STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
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STEVE SISOLAK
Governor

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RICHARD PERRY
Administrator

COMMISSION ON MINERAL RESOURCES
Humboldt County Courthouse, Meeting Room #201
50 West Fifth St., Winnemucca, NV 89445

Thursday, August 15, 2019 1:00 P.M.

AGENDA

CALL TO ORDER

The Agenda for this meeting of the Commission on Mineral Resources has been properly posted for this date and time in accordance with NRS requirement.

ROLL CALL

PLEDGE OF ALLEGIANCE

COMMENTS BY THE GENERAL PUBLIC

Pursuant to N.R.S. 241, this time is devoted to comments by the public, if any, and discussion of those comments. No action may be taken upon a matter raised under this item on the agenda until the matter itself has been specifically included on a successive agenda and identified as an item for possible action. Public comments may be limited to 5 minutes for each person. **ACTION WILL NOT BE TAKEN**

I. AGENDA

A. Approval of the Agenda **FOR POSSIBLE ACTION**

II. MINUTES

A. Approval of the May 9, 2019 meeting minutes **FOR POSSIBLE ACTION**

III. NEW BUSINESS

A Biennium contract with the Nevada Bureau of Mines and Geology. **FOR DISCUSSION ONLY**
The 2-year biennium contract for reports and archiving at NBMG was approved by the Board of Examiners and can now be executed. A copy of the approved contract is included. Mike Visher will provide a brief update on the scope and details.

B. Mineral Resource Database Project (MRDP) The Commission approved **FOR DISCUSSION ONLY**
funding for a second project to assist the Nevada Bureau of Mines and Geology (NBMG) in the development of a Nevada Mineral Resource Database web application. NBMG and NDOM staff kicked off a project team and defined the objective, plan, scope and schedule, and have been meeting monthly to make decisions and assignments. Rachel Micander with NBMG will provide an update on progress of the web application.

Dennis Bryan; *Small-Scale Mining and Prospecting*
Mary Korpi, *Public at Large*
Arthur Henderson; *Oil and Gas*

Commission on Mineral Resources
Richard DeLong, *Chairman; Large-Scale Mining*

Nigel Bain; *Large-Scale Mining*
Robert Felder; *Exploration and Development*
John H. Snow; *Geothermal Resources*

C. 2019 Northern and Southern Nevada Teacher Workshops **FOR DISCUSSION ONLY**
Eight Division Staff were involved in the two teacher workshops that are jointly sponsored by NDOM and the Nevada Mining Association. Five Division staff developed and delivered classes during the Spring and Fall workshops. Garrett Wake and Courtney Brailo will present the work done through photos and videos.

IV. OLD BUSINESS

A. Legislatively-Approved 2020-2021 NDOM Budget **FOR DISCUSSION ONLY**
The legislature approved the CMR-NDOM biennium budget in June. Rich Perry will present a summary of the approved budget for 2020-2021.

B. Fluid Minerals Activity Update and FY 2019 Production **FOR DISCUSSION ONLY**
Lowell Price will provide an update of CY 2018 fluid minerals permitting, production, well inspections and YTD activity in 2019.

C. Courtney Brailo graduated from the TOPCORP **FOR DISCUSSION ONLY**
Energy Training for Regulators. Courtney will discuss details of the curriculum, which included courses at University of Pennsylvania University of Texas and Colorado School of Mines on Petroleum Geology & Engineering Concepts, Petroleum Technology, Environmental Management Technology, and Emerging Topics & Communication.

D. Update on NAC 534A, NAC 517 and NAC 519A regulation changes. **FOR DISCUSSION ONLY**
The CMR directed NDOM staff to update 3 regulations earlier this year. Draft of the regulation changes have been submitted to the Legislative Counsel Bureau for legal review. Rich Perry will report on progress and expected timing for workshops and final hearing before the Commission.

COMMISSION BUSINESS

A. Next Commission meeting was tentatively set for November 14, 2019 at the Legislative building in Carson City, NV. Chairman DeLong has requested this be changed to a later date, possibly November 21.

COMMENTS BY THE GENERAL PUBLIC

Pursuant to N.R.S. 241, this time is devoted to comments by the public, if any, and discussion of those comments. No action may be taken upon a matter raised under this item on the agenda until the matter itself has been specifically included on a successive agenda and identified as an item for possible action. All public comments will be limited to 5 minutes for each person. **ACTION WILL NOT BE TAKEN**

ADJOURNMENT

NOTICE TO PERSONS WITH DISABILITIES

Members of the public who are disabled and require special accommodations or assistance at the meeting are requested to notify the Division of Minerals, 400 W. King Street, suite 106, Carson City, NV 89701 or contact Sherrie Nuckolls at (775) 684-7043 or Email SNuckolls@minerals.nv.gov
The Commission will be attending a field trip on Friday 8/16/19 to Hycroft Mine in Winnemucca at 9:30 am. Members of the public may attend but must provide their own transportation and safety equipment including Steel toes shoes. Commission members and NDOM staff will be departing Winnemucca at 8:00 am. Advanced notification is required. Please call Sherrie Nuckolls at (775) 684-7043.

II. MINUTES

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RICHARD PERRY
Administrator

Thursday, May 9, 2019 1:00 P.M.

MINUTES

CALL TO ORDER
1:00 pm by Richard DeLong

ROLL CALL

Commission	Staff
Richard DeLong	Richard Perry
Dennis Bryan	Mike Visher
Nigel Bain	Rob Ghiglieri
Mary Korpi	Bryan Stockton
Bob Felder	Lucia Patterson
John Snow	Sherrie Nuckolls
Art Henderson (absent)	Public
	Mike Ressel
	Tim Crowley

PLEDGE OF ALLEGIANCE
Led by Richard DeLong

COMMENTS BY THE GENERAL PUBLIC
There were no comments by the public.

I. AGENDA
A. Approval of the Agenda

Motion to approve the agenda made by: John Snow
Seconded by: Dennis Bryan
Unanimously approved

II. MINUTES
A. Approval of the February 7, 2019 meeting minutes

Motion to approve the minutes made by: Mary Korpi
Seconded by: John Snow
Unanimously approved

III. NEW BUSINESS

A. Presentation of the 2017-2018 Exploration Survey
Mike Ressel presented the results of the mineral industry exploration survey conducted by the NBMG using a PowerPoint presentation. Out of 315 companies who were sent the survey, 172 companies responded. To summarize,

there was a major increase of 31% in exploration spending in Nevada year over year from 2017 and 2018; increases felt mainly in precious, base, and energy metals; geothermal and industrial minerals were flat; spending in Nevada was higher in 2018 compared to global increase of 20%; Nevada exploration company labor increased a corresponding 21% between 2017 and 2018; outlook for 2019 is good, most companies will spend as much if not more than in 2018. Mike also remarked that they appreciate the Commission's support of the survey, it's conducted every 2 years, they have a consistent way of getting responses every year, which is good, in terms of building an idea of what the expenditures are and the impacts of exploration on Nevada's economy.

Rich Perry: I'd like to follow up on Mr. Ressel's presentation that we took a one page summary and included it with several other documents we had printed this year and sent a copy to every legislator the day before Exploration Day at the Nevada Legislature. Exploration Day was very well attended, comments I heard were it was the best attended of the groups that have been there in the legislature so far.

B. Las Vegas Natural History Museum Update

Lucia Patterson gave an update on Garrett Wakes' behalf as he was on military leave. Lucia gave an overview using a PowerPoint presentation which included an update that LVNHM could not secure adequate funding to move to a new location so the new plan is to use donations towards updating the current museum and would still like to incorporate the CMR-funded exhibit at the current location and possibly moving to a new venue at a future date. Lucia described the final sketches with four activities including Rock-Forming Environments, Rock Identification, Mineral Uses, and Mineral Properties. As for the timeline, we didn't receive any bids, unfortunately 2 out 3 companies that Garrett spoke to did not receive a copy of the RFP and he is checking with State Purchasing on this. The current plan is to spend the month of May looking over the scope of work to identify areas where we may be able to cut costs, or deciding on if we need to stick with making one display vs two. Garrett would like to send the materials back to State Purchasing by the end of May to get the bidding process started again. The Museum does not need the exhibit anytime soon as they currently are not making any renovations on other exhibits and is still in the planning stages themselves. Garrett would also like to have the exhibit(s) delivered to them by June of 2020 at the latest. He has meetings with four design companies regarding ways to make the project feasible to take on, unfortunately most of the companies that do this are not Nevada State vendors, and submitting a bid can be costly for these companies.

Rich Delong: Do you know why the bids didn't go to those companies?

Lucia Patterson: Garrett is checking with State Purchasing to see what happened.

C. Update of Internal Controls for Abandoned Mine Lands Public Safety Program

Rob Ghiglieri presented a PowerPoint presentation of AML internal controls and stated it is a state requirement; every agency and department has their own internal controls. Part of the presentation was on Inventorying, securing and researching claimants, the number of AML and mineral education presentations per fulltime employees per year of 18. A minimum of 70% of all the hazards inventoried in the state must be secured, which we have surpassed for a long period of time. Rob went over a variety of flowcharts and explained that if AML staff disappeared, these flowcharts breakdown, in detail, the entire AML program step by step on how to operate a good AML program. It's helpful to staff for research and helps Interns to know what to do. Current statistics includes about 3.43 FTE involved with AML, 22,601 sites have been inventoried, 29% of all the hazards are orphans, 89% of orphans are currently secured, leaving 11% currently not secured. The main focus for our Interns is to work on a lot of the orphan securing's. We've identified over 85,000 non-hazardous features, and total inventory is less than 50% complete. Rob went over Topo Prioritization, why and where they go every year showing a series of Topo quads. Rob talked about the Intern Program, how we started out with 2 interns in 2000, where they mainly focused on inventory; since then 108 individual university students have been hired, including the students this summer. It's a very effective program but very time consuming for staff, the amount of time and energy with the recruitment, hiring, planning, time spent in the field every week, the staff members with them in the field, as well as data entry, cleaning the data afterwards and reporting . From 2007-2018 the interns have secured 3,000 hazard sites, they've inventoried 6,000 hazard sites and inventoried >50,000 non-hazard features. They get a lot done in a very short time in 13 weeks. Rob discussed securing's and revisits, contracted work and a summary of work accomplished with a forecast for how long it will take to finish inventory efforts and total costs.

Rich DeLong: Those numbers are daunting, should we be considering increasing staff?

Rob Ghiglieri: That's the only way we're going to be able to increase this program is to increase staff or reprioritize.
Rich DeLong: I appreciate you saying staff is maxed out; we've been focusing on increasing productivity for a number of years rather than increasing staff.
Rob Ghiglieri: Just in the contracting amount, the last two years' was 50% of the last 10 years' total; we've spent a lot of money recently. We're still able to do work efficiently but with the current staffing we're starting to hit our limits.
Rich DeLong: What I'm hearing from you is if we tried to bring on a second contractor, we don't have the staff to manage that. Is this a correct statement?
Rob Ghiglieri: Yes.
Rich Perry: We've had a number of discussions on this as we went through the claim fee question that we'll talk about later today, only the legislature could increase staffing so that would have to go to the next session, if we did that, we'd have to start looking at how much more do we want to spend and we'd have to go back and ask additional money in the claim fee if we really wanted to ratchet this program up. There's a lot of friction once we go beyond what we've been able to achieve at this point and time.
Dennis Bryan: Would you need more space?
Rich Perry: I don't think we need more office space, I would arguably not recommend backing off on the public education component. I this we've hit an optimal point here on this program, it's cost effective every year that it is done with claim fees at no expense to the general fund and the industry is willing to fund it because they see it as a social license program.
Dennis Bryan: The AML program, what's the percentage of the total budget?
Rich Perry: 60%**, and** contracted work is a big chunk of that.
John Snow: Excellent presentation, I thought it was pretty alarming the introduction of the tablets and the noted increase of output and efficiency, with that, is the drone expected to have the same impact on the remote site's, the hard to get to ones?
Rob Ghiglieri: Yes for staff, no for the interns to use drones as they'd have to study on their own time and take the exam to be a certified pilot.
John Snow: That's great, you gave a good big picture overview, with the BLM they have a national contractor, is that factored into these statistics?
Rob Ghiglieri: Yes, the overall numbers is including the BLM, Forest Service, fencing and the contractors. Overall in Nevada, we're the only ones doing inventory.
John Snow: As a discussion point for the Commission, maybe we should push to have them take ownership of the 29,000 orphans; they're not orphans if they're on BLM land.
Rich DeLong: it's a good point.

D. <u>AME Roundup in Vancouver, January 20-23, 2020</u>

Rich Perry, on behalf of Garret Wake, presented a PowerPoint presentation which gave a background on Round Up, including justification for Nevada presence, budget forecast, and deliverables. Staff is recommending sending one representative to attend in 2020. The estimated cost would be $2,547 USD.
Bob Felder: Vancouver is the hub of junior exploration activities, there's a lot of reasons to be there. Who would go?
Rich Perry: We haven't talked about it yet but it will probably be Mike or I.
Bob Felder: Exhibit space cost is less than Toronto, staying in town is less; it's a really great place for Nevada to make a presence.
Rich Perry: Do you believe one is better than the other and we should be at one or both?
Bob Felder: If I had to pick one, I'd pick Vancouver.
Rich DeLong: I agree with Bob, If I had to pick one, I'd pick Vancouver, I see a validity in both PDAC and Vancouver, PDAC is little more mining focused and has a more international attendance, I've always viewed Vancouver as a western North America show really focusing on the cordilleran and Nevada is kind of in the cordilleran.
Bob Felder: If you aren't in the room, you definitely know the outcome and won't have any conversations of usefulness, you just have to be there and over the long run it will benefit.
Rich Perry: I do believe that fully with PDAC, some of the increased exploration spending and Fraser Institute results were partially a result of that presence, we had a lot of people come and say it's about time. We track one metric for the last two years we've looked at hits on the website after PDAC; I always include those on the monthly report.

Dennis Bryan: For $2,500 we should go, and then based on the experience, next year make a determination.
Rich DeLong: I agree with Dennis, the $2,500 amount and what's proposed for 2020 is a no brainer, right now we don't know if we can get in.
Bob Felder: I think we could get in, for years Round Up was in a little hotel and they outgrew it about 5 years ago, they moved into the convention center, my thought would be there's still room to expand, it's a big facility, it's not a huge meeting, I don't think they have the same waiting list as PDAC for booth space.
Rich DeLong: I would like to see, if there is a waiting list to get on the list and accelerate, look at a year schedule. From a fiscal prospective we have the money to do this, even if it requires going to IFC I think it's worth it.
Rich Perry: It always helps in our argument when we write some type of fiscal note that's going to go to IFC or a work program that our Commission instructed us to do this.

Motion to fund a person to attend AME in 2020 in Vancouver made by: Nigel Bain
Seconded by: Mary Korpi
Unanimously approved

E. 2018 Nevada Mineral, Geothermal and Oil Production

Mike Visher went over the Annual Status and Production Reports Draft as of April 25, 2019. Gold dropped 13%, Silver dropped 5.4%, and there was an 8% reduction for Copper and a 30% reduction for Molybdenite. There's been a shift from open pit towards underground so production usually goes down, production usually lags a little bit behind the commodity prices, and so as commodity prices go down, production goes down but not at the same exact time. The numbers may go up but this is what we have to date.
Rich DeLong: There was a 700,000 ounce drop in gold, over half of that is from Pipeline; do you think that's a reflection of them just going underground at Cortez Hills?
Mike Visher: There was a shift in the development, they had some challenges with some of the headings and some of the underground conditions so they had some delays and shifts on how they're actually doing some production, the grade had gone down of that which was actually produced.
Rich DeLong: There's a similar drop at Arturo from 140,000 ounces to 50,000 ounces.
Mike Visher: And that was part of their plan, so they had some higher grade near surface and that was exhausted, so there's more stripping involved down to the next resource level.

Mike showed a graph for Geothermal Power Production, we saw a 7% increase year over year, and I do not have an average price until the Department of Taxation finalizes their numbers and then creates a report for us to show the actual price for what was sold. The next slide was on the Oil Production, with a 10% drop that was not unanticipated.

IV. OLD BUSINESS

A. Open Data Site additions

Lucia Patterson presented a PowerPoint presentation on the updated Open Data Site on NDOM's website, there are two new items, Nevada Mining Claims (all mining claims active, closed or pending), Mining Districts and Commodities. Lucia also demonstrated how to search and navigate using the new functions and is offering a workshop on how to use and navigate through the open data site on May 14, 2019 from 8:00 am to 12:00 pm at the NBMG Gold building in Reno.
Mary Korpi: I think it's a great idea for the workshop; it's a good service to the users.
Lucia Patterson: I hope so, how to take away the "new and I don't know how to do this" factor.
Dennis: If you could give an update on NDOM and give a demonstration of the website at the GSN regular meeting in September that would be great, there will be about 120 people there.
Lucia Patterson: Dana Bennett actually also invited me to present this at their mining convention in Tahoe.
Rich Perry: Lucia, do you want to comment on where we're at in our project with the Bureau that was enabled at the last Commission meeting, when the Commission said here are the 2 things we want to fund at the Bureau for the intervening year, the second one of those was a database type project.
Lucia Patterson: We've met with them twice; we have a project timeline with an estimated completion date in May 2020. Right now we're sourcing the data, where all the data sets are going to come from, and assessing what kind of, if

there might possibility be a need for an additional server, if there's a need for an additional server there might be a cost maintenance, there assessing what kind of data were going to have within certain parameters, how much space is it going to take up, what do they already have, what do we have. Next month we start formatting it.
Rich Perry: The name of the project is Nevada Mineral Resource Database, it will be housed by the Bureau because this will be a sizable one, and we're trying to build the framework to make that happen so no one has to come into Nevada and reinvent the wheel.
Bob Felder: To have such a repository would be amazing development in Nevada. Were you saying you would find money to buy data from sources or is that a difficulty?
Rich Perry: That's not what we envisioned, we're trying to set up framework so that when it was brought in, donated or somebody found some someplace and said I don't have room to store this anymore that it would have a place to go at the Bureau and could get scanned it and set up an electronic database. We would like to roll this out at the May GSN meeting.
Dennis Bryan: I don't know if there's going to be a meeting in May because that's the Symposium.
Rich Perry: Well maybe we'll roll it out at the Symposium because we we're trying to build it to where we had a date where we'd have this done and we're going to continue to meet monthly in order to drive it.
Lucia Patterson: Prior to that, there are some anticipating users and industry that we're going to pull in to beta test this.
Dennis Bryan: Symposium would be a great spot to do this at. Contact Eric Struhsacker.
Rich Perry: Ok we'll do that.

B. PDAC Recap

Rob Ghiglieri shared a PowerPoint presentation with photos of the booth and location, graphic designs, geologic maps, presentations with four presenters including Joel Lenz who spoke about opportunities for Ore Tolling and Copper concentrate processing in Nevada. Rob shared the NDOM open data website, Garrett Wake spoke about MI 2017 report, and Bob Felder discussed exploring Nevada from a junior exploration company perspective. Rob explained the 2019 web analytic comparison showing increases on the NDOM Website and NDOM Open Data Website, NBMG website and NBMG Open Data site.
Notable takeaways were: GSN signed up 5 new members and totaled $1,380 in publication sales; NvMA signed four new members directly from PDAC; and GOED networked with several companies and government entities. Overall it was a very good year.
Rich DeLong: I was there and I thought the booth was a really great representative of Nevada; you did a really good job.
Rob Ghiglieri: Thanks.
Rich Perry: Just a note, I added the "Stake your claim" brochure, this is a collaborate effort with the Nevada Bureau of Mines and Geology and us and we use this as our primary sales brochure of what's going on and the new discoveries in the state.

C. 2019 Legislative Session Update

Rich Perry gave an update about what's transpired. There was no legislation in this session that directly impacted the industries that we regulate or advocate for. There are two bills that could have had an impact on us, AB264, which is relations between state agencies and Indian nations and tribes, it's the one and only bill I did a fiscal note on this year because it would require state agencies, Boards and Commissions to designate a native American liaison within our organization to do consultation with them. The bill has some language, in my opinion that would cause a fair amount of potential time, that bill passed out of the Assembly and is now sitting at the Senate; I don't know the outcome of what that is. The final bill is AB486, which is the creation of the Division of Outdoor Recreation within the Department of Conservation of Natural Resources. This is supported by the Outdoor Industry Association which brought forward testimony that said the Outdoor Industry Association creates 12 billion dollars in revenue and 87,000 jobs in the State of Nevada which we found that it is not a factual statement.
One of the documents I've used to help educate on that is from the BLM "Your Public Land by the Dollars" which tells a really strong story in Nevada about the impact of the BLM public lands.
Dennis Bryan: Did the BLM do this?
Rich Perry: Yes, this is put out by the BLM every year.

We have 25 days left in our legislative session, there's a lot less bills signed this time around by the governor, the number I heard, about a week ago, there were 3 or 4 bills signed. In the last session there were 60 bills signed from the last governor, things should get interesting in the final 25 days.

