

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MINERAL REPORT

Results of Analyses of Standard and Blank
Samples Tested At Selected Assay Laboratories
In North America

Prepared By:



Matthew W. Shumaker
Signature

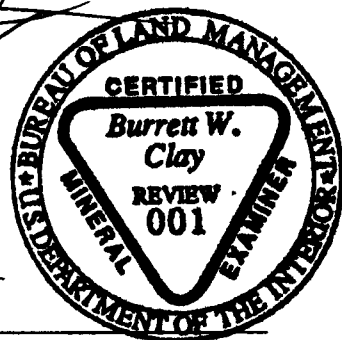
Matthew W. Shumaker
Senior Geologist
BLM National Training Center
Executive Secretary, BLM Mineral
Examiner Certification Panel
CRME 028

29 OCT 2002
Date

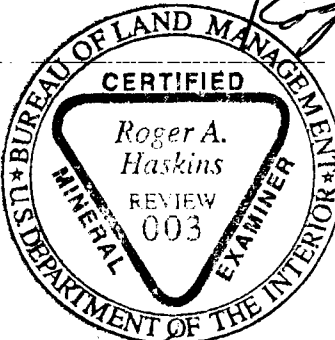
Burrett W. Clay
Signature

Burrett W. Clay
Supervisory Geologist
BLM National Training Center,
Chairman, BLM Mineral Examiner
Certification Panel
CRME 001

Oct 29, 2002
Date



Technical Review and Approval



Roger A. Haskins
Signature

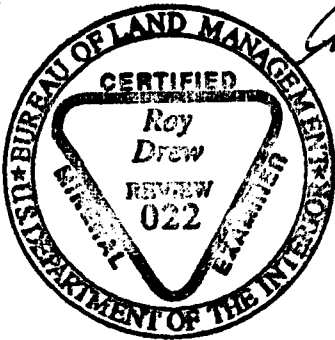
Roger A. Haskins
Senior Geologist,
Mining Law
Member, BLM Mineral Examiner
Certification Panel
Washington, DC
CRME 003

11/21/02
Date

Glenwood F. Kerestes
Signature

Glenwood F. Kerestes
Senior Mining Engineer
Member, BLM Mineral Examiner
Certification Panel
Montana State Office
CRME 009

Nov. 1, 2002
Date



Roy H. Drew
Signature

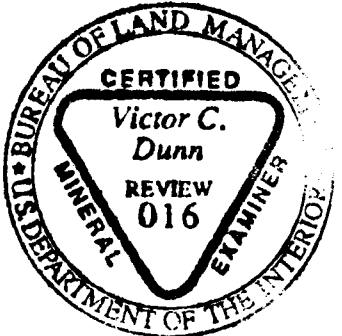
Roy H. Drew
Senior Geologist
Member, BLM Mineral Examiner
Certification Panel
Colorado State Office
CRME 022

11/7/2002
Date

Victor C. Dunn
Signature

Victor C. Dunn
Senior Mining Geologist,
Member, BLM Mineral Examiner
Certification Panel
Winnemucca Field Office
CRME 016

Nov. 14, 2002
Date



Management Acknowledgment

Bob Anderson
Signature

Assistant Director, Minerals,
Realty, and Resource Protection

1-22-03
Date

Introduction

The Bureau of Land Management (BLM) administers the Public Lands of the United States. Authority to administer is delegated by the Secretary of the Department of the Interior. The BLM also administers mineral actions under various United States Mining laws (30 USC 22, et seq), Mineral Leasing laws (30 USC 181) and Material Sales laws (30 USC 601).

Because of documented Public Land administration problems caused by inaccurate or nonreproducible precious metal assays, BLM's Washington Office assigned the National Training Center in Phoenix to develop and implement a scientific survey of assay laboratory results. The project was undertaken by Geologists Matthew W. Shumaker and Burrett W. Clay.

Shumaker and Clay designed and commenced the laboratory survey in late 1999. The majority of the samples had been submitted by May, 2002, and most results were received by the end of July, 2002.

This report, including the results in Attachment 6, are intended for the use of Bureau of Land Management personnel in evaluating laboratory results submitted to them, and for reference in selecting laboratories to analyze samples. Any other use of this report or the information herein is beyond the original scope and objectives of the project. For the purposes of this report, we made no attempt to determine the reasons one or another laboratory may have reported acceptable, unacceptable or marginal results. A statistical analysis of results from laboratories is beyond the scope and objectives of this project, and is not a part of this report.

This report copy is complete only if it contains the one page cover sheet, all nine printed pages of text, Attachments 1 through 4 of one printed page each, Attachment 5 of two pages, and Attachment 6 containing eighteen printed pages.

II. Assays Generally

Black's Law Dictionary (1979) defines an assay as:

The proof or trial, by chemical experiments, of the purity or the fineness of metals; particularly of the precious metals, gold and silver. Examination as to characteristics (as weight, measure, or quality). (Citations omitted.)

