamination methods have been tried?
48	SOP 12	4	There is a footnote 1 but no actual footnote.
49	SOP 12 Sect 5	4	Delete bullet 4. This is covered by SOP 16.
50	SOP 12 Sect 6.3	7	If contamination is detected on clothing, the skin under that section of clothing should be checked. This comment also applies to similar instructions in other SOPs.
51	SOP 12 Sect 6.3 bullet 2	7	"If **elevated** counts are…"
52	SOP 12 Sect 7.2	9	Is it the intention to decontaminate personnel at this decon pad? If so, better provisions, especially an enclosed personnel shower area with hot water available, should be provided.
53	EDF-5	13	There are multiple uses of the acronym "epm." Is this a typo or is "emissions per minute" intended? If emissions is intended, then a correction for emission efficiency for both the check source and the contaminated objects are needed.
54	SOP 13	87	CEDE should be calculated especially since the CEDE may be greater than the DDE.
55	SOP 13	87	Procedure step 1 states that each badge *should* be worn only by the person to whom it is issued. It should say each badge *shall* only…
56	SOP 13	88	Procedure step 4: notification of a lost badge should be performed promptly.
57	SOP 14	94	Given cross contamination concerns, the lab surfaces used for urine sample preparation should be deconned to background levels.

58	SOP 14	94	The analytical lower limit of detection should be “no more than” 5 ug/L. “At least” is unclear.
59	SOP 16	1	Test procedure: Clarify that instruments test are performed before the first use and after the last use each day.
60	SOP 16	1	Step 1: Include a check that the calibration is not expired and an explicit statement to not use an instrument with an expired calibration.
61	SOP 16	1	This SOP is not calibrating instruments. It is just checking the calibration. We suggest re-titling it accordingly.
62	SOP 16	2	Are instrument calibration checks being based on the emission rate from the check sources or the activity of the check source? Form EDF-28A makes it seem the emission rate is being used. If this is the case, then a formal determination of the emission efficiency from objects being surveyed is needed. You are converting from cpm to epm but still need to convert from epm to dpm.
63	SOP 18	1	Procedure step 1: Is this list of facilities complete or could FLRAs be needed elsewhere?
64	SOP 18	1	The FLRA is a critical link in the chain of events which leads to determining the need for a RWP. There are criteria for what the FLRA must include that are not captured on the simple FLRA form. The FLRA form needs an SOP and should be improved to explicitly include these items.
65	SOP 18	1	One of the assumptions in your contamination control process is that the Controlled Area is clean and thus surveys are not needed for exit of personnel and equipment from the Controlled Area. Any equipment used during work under a RWP, and thus presumably in a restricted area, should be deconned prior to being removed form the restricted area. If it cannot be deconned, then specific instructions should be provided on how to handle it, move it to another area to be deconned, or how it must be controlled to prevent contamination of the “clean” controlled area.
66	SOP 18	2	In addition, to documenting why the RWP was terminated, when should also be provided.
67	SOP 20	119	Landauer Rapidos is now Radonova Rapidos.
68	SOP 20	119	Since the filters are not cut any longer, cutting tools are not needed.
69	SOP 20	120	2 Trip control dosimeters are listed but SOP 11 makes no mention of a second trip control dosimeter.
70	SOP 20	121	Provide the coordinate system used for the easting and northing. WGS 84 NM state plane? Is NM divided into multiple planes?
71	SOP 20 Sect 2.B	122	Pressure is not being measured. Differential pressure is.
72	SOP 20 Sect 2.D	122	Inches of water is a pressure differential, not a flow rate. This applies multiple places.
73	SOP 20 Sect 2.F	123	Inches of water is not an anemometer reading.
74	SOP 20 Sect 4	124	No mention of what to do with TC2 is provided.
75	SOP 22	131	Scope ¶1: Non-radiologically-impacted wastes *shall* not be placed in the pit.
76	SOP 22	133	Pit operation step 11: Corners of trenches *shall* be surveyed…

77	SOP 22	133	Rad Survey requirements: We assume surface contamination limits of concern are really only for removable contamination. Explicitly state this.
78	SOP 22	135	Why is Thomas Wohlford's signature already on a blank document?
79	SOP 23		This is not an SOP. This is a description of the ponds. It needs to be totally re-written as an SOP with instructions and directions for workers to follow.
80	SOP 23	140	If radiological controls are warranted, then they either need to be specified in an SOP or a RWP is required. There is no situation where radiological controls that are not specified in either an SOP or a RWP are appropriate.
81	SOP 23	141	The pond sample locations should be specified. What are the criteria for when sampling more often than once a quarter is needed?