D. Division Financials and Recommendations

Mike Visher stated at the last Commission meeting we were asked to come back with an expenditure analysis and recommendation for reserve guidance with regards to our current budget. The agency recommends using $1.2M as new reserve guidance amount. Reductions to CAT 39 expenses could then act as a safety net in the event of unforeseen revenue decreases. Forecasting in mining claim revenue, at the end of the fiscal year with $2,050,000, YOY increase of 1%. Mike talked about claim filings, explained the financials and AML expenses graph. Note that in CAT 39 a work program is in place to increase our authority to spend money based on what the Commission asked for, that does not get heard until June 20th, that's for expenditures in this fiscal. As Rob discussed on CAT 39 and whether we want to increase our expenditures on AML or do we want to do a claim fee decrease or a combination of the two. Next Mike walked through the reserve sensitivity analysis using a flat 10 yr. average for mining claim revenue, which included why increased AML expenditures by $150K a year for four years which comes in just above the guidance amount. Then we looked at the claim fee reductions, if we reduce the claim fee reductions by $.50 per claim, which won't take effect until FY2021. We can't actually do anything until FY20 because the County Recorders can't change what they're collecting until FY21 so there's a bit of a delay. Alternatively if we did $1.00 decrease we come in at just a little above $1M but that's below our reserve guidance. So if we do a combination, if we do a $.50 reduction on the mining claim fee and we add $75K to AML for four years we come in just barely underneath our guidance. This was for flat mining claim fee listings. Mike also went over a reserve sensitivity analysis using a 3% YOY decrease, which showed that any claim fee decrease or combination resulted in falling below the reserve guidance amount. However, if we did a combination of mining claim fee reduction of $.50 per claim and increased AML expenditures of $75K a year for either four or five years it gets us pretty close to our reserve guidance with the caveat that the biggest way to adjust the trajectory of that decline, changing the slope of it, is taking bites at AML. Our capacity for the program is roughly $650K, we're budgeted for $500K so we have capacity of $150K but if a partner comes in and say we've got $150K we'll give you to take care of the next project or we can't do that if we're already at our limit above $650K. One of things a combination does is build in capacity for additional partner funding or the flexibility for us to re-evaluate our spending on a year by year basis based on mining claim revenue, at the same time as providing a mining claim fee reduction that starts to drop our reserve no matter what. Our recommendation is we do a $.50 claim fee reduction and then we augment the AML program with additional monies based on additional guidance revenue, future forecast that we're looking at $75K increase which adds to AML but still allows for additional projects that might come in that we can't foresee.

Rich DeLong: I thought I heard earlier from Rob he was at max capacity right now.

Mike Visher: At $650K.

John Snow: Do these figures include overhead and salary?

Mike Visher: Yes, if anything it may be a little high.

Rich DeLong: I see the logic of moving forward down the path of doing a regulation change to decrease the fee, my one concern is there's potential for a sweep this year, some of this excess we have might disappear, I would not want to vote at this meeting saying we're definitely doing a decrease, I can see moving forward with it so that we're ready on July 1 after the session's over to move forward with it but we'll have an opportunity to see what the legislature does with any potential excesses we have.

Rich Perry: The one time that money was swept from the Division of Minerals was a calculation of all the interest that had accrued in the Treasurer's office that was paid to the Division's two bond pool accounts over the years. I don't think sweeping money from our general fund could legally be done because it's in the statute. If you voted today to accept the new reserve guidance number that will help us in justifying our budgets going forward. Per the State Administrative Manual guidelines for finance, an agency isn't supposed to hold more than two months of operating revenue and we hold six months. The reason we've argued that is because we go six months without getting any revenue and we have to adapt to that and our Commission has told us that this is what it should be, and that has prevailed us in argument so

that would help if it's part of the motion. The mechanism would be to direct the division to start moving forward with a regulation change in NRS 517.185 from $6.00 to $5.50 per filing, the other $4.00 is in NRS 513 and that is specific to AML. If you enable this right now and say go ahead and start the process, you can always vote no when it comes back to you. Does this sound logical and if so, let us start the process of doing it.
Dennis Bryan: The $75K in AML can we spend $75,000 elsewhere?
Rich Perry: If it's legally enabled in the statute that we can do it, if it's outside the budget and it's $75K I can guarantee it's going to go to IFC and if it's a contractual thing with any other entity it's going to go to the Board of Examiners too.
Mike Visher: Rob's presentation for what is queued up that you asked him to spend additional monies in FY19, he's got a similar amount in FY20 and an even a larger amount in FY21, everything is on track to spend more than the $500K that's in our current budget, things can slide to a degree and certainly if something else comes through the door we'd have to slide down but we'd like to see the frontloaded efforts be funded as a priority over other things at this point.
Rich Perry: When we went through this process with Arden, last budget, we had to go to the Board of Examiners, we have no problem with them if we're doing AML work, and they love it. If we want to spend more money on AML, we're not going to have any problem with that. If we want to spend a little more money with the Bureau, like we're doing, we have to have a contract in place with them and it is budgeted and it's economic development type stuff, I don't think we'd have a problem with that. I think that if it was a donation to somebody we'd probably have a problem.
Dennis Bryan: I was referring to some other deliverables that would benefit the mining industry, the exploration industry, something like that.
Rich Perry: Bureau related stuff like we're doing? I think those are the biggest impacts, for $35K at your last meeting you directed us.
Dennis Bryan: Why can't we split the $75K and double the $35K?
Rich DeLong: Just my opinion, I think we could, the key is what are the projects, and are they projects we find useful.
Dennis Bryan: What about the project on collecting all the data, I don't think $35K is going to be enough.
Rich Perry: If it isn't I'll let you know because we put a budget to it last time, remember the Bureau has a statute similar to ours that says they're supposed to do things for economic geology and so forth, we can suggest it and with a small amount of money put the priority to it and if you throw Lucia and I into it, and we meet every month, It's going to happen.
Mike Visher: Just a note on that project, it's funded for $40K.
Dennis Bryan: If we were to lower it by $1.00 and five years from now we needed that money back would the process be complicated?
Rich Perry: It would be the same process as this, go through rulemaking, like when we raised it a couple of years ago $1.50.
Rich DeLong: Mike, would you speak about the reason you selected $.50 vs $1.00.
Mike Visher: I chose both to see what the impacts are, the $1.00 fee reduction; if mining claims stayed stagnant we fall underneath our reserve guidance at 2024 so that seemed to be a little much. If we increase additional expenditures in additional to that we fall well below, and that forced me to look at the $.50. Because originally we were looking at dropping it $1.00 and that's what I did but it came in much lower, we're trying to look for something that manages a softer landing closer to that reserve and keeps it more manageable, it may be a combination in order to achieve that.
Bob Felder: Both $1.00 reduction proposals include $75K increase to AML, did you look at any intermediate cases where $1.00 reduction and maybe a $50K increase to AML or to try and play with the numbers a little bit and see how you come out relevant to the guidance.
Mike Visher: I did two things on the $1.00. I did just $1.00 with no increase to AML and then $1.00 reduction with $75K increase to AML for 2 years, part of the reasoning by adding some reduction to AML we can make that impact FY20 right away so it will drop our reserve base immediately, if I wait and do it later then we don't have that immediate impact. What we're trying to do is lessen the reserve amount soon so it's not so high but try to make sure that we don't have to make major changes again, we're limited to when we can do the rulemaking, it's only every other year we can do the rulemaking and the County Recorders have to reset their software for that. We do have claimants that start paying in July, so for mining claim reductions, everybody's going to wait until that takes effect, for increases, people prepaid to avoid the increase. You can pay as early as January on your claims for the next assessment year, so if you're going to do an increase, you limit the effectiveness of that increase and that's what happened when we did the last increase, people get wise to this if they have a significant number of claims so we can't make big changes to the mining claim fee

revenue, because of the delay in the rulemaking, in the timing of when that actually occurs at the County level for filings. I looked at the combination because we're trying to get our reserve down; I played with the number of years added to AML in order to not get us too far away from that reserve guidance.
Dennis Bryan: The $1.00 reduction sounds better than a $.50 reduction, so if you had a $1.00 reduction plus $75K increase in AML, in two years' time in 2022, if there are some changes we could eliminate that $75K increase in AML, is that correct?
Mike Visher: You could, it would change a little bit, so you could add the difference and add it to the end, it would still be a little under the reserve guidance. That's the beauty of doing the combination of the two, whether its $.50 or $1.00 on AML that's your other bite, how you're going to use your 'thrusters' for a soft landing.
Dennis Bryan: But the AML could easily be adjusted?
Mike Visher: If we're going to increase expenditures in AML over the $500Kwe have to do a work program so it's not just go spend more money, we have to get approval to spend more money from the Legislature.
Dennis Bryan: if we wanted to take that money away in two years, we wouldn't have to do anything?
Mike Visher: Correct, you wouldn't have to do anything because you're budgeted at X amount and spending less that would be an easy thing to do.
Rich DeLong: The $1.00 decrease under both scenarios, both times the $1.00 decrease takes us below the reserve which means we're guaranteeing another regulation change in four years.
Mike Visher: Or less because you have to tee it up.
John Snow: Did we see a decrease when the BLM raised their maintenance fee.
Mike Visher: There was a nominal decrease but not to the degree that you see when the gold price drops, that has a larger impact, so I think it will be dependent on what the amount is, the net effect is to cut back to your core position, if you don't have money set aside for increased holding costs there will certainly be some entities that didn't see this coming, but trying to predict what that's going to look like, I really don't know and not knowing what that increase is going to be, I really don't know. The BLM couldn't comment on what they thought that increase might be yesterday when I met with them.
Rich DeLong: Staff is recommending 1.2 M reserve base and a $.50 reduction and $75K additional AML expenditures but I don't think we need to make a recommendation on the $75K right now, what we're trying to do it is start the process to a regulation change for the $.50 or $1.00 depending on what the mood of the group is.

Motion made by: Mary Korpi moved we make the new Reserve Guidance $1.2M.
Seconded by: Dennis Bryan
Unanimously approved

Motion made by: Mary Korpi moved we instruct staff to start the process to decrease claim fee by $.50.
Seconded by: Bob Felder
Unanimously approved

COMMENTS BY THE GENERAL PUBLIC
Tim Crowley with Lithium Nevada invited the Commission to attend one of their meetings or take a tour of their pilot plant near Renown Hospital. Tim shared a handout explaining the development of the largest known lithium deposit in the United States located in Humboldt County, NV.

COMMISSION BUSINESS

A. Determination of time and place of next CMR meetings
August 15, 2019, 1:00 pm in Winnemucca, NV with a tour at Hycroft Mine on Friday, August 16, 2019. November 14, 2019, 1:00 pm in Carson City with a possible Hearing.

COMMENTS BY THE GENERAL PUBLIC
No public came forward for comment.

ADJOURNMENT
4:38 pm

III. NEW BUSINESS

III. A Biennium contract with the Nevada Bureau of Mines and Geology

BOE

For Board Use Only
Date: _____

CONTRACT SUMMARY

(This form must accompany all contracts submitted to the Board of Examiners (BOE) for review and approval)

I. DESCRIPTION OF CONTRACT

1. Contract Number: **22017**

		Legal Entity Name:	Board of Regents OBO - University of Nevada, Reno
Agency Name:	**COMMISSION ON MINERAL RESOURCE**	Contractor Name:	**Board of Regents OBO - University of Nevada, Reno**
Agency Code:	**500**	Address:	**UNR Controller's Office**
Appropriation Unit:	**4219-09**		**Mail Stop 0124**
Is budget authority available?:	**Yes**	City/State/Zip	**Reno, NV 89557-0124**
If "No" please explain:	Not Applicable	Contact/Phone:	Thomas A. Landis 775-784-4040
		Vendor No.:	D35000816
		NV Business ID:	NV20161295653

To what State Fiscal Year(s) will the contract be charged? **2020-2021**

What is the source of funds that will be used to pay the contractor? Indicate the percentage of each funding source if the contractor will be paid by multiple funding sources.

General Funds	0.00 %	X	Fees	**100.00 % Mining Claim**
Federal Funds	0.00 %		Bonds	0.00 %
Highway Funds	0.00 %		Other funding	0.00 %

APPROVED BY THE BOARD OF EXAMINERS AT THEIR JUL 09 2019 MEETING 10#10 Initials

2. Contract start date:
   a. Effective upon Board of Examiner's approval? **Yes** or b. other effective date: **NA**
   Anticipated BOE meeting date 07/2019
   Retroactive? **No**
   If "Yes", please explain
   Not Applicable
3. Termination Date: **06/30/2021**
   Contract term: **2 years**
4. Type of contract: **Interlocal Agreement**
   Contract description: **Industry Reports**
5. Purpose of contract:
   This is a new interlocal agreement to provide the publication of annual mineral industry related reports and for the curation and associated database management of oil, gas, and geothermal drill cuttings.
6. NEW CONTRACT
   The maximum amount of the contract for the term of the contract is: **$180,000.00**
   Other basis for payment: Fixed price; $90,000 for Fiscal Year 2020 and $90,000 for Fiscal Year 2021

II. JUSTIFICATION

7. What conditions require that this work be done?
   Under the authority of NRS 522.040 and pursuant to NAC 522.215 and NAC 522.510 two sets of drill cuttings and one copy of all logging surveys are to be filed by oil and gas operators with the Nevada Bureau of Mines and Geology (NBMG) to be made available for public inspection when the records are no longer confidential. Similar requirements exist for geothermal operators under the authority of NRS 534A.090 and pursuant to NAC 534A.310 and NAC 534A.550. The curation and public availability of these records are critical to further exploration of oil, gas and geothermal resources in Nevada. Under authority of NRS 513.073, the Division is to encourage exploration of oil, gas, and geothermal energy and minerals within this State and collect and disseminate information pertaining to any program administered by the Division.
8. Explain why State employees in your agency or other State agencies are not able to do this work:
   For curation and public availability of oil, gas, and geothermal records, the Nevada Bureau of Mines and Geology (NBMG) utilizes the same staff, student resources, scanning equipment, tracking software, online services and warehouse space as is currently utilized for general geological information, maps, samples and reports. The Division does not have sufficient staff, expertise, and resources necessary to publish mineral industry and exploration reports and certain special reports which may be requested from the Commission on Mineral Resources.

9. Were quotes or proposals solicited? No

Was the solicitation (RFP) done by the Purchasing Division? No

a. List the names of vendors that were solicited to submit proposals (include at least three):

Not Applicable

b. Soliciation Waiver: **Not Applicable**

c. Why was this contractor chosen in preference to other?

At the August 23, 2018 quarterly public meeting of the Commission on Mineral Resources, the Commission approved the Division's proposed FY21/22 biennial budget which included funding a new agreement with the Nevada Bureau of Mines and Geology for $90,000 in fiscal years 2020 and 2021, Item III. A. in attached minutes of that meeting.

d. Last bid date: Anticipated re-bid date:

10. Does the contract contain any IT components? No

III. OTHER INFORMATION

11. Is there an Indirect Cost Rate or Percentage Paid to the Contractor?

No If "Yes", please provide the Indirect Cost Rate or Percentage Paid to the Contractor

Not Applicable

12. a. Is the contractor a current employee of the State of Nevada or will the contracted services be performed by a current employee of the State of Nevada?

No

b. Was the contractor formerly employed by the State of Nevada within the last 24 months or will the contracted services be performed by someone formerly employed by the State of Nevada within the last 24 months?

No

c. Is the contractor employed by any of Nevada's political subdivisions or by any other government?

No If "Yes", please explain

Not Applicable

13. Has the contractor ever been engaged under contract by any State agency?

No If "Yes", specify when and for which agency and indicate if the quality of service provided to the identified agency has been verified as satisfactory:

Not Applicable

14. Is the contractor currently involved in litigation with the State of Nevada?

No If "Yes", please provide details of the litigation and facts supporting approval of the contract:

Not Applicable

15. The contractor is not registered with the Nevada Secretary of State's Office because the legal entity is a:
Governmental Entity

16. Not Applicable

17. Not Applicable

18. Not Applicable

19. Agency Field Contract Monitor:

20. Contract Status:

Contract Approvals:

Approval Level	User	Signature Date
Budget Account Approval	dvisher	06/04/2019 13:08:37 PM
Division Approval	dvisher	06/04/2019 13:08:40 PM
Department Approval	dvisher	06/04/2019 13:08:47 PM
Contract Manager Approval	dvisher	06/04/2019 13:08:50 PM
Budget Analyst Approval	mtum1	06/07/2019 15:47:12 PM
BOE Agenda Approval	Pending	
BOE Final Approval	Pending	

INTERLOCAL CONTRACT BETWEEN PUBLIC AGENCIES

A Contract Between the State of Nevada
Acting By and Through Its
NEVADA COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King St., Ste. 106
Carson City, NV 89703
775-684-7040
775-684-7052 (fax)

and

BOARD OF REGENTS
NEVADA SYSTEM OF HIGHER EDUCATION
on behalf of the
UNIVERSITY OF NEVADA, RENO
1664 N. Virginia St., Mail Stop 0325
Reno, NV 89557
775-784-4040
775-784-6680 (fax)

WHEREAS, NRS 277.180 authorizes any one or more public agencies to contract with any one or more other public agencies to perform any governmental service, activity or undertaking which any of the public agencies entering into the contract is authorized by law to perform; and

WHEREAS, it is deemed that the services of University of Nevada, Reno hereinafter set forth are both necessary to Nevada Commission on Mineral Resources and in the best interests of the State of Nevada;

NOW, THEREFORE, in consideration of the aforesaid premises, the parties mutually agree as follows:

1. REQUIRED APPROVAL. This Contract shall not become effective until and unless approved by appropriate official action of the governing body of each party.

2. DEFINITIONS. "State" means the State of Nevada and any state agency identified herein, its officers, employees and immune contractors as defined in NRS 41.0307.

3. CONTRACT TERM. This Contract shall be effective upon approval to **June 30, 2021**, unless sooner terminated by either party as set forth in this Contract.

4. TERMINATION. This Contract may be terminated by either party prior to the date set forth in paragraph (3), provided that a termination shall not be effective until 30 days after a party has served written notice upon the other party. This Contract may be terminated by mutual consent of both parties or unilaterally by either party without cause. The parties expressly agree that this Contract shall be terminated immediately if for any reason federal and/or State Legislature funding ability to satisfy this Contract is withdrawn, limited, or impaired.

5. NOTICE. All notices or other communications required or permitted to be given under this Contract shall be in writing and shall be deemed to have been duly given if delivered personally in hand, by telephonic facsimile with simultaneous regular mail, or mailed certified mail, return receipt requested, postage prepaid on the date posted, and addressed to the other party at the address set forth above.

6. INCORPORATED DOCUMENTS. The parties agree that the services to be performed shall be specifically described; this Contract incorporates the following attachments in descending order of constructive precedence:

ATTACHMENT A: SCOPE OF WORK

7. CONSIDERATION. The **Board of Regents, Nevada System of Higher Education, on behalf of the University of Nevada, Reno** agrees to provide the services set forth in paragraph (6) at a **fixed cost of $90,000 for Fiscal Year 2020 and $90,000 for Fiscal Year 2021**. Any intervening end to an annual or biennial appropriation period shall be deemed an automatic renewal (not changing the overall Contract term) or a termination as the results of legislative appropriation may require.

8. ASSENT. The parties agree that the terms and conditions listed on incorporated attachments of this Contract are also specifically a part of this Contract and are limited only by their respective order of precedence and any limitations expressly provided.

9. INSPECTION & AUDIT.

a. Books and Records. Each party agrees to keep and maintain under generally accepted accounting principles full, true and complete records, agreements, books, and documents as are necessary to fully disclose to the State or United States Government, or their authorized representatives, upon audits or reviews, sufficient information to determine compliance with all state and federal regulations and statutes.

b. Inspection & Audit. Each party agrees that the relevant books, records (written, electronic, computer related or otherwise), including but not limited to relevant accounting procedures and practices of the party, financial statements and supporting documentation, and documentation related to the work product shall be subject, at any reasonable time, to inspection, examination, review, audit, and copying at any office or location where such records may be found, with or without notice by the State Auditor, Employment Security, the Department of Administration, Budget Division, the Nevada State Attorney General's Office or its Fraud Control Units, the State Legislative Auditor, and with regard to any federal funding, the relevant federal agency, the Comptroller General, the General Accounting Office, the Office of the Inspector General, or any of their authorized representatives.

c. Period of Retention. All books, records, reports, and statements relevant to this Contract must be retained a minimum three years and for five years if any federal funds are used in this Contract. The retention period runs from the date of termination of this Contract. Retention time shall be extended when an audit is scheduled or in progress for a period reasonably necessary to complete an audit and/or to complete any administrative and judicial litigation which may ensue.

10. BREACH; REMEDIES. Failure of either party to perform any obligation of this Contract shall be deemed a breach. Except as otherwise provided for by law or this Contract, the rights and remedies of the parties shall not be exclusive and are in addition to any other rights and remedies provided by law or equity, including but not limited to actual damages, and to a prevailing party reasonable attorneys' fees and costs. It is specifically agreed that reasonable attorneys' fees shall not exceed $150 per hour.

11. LIMITED LIABILITY. The parties will not waive and intend to assert available NRS chapter 41 liability limitations in all cases. Contract liability of both parties shall not be subject to punitive damages. Actual damages for any State breach shall never exceed the amount of funds which have been appropriated for payment under this Contract, but not yet paid, for the fiscal year budget in existence at the time of the breach.

12. FORCE MAJEURE. Neither party shall be deemed to be in violation of this Contract if it is prevented from performing any of its obligations hereunder due to strikes, failure of public transportation, civil or military authority, acts of public enemy, acts of terrorism, accidents, fires, explosions, or acts of God, including, without limitation, earthquakes, floods, winds, or storms. In such an event the intervening cause must not be through the fault of the party asserting such an excuse, and the excused party is obligated to promptly perform in accordance with the terms of the Contract after the intervening cause ceases.

13. INDEMNIFICATION. Neither party waives any right or defense to indemnification that may exist in law or equity.

14. INDEPENDENT PUBLIC AGENCIES. The parties are associated with each other only for the purposes and to the extent set forth in this Contract, and in respect to performance of services pursuant to this Contract, each party is and shall be a public agency separate and distinct from the other party and, subject only to the terms of this Contract, shall have the sole right to supervise, manage, operate, control, and direct performance of the details incident to its duties under this Contract. Nothing contained in this Contract shall be deemed or construed to create a partnership or joint venture, to create relationships of an employer-employee or principal-agent, or to otherwise create any liability for one agency whatsoever with respect to the indebtedness, liabilities, and obligations of the other agency or any other party.

15. WAIVER OF BREACH. Failure to declare a breach or the actual waiver of any particular breach of the Contract or its material or nonmaterial terms by either party shall not operate as a waiver by such party of any of its rights or remedies as to any other breach.

16. SEVERABILITY. If any provision contained in this Contract is held to be unenforceable by a court of law or equity, this Contract shall be construed as if such provision did not exist and the nonenforceability of such provision shall not be held to render any other provision or provisions of this Contract unenforceable.