The definition in *Black's* is often quoted but not necessarily complete or applicable. It best describes purity testing of bullion or dore'¹. The *Black's* definition is not a useful one to

¹ Thrush (1996) defines "dore" in a fire assaying context as "Gold and silver bullion which remains in a cupelling furnace after the lead has been oxidized and skimmed off." When the dore' results from a fire assay, it will normally also contain platinum group metals, but only if they were present in the material assayed. The term dore' also applies to gold and silver, prior to refining, which is derived

describe what is done when a mineral examiner or a related professional submits a sample of earth material or concentrates to an assay laboratory to determine what elements or compounds of economic interest it contains.

The Dictionary of Mining, Minerals and Related Terms (Thrush, 1996) provides a definition for assay that is more applicable to work undertaken in mining claim examinations and related work:

- a. To analyze the proportion of metals in an ore; to test an ore or mineral for composition, purity, weight, or other properties of commercial interest.
- b. The test or analysis itself; its results.

The Center for Advanced Mineral and Metallurgical Processing (CAMP, 2000), at Montana Tech, in Butte, provides a succinct and useful definition:

Assaying is generally defined as the quantitative determination of the metals in ores and furnace products.

Assay definitions may appear to imply that only ores are assayed, as opposed to samples of rock. The term *ore* possesses an economic meaning. An *ore* is a rock or mineral that can be mined, processed and sold at a profit under current technological and economic conditions. Tens of thousands of samples of rocks and other mineral matter are submitted to assay laboratories annually. Only a fraction of them turn out to be *ore*.

The terms “assay” and “analysis” are used almost interchangeably in the minerals industry and in governmental agencies with responsibility for mineral resources. Both terms describe a chemical or pyrochemical protocol used to quantitatively determine the concentration of certain elements or chemical compounds of interest in samples of rock or other materials. There are numerous proven, conventional methods of performing assays, including fire assay (FA), neutron activation (NA), several methods of induction coupled plasma arc spectrometry (ICP), and atomic absorption spectrophotometry (AA)².

An acceptable assay or analysis by any method must be undertaken in a scientifically accepted manner in a laboratory free of contamination. It must be repeatable within standard laboratory parameters. The elements or chemical compounds measured may include a wide spectrum of potentially valuable commodities, such as calcium carbonate, magnesium oxide, gold, silver or platinum.

(footnote 1, continued) from a mine’s precious metal recovery facility. In that context, the dore’ may also contain residual zinc from the recovery process (such as Merrill-Crowe), as well as other precious metals, and sometimes, copper.

² A complete listing of assay and analysis methods, with a description of how they work, is beyond the scope of this report. A good place to start when researching assay methods is U.S. Geological Survey Bulletin 1445 (1977), *A Manual on Fire Assaying and Determination of the Noble Metals in Geological Materials*.

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As illustrated by the definition in Thrush (1996), there is no rigid differentiation between an assay and an analysis. Tests for industrial minerals and some non-precious metals, are often referred to as analyses, or chemical analyses. When undertaken properly, a chemical analysis is comparable in precision to an assay. Within the mineral industry in the United States, the word “assay” is most often applied to describe the protocol of a physical and chemical process that determines, using precise methodology, the concentration of the precious metals in a sample. The sample thus assayed may consist of material from an interesting prospect, of material believed to be ore, of slag, of material thought to be mine waste, or of simple earth material. The written result is usually called an “assay sheet” or “report of assay.” In informal usage, the written result is often called simply an “assay.” Throughout this report, the terms *analysis* and *assay* are used interchangeably, except where differentiation is necessary.

III Survey of Assay Laboratories

Standards and Blanks Used

Various sources in Australia, Canada, the United States and elsewhere prepare and sell standard or certified reference materials of known metal content. Hereinafter referred to as “standards,” they consist of ore that has been finely ground and thoroughly homogenized. The homogenized standards are repeatedly assayed by a number of different laboratories. The results are statistically analyzed so that a mean result can be determined, and the expected laboratory deviation reflecting high confidence can be developed.

In North America, standards are readily available from CANMET, a division of Natural Resources Canada, and from the Nevada Bureau of Mines and Geology (NBMG), both governmental agencies. CANMET refers to their standards as “certified reference materials.” NBMG refers to their standards as “standard reference materials.” The CANMET and NBMG standards are both derived from bulk samples of ores from known mines that have been crushed, pulverized, and extensively homogenized. CANMET and NBMG standards are all analyzed in a “round robin” analysis program through which numerous laboratories perform replicate analyses of each sample. Both CANMET and NBMG standards are of very high quality. NBMG’s standard reference materials tend to be less expensive, and are derived from mines in the United States. Standards from NBMG are readily available for sale to anyone at a reasonable price. A description of how NBMG’s standard reference materials are prepared is included in this report as Attachment 5.

We selected three standards produced by the Nevada Bureau of Mines and Geology (NBMG) for this project.

NBMG Standard Reference Material 4b. This standard consists of pulverized and homogenized gold ore from the Mesquite mine in southeastern California (Attachment 1).

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NBMG Standard Reference Material 2b. This standard consists of pulverized and homogenized gold ore from the Jerritt Canyon Mine, in Nevada (Attachment 2).

NBMG Standard Reference Material 6b. This standard consists of pulverized and homogenized platinum and palladium ore from the J-M Reef, at the Stillwater Mine in Montana (Attachment 3).

A blank sample contains no precious metals. Some blanks derived from natural sources may contain insignificant, minuscule concentrations of precious metals at or below their average crustal abundance. If a laboratory reported precious metal concentrations above crustal abundance in blanks, all their reported results would be suspect. Selection of a blank is not as simple as it might first appear. A traditionally used blank consists of silica sand, which could be purchased at a hardware store. Silica sand is becoming less widely available due to health and safety concerns about airborne silica. Silica sand consists almost exclusively of quartz, with minuscule amounts of other minerals. It has a very bright, white color that is unlike virtually all ore materials. When pulverized to the size range of the standards that we selected, silica sand maintains a distinctive white “powdered sugar” appearance, and is an obvious blank. Silica sand was not appropriate for this project for that reason.

The standards that we selected ranged from a buff to a dark gray color, so it was necessary for us to develop a blank that was not obviously silica sand, and that at least superficially resembled one or more of the standards.

The blank that we used contains more than one mineral, unlike silica sand, so we termed it a “complex blank.” We developed that term on the basis of the definition of a “complex ore”³ as being an ore that contains several metals (Thrush, 1996). Its tan color resembles common mineral matter of interest in many examinations because it contains many dark accessory minerals common to most felsic igneous rocks. It consists of landscaping material derived from the front yard of the personal residence of one of the authors of this report. Our complex blank has been analyzed by seven reputable laboratories that are recognized by the mining industry. Their analyses (Attachment 4) showed that the complex blank contained no gold, silver, or platinum group metals above average crustal abundance (Weast, 1973). Our complex blank also has the advantage of being readily available at no cost to the government.

³ As illustrated in Thrush (1996), the term “complex ore” has an imprecise meaning. The most useful definitions of “complex ore” are (1), “An ore containing several metals,” and (2), “Ores named for two or more valuable metals, such as lead-zinc ores, gold-silver ores, etc.” In metallurgical terms, “complex ore” can also denote ores that may be difficult or costly to treat because of the presence of deleterious materials, such as antimony or arsenic. The term “complex ore” has been extensively *misused* to describe what are actually common earth materials, which are barren of precious metals, that will reportedly show precious metal values only when they are “assayed” using unconventional methods, or only when the “assays” are performed by certain laboratories.

Survey Methodology

Once we had selected standards and blanks, we sent suites of samples to North American laboratories that would perform assays for the general public for money. We selected laboratories through their advertising in print and on the Internet, plus referrals and references to them in print, on the Internet, and through professional contacts. Some laboratories were selected because they have previously provided assay results used in matters pertaining to the public lands. We tested 65 laboratories, mostly in the United States, and several in Canada. We did not test *all* laboratories.

We utilized one blank and three samples of known content. Where possible, we sent each laboratory six samples, each differently numbered. These included two duplicate samples of the blank, and two duplicate samples of NBMG Standard Reference Material 6b. We sent duplicates because it is also important to determine if a laboratory can repeat results. If a laboratory's results cannot be repeated, all of their results may be suspect.

In some cases, we sent fewer than six samples to a laboratory due to their high assay cost. We sent more than one suite of the same samples to some laboratories. In a few cases, partial suites of blanks and standards for this project were included in the series of samples sent for one or more concurrent validity examinations. In all cases, Shumaker and/or Clay physically prepared and packed the samples. In some cases, other qualified personnel sent samples that we had prepared to various laboratories on our behalf. To maintain the chain of custody in those cases, we provided samples that we had previously sealed, plus specific handling and shipping instructions to the person sending the samples.

Each sample within each suite normally contained between 60 and 100 grams of material. Since a standard fire assay uses about 30 grams, we believed that would be a sufficient amount. At some laboratories, their gold and silver assays are done on a separate split from those analyzed for platinum and palladium. Most laboratories using conventional assaying methods publish catalogs of available assay services. Most of those catalogs specify the minimum amount of material that they will need when several metals are to be analyzed. Those requirements did not exceed 90 grams.

Where there was no published catalog, we asked how much sample was needed. A few laboratories asked for "a coffee can full" or "several pounds." Because a 300 gram jar of each NBMG standard cost about \$50, we were reluctant to send very large samples. Where unusually large samples were requested, we sent 90 to 120 grams. No laboratory asked for more sample material.

In our experience, most relatively large laboratories assay numerous samples daily. Each sample is typically assigned a working number for use in the laboratory, which bears no connection to the sample number provided by the client until the final assay report is produced. Laboratory technicians at larger competent laboratories generally do not know--or care--who submitted a particular sample. They would know the sample only by its working number. Because of the large number of samples that they analyze, those laboratories would simply report what they found.

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Many smaller laboratories are operated by only one or two people. Their situation can be different, where smaller numbers of samples are handled only by the proprietor or an assistant. Detection of platinum in samples submitted by the general public could surprise a small, but competent laboratory. (Discovering that a sample actually contains platinum or palladium above crustal abundance levels is, indeed, a rare occurrence.) In such cases, the lab could run a replicate assay on whatever volume of sample was left from the initial work. This would be intended to rule out laboratory error or contamination in their laboratory. We provided enough sample material for a laboratory to conduct one or two replicate assays. We did not provide enough sample material for laboratories to do so extensively, as explained above. The surprising presence of platinum was specifically mentioned by a few small laboratories. These included Mineral Research Laboratory in Monrovia, California, Mineral Assay office in Mina, Nevada, Mother Lode Assaying in Foresthill, California, and Cone Geochemical in Denver. ACTLabs/Skyline, a medium sized laboratory in Tucson, also noted the presence of platinum.