17. ASSIGNMENT. Neither party shall assign, transfer or delegate any rights, obligations or duties under this Contract without the prior written consent of the other party.

18. OWNERSHIP OF PROPRIETARY INFORMATION. Unless otherwise provided by law any reports, histories, studies, tests, manuals, instructions, photographs, negatives, blue prints, plans, maps, data, system designs, computer code (which is intended to be consideration under this Contract), or any other documents or drawings, prepared or in the course of preparation by either party in performance of its obligations under this Contract shall be the joint property of both parties.

19. PUBLIC RECORDS. Pursuant to NRS 239.010, information or documents may be open to public inspection and copying. The parties will have the duty to disclose unless a particular record is made confidential by law or a common law balancing of interests.

20. CONFIDENTIALITY. Each party shall keep confidential all information, in whatever form, produced, prepared, observed or received by that party to the extent that such information is confidential by law or otherwise required by this Contract.

21. PROPER AUTHORITY. The parties hereto represent and warrant that the person executing this Contract on behalf of each party has full power and authority to enter into this Contract and that the parties are authorized by law to perform the services set forth in paragraph (6).

22. GOVERNING LAW; JURISDICTION. This Contract and the rights and obligations of the parties hereto shall be governed by, and construed according to, the laws of the State of Nevada. The parties consent to the exclusive jurisdiction of and venue in the First Judicial District Court, Carson City, Nevada for enforcement of this Contract.

23. ENTIRE AGREEMENT AND MODIFICATION. This Contract and its integrated attachment(s) constitute the entire agreement of the parties and such are intended as a complete and exclusive statement of the promises, representations, negotiations, discussions, and other agreements that may have been made in connection with the subject matter hereof. Unless an integrated attachment to this Contract specifically displays a mutual intent to amend a particular part of this Contract, general conflicts in language between any such attachment and this Contract shall be construed consistent with the terms of this Contract. Unless otherwise expressly authorized by the terms of this Contract, no modification or amendment to this Contract shall be binding upon the parties unless the same is in writing and signed by the respective parties hereto, approved by the Office of the Attorney General.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be signed and intend to be legally bound thereby.

Commission on Mineral Resources, Nevada Division of Minerals

R M Perry — 5-23-19 — Administrator

Richard M. Perry — Date — Title

Board of Regents, NSHE obo University of Nevada, Reno

5/21/2019 — Grants and Contracts Manager

Thomas A. Landis, J.D. — Date — Title

Signature – Nevada State Board of Examiners

APPROVED BY BOARD OF EXAMINERS

On 7-9-19
(Date)

Approved as to form and compliance with law by:

On 22 MAY 2019
(Date)

Deputy Attorney General for Attorney General, State of Nevada

ATTACHMENT A

Scope of work for contract between the Nevada Division of Minerals and Nevada Bureau of Mines and Geology (NBMG)

NBMG agrees to complete the following work in fiscal years 2020 and 2021 in cooperation with the Nevada Division of Minerals and Commission on Mineral Resources. NBMG serves as the state geological survey and is a public service unit of the University of Nevada, Reno. State statutes require that NBMG "serve as a bureau of information and exchange on Nevada's mineral industry, mineral resources, and geology". The projects will produce reports or make available data on Nevada's mineral and energy resources, which help to stimulate exploration and development in Nevada. The total request is for **$180,000** ($90,000 per fiscal year). Four primary continuing projects are proposed. Table 1 provides itemized budgets for the projects in each fiscal year.

Project 1 – Sample Curation ($20,000 per year): The GBSSRL serves as a repository for oil, gas and geothermal (OGG) well cuttings and well logs. Specific deliverables include:

- Cataloguing and curation of all new OGG well cuttings and core.
- Digitizing oil, gas, and geothermal well logs into a searchable database
- One annual report listing the cuttings and well logs that have been archived and digitized, including any back-log.

Project 2 – Publication of the annual Nevada Mineral Industry Report ($35,000 per year): NBMG produces an annual report on activities of the mining and energy industries in Nevada. Specific deliverables:

- Nevada Mineral Industry Report in each fiscal year by December 1 each year.
- Update the Active Mines and Energy Producer Maps by November 15, 2020 (every other year).

Project 3 – Exploration Survey ($35,000 in FY 2021): This project involves preparing a fourth edition in FY21 of exploration activities conducted in Nevada. Funds will be allocated toward a survey of mineral and geothermal exploration completed by companies in 2019/2020. Periodic assessments are critical for defining industry trends, which will provide insights into future economic impacts on the State. In addition to a traditional survey being distributed to mining and exploration companies, information on exploration activities and expenditures will be compiled from company websites and stock exchange filings. Specific deliverable:

- Report will be completed prior to the 2021 legislative session (by February 1, 2021) and thus available for consideration for any resource-related legislation.

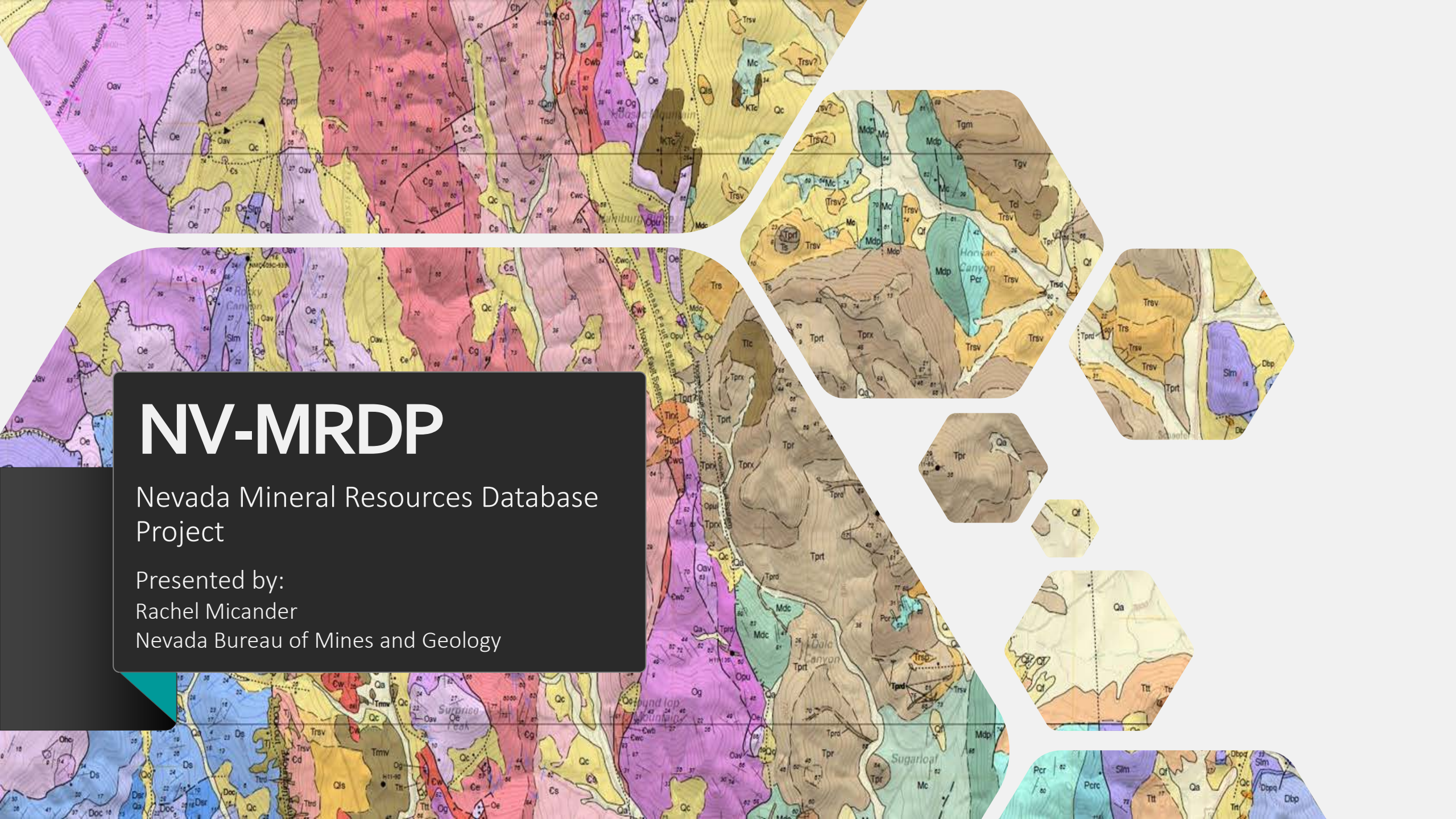
Project 4 – Geothermal Database – Special Report Requested by CMR ($35,000 in FY 2020): NBMG will organize, review for quality assurance, and publish a dataset on the structural settings of both active geothermal systems and late Miocene to recent epithermal mineral deposits in Nevada. The data will be released through the NBMG open data site as an interactive web map and relational database. Specific deliverable:

- NBMG map and report on the structural settings of geothermal systems and late Miocene to recent epithermal mineral deposits by June 30, 2020.

Table 1. Budgets for Proposed Projects

Fiscal Year	Project 1 Sample Curation and Well log Scanning/ Database	Project 2 MI Reports	Project 3 Exploration Survey	Project 4 Geothermal Database	Total
2020	$20,000	$35,000	--	$35,000	$90,000
2021	$20,000	$35,000	$35,000	-	$90,000
Total – Each Project	$40,000	$70,000	$35,000	$35,000	$180,000

III. B Mineral Resource Database Project (MRDP)



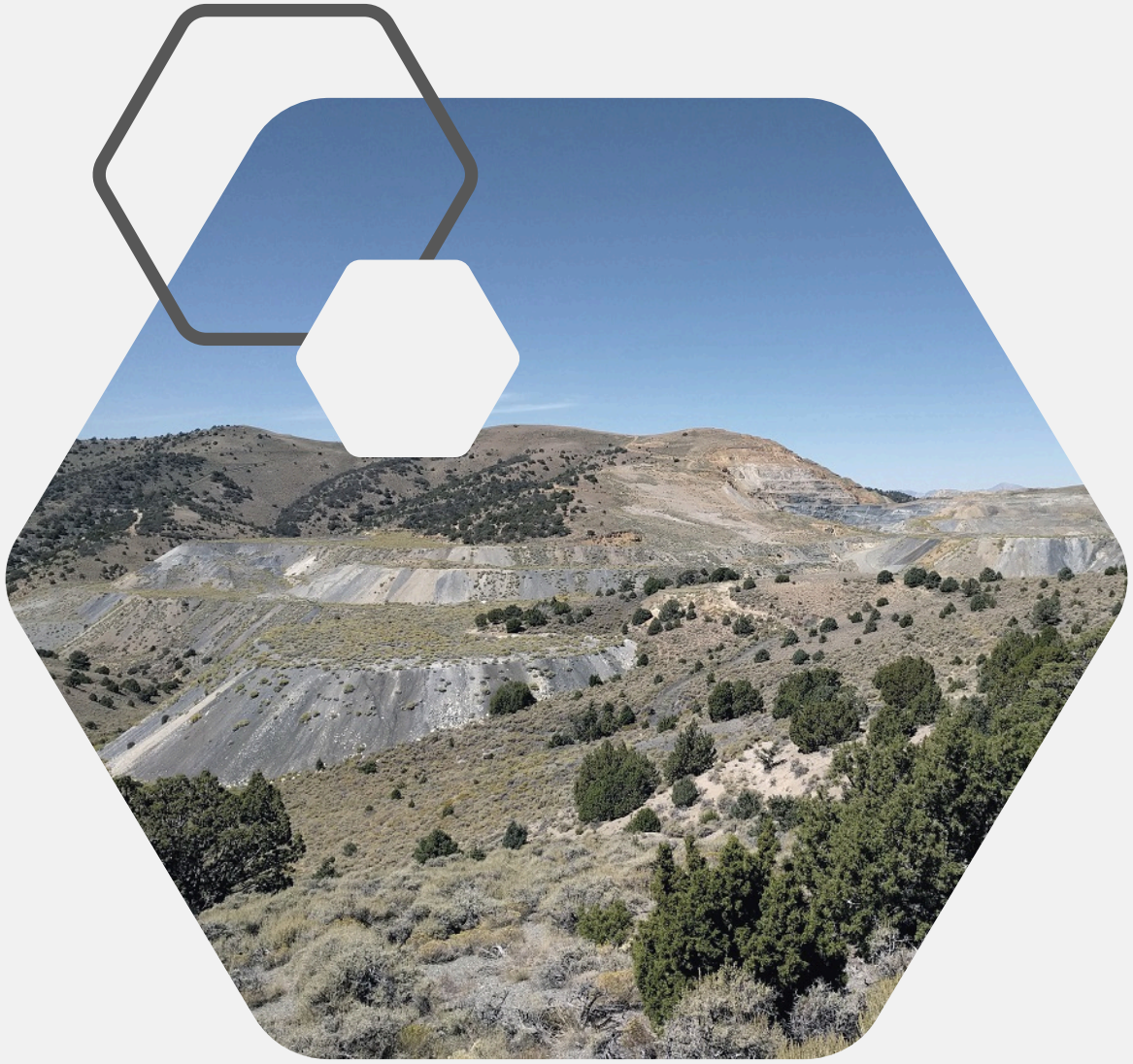
NV-MRDP

Nevada Mineral Resources Database Project

Presented by:
Rachel Micander
Nevada Bureau of Mines and Geology

Objective:

To show explorers who are new to Nevada what has been explored.



Project Team

- A combination of expertise from NBMG and NDOM
- NBMG:
  - Cartography and GIS (Jennifer Vlcan, Rachel Micander, and others)
  - Mike Ressell, David Davis, Emily O'Dean, Jim Faulds, and others as needed
- NDOM
  - Lucia Patterson and Rich Perry

The Project

Create a web platform of Nevada mineral resources including precious metals, base metals, and industrial minerals.

Plan

- The project team originally looked at *MapPlace* as an example
  - *MapPlace* is a suite of geospatial web services provided by the British Columbia Geological Survey to visualize and analyze geoscience and mineral resource data in British Columbia.
- The team decided to refer to this project as a web platform project rather than a database
  - It will combine many databases and resources into a one-stop-shop.

Progress

- The project team has been meeting monthly to discuss progress, data layers to include, and organization methods.

Data Organization

Data have been organized into several categories relevant to exploration in Nevada.

- Categories Include*
  - Occurrences and Production
  - Deposits
  - Mineral Resource
  - Geology
  - Exploration
  - Technical Reports
  - Geophysical
  - Geochemical
  - Land Status
  - Reference Data
- Some of the datasets that will be included in these categories already exists as a web service, while others will need to be created over the course of this project.

**Please note that these categories may change or be further refined as the project progresses*

Data Layers

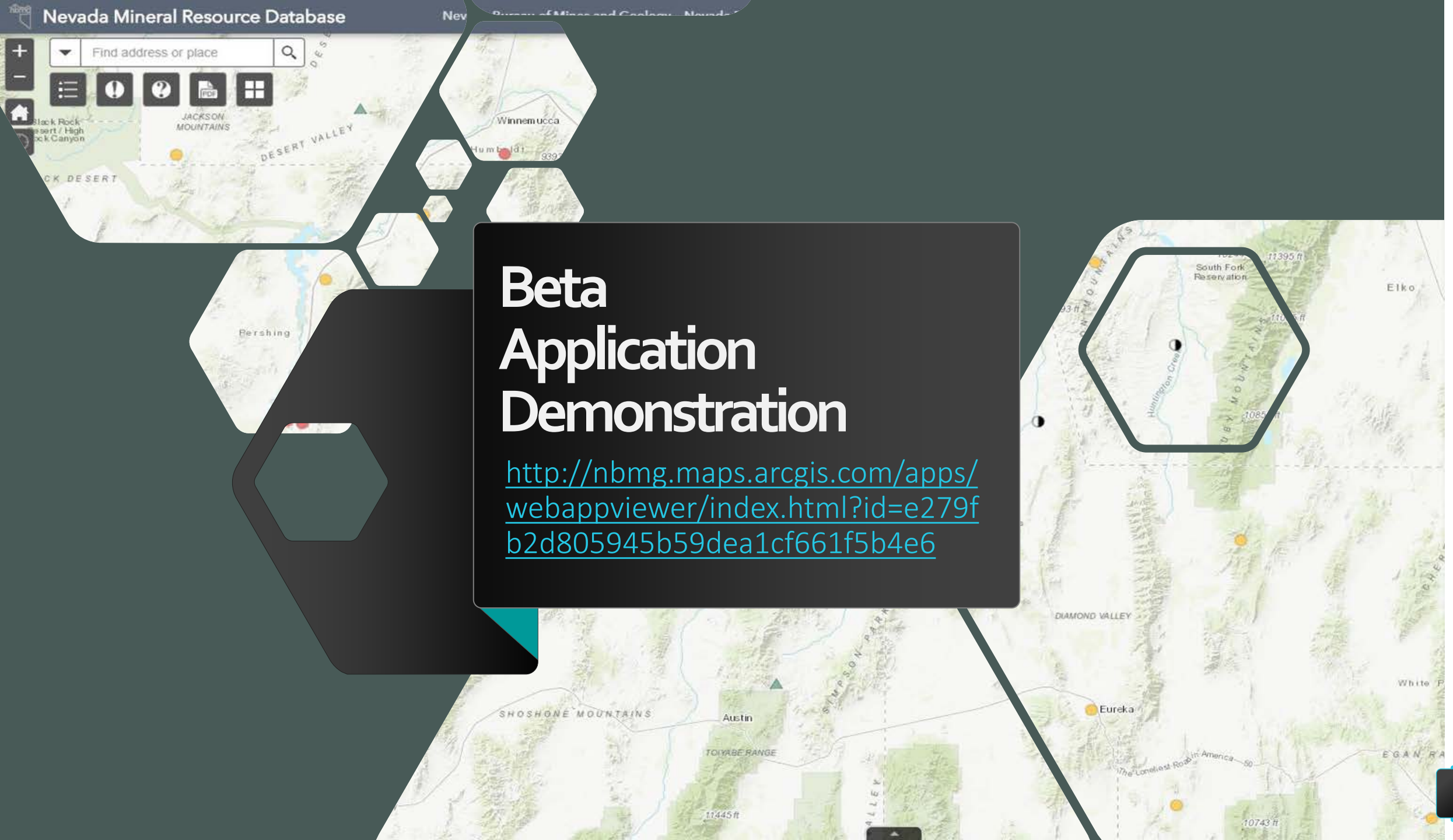
Some of the layers that are or may be included in the mapping application:

Future Layers

- Historical production
- Precious metals, base metals, industrial minerals
- Age dates
- Theses
- Economic geology reports
- Mining district files
- Soils geochemistry
- ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer)

Current Layers

- Active Mines and Energy Producers
- MRDS
- Notices and Plan of Operations
- Geology data including
  - Rock units, terranes, geologic map index, biostratigraphy
- Surface Management Agency
- Land Withdrawls: existing and proposed
- Mining Claims
- PLSS
- 43-101 Reports
- NAIP and Topographic Map Indexes



Beta Application Demonstration

http://nbmg.maps.arcgis.com/apps/webappviewer/index.html?id=e279fb2d805945b59dea1cf661f5b4e6

Thank You

Rachel Micander

rmicander@unr.edu

http://www.nbmg.unr.edu/

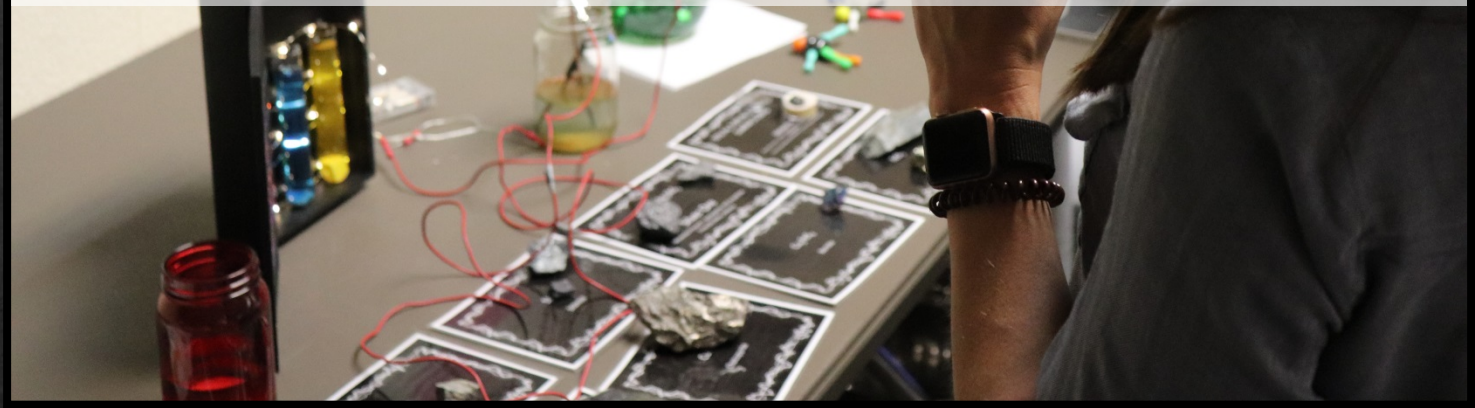
III. C 2019 Northern and Southern Nevada Teacher Workshops

2019 Teachers Workshop Update

Garrett Wake & Courtney Brailo
Nevada Division of Minerals

Introduction

- **Minerals Education Teacher's Workshop**
  - **Educate teachers about minerals, mineral use, economics of mining and develop a foundation for earth science education**
  - **Complete with take-away activities for classrooms**
- **Held twice a year**
  - **Las Vegas – Spring Break**
  - **Northern Nevada (Reno/Rural) – Early Summer**



NRS 513.073 Encouragement of exploration; collection and dissemination of educational information
NRS 513.108 Abatement of dangerous condition of nonoperating mine