Where a laboratory published a catalog of services, we normally selected a “package” assay that included gold, platinum, and palladium. In some cases, a silver assay cost extra. In many cases, the package assay consisted of a fire assay (FA) preconcentration followed by an Induction Coupled Plasma Arc (ICP) finish. In other cases, the laboratory would not specify the method that was used, or they asserted a proprietary method that was undefined or unexplained. A few laboratories provided results for rhodium, osmium, rhenium, ruthenium, and the rare earth elements at no extra cost. Laboratories employing conventional assay methods that are accepted by the mainstream mining industry did not do so.

Many laboratories offer assay and analysis packages at various levels of precision, with lower detection limits that can quantify minuscule, crustal abundance levels of metals. Assays using such low detection limits tend to cost more, and are usually described in the laboratory’s catalog of services. We did not normally choose the quantitative method with the lowest detection limits where more than one method was offered. Based on our experience, we instead selected the quantitative method that would most likely be used in exploration or deposit delineation. In a few cases, notably Bondar-Clegg and Acme, the most cost-effective platinum and gold package was also very precise. We did not knowingly select *qualitative* methods, although some assay reports appeared to list qualitative numbers. Where no catalog was published or where there was no choice of method, we accepted what the laboratory offered. In those cases, the laboratory rarely provided detection limits or information on the method’s precision.

Each laboratory received samples that we had assigned alphanumeric designators. We used numerous different designators which did not indicate the actual origin of the samples. The alphanumeric designators were designed so that we could keep track of the origin of each sample, regardless of how complex any designator appeared. In the results portrayed in Attachment 6, only the origin of the sample is shown. We submitted samples, and paid for their analysis, in a manner that assured that the results reported would be the same as would be reported to any member of the public.

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Interpreting Results

All assay results herein are reported in Troy ounces per ton. Where we received results in parts per million (ppm) or parts per billion (ppb), we mathematically converted those results to Troy ounces per ton. Where the assay costs are shown, those costs are in United States Dollars unless otherwise indicated.

Several laboratories were surprisingly slow in producing results. We have not yet received results from some laboratories. Other laboratories ceased operations and disappeared after receiving the sample suites. The results tabulated in Attachment 6 represent what we have received as of the date of this report.

Because of the differing methods used by each laboratory, and the wide disparity in precious metal concentrations reported, we did not analyze the results statistically. Had we done so, any such analysis involving all the results would have been of limited value. **The best way to evaluate results for each element from each laboratory would be to compare that laboratory's results only to the range of recommended values⁴ reported by NBMG for each standard** (see Attachments 1 through 4), and to compare the analyses of the duplicate samples to one another within each laboratory's report. Results from laboratories should not be compared against results from other laboratories, only to the recommended values provided by the NBMG. The ranges of recommended values are as follows:

Standard Reference Material NBM-4b, Mesquite mine, California, in troy ounces per ton			
Element	Recommended Value	Lower Value	Upper Value
Gold (Au)	0.012 +/- 0.002	0.010	0.014
Silver (Ag)	0.03 +/- 0.04	0.0	0.07

Standard Reference Material NBM-2b, Jerritt Canyon Mine, Nevada in troy ounces per ton			
Element	Recommended Value	Lower Value	Upper Value
Gold (Au)	0.228 +/- 0.008	0.220	0.236
Silver (Ag)	0.02 +/- 0.03	0.0	0.05

⁴ "Recommended Value" is the term used by NBMG to indicate the mean precious metal concentrations resulting from their multiple assays of the standard. Results of competently done assays using methods of comparable precision should be very close to that number.

Standard Reference Material NBM-6b, JM Reef, Stillwater Mine, MT, in troy ounces per ton				
Element	Recommended Value		Lower Value	Upper Value
Gold (Au)	0.023	+/- 0.003	0.020	0.026
Platinum (Pt)	0.352	+/- 0.083	0.269	0.435
Palladium (Pd)	1.13	+/- 0.136	0.994	1.266

Attachment 6 lists the name and location of each laboratory tested, with results of the tests. Relatively larger laboratories typically employ many people. Smaller laboratories typically involve only the proprietor or the proprietor and a technician. In the case of small laboratories, we listed the name of the lab technician or proprietor, or both, when that information was available. That information can be important, because some proprietors have been known to go out of business under one laboratory name, and reappear later under a different laboratory name.

Depending on the analysis methods used, some of the platinum and palladium in NBMG Standard Reference Material 6b could be reported as silver and/or gold. That result would be most likely where a lead collector fire assay is performed, after which the results are determined gravimetrically. The potential for error is compounded due to the high grade of the Stillwater ore that we used⁵. The problem will generally not occur with more precise methods, such as where the fire assay is used as preconcentration, followed by an ICP analysis of the prill or bead. When analyzing samples which contain significant amounts of platinum group elements other than gold and silver, proper assay techniques need to be utilized which will address this issue (Lewis, Pers. Comm. 2002)⁶. These techniques are described in Bugbee (1940, pages 131-2). When platinum is actually present, it will almost always cause a discolored bead or prill, and discolor the parting acid when present in large relative concentrations, such as in NBMG standard reference material 6b. Palladium will cause a discolored nitric acid parting solution. Both effects should be evident to the assayer, and should be noted on the assay report. Whatever methods are used, the assay must be performed correctly, otherwise the result will be wrong.

⁵ NBMG now offers a lower grade platinum and palladium standard reference material, which was not available when we began the project.

⁶ If platinum and palladium are actually present, gold, platinum, and palladium need to each be specifically determined--usually instrumentally, and then the silver can be determined by difference.

If gold and silver are both being determined gravimetrically, then some of the platinum will report as gold and some as silver since it is partially soluble in nitric acid, and the palladium will report as silver. (Palladium is soluble in nitric acid, while platinum is partially soluble). An excellent discussion of the ramifications can be found in Bugbee (1940 pages 131-2).

If the Au is being determined by an instrumental finish (and silver gravimetrically by difference), but platinum and palladium are not being analyzed, then the gold result should be correct, but the silver will be high by the amount of platinum and palladium present.

Results significantly different from the expected values (Attachments 1 - 4) may be due to contamination, poor technique, incorrect application of an otherwise proper technique, errors, incompetence, or fraud. In some cases, where unexpected results are provided by a laboratory, the cause may have been an internal calculation error that is easily corrected. Customers who send samples to a laboratory for analysis expect that the results will be right the first time. We did not contact any laboratory for clarification or correction when the results they produced fell outside the expected range of results.

IV. Selected References

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Weast, R.C., editor, 1973, Handbook of Chemistry and Physics, 54th edition, The Chemical Rubber Company, p. F-188.

Standard Reference Material NBM-4b

(Mesquite Mine, California low grade ore)

Accepted fire-assayable gold and silver values based on mean results from 14 separate laboratories. Data are in troy ounces/short ton and parts per million by weight; precision figures are for 95% confidence. Each laboratory assayed 3 splits in triplicate (9 determinations) resulting in 126 assays. This material is nominally >95% -200 mesh:

Gold (Au) = 0.012 +/- 0.002 oz/ton (0.41 +/- 0.07 ppm)

Silver (Ag) = 0.03 +/- 0.04 oz/ton (1.0 +/- 1.4 ppm)

For questions or comments contact:

Dr. Paul J. Lechler
702-784-6691
702-784-1709 fax
plechler@comstock.nbmgs.unr.edu

NEVADA BUREAU OF MINES AND GEOLOGY

UNIVERSITY
OF NEVADA

Mail Stop 178
Reno, Nevada 89557-0088
Telephone: (775) 784-6691
FAX: (775) 784-1709

STANDARD REFERENCE MATERIAL NBM-2b

(Jerritt Canyon, Nevada carbonaceous Au, Ag ore)

Accepted gold and silver values are based on mean results from 13 separate laboratories. Data are in troy ounces/short ton and parts per million by weight; precision figures are for 95% confidence. Each laboratory (with few exceptions) assayed three splits in triplicate (9 determinations) resulting in $n = 50-55$ for this SRM. This material is nominally >95% -200 mesh:

Gold (Au) = 0.228 ± 0.008 oz/ton (7.81 ± 0.27 ppm)

Silver (Ag) = 0.02 ± 0.03 oz/ton (0.68 ± 1.03 ppm)

For questions or comments contact: Paul J. Lechler, PhD
775-784-6691 ext. 123
775-784-1709 fax
plechler@unr.edu

Standard Reference Material NBM-6b

(Stillwater Mine, Montana J-M Reef ore)

Accepted gold, platinum, and palladium values based on mean results from 8 to 11 separate laboratories (depending on element). Data are in troy ounces/short ton and parts per million by weight; precision figures are for 95% confidence. Each laboratory (with few exceptions) assayed 3 splits in triplicate (9 determinations) resulting in $n = 70$ to 100 for this SRM. This material is nominally >95% -200 mesh:

Gold (Au) = 0.023 ± 0.003 oz/ton (0.793 ± 0.091 ppm)

Platinum (Pt) = 0.352 ± 0.083 oz/ton (12.1 ± 2.85 ppm)

Palladium (Pd) = 1.13 ± 0.136 oz/ton (38.6 ± 4.66 ppm)

For questions or comments contact: Dr. Paul J. Lechler
702-784-6691
702-784-1709 fax
plechler@comstock.nbmgs.unr.edu



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

National Training Center
 9828 North 31st Avenue
 Phoenix, AZ 85051

In reply refer to:

3800

May 29, 2001

Complex Blank Reference Material

(Maricopa County, Arizona, residential yard landscape material)

The values listed below are the result of replicated analyses by laboratories denoted below. Data are in troy ounces per ton, where above lower detection limits.

XX indicates below lower detection limits. NT denotes element was not analyzed.