Funding & Sponsors

NEVADA
Mining Association

COEUR MINING

NEWMONT

BARRICK

NEVADA COPPER

KINROSS

REDPATH 1962

GRAYMONT

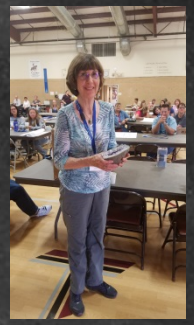
SILVER STANDARD

- **CMR Approved Funds & NMA Supported**
- **5 Dedicated NDOM Staff *plus Interns (northern)***

Schedule & Classes

- **Funds support:**
  - Classroom Material (lots! – posters, mineral ID books & kits, hand lenses, etc.)
  - AML Swag with Safety Message
  - Rock and Mineral Boxes
  - Teacher Giveawayss & Microscope





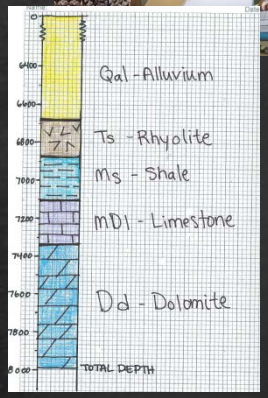
- **Workshop includes:**
  - Industry Message
  - AML Message
  - 16+ Classroom & Tour Hours

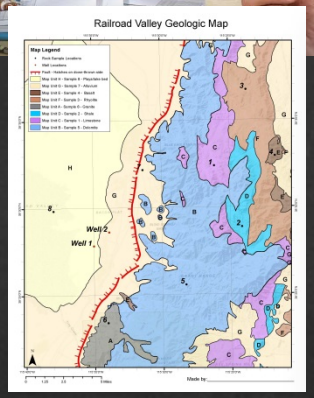
Schedule & Classes

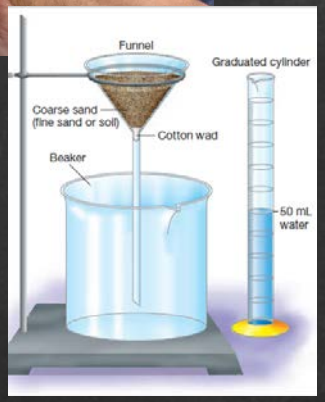
30th Annual Southern Nevada Earth Science Education Workshop 2019					
Room#	Session 1 8:15 – 9:45 a.m.	Session 2 9:55 - 11:25 a.m.	Session 3 12:20 - 1:50 p.m.	Session 4 2:00 - 3:30 p.m.	Session 5 3:40-5:10pm
304 H2O Tab-Count	Minerals L1 K-8 Bill X	The Circle of Mine Life/Reclamation 3-12 Ginger/Pamela X	Rocks & Geology L1 K-8 Bill X	Paste with a Taste 3-8 Bill X	--------
308 H2O Tab-Count	Minerals L1 K-8 DD	Mineral Use Activities 4-8 DD	Rocks & Geology L1 K-8 DD	One In A Million 3-8 Beth/Ginger	Water: Yours, Ours, Mine 6-12 DD/Ginger X
311 H20 Tab-Desks	Minerals L1 K-6 Rachel M./Rob G.	--------	Rocks & Geology L1 K-6 Rachel M./Rob G.	Finding Your Way 4-12 Rachel/Garrett /Becky	Plate Tectonics 6-12 Rachel/Jon
312 H2O Tab-Count	--------	Nevada's Natural Resources K-12 Patti/Sean	--------	Drilling for Energy 6-12 Courtney/Garret/Becky/Lucia	--------
313 - Desks	Minerals L2 (prev att L1) Lucia/Courtney	Geologic Time and Fossils K-8 Lucia/Courtney	Rocks & Geology L2 (prev. att. L1) Lucia/Courtney	--------	Geologic Timescale Challenge 5-12 Lucia/Courtney
316 - Desks	Minerals L1 K-8 Terry J	--------	Rocks & Geology L1 K-8 Terry J.	Cupcake Core Drilling 5-12 Terry J.	--------
318 - Desks	Minerals L1 4-12 Garrett/Becky	--------	Rocks & Geology L1 4-12 Garrett/Becky	--------	Minerals "Grab Bag" 2-8 Garrett/Becky
320 - Desks	Minerals L1 K-8 Lorri Dee X	Natural Disasters 5-12 Rob	Rocks & Geology L1 K-8 Lorri Dee X	Build a Mine 4-12 Joe/Rob	Build a Mine 4-12 Joe/Terry
322 - Desks	Minerals L1 9-12 Jon X	Critical Elements of Energy 6-12 Jon	Rocks & Geology L1 9-12 Jon X	--------	Nevada Mining History K-6 Rob /Sam
402 HE H2O Tables	--------	Crystal Gardens and Stepping Stones; Make it and Take it K-6 Sam	--------	Geography/Geology of Nevada on a Brownie 2-12 Sam X	Edible Geology K-8 Sam

- **Tours are guided with focus on geology and mining**
- **Digital Road Logs available for teacher's during & after workshop**

Example: Drilling For Energy Class



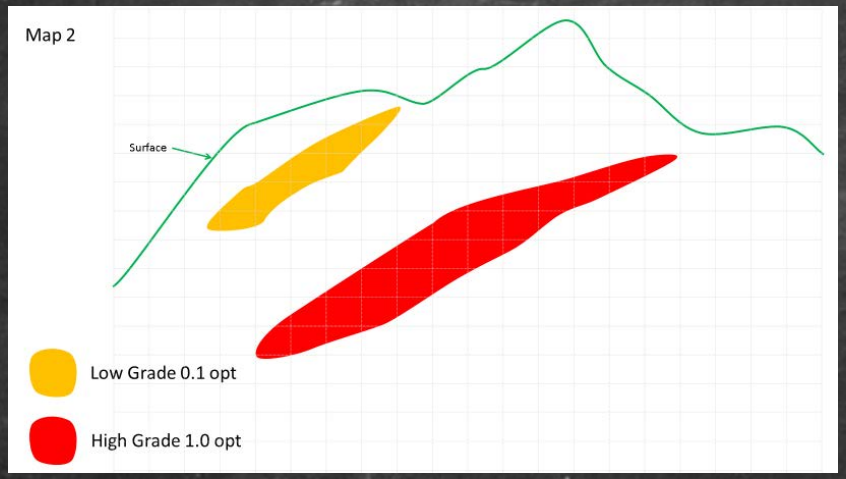


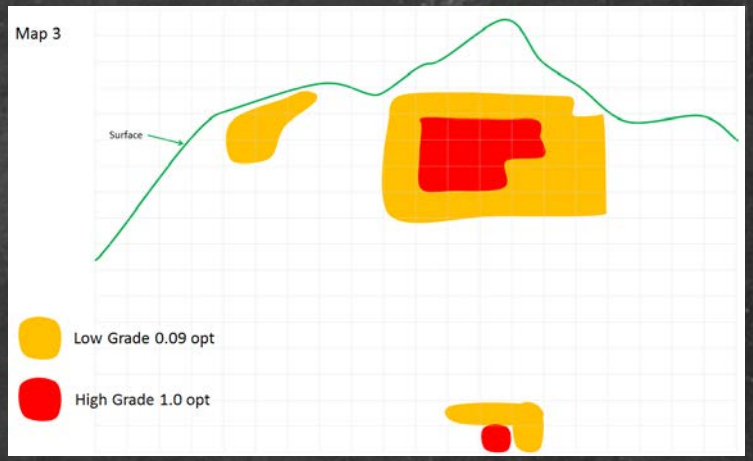


- **Addresses drilling and exploration practices with Nevada Specific example**
  - Rock Identification
  - Geologic Mapping
  - Reading and Creating Well Logs / Stratigraphic Sections
  - Porosity & Permeability Testing
  - Drilling and Hydraulically Fracturing Wells

- Cupcake Core Drilling Class – Addresses many of these topics with mineral exploration and production – geared at younger ages

Example: Build A Mine



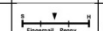
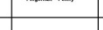


- **Instructs on the various aspects that come into consideration when considering mining a deposit:**
  - Are the economics favorable?
  - What type of resource is it?
  - Life cycle of a mining operation
    - In detail: Exploration, Permitting, Development, Extraction, Reclamation
  - Activity where groups each receive a different game board hosting a mineral deposit
    - Decide on your resource model
      - Underground / Open Pit
    - Roll dice to determine:
      - Commodity price, proximity to towns and infrastructure, purchase equipment or contract, favorability of geochemistry, reclamation cost, nearby biological/cultural resources, etc.

Example: Minerals Grab Bag

What am I made of?

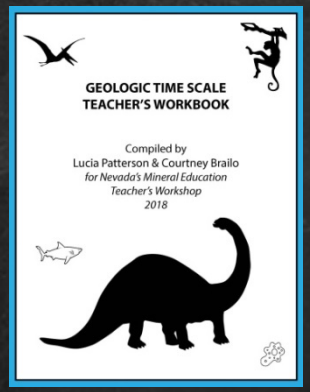
Mineral Physical Properties & Uses

Mineral	Color	Streak	Hardness	Special Properties	Uses
Mica	black, silver, green	white-gray		breaks into planes	cosmetics, insulator in electronics
Calcite	white, brown	white		fizzes with acid	toothpaste, cement, antacids, chewing gum
Fluorite	clear, purple, green	white		fluoresces	optical glass, fluoride in drinking water and toothpaste, refrigerants in refrigerators
Gypsum	clear, white	white		---	drywall, cement manufacturing, plaster-of-paris
Halite	white	white		tastes salty	table salt, soaps and detergents, road de-icing
Magnetite	gray, black	black		magnetic	iron and steel for cars, ships, bridges, buildings, machinery, tools, kitchen appliances, cans, cooking utensils (stainless steel), magnets
Copper ore	green, blue	green		---	electrical wiring used in buildings, appliances, telephones, motors, and power lines, copper pipes, coins, jewelry
Quartz	white, clear, any color	no streak		---	computer chips and optics, glass, semi-precious gemstones (ex. amethyst)
Talc	white, gray	white		feels waxy or powdery	powders, medicines, food, paper

- **Two activities pulled from NDOM's growing archive**
- **2019:**
  - What am I made of? (2nd & 3rd grade)
    - Students identify and classify common objects
  - Minerals properties and uses (4th – 12th grade)
    - Students test 8 minerals for hardness, streak and color
    - Students identify each mineral based off exhibited properties

Example: Geologic Time

- **Understanding geologic time and evolution – perspective**
- **Earth History Overview with Nevada highlights**
  - 76 million years per minute!
- **Multitude of activities and resources**
  - Earth Timescale – to scale
  - Poster Game
  - Make a fossil
  - Evolve a Beast
  - Many more!



Tours – Southern Nevada

- **Lhoist - Chemical Lime Mine/Processing Plant, Quarry, Sampling, Processing & Final Product *with blast!***
- **Tule Springs Fossil Beds**

Lhoist Blast short.mp4

Tours – Southern Nevada

- **Las Vegas Rock - Decorative Sandstone, Quarry t0 Custom Product Process**
- **Red Rock National Park – Archeology, Geology & Biology**

Tours – Southern Nevada

- **Simplot - Silica Mine**
- **Lost City Museum**

Tours – Northern Nevada

- **Pumpkin Hollow - Copper Mine**
- **Anaconda Mine - NDEP/Reclamation**

Tours – Northern Nevada

- **Truckee River - Geology & Flood Cycles**
- **Pyramid Lake - Historic Mining, AML, Native Tribes & History,**
- **BLM Wild Horse & Burro Management**

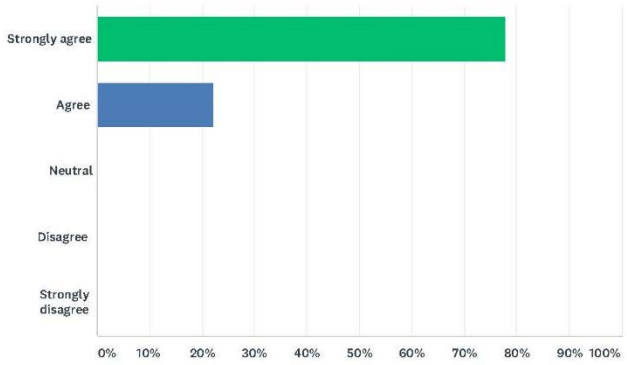
Attendance Totals

- **Southern Nevada**
  - 177 teachers signed up
  - 119 teachers in attendance
- **Northern Nevada**
  - 81 teachers signed up
  - 57 teachers in attendance

Surveys – So. NV

Q16 I feel that I have received important content from this workshop that I can use in my classroom.

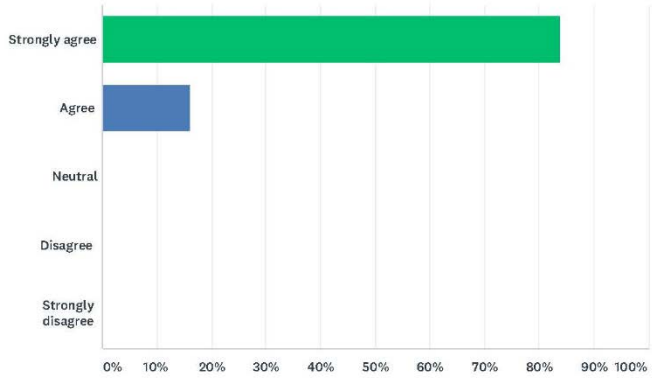
Answered: 81 Skipped: 4



ANSWER CHOICES	RESPONSES	
Strongly agree	77.78%	63
Agree	22.22%	18
Neutral	0.00%	0
Disagree	0.00%	0
Strongly disagree	0.00%	0
TOTAL		81

Q17 This workshop has been a great experience overall.

Answered: 81 Skipped: 4



ANSWER CHOICES	RESPONSES	
Strongly agree	83.95%	68
Agree	16.05%	13
Neutral	0.00%	0
Disagree	0.00%	0
Strongly disagree	0.00%	0
TOTAL		81

Surveys – So. NV

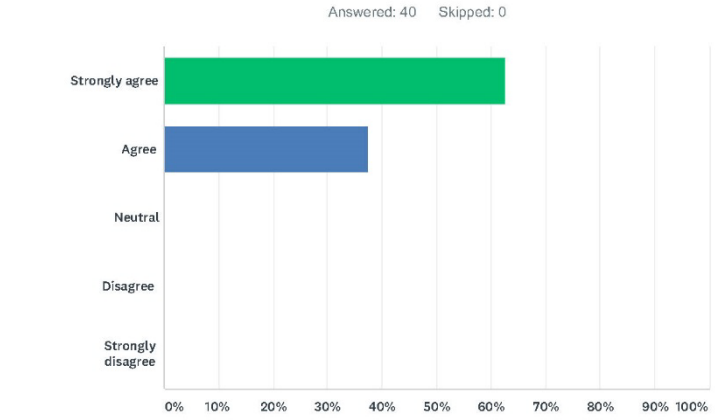
Q18 What do you consider were the important takeaways from this workshop?

Answered: 81 Skipped: 4

#	RESPONSES	DATE
1	The real on the spot experiences from the tour sites gave me tons of knowledge which will motivate me to learn more about the things I learned from the tours, such as fossils, land mines, etc.	4/18/2019 9:37 AM
2	I can use everything in my classroom even if I do not teach science Just to share all the stuff with our kids about the great state of NV and mining is everything	4/18/2019 8:36 AM
3	Very informative	4/18/2019 8:33 AM
4	That mining is good for the economy but bad for the planet.	4/17/2019 7:10 PM
5	The presentors were very experienced and knowledgeable in the topic we are learning about.	4/17/2019 7:02 PM
6	Fun and networking	4/17/2019 6:07 PM
7	The handouts for paste with taste was fantastic. The rock and mineral boxes are so appreciated and will be such an asset for my students. Rubbing shoulders with folks who were excited about rocks and minerals was a great two days.	4/17/2019 5:46 PM
8	Direct experiences to share with the students.	4/17/2019 5:06 PM
9	The whole mining topic in NV. I had no idea it was so expansive. Excellent info	4/17/2019 4:37 PM
10	That the mining industry has a larger impact than many of us believe and that there are opportunities out there for our community to join the industry.	4/17/2019 4:36 PM
11	The use of minerals in daily life and the information about mining.	4/17/2019 4:35 PM
12	Great information about mining and the different phases of the mining industry.	4/17/2019 4:35 PM
13	Clear explanations	4/17/2019 4:34 PM
14	I learned how important mining is to our state and how it has impacted our state history. I had a great time and enjoyed all the hands on activities that I can do with my students.	4/17/2019 4:33 PM
15	The networking and opportunity to visit a site that otherwise would be not available	4/17/2019 4:33 PM
16	The most important takeaways were that mining is a big industry in Nevada so it is important that I introduce students to natural sciences and the basics of mining	4/17/2019 4:32 PM
17	None	4/17/2019 4:31 PM
18	The importance of mining and protection of the environment. Also the uses of so many minerals "esides the high profile minerals gold and silver.	4/17/2019 4:26 PM
19	Lots of activities to take back and use in classroom.	4/17/2019 4:23 PM
20	The connection to the new NV Social Studies and NGSS standards are essential. (Especially for 4th grade teachers like me.)	4/17/2019 4:09 PM
21	Rocks and minerals activities. They were all good!	4/17/2019 4:09 PM
22	Facts and friendships	4/17/2019 4:08 PM

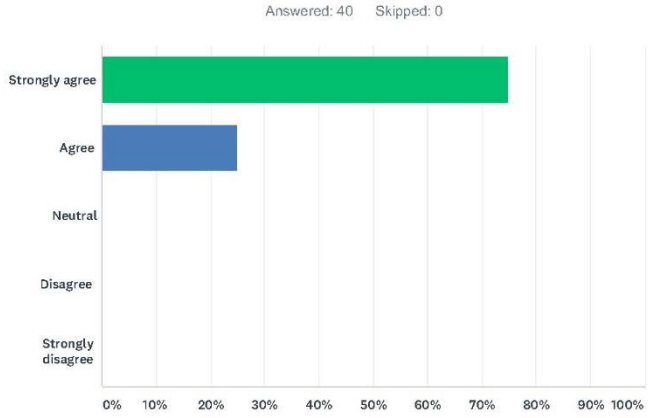
Surveys – N. NV

Q10 I feel that I have received important content from this workshop that I can use in my classroom.



ANSWER CHOICES	RESPONSES	
Strongly agree	62.50%	25
Agree	37.50%	15
Neutral	0.00%	0
Disagree	0.00%	0
Strongly disagree	0.00%	0
TOTAL		40

Q11 This workshop has been a great experience overall.



ANSWER CHOICES	RESPONSES	
Strongly agree	75.00%	30
Agree	25.00%	10
Neutral	0.00%	0
Disagree	0.00%	0
Strongly disagree	0.00%	0
TOTAL		40

Surveys – N. NV

Q12 What do you consider were the important takeaways from this workshop?

Answered: 40 Skipped: 0

#	RESPONSES	DATE
1	Information about rocks and minerals made me more knowledgeable and I will now be able to relay more facts to my students in fun ways such as the edible geology. square set timbering and heap leaching.	6/19/2019 11:25 PM
2	I think this is always a wonderful class.	6/19/2019 10:17 PM
3	Lots of good ideas to take back to school for speech students	6/19/2019 10:10 PM
4	Everything I love this conference! Such a good idea to learn about geology and history on the bus ride. All the sessions were amazing, the food and the giveaways. You guys do an amazing job. Please keep it in June. July is too hot.	6/19/2019 9:45 PM
5	Some really great activities that can be easily used in the classroom. A vast amount of resources that are an email or hone call away.	6/19/2019 8:38 PM
6	Actual rocks/minerals plus activities with them. Speaker on making abandoned mines safe was entertaining!	6/19/2019 8:35 PM
7	Names and contact info for those who are willing to do guest workshops for my school.	6/19/2019 8:03 PM
8	The tour and workshop on second day were great. See comments on prior tome. All good.	6/19/2019 7:49 PM
9	Seeing mining in a positive light and learning about the reclamation process. Learning about all the mined products that go into making relatively simple items such as a soccer ball.	6/19/2019 7:44 PM
10	Great collaboration with other teachers. Great information about field trips and funding	6/19/2019 6:14 PM
11	Content was good. There needs to be more focus on classroom implemtation. Rather than a grade level breakout session at the end, each session should end with a 15+ minutes on how to implement the session in the classroom.	6/19/2019 6:14 PM
12	I enjoyed the breakaway sessions this morning and learning about other sessions I did not attend!	6/19/2019 5:54 PM
13	The information, hands on experience, the stuff we got. Last time I went the school with the most trachers got the microscope.	6/19/2019 5:16 PM
14	The things i can use in my classroom	6/19/2019 5:09 PM
15	Networking with other professionals, activities that can be adapted and used in my classroom, free handouts and resources!	6/19/2019 5:09 PM
16	These conferences have opened my eyes to the world of geology! It's all around us!	6/19/2019 5:08 PM
17	Mining and minerals are an important part to our understanding of Nevada and many science topics	6/19/2019 5:07 PM
18	The hands on activities	6/19/2019 5:06 PM
19	How important the mining industry is to Nevada	6/19/2019 5:05 PM

Questions

IV. OLD BUISNESS

IV. A Legislatively-Approved 2020-2021 NDOM Budget

Legislatively Approved Budget
For FY 2020-2021
Commission on Mineral Resources
Division of Minerals