Au	Ag	Pt	Pd	Rh	Ir	Ru	Os	Lab
XX	XX	XX	XX	XX	XX	XX	XX	Legend ¹
XX	XX	XX	XX	XX	XX	XX	XX	Chemex (two separate submissions at different dates)
0.00015	XX	XX	XX	XX	XX	XX	XX	Bondar-Clegg ²
XX	NT	XX	NT	NT	NT	NT	NT	Alfred H. Knight
XX	XX	XX	XX	NT	NT	NT	NT	Florin Analytical Services ³
XX	XX	XX	XX	NT	NT	NT	NT	Inspectorate – Rocky Mountain Geochemical, Sparks, NV ³
XX	XX	XX	XX	XX	XX	XX	XX	Nevada Bureau of Mines & Geology

Notes:

- Legend ceased performing assays and analyses in September, 1999. They performed four replicate analyses of this material at different times under different sample numbers.
- Bondar-Clegg's method had a lower detection limit of 1 ppb (part per billion) or 0.00003 troy ounces per ton. The result reported for gold is within the expected average crustal abundance for that element.
- Submitted together as blind duplicates with different identifying numbers.



The NBMG Standard Reference Material Project

Spring 1991

The Nevada Bureau of Mines and Geology provides inexpensive standard reference materials (SRMs) for precious-metal assays. In addition to producing quality assurance standards for geochemical laboratories, this project is designed to assess the quality of data generated by specific laboratories and to determine the variation in analytical results among laboratories. The SRMs produced by this project are priced significantly lower than the typical prices for SRMs, encouraging greater use of SRMs for quality assurance in precious-metal assays.

At present, six mines have supplied bulk samples for this project: the Mesquite (metamorphic-hosted) mine in California; the Paradise Peak (andesite-hosted), the Jerritt Canyon (carbonaceous limestone-hosted), the Round Mountain (rhyolite-hosted), and the Boss (carbonate-hosted) mines in Nevada; and the Stillwater (mafic-hosted) mine in Montana. At most of these mines, three bulk samples are taken: high-grade ore, low-grade ore, and unmineralized host rock.

All bulk samples are pulverized, ball-milled for 24 hours, and blended in a cement mixer at the NBMG laboratory. The resulting samples are 98% -200 mesh and are homogeneous, as indicated by repeated fire assays at the NBMG laboratory. Fifteen geochemical laboratories are analyzing splits of each of these samples for gold and silver. Boss and Stillwater samples are also being analyzed for platinum-group elements.

Analyses have been completed for five SRMs from Paradise Peak and Jerritt Canyon; these are now ready to use. SRMs from the remaining four mines are expected to become available during 1991. Results of fire assays of the five currently available SRMs can be summarized as follows:

SRM No.	Gold content			Silver content		
	Mean	Std. dev.	Median	Mean	Std. dev.	Median
Paradise Peak (andesite-hosted)						
NBM-1a	9.8 ppb	--	5.0 ppb	575 ppb	--	400 ppb
NBM-1b	0.046	0.003	0.045	0.41	0.09	0.40
NBM-1c	0.464	0.016	0.468	5.79	0.54	5.80
Jerritt Canyon (carbonaceous limestone-hosted)						
NBM-2a	9.6 ppb	--	5.0 ppb	270 ppb	--	200 ppb
NBM-2b	0.228	0.010	0.228	0.02	--	0.01

All values are in troy ounces per short ton except where noted. The gold and silver contents of the two

Attachment 5-1

unmineralized samples (NBM-1a and NBM-2a) are below the detection limits of several participating laboratories. The silver content of the ore sample from Jerritt Canyon is also close to detection limits of most laboratories. Standard deviations are not given for the unmineralized samples and the silver content of NBM-2b because their distribution curves are rather badly skewed due to truncation at the detection limits, and standard deviation is meaningless as an estimator of confidence limits when the distribution is not approximately normal. In these three cases the median is a more useful statistic than the mean because the means were calculated from detectable values only.

The distributions of the gold and silver measurements by the participating laboratories for the ore-grade SRMs are shown in the histograms on the next page. Distributions of gold values appear more tightly constrained than the silver values. This is probably a reflection of the poorer analytical precision for silver than a description of the homogeneity of silver in the SRMs.

These SRMs can be purchased in 30-gram bags and 300-gram bottles at the sales office (room 310 in the Scragham Engineering-Mines Building on the University of Nevada, Reno campus), by mail (Nevada Bureau of Mines and Geology/178, University of Nevada, Reno, NV 89557-0088), by FAX (702-784-1709), or by telephone (702-784-6691). Mail orders must either be prepaid by check or money order made out to "Board of Regents," or charged to a MasterCard or VISA credit card. Telephone and FAX orders must be charged to MasterCard or VISA. When ordering by mail or FAX with a credit card, please include card number and expiration date. Each 300-gram bottle is US\$50.00 + \$5.00 shipping (\$8.00 international) and each 30-gram bag is US\$7.00 + \$1.00 shipping (\$3.00 international).