Richard Perry, Administrator

August 15, 2019

Budget Approval Path

Division Prepares Budget & Projects

July-Aug, 2018

CMR Reviews Budget Sets Priorities

Late August, 2018

Division Submits to Governor's Office

August 31, 2018

Governor Recommends to Legislature

Early January, 2019

Legislature Modifies & Approves

Feb-June 2019

CMR-Division of Minerals - 2020-2021 Legislatively-approved Budget

Revenue

GL #	Description	2019 EST *	FY20 BUDGET	FY21 BUDGET	Remarks
2511	Balance Forward Previous Year	1,358,743	1,139,097	1,198,254	
3578	BLM Cooperative Agreement	130,475	8,397	8,397	BLM assistance funding AML work performed by NDOM on BLM lands
3580	USFS Assistance Agreement	13,409	8,397	8,397	USFS assistance funding AML work performed by NDOM on USFS lands
3654	Oil Production Fee	35,035	40,016	40,016	$0.15 per bbl fee for oil production annually
3717	Oil Permit Fees	6,800	6,500	6,500	Permit fees for new oil and gas wells
3718 & 3727	Mining Claim Fees	1,993,030	1,812,030	1,794,340	Mining Claim fees @ $10 per new claim, $10 for claims held
3736	Geothermal Fees	160,100	157,500	157,500	Annual fee and permit fees for geothermal wells and permitting
3740	Dissolved Mineral Resource Fees	1,000	10,000	10,000	Permit fees for DMR (lithium brine) permits
3770	Surface Disturbance Fee (AML)	29,140	51,567	51,567	$20 per acre fee for new mine surface disturbance
3801	Clark County AML	143,365	0	0	Inter-local contract for AML securing
3805	NAAMLP Conference	0	0	0	pass-through, Nevada hosting 2020 NAAMLP Conference in So. Lake Tahoe
4011	Copy Machines - Sales to Public	1,613	606	606	Copying Charge for Public Records Request
4027	Publication Sales (AML signs)	1,480	1,233	1,233	AML signs sold at office
4203	BOA Travel Card Refund	0	75	75	
4311	Medallion Royalty Fee	107	226	226	Fee for minting of medallions with State seal remitted to NDOM
4326	Treasurer's Interest	29,653	25,292	25,292	Interest we receive for money deposited with Treasurer
4620	Transfer from Recl. Bond Pool	81,151	93,327	93,327	Fee from Bond Pool for NDOM Management
	REVENUE TOTAL	$3,985,101	$3,354,263	$3,395,730	

Expenditures

CAT #	Description	FY19 Actuals	FY20 Forecast	FY21 Forecast	Remarks
01	Personnel (Sal.,WC, PERS,OT)	1,153,607	1,228,059	1,227,658	11 FTE's and 8 summer interns, includes 3 weeks in Dec for interns
02	Out-of-State Travel (Staff, CMR)	16,351	17,078	16,438	Includes PDAC (3), AEMA (3), NAAMLP (2)
03	In-State Travel (Non-AML)	12,978	13,724	12,325	Travel, lodging and per-diem within State
04	Carson Operating Expenses+Equipment	121,830	113,436	111,832	Rent, Operaing supplies
08	CMR Travel (In-State)	3,353	6,409	6,409	
09	Special Projects (Mackay, NBMG)	156,937	128,017	128,017	FY20 - $90k (NBMG deliverables), $27,304k (PDAC), $15k (NVMA Ed) $2.7k display updates, $40k AML SOSA video; FY21 - $90k (NBMG deliverables), $27,826 PDAC, $15k (NVMA Ed), $2.7k display updates
14	Las Vegas Operating Expenses	33,868	34,991	35,687	Office will move in 2020
17	Fluid Minerals	22,171	10,258	10,258	Lowell's field expenses for OGG and DMRE
18	AML Support (per diem, trucks, fuel, AML supplies and travel, SOSA supplies)	144,347	120,527	120,177	Swag; AML per diem 6 interns for 3 wks in winter (FY19); 8 interns; vehicle repair costs; Fleet Services lease on trucks, 8 new Mesa tablets in 2021
26	Computer and IT	23,006	7,944	7,944	computer hardware/replacements
30	Training	2,085	4,840	4,840	ESRI training
39	AML Enhancements(contracts, equip.)	628,509	494,000	500,000	Contracted AML closure work
40	AML Conference (NAAMLP Sep. 2020)	1,568	0	0	pass-through, Nevada hosting 2020 NAAMLP Conference in So. Lake Tahoe
87 & 88 & 89	Cost Allocations (State, Purchasing, AG)	79,592	98,798	98,798	Purchasing assessment, AG cost allocation, State cost allocation
	EXPENDITURE TOTAL	$2,400,201	$2,278,081	$2,280,383	
86	Reserve - Balance Forward to Next Year	$1,584,900	$1,076,182	$1,115,347	
		$634,900	$126,182	$165,347	Reserve Amount in excess of $950,000 guidance

* 2019 not yet closed

PERFORMANCE MEASURES - DIVISION OF MINERALS		
ACTIVITY NAME	PERFORMANCE MEASURE	GOAL
1. Oil, Gas and Geothermal Well and Resource Regulation	Field inspection of permitted oil, gas and geothermal wells in Nevada each year	> 33% Annually
2. Mining Regulation and Fluid Management and Reclmamation	Number of hazardous AML openings secured vs. number inventoried	> 70% Annualized
3. Resource Management and Public Outreach	Number of mineral education and AML hazard presentations per year	> 264 per year, which is 2 per employee per month

Priorities and Core Functions

EDUCATED & HEALTHY CITIZENRY	EFFICIENT & RESPONSIVE STATE GOVT
• **Education & Workforce Development** • **Health Services** • **Human Services** Minerals Education in Schools Summer College Internship program NRS 513	• **State Support Services** NDOM web-site delivery of fillable-forms, open-data web site, information to public and industry, maps and information to Governor and Legislature.
SAFE & LIVABLE COMMUNITIES	**VIBRANT & SUSTAINABLE ECONOMY**
• **Public Safety** AML Program • **Resource Management** Oil, Gas, Geothermal and Dissolved Mineral Exploration Well Permitting NRS 522, NRS 534A, NRS 534B	• **Business Development & Services** • **Infrastructure & Communications** Industry outreach, Mines Registry, Record annual production, collect and Disseminate information, trade shows, NRS 517 (Claims), NRS 519A (bond pool)

STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 • Fax (775) 684-7052
http://minerals.nv.gov/

BRIAN SANDOVAL
Governor

Las Vegas Office: 2030 E. Flamingo Rd. #220, Las Vegas, NV 89119
Phone: (702) 486-4343; Fax: (702) 486-4345

RICHARD PERRY
Administrator

DATE: January 2, 2019
TO: Cindy Jones, Assembly Fiscal Analyst
FROM: Richard Perry, Administrator
SUBJECT: Expanded Program Narrative
BUDGET ACCOUNT NUMBER: 4219

DESCRIPTION OF PROGRAM

The Nevada Division of Minerals, a part of the Commission on Mineral Resources, administers programs and activities for abandoned mine land public safety, minerals education, reclamation performance bonds, and annual reporting of all mineral, geothermal and oil & gas production for the State. In addition, the Division is the regulatory agency for geothermal, oil & gas drilling and production, and dissolved mineral resource exploration wells.

The Commission on Mineral Resources is a seven-member body appointed by the Governor for their knowledge of mining, minerals exploration, geothermal, and oil & gas exploration and production. The Commission directs mineral-related policy for the Division, advises the Governor and Legislature on matters relating to mineral resources, and approves any regulation changes charged to the Division. The Commission on Mineral Resources is an Executive Branch agency, as defined in NRS 513.

The Division of Minerals has 11 full-time employees and offices in Carson City and Las Vegas. Professional staff are generally recruited from industry with educational backgrounds in minerals exploration and mining, geothermal and oil & gas production, and global information systems. Professional staff are all unclassified employees and skilled in their areas of expertise. The Division is entirely fee-funded through mining claim fees, geothermal fees, oil and gas fees, reclamation fees, and matching support for abandoned mine land inventory and securing work from the US Forest Service, Bureau of Land Management (BLM), US Army Corps of Engineers and Nevada counties. No revenues are derived from General Fund appropriations.

The Division maintains an active State web site where program information, meetings, forms and approved permits can be viewed (http://minerals.nv.gov/), and an open-data site where maps, shapefiles, educational materials and other digital data can be downloaded by the public.
http://data-ndom.opendata.arcgis.com/

Commission on Mineral Resources
Richard DeLong, *Chairman; Large-Scale Mining*
Dennis Bryan; *Small-Scale Mining and Prospecting*
Mary Korpi, *Public at Large*
Arthur Henderson; *Oil and Gas*
Nigel Bain; *Large-Scale Mining*
Robert Felder; *Exploration and Development*
John H. Snow; *Geothermal Resources*

I. APPLICABLE NEVADA REVISED STATUTES, PURPOSE AND CRITICAL NEED

NRS 513 – Commission on Mineral Resources, Division of Minerals

- Encouragement of minerals exploration, collection and dissemination of educational information and maintenance of a register of all active mining, geothermal and oil & gas operations in the State, and abatement of dangerous conditions of non-operating mines.

    - The Division issues an annual publication each year entitled "Major Mines of Nevada", which has production data for the State's mines, geothermal energy fields and oil production. This publication is used by industry, elected officials, government agencies and the public. The Nevada Department of Taxation also uses this production data to help audit net proceeds of mines calculations. http://pubs.nbmg.unr.edu/Major-mines-of-Nevada-2017-p/p029.htm

    - The abandoned mine lands (AML) program is designed to discover dangerous conditions from historic mining practices that pose a physical safety risk to the public. The Division identifies the owner or responsible party, annually notifies each board of county commissioners, secures orphan hazardous mine openings and educates the public about these hazards. Division Staff respond to law enforcement on matters relating to abandoned mine shafts and operate remote equipment for inspection of shafts and tunnels. The annual Nevada Abandoned Mine Lands Report documents work completed the previous year along with performance measures and reported incidents or fatalities. Mine securing work is performed by Division staff, summer interns, staff-supervised scout service projects and the Division's remediation contractors. http://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/AML/2017_NDOM_AML_Report_Final.pdf

    - Education and Outreach - Division personnel provide minerals education programs and materials to K-12 schools and presentations to civic and trade organizations. The Division partners with the Education Committee of the Nevada Mining Association to provide earth science teacher workshops in southern and northern Nevada each year, and assists State museums with technical assistance and displays related to earth science and mineral resources. http://minerals.nv.gov/Programs/EO/EO/

    - The Commission funds targeted studies and reports published by the Nevada Bureau of Mines and Geology on topics related to mineral exploration, mining and processing, using funds derived from mining claim fees. http://minerals.nv.gov/Programs/Mining/Mining_Forms/

NRS 517 – Mining Claims, Mill Sites and Tunnel Rights

- This statute, which dates back to 1873, defines all of the critical laws and procedures for filing and maintaining unpatented mining claims on Federal lands in Nevada. These include the persons entitled to locate unpatented mining claims, monumenting for the various types of claims, maps and surveys required, recording of claims with counties, and definitions of unlawful acts. The Division maintains approved forms for the various types of mining claims on its web site and responds to public and industry information requests. Division staff also responds to questions from county recorders and the public on issues related to locating and recording of mining claims. The Division partners with the BLM in their mining claim workshops, offered for free each year to the public. As of October, 2018, there were 193,654 active mining claims within the State. http://minerals.nv.gov/Programs/Mining/MiningClaims/

- The Division updated all 16 mining claim forms referenced in NAC 517 to include online-fillable forms in 2016.

NRS 519A.290 – Program for Pooling of Reclamation Performance Bonds.

- The Division administers a reclamation bond pool for small miners and exploration companies operating in Nevada. The Division issues reclamation bonds which are required by the Nevada Division of Environmental Protection and/or the BLM before land can be disturbed for exploration. Most of this reclamation pool covers "notice-level projects", which disturb five acres or less of Federal land. This program is important to the minerals exploration community as it reduces the time required to acquire reclamation bonding through other sources. http://minerals.nv.gov/Programs/BP/BP/

NRS 522 – Oil and Gas.

- The Division of Minerals is the permitting and compliance agency responsible for evaluating and issuing drilling permits for oil and gas wells, completion and operation of wells, conservation of the resource and protection of fresh water. Procedures to resolve questions and disputes through hearings and orders regarding pooling and unitization of hydrocarbon resources are defined in this chapter. Nevada had 119 permitted oil wells in 2018 and no gas wells. At the end of 2018, there were three active permits to drill. All existing oil & gas wells are inspected by Division staff every year.

- Nevada is a member of the Interstate Oil and Gas Compact Commission (IOGCC) which represents the governors of 31 member states and works to ensure the nation's oil and gas resources are conserved and utilized to their maximum potential while protecting health, safety and the environment. The Administrator of the Division has historically been appointed as the Governor's representative to IOGCC. The Division pays Nevada's IOGCC dues with fees collected from oil production each year.

- The State's Oil and Gas code (NAC 522) was updated in 2014. This update included regulations for the use of hydraulic fracturing in oil and gas drilling. The Division coordinates with the Bureau of Land Management in permitting wells on Federal lands, as Nevada is a "dual-permitting" State, which allows for Nevada's more stringent regulations to be enforced on Federal lands. http://minerals.nv.gov/Programs/OG/OG/

NRS 534A – Geothermal Resources.

- The Division is the permitting and compliance agency for drilling, completion and operation of geothermal wells in Nevada. Nevada had 459 permitted commercial and industrial geothermal wells at the end of calendar 2018. Geothermal wells are inspected by Division staff on a minimum three-year cycle. Nevada is the second largest producer of geothermal electrical power in the nation.

- The Division was directed by the Commission on Mineral Resources to review and update the State's geothermal code (NAC 534A) to reflect current drilling practices and technology changes. This process will begin in calendar 2019. http://minerals.nv.gov/Programs/Geo/Geo/

NRS 534B – Dissolved Mineral Resources

- This new chapter of NRS was created during the 2017 legislative session, and regulations were subsequently developed in coordination with the Divisions of Environmental Protection and Water Resources. The regulations address permitting of exploration boreholes and wells for mineral brines, more specifically lithium-bearing brines. Nevada had approximately 12,000 mining claims located for lithium brine exploration on Federal lands as of October, 2018.

- The program is necessary to regulate drilling and plugging of exploration boreholes and wells for dissolved minerals, limits the amount of water that can be sampled or pumped for each project, and requires a safety review by the Division staff where boreholes or wells are in proximity to active geothermal or oil-producing areas. The regulations operate in conjunction with BLM surface-disturbance permitting and reclamation bonding for locatable mineral exploration projects.

NEW PROGRAMS OR MODIFICATIONS TO EXISTING PROGRAMS

The Division of Minerals has no new programs or modifications of existing programs proposed for 2020-2021. Division revenues are highly dependent on the number of mining claims filed or renewed each year. Activity levels in the abandoned mine land securing program are adjusted to these revenues by ramping contracted securing work up or down. The Division expects the number of mining claims to remain relatively static during the next two years, and has budgeted accordingly. The Division has no BDR's or Bill drafts.

II. PERFORMANCE INDICATORS

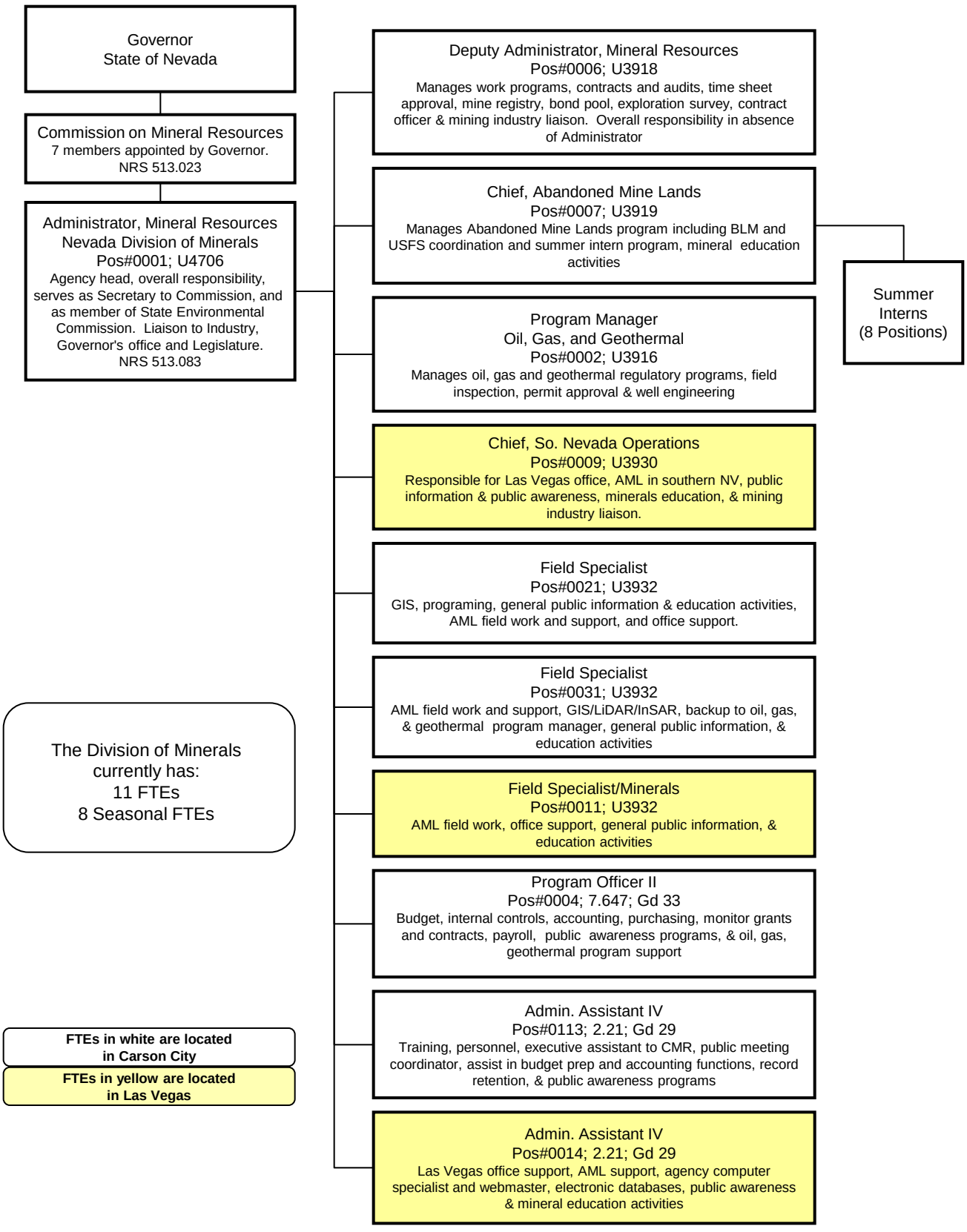
The Division has three performance indicators in the 2018-19 budget plan. The Division exceeded all three of these performance indicators in FY 2018. These measures are used to drive activities and performance within the Division and are reported to the Governor's Office and Commission on Mineral Resources in the Division's monthly executive summary.

Agency 500 Commission on Mineral Resources - Performance Measures							
ACTIVITY	PERFORMANCE MEASURE	DESCRIPTION	FY-17 Actual	FY-18 Actual	FY-19 Projected	FY-20 Projected	FY -21 Projected
Resource Management and Public Outreach	Abandoned Mine Lands and Minerals Education Presentations per Employee	Number of abandoned mine land (AML) and minerals education presentations in schools, civic and trade groups per employee annually (Goal >24 per year per emplyee)	29	34.7	25	24	24
Mining Regulation and Fluid Management and Reclamation	Percent of Hazardous Abandoned Mine Openings Secured	Percent of Abandoned Mine Lands Opening Secured (Goal: AML hazards logged/ AML hazards secured > 70% annually)	81%	79.40%	80%	80%	80%
Oil, Gas and Geothermal well Resource Regulation	Percent of Oil, Gas and Geothermal wells inspected annually	Percent of total Oil, Gas, and Geothermal Wells inspected (Goal: >33% per year)	61%	64%	59%	58%	57%

III. WORKLOAD STATISTICS

The Division of Minerals does not use workload statistics. The Division does track numbers of permits issued for oil, gas and geothermal drilling, the number of well inspections performed, the number of minerals education presentations given by staff, and abandoned mine land work completed. These are reported in the Division's monthly report.

Nevada Commission on Mineral Resources
Division of Minerals (4219)
FY 20/21 as of 7/5/2018



IV. B Fluid Minerals Activity Update and FY 2019 Production

OIL, GAS, AND GEOTHERMAL ACTIVITY

2019 Permitting and Drilling Activity (through August 2, 2019)

Permit Type	Issued 2016	Drilled 2016	Issued 2017	Drilled 2017	Issued 2018	Drilled 2018	Issued 2019	Drilled 2019
Geothermal - Ind Production	9	10	6	4	3	4	1	---
Geothermal - Ind Inj	3	1	4	4	1	1	3	1
Geothermal - Observation	2	4	3	1	3	3	1	1
Geothermal - TG	---	---	19	15	18	19	2	2
Geothermal - Com	---	---	---	---	---	---	---	---
Geothermal - Dom	---	4	2	2	---	---	---	---
Geothermal - Project Area	---	---	1	---	---	---	---	---
Geothermal - Total	14	19	35	26	25	27	7	4
Oil & Gas	3	1	0	1	3	1	3	1

No permits have been issued during January 2019.

Activity	Geothermal	Ormat Nevada	Ormat Nevada drilled the 42-8 injection well at Wild Rose during the second quarter of 2019. Ormat completed the drilling of the Dixie Meadows 22D-8 observation well in early August. Ormat has been issued a drilling permit for the 83(82)-6 production well in Steamboat Hills, and is expected to spud this well in August or September.
		USG Nevada (Ormat Nevada)	USG Nevada completed the drilling the San Emidio 25A-21 production well in the field's southwest extension area in December 2018. USG Nevada permitted two injection wells north of the San Emidio Field, near the Wind Mountain Mine area, in July. The two injection wells are expected to be drilled in August.
		Enel North America	Enel North America has submitted a permit application for a temperature gradient well at their Salt Wells Field.
	Oil	Major Oil International	Major Oil International plugged and abandoned the Eblana 1 and Eblana 3 wells in May. Eblana 1 was drilled in 2012, and the Eblana 3 was drilled in 2018.
		Grant Canyon Oil and Gas	Grant Canyon Oil and Gas permitted the Three Bar Federal 25-2 in May. Grant Canyon will be attempting to bring the well onto production in August or September.
		West Grant Canyon Development	West Grant Canyon Development permitted the Butterfield 1 exploration well in June. The proposed location for the well is approximately 1.75 miles southwest of the Sans Spring Field tank battery location. It is unknown as to when this well will spud.
		SAM Oil	SAM Oil permitted the White River Valley 1-9 in late February. The proposed location is approximately 26 miles south of Lund. SAM Oil is waiting on the release of the Welsco Drilling rig by USG Nevada to spud this well. Most likely the well will spud in September.

Summary of 2018 Dissolved Minerals Activity

Type of Activity	Permits Issued 2018	Permits Drilled 2018	NOI Approved 2018	NOI Drilled 2018
Exploration Well Permits	6	3	---	---
Notice of Intent Approvals	---	---	6	5

Summary of 2019 Dissolved Minerals Activity (through August 2, 2019)

Type of Activity	Permits Issued 2019	Permits Drilled 2019	NOI Approved 2019	NOI Drilled 2019
Exploration Well Permits	---	1	---	---
Notice of Intent Approvals	---	---	---	1

No exploration well permits for dissolved minerals have been issued during 2019. Belmont Resources did drill a borehole in Kibby Basin, located approximately 36 miles northwest of Tonopah. The NOI was approved in early December 2018. Drilling began in late December, and completed drilling in February, after a multi-week hiatus in drilling. Plugging of the borehole was delayed until May due an exceptionally wet valley floor after spring runoff.

LithiumOre permitted the LithiumOre 1 exploration well in Railroad Valley in November 2018. The well was drilled during April and early May 2019 to a total depth of 3,000 feet. The location for this well is approximately 4 miles south-southeast of the Foreland Refinery.

Summary of Geothermal and Oil Well Inspections for Fiscal Year 2019 (as of 6/30/2019)

FY 2019 Well Inspections	Total Wells	Wells Needed for FY19	Wells Inspected	% of Total Needed	Wells Remaining
Geothermal (22 Locations)	457	152	261	171.3%	-109
Oil (20 Locations)	118	39	119	303%	-80
Totals	575	192	380	198%	-188

The two remaining open DMRE exploration wells, 3PL LD 1-32 and LithiumOre 1, were inspected in May 2019. Both wells are located in Railroad Valley.

Sundry Notice Activity (through August 2, 2019)

Twenty-nine geothermal and five oil sundry notices have been approved during the 2019 calendar year.

BLM Lease Sales

The BLM Ely, Elko and Battle Mountain Districts March 26th lease sale was postponed to a later date. The July 30th BLM Oil and Gas Lease Sale incorporated parcels located in the Elko and Battle Mountain Districts. A total of 200 parcels, totaling 389,176.20 acres, were offered. The parcels were protested by The Wilderness Society and individuals purportedly representing the Sierra Club. No parcels were removed from the sale as a result of the protests. The sale had sixteen bidders. Twenty-three parcels received bids, covering 22,352.13 acres. The highest bid per acre, submitted by Kirkwood Oil and Gas, was $47.00, for a 1282.52 acre parcel located in T27N, R51E, Section 3 and T28N, R51E, Section 34 (Pine Valley, north of Blackburn and Three Bar and southwest of Tomera Ranch). Kirkwood Oil and Gas also acquired a 1280 acre lease for $22.00 an acre in T28N, R51E, Sections 22 and 27 (adjoining lease to previous Pine Valley description). Kirkwood Oil and Gas also obtained a 2255.33 acre lease in T34N, R58E, within Sections 4, 6, 8, 18 (northwest, west and southwest of Noble Energy's K1L-1V plugged and abandoned well Section 10), and a 1710.57 acre lease in T38N, R61E, within Sections 4, 10, 12, 14, and 24 (northwest of the city of Wells, and near Tetuan Resources plugged and abandoned Marys River 34-26 in Section 26). Both of these two leases were obtained for $2.00 per acre. Total receipts for all leases sold within the July 30th sale were $168,173.00. The next oil and gas lease sale is scheduled for September 10th, where parcels within the Ely and Elko Districts are to be offered.

The BLM Statewide Geothermal Lease Sale will be held on September 17th. The BLM will be offering 142 parcels covering 387,032.47 acres in Churchill, Eureka, Elko, Esmeralda, Humboldt, Lander, Mineral, Nye, Pershing, Washoe, and White Pine counties.

IV.C Courtney Brailo graduated from the IOGCC-funded Topcorp training for regulators

TOPCORP Energy Training

For Oil and Gas Policy Makers and Regulators Nationwide

-Courtney Brailo

What is TOPCORP?

- Industry-sponsored training geared toward oil & gas policy makers and regulators
  - *Designed for first-year inspectors, field operations personnel, environmental protection agencies, and others…*
- Developed by university faculty and researchers
- **Online Coursework, Classroom/Lab Instruction, Well Field & Processing Plant Tours**

Nevada Participation

- Nevada is currently (2019) ranks 26/31 crude oil, 33/34 natural gas production in the US
  - *Semi-constant production of oil, 255+ thousand barrels in 2018, and ongoing exploration interest in the state*
- Nevada is second in United States geothermal production, and growing every year
  - *Processes for drilling and maintaining a geothermal well are very similar to oil and gas*
- We can learn from other states how to better keep drilling operations safe and to ensure wells are constructed and maintained in good condition, or plugged, throughout the state. Networking!

TOPCORP

- Four part training in hosted by three universities and collaborating faculty
  - Petroleum Geology & Engineering, *Colorado School of Mines*
  - Petroleum Technology, *Colorado School of Mines*
  - Environmental Stewardship, *Pennsyvania State University*
  - Emerging Topics & Communication, *University of Texas, Austin*
- https://www.youtube.com/watch?time_continue=113&v=fBWj7nbQUi0

Topics Covered

- Reading & Understanding Well Logs, Proper Cementing Practices, Well Integrity
- Reservoir characteristics & geology
- Public Appearance & Outreach – Social license to operate
- Advancements in Technology
- Case Studies - Drilling Simulations, Blowouts, Seismicity, Aquifer Testing (Hydrocarbons), Pad Reclamation, etc.
- Many More! Speakers, topics and time for discussion!




TOPCORP & NDOM

- **Lowell Price**
  - Attended all four courses and graduated 2016
- **Courtney Brailo**
  - Attended all four courses and graduated 2018
- **Webinars and continued education**
  - New this year!
  - Webinars highlighting a multitude of topics

Moving Forward with TOPCORP

- Send another staff member
- Stay in touch the community with webinars and maintaining presence at IOGCC meetings and forums.

Questions?

IV. D Update on NAC 534A, NAC 517 and NAC 519A regulation changes

REGULATION UPDATES

NAC 534A – Geothermal Resources.

- Major re-ordering of Chapter, elimination of obsolete language
- Task force from NDOM, NDWR and AG met for 4 months to develop draft
- Public workshop held on 6/13/19. Attended by industry and consultants
- Submitted for LCB legal review on 7/19, assigned file R032-19.
- Another workshop after LCB review Sept-mid Oct, + SBIS
- Expect Hearing at November CMR meeting

NAC 519A.570 through .630 – Pooling of Reclamation Bonds

- Reduction of administrative fee from 3% to 2%, clarifying language
- Refund of some premium for plan-level bond when transferred
- Submitted to LCB legal on 7/22/19. Assigned file R044-19
- Workshop and SBIS in Sept-mid Oct
- Expect Hearing at November CMR meeting

NAC 517 Mining Claims

- Reduction in claim fee to reduce reserve
- Expect hearing at February 2020 meeting

STEPHEN F. SISOLAK
Governor

STATE OF NEVADA

MICHAEL BROWN
Director

BARBARA D. RICHARDSON
Commissioner

DEPARTMENT OF BUSINESS AND INDUSTRY
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E-mail: insinfo@doi.nv.gov

July 15, 2019

Mike Visher, Deputy Administrator
State of Nevada, Commission on Mineral Resources, Division of Minerals
400 W. King St., Ste. 106
Carson City, NV 89703

Sent via e-mail to mvisher@minerals.nv.gov

Re: Recommendation Regarding the Change in the Minimum Bond Premium for the Nevada Reclamation Performance Bond Pool

Dear Mr. Visher:

I am writing to provide my actuarial recommendation pursuant to NAC 519A.595(8), regarding the feasibility of decreasing the minimum annual bond premium for the Nevada Reclamation Performance Bond Pool ("NRPBP") from 3% to 2% of the bond amount. Pursuant to NAC 519A.595(8), "The Administrator [of the Division of Minerals] or a person designated by him or her will base any change in the percentage of the premium on the recommendation of an actuary who is approved by the Commissioner of Insurance to review the status of the bond pool. The findings of the actuary must show that a change in percentage allows the bond pool to remain self-sustaining under statistically expected forfeiture rates and forecasted administrative costs." On July 11, 2019, Commissioner Barbara Richardson approved me to provide findings in relation to my review of the status of the bond pool. This actuarial review is a singular exercise conducted solely pursuant to the requirements and prescriptions of Nevada law – NAC 519A.595(8). My recommendation, as explained and supported herein, is that reducing the minimum annual premium to 2% of the bond amount is consistent with the criteria expressed in NAC 519A.595(8).

I considered the following information in the course of providing this recommendation:

● **Forecasted Administrative Costs:** Information regarding administrative costs for the NRPBP, for which a detailed breakdown was provided by you in the spreadsheet entitled "BondPoolAdmitCosts_FY18.xls". This spreadsheet calculates the total administrative costs for Fiscal Year 2018 to have been $93,327.24. You have stated that "The [administrative cost] amount is

not expected to change significantly from what it has been for the last five years." Furthermore, you provided information stating that, because of a 3% cap on the administrative costs pursuant to NAC 519A.600(3), the administrative costs would not be permitted to exceed $97,366.16 based on the average total bond obligation of the NRPBP in Fiscal Year 2018.

● **Statistically Expected Forfeiture Rates:** Historically, forfeitures for the NRPBP have been relatively low and few in number. Per your description in your e-mail of July 10, 2019, "Since [Fiscal Year] 1999 and through 2019, total forfeitures were $503,431. They occurred in 6 fiscal years and ranged from $2,800 to $209,900, with an average of $83,905. If you spread the average across the entire 21 year history it would be $23,973 per year."

Statistical expectations rely on the Law of Large Numbers, which posits that as the number of observations increases, the average of the results of those observations will be close to a predictable mean or expected value. If observations are few in number, however, much more substantial volatility around and departures from the expected value can arise within the actual results.

Because of the small number of historical instances of forfeitures for the NRPBP, and in recognizing the variability of potential forfeitures – e.g., none in some years, but possibly some large forfeitures in other years – I considered three scenarios in my analysis:

- **Scenario 1: Expected Scenario:** In each year beginning in 2019, the forfeitures are assumed to be at $23,973 – the 21-year historical average. I would consider this to be a reasonable expected scenario and the closest approximation to "statistically expected forfeiture rates", given the small number of historical forfeitures.
- **Scenario 2: Conservative Scenario:** In each year beginning in 2019, the forfeitures are assumed to be at $83,905 – the average forfeiture amount for those years that historically have had forfeitures. Essentially, this is a more conservative scenario that assumes that some level of forfeitures will become the norm in the future and those forfeitures will resemble the ones that occurred historically.
- **Scenario 3: Adverse Scenario:** In each year beginning in 2019, the forfeitures are assumed to be at $209,900 – essentially, a forfeiture of the magnitude of the largest historical forfeiture is assumed to occur every year. I would consider this to be an adverse or "stress-test" scenario.

Considering the Conservative Scenario and the Adverse Scenario provides some beneficial sensitivity testing in light of the variability of historical results.

● **Financial Condition and History of the NRPBP:** You also provided information regarding the status of the current bonds within the NRPBP and the cash in the account of the NRPBP ("Bond Pool Status_033119.pdf"), which showed that, as of March 31, 2019, the NRPBP had $3,918,743.15 in cash, as compared to a total bonded amount of $2,900,838.16, which implies that the NRPBP was 135.1% funded as of March 31, 2019. This information also showed that, of all of the plan-level bonds that are currently outstanding and have not been terminated, all but one are more than 100% funded, and one bond was 94.5% funded as of December 31, 2018. You further provided the history of notice-level bond transactions for the NRPBP from July 1, 2005 to March 6, 2019 ("statewidebondstatus.xls"). You explained in your e-mail of May 1, 2019, that forfeitures on notice-level bonds are unlikely and that, furthermore, there is never an unfunded liability to the State for

these bonds because "Unlike plan-level participants, the deposit amount for notice-level participants is 100% of the bond amount required by the BLM and their premium is 3% annually."

● **Financial Projections Under Various Premium Assumptions:** You also provided a spreadsheet of financial projections through Fiscal Year 2026 ("BP premium analysis.xls") under assumptions of a 3% minimum premium (status quo), a 2% minimum premium, a 1% minimum premium, and a 0% minimum premium. The presentation of the NRPBP's performance within these projections is based on the following assumptions:

- ◦ The Total Bonded Amount will remain the same at $3,237,760.16 each year.
- ◦ The Fiscal Year 2018 figures are at their historical values.
- ◦ Premium for all bonds is assumed to be paid at the minimum amount; this appears to be a slightly conservative assumption but would be the case for notice-level bonds and other bonds that are more than 100% funded.
- ◦ Annual deposits will be constant at $270,946 per year, based on a 6-year historical average.
- ◦ Annual interest earned will be constant at $43,411 per year. This is based on a 19-year historical average.
- ◦ Annual bond refunds will be $331,235. This is based on a 5-year historical average.
- ◦ Annual administrative costs will be $92,703. This is based on a 6-year historical average. Assuming that the average total bond obligation of the NRPBP remains approximately constant, I can conclude that projecting administrative costs of $92,703 – i.e., a constant level of costs – for the foreseeable future would be a reasonable assumption.

Based on the information available to me, I find the above assumptions to be reasonable.

Analysis

The exhibits below consider the status of the NRPBP over the projection period through Fiscal Year 2026 based on the financial projections that you provided in the "BP premium analysis.xls" spreadsheet, modified by taking into additional consideration the forfeiture rates under the assumptions of Scenarios 1, 2, and 3 (Expected, Conservative, and Adverse) outlined above (see p. 2). Exhibits 1, 2, and 3 below show the results under each scenario. These results are qualitatively summarized below.

◦ **Scenario 1: Expected Scenario – Exhibit 1:** This scenario shows that the Bond Pool Account would remain at 112.6% funded in Fiscal Year 2026 if a 2% premium were charged. Even at a 0% premium, the Bond Pool Account would remain above 100% funded through Fiscal Year 2025.

◦ **Scenario 2: Conservative Scenario – Exhibit 2:** This scenario shows that, at a 2% premium, the Bond Pool Account would remain more than 100% funded through Fiscal Year 2025; in Fiscal Year 2026 the account would be 97.8% funded. At a 1% premium, the account would remain more than 100% funded through Fiscal Year 2023. At a 0% premium, the account would remain more than 100% funded through Fiscal Year 2022.

◦ **Scenario 3: Adverse Scenario – Exhibit 3:** This scenario shows the account balance declining rapidly no matter what premium is charged, but the account would remain more than 100% funded through Fiscal Year 2021 at a 2% premium. One way to interpret this is that the Bond Pool Account has approximately a three-year buffer to withstand a major and persistent increase in forfeitures to their highest historical levels. I hypothesize that, if this scenario were to begin to materialize, the Division of Minerals would take steps to increase the premiums, recover some of the forfeited amounts, and/or provide another funding mechanism well before the funds are depleted.

Exhibit 1 – Expected Scenario – Forfeitures at 21-Year Historical Average: $23,973

Bond Pool Account Status under Various Premium % Scenarios

Forecast Year Assumptions (from the Division of Minerals):

◦ Static total bond amount; 5-year average for Bond Refunds;

◦ 6-year averages for Net Premiums, Bond Deposits, and Admin Fee transfer; 19-year average for Interest

Bond Pool Account Status with 3% Premium (Current)										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,158,734	128.4%	$920,974
2020	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,122,313	127.3%	$884,552
2021	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,085,891	126.2%	$848,131
2022	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,049,469	125.1%	$811,709
2023	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,013,048	123.9%	$775,288
2024	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,976,626	122.8%	$738,866
2025	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,940,205	121.7%	$702,445
2026	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,903,783	120.6%	$666,023

Bond Pool Account Status with 2% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,126,357	127.4%	$888,596
2020	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,057,557	125.3%	$819,797
2021	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,988,758	123.2%	$750,998
2022	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,919,959	121.1%	$682,199
2023	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,851,160	118.9%	$613,400
2024	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,782,361	116.8%	$544,600
2025	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,713,561	114.7%	$475,801
2026	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,644,762	112.6%	$407,002

Exhibit 1 – Expected Scenario - Forfeitures at 21-Year Historical Average: $23,973 (Continued)

Bond Pool Account Status with 1% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,093,979	126.4%	$856,219
2020	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,992,802	123.3%	$755,042
2021	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,891,625	120.2%	$653,865
2022	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,790,449	117.1%	$552,688
2023	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,689,272	113.9%	$451,512
2024	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,588,095	110.8%	$350,335
2025	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,486,918	107.7%	$249,158
2026	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,385,741	104.6%	$147,981

Bond Pool Account Status with 0% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$4,061,601	125.4%	$823,841
2020	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,928,047	121.3%	$690,287
2021	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,794,493	117.2%	$556,732
2022	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,660,938	113.1%	$423,178
2023	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,527,384	108.9%	$289,624
2024	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,393,829	104.8%	$156,069
2025	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,260,275	100.7%	$22,515
2026	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($23,973)	$3,126,721	96.6%	-$111,040

Exhibit 2 – Conservative Scenario - Forfeitures at Average for Years in Which Forfeitures Occurred: $83,905

Bond Pool Account Status under Various Premium % Scenarios

Forecast Year Assumptions (from the Division of Minerals):

◦ Static total bond amount; 5-year average for Bond Refunds;

◦ 6-year averages for Net Premiums, Bond Deposits, and Admin Fee transfer; 19-year average for Interest

Bond Pool Account Status with 3% Premium (Current)										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$4,098,802	126.6%	$861,042
2020	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$4,002,449	123.6%	$764,688
2021	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,906,095	120.6%	$668,335
2022	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,809,741	117.7%	$571,981
2023	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,713,388	114.7%	$475,628
2024	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,617,034	111.7%	$379,274
2025	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,520,681	108.7%	$282,921
2026	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,424,327	105.8%	$186,567

Bond Pool Account Status with 2% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$4,066,425	125.6%	$828,664
2020	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,937,693	121.6%	$699,933
2021	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,808,962	117.6%	$571,202
2022	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,680,231	113.7%	$442,471
2023	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,551,500	109.7%	$313,740
2024	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,422,769	105.7%	$185,008
2025	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,294,037	101.7%	$56,277
2026	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,165,306	97.8%	($72,454)

Exhibit 2 – Conservative Scenario - Forfeitures at Average for Years in Which Forfeitures Occurred: $83,905 (Continued)

Bond Pool Account Status with 1% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$4,034,047	124.6%	$796,287
2020	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,872,938	119.6%	$635,178
2021	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,711,829	114.6%	$474,069
2022	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,550,721	109.7%	$312,960
2023	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,389,612	104.7%	$151,852
2024	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,228,503	99.7%	($9,257)
2025	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,067,394	94.7%	($170,366)
2026	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$2,906,285	89.8%	($331,475)

Bond Pool Account Status with 0% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$4,001,669	123.6%	$763,909
2020	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,808,183	117.6%	$570,423
2021	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,614,697	111.6%	$376,936
2022	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,421,210	105.7%	$183,450
2023	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,227,724	99.7%	($10,036)
2024	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$3,034,237	93.7%	($203,523)
2025	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$2,840,751	87.7%	($397,009)
2026	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($83,905)	$2,647,265	81.8%	($590,496)

Exhibit 3 – Adverse Scenario - Forfeitures at Maximum Historical Level per Year: $209,900

Bond Pool Account Status under Various Premium % Scenarios

Forecast Year Assumptions (from the Division of Minerals):

◦ Static total bond amount; 5-year average for Bond Refunds;

◦ 6-year averages for Net Premiums, Bond Deposits, and Admin Fee transfer; 19-year average for Interest

Bond Pool Account Status with 3% Premium (Current)										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,972,807	122.7%	$735,047
2020	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,750,459	115.8%	$512,698
2021	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,528,110	109.0%	$290,350
2022	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,305,761	102.1%	$68,001
2023	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,083,413	95.2%	($154,347)
2024	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,861,064	88.4%	($376,696)
2025	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,638,716	81.5%	($599,044)
2026	$3,237,760	$97,133	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,416,367	74.6%	($821,393)

Bond Pool Account Status with 2% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,940,430	121.7%	$702,669
2020	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,685,703	113.8%	$447,943
2021	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,430,977	106.0%	$193,217
2022	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,176,251	98.1%	($61,509)
2023	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,921,525	90.2%	($316,235)
2024	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,666,799	82.4%	($570,962)
2025	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,412,072	74.5%	($825,688)
2026	$3,237,760	$64,755	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,157,346	66.6%	($1,080,414)

Exhibit 3 – Adverse Scenario - Forfeitures at Maximum Historical Level per Year: $209,900 (Continued)

Bond Pool Account Status with 1% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,908,052	120.7%	$670,292
2020	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,620,948	111.8%	$383,188
2021	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,333,844	103.0%	$96,084
2022	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,046,741	94.1%	($191,020)
2023	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,759,637	85.2%	($478,123)
2024	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,472,533	76.4%	($765,227)
2025	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,185,429	67.5%	($1,052,331)
2026	$3,237,760	$32,378	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$1,898,325	58.6%	($1,339,435)

Bond Pool Account Status with 0% Premium										
Fiscal Year	Total Bonded Amount	Net Premiums (3%)	Total Deposits Received	Interest	Bond Refunds	Admin Fee Transferred	Forfeitures	Total in BP Account	Account Funded %	Bond Pool Excess
2018	$3,237,760	$104,341	$379,803	$40,065	($273,759)	($93,327)	$0	$4,195,156	129.6%	$957,396
2019	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,875,674	119.7%	$637,914
2020	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,556,193	109.8%	$318,433
2021	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$3,236,712	100.0%	($1,049)
2022	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,917,230	90.1%	($320,530)
2023	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,597,749	80.2%	($640,011)
2024	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$2,278,267	70.4%	($959,493)
2025	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$1,958,786	60.5%	($1,278,974)
2026	$3,237,760	$0	$270,946	$43,411	($331,235)	($92,703)	($209,900)	$1,639,305	50.6%	($1,598,456)

Based on the projections in Exhibits 1 through 3 above and the interpretations of those projections expressed herein, it is my conclusion that decreasing the minimum annual bond premium from 3% to 2% would allow "the bond pool to remain self-sustaining under statistically expected forfeiture rates and forecasted administrative costs" as required pursuant to NAC 519A.595(8). It is my view that, in the absence of historically unprecedented and unforeseen events, it is more likely than not that the NRPBP will remain more than 100% funded through at least Fiscal Year 2026 if the minimum annual bond premium is reduced to 2%. This outlook is based and reliant upon the assumptions utilized herein, which posit that the intermediate-term future will approximately resemble the recent past financial results of the NRPBP. These findings may need to be revisited and updated if future performance of the NRPBP materially deviates in an adverse direction from the historical performance.