This project would not have been possible without the help and cooperation of the mine operators that contributed bulk ore samples and the geochemical laboratories that analyzed the blended materials. We appreciate the assistance of the following: American Assay Laboratories, Barringer Laboratories, Bondar-Clegg Inc., Chemex Laboratories Ltd., Cone Geochemical Inc., FMC Gold Company, Geochemical Services Inc., Goldfields Operating Company, Independence Mining Company, Legend Metallurgical Laboratory Inc., Mineral Processing and Environmental Laboratories Inc., Rocky Mountain Geo-chemical of Nevada, Round Mountain Gold Corporation, Skyline Laboratories Inc., Stillwater Mining Company, U.S. Bureau of Mines, and U.S. Geological Survey.

---Paul J. Lechler, Chief Chemist/Geochemist, and Mario O. Desilets, Assistant Chemist

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Accurassay, Thunder Bay, ON	Au: 0.0003 Ag: <LD Pt: 0.0012 Pd: <LD	Au: 0.233 Ag: 0.029 Pt: 0.0010 Pd: <LD	Au: 0.0106 Ag: 0.029 Pt: 0.0007 Pd: <LD	Au: 0.0215 Ag: 0.0870 Pt: 0.3361 Pd: 1.2868	Au: 0.0277 Ag: 0.0870 Pt: 0.3392 Pd: 1.2373	Au: 0.0006 Ag: <LD Pt: 0.0011 Pd: <LD	US\$155 for all. Report 8/2002. Results reported in ppb, ppm for silver. Converted.
Acme Analytical Labs, Vancouver, BC	Au: <LD Ag: 0.01 Pt: <LD Pd: <LD	Au: 0.223 Ag: <LD Pt: <LD Pd: <LD	Au: 0.011 Ag: <LD Pt: <LD Pd: <LD	Au: 0.023 Ag: <LD Pt: 0.339 Pd: 1.189	Not Used	Au: <LD Ag: <LD Pt: <LD Pd: <LD	CDN\$96.25 Sent: August 17, 2000 Rept: 9/1/00
Action Mining Services, Sandy, OR. <i>Fire Assays</i>	Au: <LD Ag: <LD	Au: 0.07 Ag: 0.03	Au: 0.07 Ag: 0.03	Au: 0.21 Ag: 1.89	Au: 0.24 Ag: 2.16	Au: 0.01 Ag: 0.09	Report dated 09/20/2000. Fire assays \$168.
Action Mining Services, Sandy, OR. Michael C. Glenn, Lab Manager & President <i>"Spectro-ICP"</i>	Au: <LD Ag: 0.087 Pt: <LD Pd: <LD	Au: 0.228 Ag: 0.058 Pt: <LD Pd: <LD	Au: 0.01 Ag: <LD Pt: <LD Pd: <LD	Au: 0.025 Ag: 0.058 Pt: 0.36 Pd: 1.225	Au: 0.03 Ag: 0.029 Pt: 0.45 Pd: 1.2	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Report dated 10/15/00. Spectro-ICP assays \$900

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

<LD = below lower detection limit. PGM = platinum group metal ND = not detected or recovered NR = not reported
ITF = Platinum group interference prevented quantitative Au & Ag assay. Tr = Trace Nil = nil