Sincerely,

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STEVE SISOLAK
Governor

STATE OF NEVADA
Sagebrush Ecosystem Program

PROPOSED TEMPORARY REGULATION

OF THE SAGEBRUSH ECOSYSTEM

COUNCIL

LCB File No. T006-18

April 2019

AUTHORITY: Statutes of Nevada 2013, NRS 232.162 of Assembly Bill No. 461; Statutes of Nevada 2013, NRS 321.592 of Assembly Bill No. 461; Statutes of Nevada 2013, NRS 321.594 of Assembly Bill No. 461

A REGULATION to mitigate certain activities that impact lands identified as Greater Sage-Grouse Habitat.

Summary:

NRS 232.162 provides authority for the Sagebrush Ecosystem Council to adopt regulations specific to the management of sagebrush ecosystems and the establishment and oversight of a mitigation program to offset certain disturbances to Greater Sage-Grouse habitat. The Sagebrush Ecosystem Council is a governor-appointed council, established to create and carry out strategies for "the conservation of the Greater Sage-Grouse and sagebrush ecosystems in this State" as well as other strategies outlined in NRS 232.162. NRS 321.592 and NRS 321.594 also provide authority for the Division of State Lands to adopt regulations for the oversight and administration of a program to mitigate damage to sagebrush ecosystems.

Section 1 states the purpose and authority of the regulations.

Section 2 outlines the instances where the regulation is applicable, as well as certain exceptions to the mitigation requirements.

Section 3 outlines the process to which a Project Proponent must adhere in order to satisfy their mitigation obligations.

Section 4 outlines the requirement of state agencies to receive certification of satisfactory mitigation requirements prior to authorization of activities resulting in anthropogenic disturbance in Greater Sage-Grouse Habitat on state-owned land.

COMPENSATORY MITIGATION REQUIREMENTS

Definitions. As used in the regulation below, unless the context otherwise requires, the words and terms defined herein have the meanings ascribed to them in those sections.

"Avoid and Minimize" defined. "Avoid and Minimize" refers to the adoption of the "Avoid and Minimize" process as contained in the Nevada State Conservation Plan.

"Credits" defined. "Credits" are quantified habitat benefits to Greater Sage-Grouse.

"Debits" defined. "Debits" are quantified impacts to Greater Sage-Grouse habitats from anthropogenic disturbances.

"*De minimis*" defined. "*De minimis*" is defined as an anthropogenic disturbance that is too trivial or minor to merit consideration for mitigation. These actions are determined through the Nevada Greater Sage-Grouse Conservation Plan and by the Sagebrush Ecosystem Program.

"Direct Impacts" defined. "Direct Impacts" is defined as Greater Sage-Grouse Habitat loss that is caused by or will ultimately result from anthropogenic disturbances within the project footprint.

"Durability" defined. "Durability" is defined as instrument(s) used to secure habitat functionality performance of a credit project site for a specific duration.

"Greater Sage-Grouse" defined. "Greater Sage-Grouse" (GRSG) is defined as any large ground dwelling bird identified under the name *Centrocercus urophasianus*, which is a species of conservation priority.

"Greater Sage-Grouse Habitat Management Areas" defined. "Greater Sage-Grouse Habitat Management Areas" are defined as any area identified as Priority, General, or Other Habitat Management Areas in the Nevada Greater Sage-Grouse Conservation Plan.

"Habitat Quantification Tool" defined. "Habitat Quantification Tool" (HQT) is defined as a set of metrics (i.e. measurements and methods) within the Nevada Conservation Credit System, applied at multiple spatial scales, to evaluate current conditions and changes in conditions indicative of habitat quality, baseline, and mitigation ratios necessary to determine the amount of total credit or credit obligation debit resulting from credit and debit projects. This is meant to be a "working tool" that will be updated as new science emerges.

"Indirect Impacts" defined. "Indirect Impacts" is defined as impacts to Greater Sage-Grouse populations or habitat that are caused by or will ultimately result from anthropogenic disturbances. Indirect impacts could occur at some point in the future or outside of the direct footprint of the disturbance area.

"Mitigate" defined. "Mitigate" refers to an action required when impacts are not avoided, and, after required minimization measures are implemented, resulting in residual adverse effects on Greater Sage-Grouse habitat.

"Mitigation Plan" defined. "Mitigation Plan" is defined as a contract that outlines the steps that have been or will be taken to fulfill mitigation requirements and includes the contract timeline and length, the debit and the offsetting credit amount, and the actions necessary to fulfill the requirements.

"Nevada Conservation Credit System" defined. "Nevada Conservation Credit System" (CCS) is defined as a pro-active solution to ensure direct, indirect, term, and permanent impacts from new, renewed, modified, or not previously authorized anthropogenic disturbances generate a net conservation gain for Greater Sage-Grouse, while enabling human activities vital to the Nevada economy and way of life. Major updates to the CCS are completed annually and are approved through the Sagebrush Ecosystem Council during public meetings.

"Nevada Greater Sage-Grouse Conservation Plan" defined. "Nevada Greater Sage-Grouse Conservation Plan" (State Plan) is defined as the document originally developed by the SETT and approved by the SEC in 2014, representing best available scientific information, as well as stakeholder input, that provides broad goals, objectives, and management actions to ameliorate the primary threats to Greater Sage-Grouse in Nevada. This is meant to be a "working document" that will be updated as new science emerges and lessons are learned through its implementation.

"Project Proponent" defined. "Project Proponent" is defined as a person or entity that proposes or implements an anthropogenic disturbance within Greater Sage-Grouse habitat.

"Residual Impacts" defined. "Residual Impacts" are defined as direct or indirect anthropogenic impacts requiring mitigation, quantified by the Habitat Quantification Tool, that remain after the Avoid and Minimize process, prior to taking reclamation activities into account.

"Sagebrush Ecosystem Council" defined. "Sagebrush Ecosystem Council" (SEC) is defined as the governor- appointed, legislatively-established, council comprised of representatives from conservation interests, industry, ranching, and government which is responsible for overseeing the operations of the Conservation Credit System and making policy decisions.

"Sagebrush Ecosystem Program" defined. "Sagebrush Ecosystem Program" (SEP) is a collaborative, multi-disciplinary program made up of the governor-appointed Sagebrush Ecosystem Council and the Sagebrush Ecosystem Technical Team, established to protect and enhance the sagebrush landscape.

"Sagebrush Ecosystem Technical Team" defined. "Sagebrush Ecosystem Technical Team" (SETT) is responsible for administering the Nevada Conservation Credit System and serves as staff to the Sagebrush Ecosystem Council.

"Verifier" defined. "Verifier" is defined as a person certified by the Sagebrush Ecosystem Program that leads the implementation of the Habitat Quantification Tool to quantify and verify credit and debit calculations.

Section 1. Purpose. The purpose of this regulation, inclusive, is to ensure continued management and conservation of Greater Sage-Grouse and sagebrush ecosystems pursuant to NRS 232.162, NRS 321.592, and NRS 321.594 by setting forth requirements to mitigate certain anthropogenic disturbances in identified Greater Sage-Grouse Habitat.

Sec. 2. Applicability of regulations. Mitigation of residual direct or indirect anthropogenic impacts resulting in potential habitat loss or degradation as defined by the Nevada Greater Sage-Grouse Conservation Plan and the Nevada Conservation Credit System, within Greater Sage-Grouse Habitat Management Areas is required when the anthropogenic disturbance is subject to state or federal review, approval, or authorization, as ordered by Nevada Executive Order 2018-32, signed on December 7, 2018. The following are not subject to these regulations:

1) Activities that are in compliance with authorized land uses that were signed prior to December 7, 2018,

2) Activities using any mitigation agreement or framework signed by the U.S. Fish and Wildlife Service prior to December 7, 2018, including any "Bank Enabling Agreement" or "Conservation Framework Agreement", between the Department of Interior and private companies, or any amendments thereto,

3) Direct impacts of projects or actions located on privately owned lands,

4) Mineral exploration activities causing surface disturbance of five (5) acres or less,

5) *De minimis* activities as identified in the Nevada Greater Sage-Grouse Conservation Plan,

6) Anthropogenic disturbances outlined in the Nevada Greater Sage-Grouse Conservation Plan and the Nevada Conservation Credit System which directly address public health and safety, or

7) Routine administrative or emergency functions conducted by federal, state, or local government that serve a public purpose that do not require federal or state authorization or that do not result in an additional direct impact or permanent indirect impact.

Sec. 3. Any Project Proponent proposing an anthropogenic disturbance activity that results in impacts to Greater Sage-Grouse Habitat Management Areas as defined by the Nevada Greater Sage-Grouse Conservation Plan and the Nevada Conservation Credit System must be fully compliant with these regulations and receive written authorization from the Sagebrush Ecosystem Program Manager indicating mitigation requirements have been met (as defined in Section 5 below) prior to commencement of the anthropogenic disturbance.

1) Any Project Proponent proposing such activity shall submit geographic information system data files sufficient to indicate any existing, authorized, and proposed disturbances, and any other information required by the Sagebrush Ecosystem Technical Team in order to assess potential impacts to Greater Sage-Grouse Habitat Management Areas as a result of the proposed activity.

2) The Project Proponent shall consult with the Sagebrush Ecosystem Technical Team and provide an analysis of the Avoid and Minimize measures considered and those planned to reduce impacts.

3) Following incorporation of the Avoid and Minimize measures into a final Project Proposal, the Project Proponent, in coordination with the Sagebrush Ecosystem Technical Team, shall quantify the residual impacts associated with the planned disturbance using the most current version of the Nevada Conservation Credit System and Habitat Quantification Tool.

4) The number of Debits resulting from the proposed project shall be confirmed by the Sagebrush Ecosystem Program Manager within thirty (30) days of a final and complete Verifier submittal.

5) Confirmed impacts to Greater Sage-Grouse Habitat Management Areas in the form of Debits shall be deemed to have adequate mitigation measures under the following circumstances:

   a) The Project Proponent has secured through a Nevada Conservation Credit System contract the purchase or transfer of an equal or greater number of Credits to offset the number of Debits generated from the project; or

   b) A Mitigation Plan developed in coordination with the Sagebrush Ecosystem Technical Team and approved by the Sagebrush Ecosystem Program Manager or the Sagebrush Ecosystem Council that considers the following factors:

      i) Conservation activity (e.g., pinyon/juniper removal, cheatgrass treatment, fire restoration),

      ii) Location of the mitigation,

      iii) Durability of the mitigation,

      iv) Credit generation term,

      v) Number of Credits generated or estimated using the most current version of the Habitat Quantification Tool, and

      vi) Other supportive documentation deemed necessary by the Sagebrush Ecosystem Council or the Sagebrush Ecosystem Technical Team.

6) Upon confirmation of adequate mitigation in accordance with Section 5 of these regulations, the Sagebrush Ecosystem Program Manager shall provide written notification within ten (10) working days to the Project Proponent and the authorizing land agency certifying that mitigation requirements have been or are expected to be satisfied.

Sec. 4. Authorization for the use of state lands within Greater Sage-Grouse Habitat Management Areas:

1) The State Lands Registrar shall receive a letter from the Sagebrush Ecosystem Program Manager certifying that mitigation requirements have been satisfied prior to issuing an authorization for any use, activity, or project that results in anthropogenic impacts to Greater Sage-Grouse Habitat Management Areas.

2) Prior to any state agency or department authorizing a project that results in anthropogenic disturbances to Greater Sage-Grouse Habitat Management Areas as defined by the Nevada Greater Sage-Grouse Conservation Plan and the Nevada Conservation Credit System, the authorizing agency must receive certification from the Sagebrush Ecosystem Program Manager that all mitigation requirements have been satisfied.

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Nevada Copper Smelter or Concentrate Autoclave Opportunity

By

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July 2019

Executive Summary

- The United States exports over a million metric tonnes of mineral concentrate per year containing 250,000 tonnes of copper. One third of these exports originate in Nevada.
- The United States also imports more than 775,000 metric tonnes of refined copper per year. This imbalance is due to a lack of copper smelting capacity in the United States.
- Constructing a new flash smelter or concentrate autoclave in Nevada would be beneficial to the economy of the State and reduce the United States' dependence on imported refined copper.
- The availability of more refined copper from Nevada may attract downstream businesses to the State such as copper wire manufacturers, pipe manufacturers, rod mills, or brass mills.
- Locations in rural Nevada have been identified that are well suited to this development. They possess transportation infrastructure, access to power, water and natural gas, suitable available land, and air basins with no other sources of emissions.
- Two technologies are discussed in the body of the report. A capital-intensive flash smelting flowsheet and a more cost-effective concentrate autoclave process. More detail on each process is presented in Appendices 1 and 2.
- The return on investment may be a challenge and capturing some of the cost-benefit from eliminating off-shore concentrate transportation will be required to generate an acceptable net present value. A more precise result cannot be calculated without project specific details.

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Background

Since 1900, world-wide copper consumption has increased 3.2% per year reaching 24.5 million metric tonnes in 2018. Chile was the largest miner of copper producing 5.5 million metric tonnes. Nevada mines produced 66,139 metric tonnes of copper in 2017. World-wide smelter production reached 19.5 million metric tonnes in 2018 with China leading the way with 7.6 million tonnes of production. The United States' smelting capacity is less that 0.6 million tonnes.

Demand for copper rises every year and mine supply is insufficient to meet demand. The difference between supply and demand has been made up by scrap recycling. New uses for copper are being invented and discovered such as lead-free brass plumbing, anti-microbial surfaces, and high-tech copper wire. Renewable energy technologies can consume up to five times the amount of copper necessary in conventional technologies. For example, an internal combustion engine (ICE) vehicle contains 18 – 40 pounds of copper. By comparison, an electric vehicle (EV) contains up to 183 pounds of copper.

U.S. copper production in 2018 was 1.2 million metric tonnes. Consumption of copper metal in the U.S. was 1.8 million tonnes with 40% of the demand supplied by imported copper. The United States lacks smelting capacity. Over one million tonnes of copper concentrate produced in the U.S. is exported due to a lack of domestic smelter capacity. One third of the exported concentrate (350,000 tons per year) is produced in Nevada.

United States Copper Statistics - 2018

	Concentrate metric tonnes	Contained Copper metric tonnes
From U.S. Mining	4,880,000	1,220,000
Smelted in U.S.	2,144,000	536,000
Exported Concentrate	1,012,000	253,000
Imported Refined Copper	-	778,000

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In 2018, the Nevada Commission on Mineral Resources funded a report published by the Nevada Bureau of Mines and Geology (Report #57) that addressed, in part, the opportunity for copper concentrate processing in Nevada. The methodology employed consisted of an assessment of the known copper deposits and resources in Nevada and a fatal flaw analysis regarding the feasibility of constructing a new copper smelter or autoclave in the State. The fatal flaw analysis examined five critical areas. They were 1) copper concentrate supply, 2) environmental permitting, 2) land use policy, 4) accessibility and infrastructure, and 5) return on investment. The conclusions from the report are summarized and expounded upon below.

Concentrate Supply

Copper concentrate supply is fundamental for the development of a new smelter or autoclave. As noted above, the United States and Nevada lacks smelter capacity and more than a million tons per year of concentrate is being exported, one third from Nevada. New copper mines are under construction in Nevada and Arizona that will increase the level of concentrate supply. Nevada Copper's Pumpkin Hollow mine in Lyon County is in construction and will begin production in 2020. During the initial production period until 2023, when the ore is solely from the underground mine, the concentrate production is estimated to be 85,000 tons per year. Pumpkin Hollow plans to develop a large open pit mine and construct a large concentrator. If built on schedule, concentrate production would ramp up to 300,000 tons per year from 2023 -2025, and then hit 1,500,000 tons per year for the next fifteen years. This would double Nevada's concentrate production by 2024 followed by tripling it by 2030.

Other significant concentrate producers under construction include Hudbay Minerals Rosemount Mine in Arizona which will add 400,000 tons per year of concentrate to the U.S. surplus. Rosemount should be in production by 2023 or 2024. While not in construction yet, Rio Tinto's Resolution Mine in Arizona is in permitting. This will be another very large underground copper

mine and could be in production within three years, again increasing the exports of concentrate from the U.S.

Hudbay Minerals acquired the Ann Mason Deposit in Lyon County in 2018. Their long-term business plan is to develop Ann Mason into a major copper mine once their Rosemount project in Arizona is constructed. This will be between a $1 billion and $2 billion investment in Lyon County, Nevada and yet again increase the copper concentrate production from Nevada. The Ann Mason project is planned to move forward in the next decade.

The conclusion is that there is ample supply of concentrates for a new smelter or concentrate autoclave. This supply will come mainly from mines in Nevada or Arizona. So, supply is not a fatal flaw.

Nevada Copper Pumpkin Hollow Underground Mine and Mill Construction, June 2019

(Source: https://www.nevadacopper.com/pumpkinhollow)

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Environmental Permitting

While permitting a new smelter or concentrate autoclave is complicated and takes time it is not a fatal flaw in Nevada depending on location. As will be illustrated in sections on land-use policy and infrastructure, Nevada has a multitude of possible sites where permitting can be completed in a timely manner and the resultant facility will not have detrimental impacts to the environment and would be welcomed by neighboring rural communities.

For a smelter, the primary environmental concern is air emissions. There are specific federal regulations that govern air emissions from smelters. Modern flash smelter designs can readily meet all federal (and international) standards. In order to meet the standards, smelters are designed to maximize sulfur dioxide (SO_2) capture by the installation of a sulfuric acid plant. Sulfuric acid production and sales are an important and critical component of the economics of modern smelters.

For a concentrate autoclave, permitting would be very similar to the gold autoclaves in operation in Nevada today. Emission controls would be required and are part of any robust design. The systems for emission controls for an autoclave circuit are significantly less capital intensive than for a smelter.

Land Use Policy

In 2018 Nevada was ranked as the best jurisdiction in the world for mining by the Frazer Institute in their annual survey of over 80 international jurisdictions. A smelter or autoclave requires a large piece of real estate for operations as well as a buffer zone for air dispersion and noise abatement. Large industrial plants like smelters and autoclaves are not well suited to an urban environment. Fortunately, Nevada is one of the least densely populated States with ample open and available ground, both public and private. Using public ground is possible, depending on location, but would require permitting in compliance with the National Environmental Policy Act (NEPA). As discussed above, this can be complex and time-consuming but is possible.

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Along the mainline railroad that traverses Northern Nevada, every other section of land is privately held and most of this land is available for development. Land use policy is not a fatal flaw. Rather, in Nevada, industrial development is encouraged and welcomed.

Accessibility and Infrastructure

Locating a smelter or concentrate autoclave near transportation infrastructure, specifically rail, is a requirement. The facility will be treating large tonnages of concentrate, up to a million tons per year to capture economies of scale for a smelter. Products shipped from the facility would include 250,000 tons per year of copper and 750,000 tons of sulfuric acid. Total rail freight could approach 2 million tons per year. Proximity to the electrical grid and natural gas are important considerations for the energy requirements of the facility. Water is also required and is available in sufficient volume in most basins in rural Nevada to meet the needs of the facility. Purchasing water or water rights may be a required development cost.

In the Nevada Bureau of Mines Report #57, a swath of land was identified containing good locations for siting a smelter. The corridor generally follows Interstate 80 from about Wells to Fernley and US Highways 95 and 95A towards Yerrington and Hawthorne. Though not depicted in Figure 1, this corridor could also be extended east towards Wendover and south towards Ely. The rail line to Ely would need to be re-constructed and the rail line from Hazen to Hawthorne would need to be upgraded to allow faster rail traffic. The air basins identified in Report #57 along the corridor have no current sources of air emissions which should simplify the permitting process. (See Figure 1) (The areas shaded green on the map are air basins with no current sources of emissions.)

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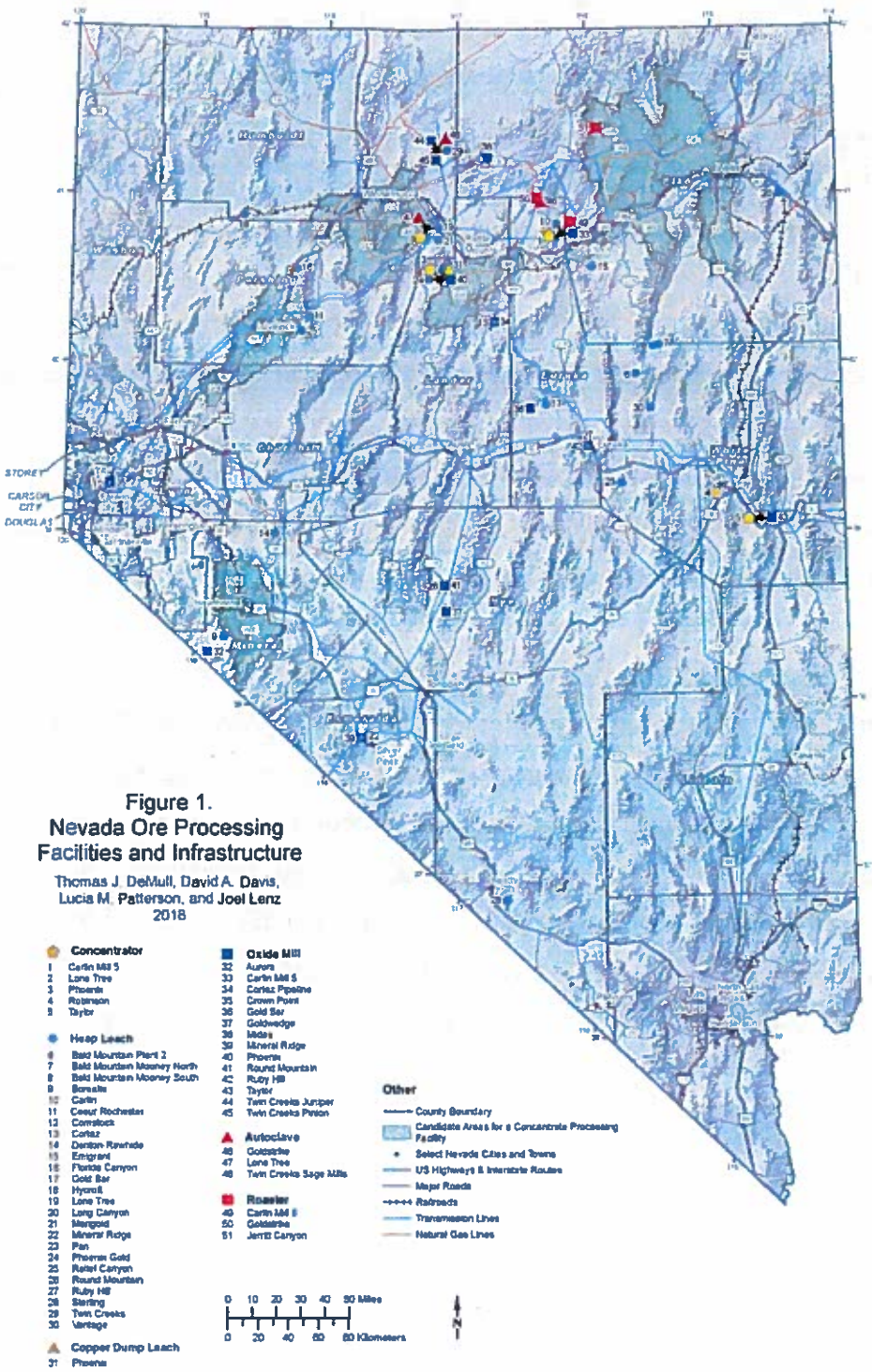

Figure 1.
Nevada Ore Processing Facilities and Infrastructure

Thomas J. DeMull, David A. Davis, Lucia M. Patterson, and Joel Lenz
2018

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Success

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Return on Investment

To calculate return on investment, one would need specific project details including revenue streams, capital and operating costs, and changes in working capital. For this exercise that is not possible. However, based on some recent published information, some generalizations can be made.

Indonesia passed a law a few years ago requiring companies operating copper mines to invest in building a smelter in Indonesia. Freeport McMoran, operator of the Grasberg Mine, is partnering with the Indonesian government to build a copper smelter. The smelter will be twice as large as that which is proposed for Nevada, two million tonnes per year of concentrate, but will not have a refinery. The capital cost for the project is expected to be $2.8 billion. One could assume for a smaller smelter (one million tonnes per year) built in Nevada that would include a refinery, the capital cost may approach $2 billion. Since there is only one concentrate autoclave and it was constructed in 2005, there are no recent data for comparison. However, gold autoclaves are similar in scope and scale. Maaden, the Saudi Arabian mining company, is currently in engineering for the Mansourah-Massarah gold autoclave project. Total costs for the project are projected to be $880 million. This does include some capital for mining. The Nevada concentrate autoclave would not require mining equipment but would require an electrowinning refinery. For the purposes of this paper, $800 million is reasonable for a capital cost estimate.

The advantage for a facility in Nevada is the transportation savings generated by the proximal location to the mines in the Western U.S. Costs to transport copper concentrate from a Nevada mine to a west coast port and then by ocean freight to Asia is approximately $100 -$150 per tonne. A Nevada smelter or concentrate autoclave should cut those transportation charges by as much as 75%. The smelter would have to capture this savings as a revenue opportunity to off-set the capital costs of constructing a new facility.

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A smelter or autoclave generates revenue not only from the treatment and refining charges for the copper but also from charges for penalty elements. By-product revenue from the sale of sulfuric acid is also an important source of revenue. Each concentrate is unique and charges for penalties vary depending on concentrations. For complex concentrates, the charges can equal the treatment and refining charges. Autoclaves are particularly well suited to handling penalty elements in a cost-effective way, so this is a distinct advantage over a smelter. However, autoclaves can only use the acid credits if they are co-located with an oxide copper leach deposit or put in a sulfur recovery circuit. Nevada has opportunities for both. There are large un-developed copper oxide deposits near Yerrington, and the new lithium mines will be large consumers of elemental sulfur.

Return on investment will be challenging for a copper smelter, but less so for a concentrate autoclave. The transportation savings for the concentrate producers in the western U.S. will be significant and some of the savings must be passed on to the smelter or autoclave plant to support the capital investment.

Conclusions

There is a lack of copper smelter capacity in the United States and a growing supply of copper concentrates, much of which originates from Nevada. Costs to transport concentrate off-shore are high and not expected to abate. A Nevada smelter or concentrate autoclave could capture the transportation cost-saving opportunity and diminish the United States' dependence on imported refined copper.

Nevada has many prime locations suitable for locating a copper facility, primarily in the rural counties, close to transportation, power, natural gas, and with available sources of water. A smelter or autoclave would provide a long-term economic benefit to the State and create high-wage jobs.

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Permitting is not a fatal flaw. Technology exists to build an environmentally compliant operation. Nevada's regulators are professional and experienced. Permitting may be complex and time consuming but is possible.

Both flash smelting and concentrate autoclaving are viable processes. Smelting is much more capital intensive but benefits from by-product sulfuric acid production regardless of site location. A concentrate autoclave is optimized when co-located near a copper oxide deposit. Alternatively, an elemental sulfur recovery circuit would be required by the autoclave to capture a benefit similar to the smelter's acid production.

Return on investment may be a challenge and capturing some of the cost savings from eliminating off-shore concentrate transportation will be required to generate an acceptable net present value. A more precise result cannot be calculated without project specific details.

Appendix 1

Smelting Process

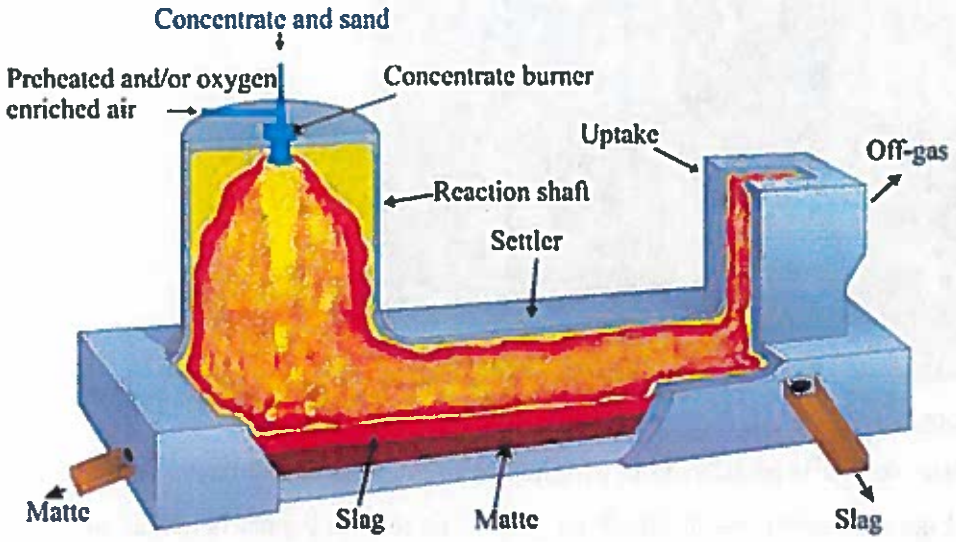
Smelting and electrolysis is the process used to refine copper sulfide ores to 99.99% purity. Pure copper (99.99%) is used to make copper wire, copper pipe, and alloys of brass and bronze. Smelting means to melt and fuse. The opportunity for a facility in Nevada described in this report will include the smelting process and downstream electrolytic refinery. Smelting involves several steps including the primary smelting furnace, converting, fire-refining, casting, and slag treatment. Each will be described in more detail below.

Copper deposits occur as sulfide mineral (chalcopyrite, chalcocite, bornite), oxide mineral, or silicate mineral deposits. Copper sulfide deposits are the largest and most important deposits. Once mined, the copper is concentrated through a crushing, grinding, and flotation processes. Currently, Nevada has two mines that produce copper concentrates; the KHGM Robinson Mine near Ely, and Nevada Gold Mines, Inc Phoenix Mine near Battle Mountain. Nevada Copper is constructing a third mine, Pumpkin Hollow, near Yerrington. Pumpkin Hollow will be operational in 2020. Copper levels in ores are often below 0.5% concentration. Concentrators like Phoenix and Robinson upgrade the ore to between 20% and 30% copper. The copper concentrate contains similar levels of sulfur and iron along with other minerals such as aluminum, calcium, and silicon. Trace elements like arsenic, cadmium, bismuth, fluorine, and mercury can be present and provide challenges in smelting.

The material feeding a smelter is a blend of materials which include the concentrate, flux materials, recycled dust from the smelter emission control systems, and products from the slag cleaning operations. Heat is required to melt and fuse the smelter charge. The main source of heat is supplied by the concentrate itself through the oxidation of the iron and sulfur contained within, but other sources of heat can be used to supplement and control the process like electric current or fuel combustion. Oxygen is an important input to the process and is supplied by an on-site air-separation plant which concentrates oxygen from air by removing the nitrogen and argon.

The flash furnace is the first step in the process. Copper concentrates and oxygen are injected into the furnace along with a silica (sand) flux. The oxygen chemically reacts with the iron and sulfur contained in the concentrate and produces a large amount of heat. The heat melts the charge. The furnace is operated at approximately 1250 C or 2300 degrees Fahrenheit. Once the charge is in a liquid form two immiscible components form; a copper matte and slag. The slag floats on the matte similar to oil on water. The copper matte contains 50% to 75% copper along with some iron, sulfur, and other minor impurities. Most of the sulfur in the concentrate reacts with oxygen forming heat and sulfur dioxide (SO_2). The SO_2 reports to the off-gas for recovery and sulfuric acid production. Sulfur recovery for the flash smelting process is 99.9%.

Flash Smelter



(Source: https://www.totalmateria.com)

Modern smelters continuously transfer the copper matte to the converter step. In older smelters, this was a manual process where the copper matte was poured into an enormous ladle and transferred by crane to the converter vessel. The new continuous process is much safer and

reduces environmental emissions. In the converter, the matte is further purified by mixing with a fluxing agent (silica or limestone) and oxygen. This is also the step where scrap copper is recycled. The product from the converter is called *blister* copper because when cooled and solidified blisters form on the surface. The blister copper has 99.5% purity.

Chambishi Copper Smelter

China Non-ferrous Metals Group

(Source: www.cnmc.com.cn)

In the next step, the blister copper is transferred in a molten form to the anode furnace. The liquid copper contains high concentrations of dissolved gases. The molten copper is treated to remove these gases by introducing a reducing agent. The reducing agent is usually natural gas and the step is called poling because the reducing agent used to be wooden poles or tree trunks. The purified copper from the anode furnace reports to the casting wheel where the molten copper is poured into anode molds and allowed to cool and solidify. The resultant anodes are transferred to the electrolytic refinery for the final step in purification. For the three remaining copper

smelters in the United States, only the Kennecott smelter in Garfield, UT has the refinery on-site. Asarco-Grupo Mexico's Hayden, AZ smelter ships anodes to Amarillo, TX for refining, and Freeport McMoran's Miami, AZ smelter ships anodes to El Paso, TX.

In the electrolytic refinery, the copper anodes containing 99.5% copper are electrolytically refined to 99.99% copper cathodes. This final product is sold to end users such as wire manufacturers, pipe manufacturers, brass mills, rod mills, etc… In the refinery process the anodes are placed in an electrolytic cell containing a copper cathode and an electrolyte solution. The electrolyte solution contains copper sulfate and sulfuric acid. The purpose of the electrolyte is to transfer electrons from the anode to the cathode. The impurities fall to the bottom of the cell and may contain some amount of gold and silver. Copper dissolves from the anode in the process and is deposited on the cathode as pure copper. Periodically, the sludge that falls to the bottom of the electrolytic cell is collected for gold and silver recovery.

Revenue for the smelter is generated from treating and refining the copper and from fees for treating penalty elements. Common penalty elements include arsenic, mercury, bismuth, fluoride, cadmium and moisture. Each carries a fee which can be a source of revenue for the smelter. By-product sulfuric acid sales are also a significant source of revenue for a smelter. Depending on smelter efficiency, higher recoveries of copper, gold, and silver present both opportunity and risk for the smelter

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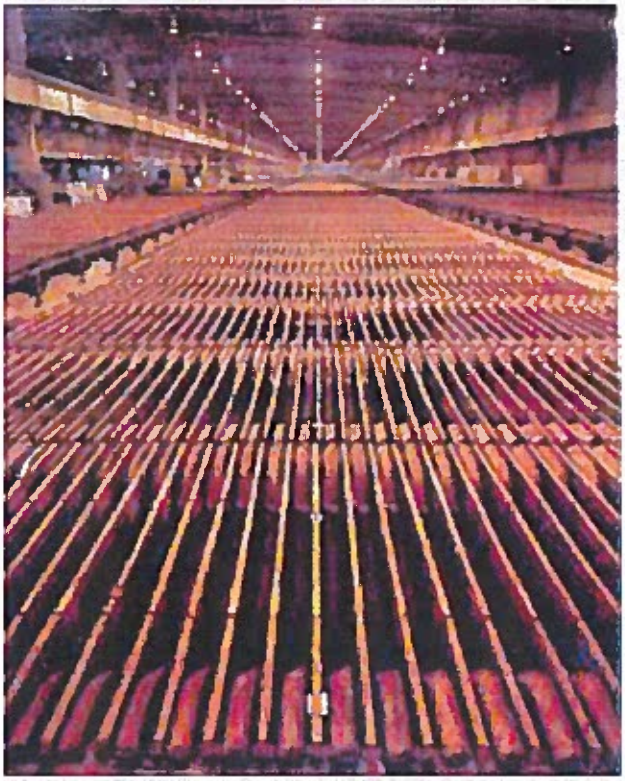
Asarco Amarillo, TX Refinery



(Source: https://www.Asarco.com)

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Appendix 2

Copper Concentrate Autoclave

Many alternatives to copper smelting have been investigated going back to the 1970s. Some of these include ammonia and chloride leaching. Compared to smelting, pressure oxidation, also known as autoclaving or concentrate leaching, is the only other commercially viable process today. Two companies have developed and advanced the process; Cominco Engineering Services Limited (CESL) and Freeport McMoran. Freeport operates a concentrate autoclave at its Morenci, AZ mine. Concentrate autoclaves have lower capital costs, can have lower operating costs. They can be designed to be more versatile than a copper smelter. A copper concentrate autoclave is very similar to the gold autoclaves operated in Nevada at Twin Creeks and Goldstrike by Nevada Gold Mines, Inc.

Freeport Morenci Autoclave Installation

(Source: www.eatonmetal.com/mining)

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The autoclave process involves several steps as outlined below. Copper concentrate is mixed with water to form a slurry and then is finely ground in a super fine-grinding mill such as an Isa-mill or tower mill. The concentrate slurry is fed into a pressure vessel known as an autoclave. Gaseous oxygen is pumped into the autoclave. The sulfur in the concentrate reacts with the oxygen completely dissolving the copper. This occurs in a medium temperature autoclave at 180 C or a high temperature autoclave at 220 C. In the medium temperature autoclave, most of the sulfur does not dissolve and reports as elemental sulfur. In a high temperature autoclave, the sulfur completely dissolves, and forms dilute sulfuric acid. The slurry exits the autoclave and the pressure is reduced to atmospheric pressure through two stages of flash vessels. Heat in the form of steam can be recovered from the off-gas of the flash vessel and the gas can be cooled to remove mercury, if present.

The dissolved copper is separated from the insoluble residue through solid-liquid separation. Usually, the slurry reports to a series of counter-current decantation thickeners where the solution is separated from the solids and the solids are washed free of any residual copper. Filters could also be used for this step.

The solution containing all of the copper is either directly advanced to an electrowinning step or could be blended into a solvent extraction plant feed. In solvent extraction (SX) the copper is loaded onto an organic reagent. Iron and other deleterious elements are rejected. The organic, highly concentrated in copper, is stripped with an electrolyte containing strong sulfuric acid. The strip solution is advanced to electowinning.

Electrowinning differs from a smelter's electrolytic refinery in that the anode is made of an insoluble lead compound. Other than that, they are basically the same. The cell contains an anode, a cathode, and an electrolyte containing copper. An electric current is passed through the cell and pure copper is deposited at the cathode. This final product, the electrowon cathodes, contain 99.99% copper and are marketed to copper wire manufacturers, brass mills, or rod mills.

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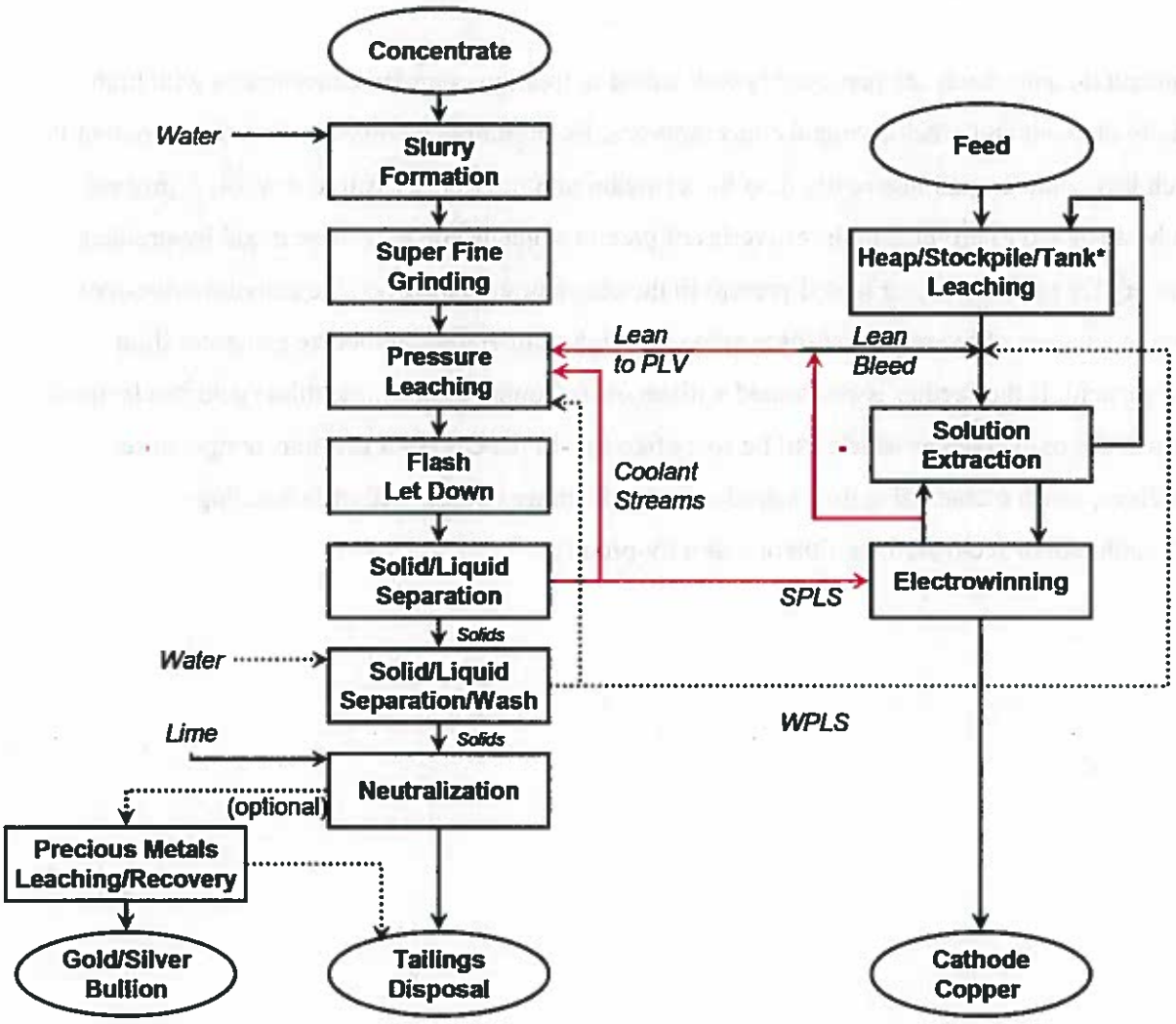
Copper Concentrate Autoclave Flowsheet



The solid residue from the solid-liquid separation step contains gold and silver, if present. The gold and silver can be recovered by neutralization with lime followed by cyanide leaching in tanks and adsorption onto activated carbon. Arsenic, bismuth and other penalty elements will be

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precipitated as stable compounds and can be safely accumulated in a lined tailings facility designed for the purpose.

Concentrate autoclaves are particularly well suited to treating complex concentrates with high penalty element and precious metal concentrations. Environmental emission control equipment is much less complex and less costly than for a smelter and provides effective control. A process can be designed to produce high recoveries of precious metals and even base metal by-product recovery for nickel, zinc, or lead if present in the concentrate. However, the autoclave does not provide a means of recovering sulfuric acid. The high-temperature autoclave generates dilute sulfuric acid. If the facility is co-located with an oxide copper deposit, the dilute acid can be used to leach the oxide copper which will be cost effective. In the case of a medium-temperature autoclave, much elemental sulfur is produced. It can either be disposed of in a tailings impoundment or recovered via flotation as a by-product.