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
ActLabs/Canada Ancaster, ON Fire Assay with ICP-MS	Au: 0.0001 Pt: 0.0003 Pd: 0.0001	Au: 0.2004 Pt: 0.0005 Pd: 0.0001	Au: 0.0003** Pt: 0.0003 Pd: 0.0001	Au: 0.0357 Pt: 0.3741 Pd: 0.4495	Au: 0.0288 Pt: 0.3161 Pd: 0.4118	Au: 0.0001 Pt: 0.0007 Pd: 0.0001	FA/ICP-MS (<i>NOT NiS</i>) results reported in ppb. Values converted to oz/ton. Samples shipped to Canadian subsidiary by lab. \$138. ** Indicates that digestion failed, with insufficient material for reassay
ACTlabs/Skyline Tucson, AZ Fire Assay	Au: <LD Ag: <LD	Au: 0.230 Ag: <LD	Au: 0.016 Ag: <LD	Au: 1.445* Ag: 1.08*	Au: 0.655* Ag: 1.90*	Au: <LD Ag: <LD	Report 9/26/2000 \$96 *Lab's note: "NOTE: Discoloration of bead and parting solution indicates possible presence of Pt and/or Pd group metals in results reported as gold and/or silver." Registered Assayer, AZ State Board of Technical Registration
American Assay Labs, Sparks, NV	Au: <LD Ag: 0.025 Pt: <LD Pd: <LD	Au: 0.240 Ag: 0.014 Pt: <LD Pd: <LD	Au: 0.016 Ag: 0.014 Pt: <LD Pd: <LD	Au: 0.021 Ag: 0.021 Pt: 0.694 Pd: 2.060	Au: 0.025 Ag: 0.018 Pt: 0.580 Pd: 1.710	Au: <LD Ag: <LD Pt: <LD Pd: <LD	\$124.50. Report dated May 23, 2001. Fire Assay, gravimetric and ICP, depending on element. Lower detection limits disclosed.
American Gold, Washington, UT Ronald "Ron" Markham is apparently the proprietor.	Did not report results	Did not report results	Did not report results	Did not report results	Did not report results	Did not report results	Did not report results.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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AuRic Metallurgical Laboratories Salt Lake City, UT, Ahmet Altinay, proprietor Fire Assay	Au: ND Ag: 0.014 Pt: 0.039 Pd: 0.004	Au: 0.233 Ag: 0.022 Pt: 0.008 Pd: 0.004	Au: 0.039 Ag: 0.043 Pt: ND Pd: 0.001	Au: 0.039 Ag: 0.028 Pt: 0.222 Pd: 1.206	Au: ND Ag: 0.035 Pt: 0.148 Pd: 1.128	Au: ND Ag: 0.013 Pt: 0.078 Pd: 0.006	Fire Assay, AA finish, and Chemical Assay/SX/GFAA finish, \$900
AuRic Metallurgical Laboratories Salt Lake City, UT. Ahmet Altinay, proprietor Chemical Assay	Not used	Not used	Not used	Au: 0.015 Ag: 0.053 Pt: 0.187 Pd: 1.079	Au: 0.082 Ag: 0.053 Pt: 0.093 Pd: 1.079	Not used	
Bahamian Refining Co., LLC, Phoenix, AZ, Fred Finell, Jr.	(Basic #5 leach) Au: 1.94 Ag: 0.33	Not used	Not used	Not used	Not used	(Acid # leach5) Au: 1.65 Ag: 0.39	Report dated January 5, 2002. Reportedly used two leaches, Basic # 5 and Acid # 5. Both were actually blanks. Charged \$800. Results included brochure advertising additional testing services.
Barringer Labs	No longer accepting assay samples. Water testing work only.						
Bondar-Clegg, Vancouver BC	Au: 0.00003 Pt: <LD Pd: <LD	Au: 0.2193 Pt: <LD Pd: 0.0001	Au: 0.0101 Pt: <LD Pd: <LD	Au: 0.0231 Pt: 0.3541 Pd: 1.198	Au: 0.0260 Pt: 0.3402 Pd: 1.216	Au: 0.0002 Pt: 0.0002 Pd: 0.0003	August 31, 2000, \$133.50. Report 9/25/00, in ppb and ppm..

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Butler, Charles L, Bodfish, CA	Au: Tr Ag: <LD PGM 0.153:	Au: Tr Ag: <LD PGM: 0.0153	Au: ND Ag: <LD PGM: 0.0153	Au: ND Ag: <LD PGM: 1.29	Au: ND Ag: <LD PGM: 1.29	Au: NR Ag: NR PGM: 0.164	\$90 for six Au Ag assays. Report Aug. 20, 2002. Au/Ag assays requested, but platinum group metals also reported. PGM reported to be mostly palladium.
Can-Pay Mining Company , Queen Creek, AZ. David P. Flasha, President	0.64	0.90	0.23	1.9	2.0	0.61	\$450. Report dated April 11, 2001. Results reported as "Mixed Metal Bead in Troy Ounces," silver excluded. Assumed to be ounces per ton. Report indicated "Due to assay procedure, extremely high loss of PGM metal was observed." Fire assays, no detection limits reported.
Chemex, Sparks, NV Fire Assay + ICP	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.279 Ag: 0.01 Pt: <LD Pd: <LD	Au: 0.026 Ag: 0.01 Pt: <LD Pd: <LD	Au: 0.025 Ag: 0.01 Pt: 0.376 Pd: 1.280	Au: 0.035 Ag: 0.01 Pt: 0.396 Pd: 1.235	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Report Oct. 12, 2000. \$114
Chemex, Sparks, NV	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.231 Ag: 0.2 Pt: <LD Pd: <LD	Au: 0.011 Ag: 0.2 Pt: <LD Pd: <LD	Au: 0.023 Ag: 2.5 Pt: 0.366 Pd: 1.230	Not Used	Au: <LD Ag: <LD Pt: <LD Pd: <LD	\$119.75 August 17, 2000 Rept: 08/30/00
Chemex, Sparks, NV Fire Assay + AA	Au: <LD Ag: <LD	Not Used	Au: 0.0121 Ag: 0.01	Not Used	Not Used	Not Used	Report August 30, 2000 for concurrent investigation by another federal agency. Standard and blank provided by NTC.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Christofferson, Chris, Inc. Kellogg, ID	Au: 0.004 Ag: 0.05 Pt: ND Pd: ND	Au: 0.252 Ag: 0.22 Pt: ND Pd: ND	Au: 0.014 Ag: 0.12 Pt: ND Pd: ND	Au: 0.020 Ag: 0.02 Pt: 0.186 Pd: 0.986	Au: 0.020 Ag: 0.02 Pt: 0.200 Pd: 1.064	Au: 0.004 Ag: 0.05 Pt: ND Pd: ND	\$72, plus \$24 billed for additional Pt & Pd readings. Fire assay, report dated April 6, 2001. Reconnaissance or resource grade assays, only. More precise analyses available at higher cost.
Clarkson Laboratories, Chula Vista, CA Jeff Shannon	Au: <LD Ag: 7.6 Pt: <LD Pd: <LD	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: <LD Ag: 24 Pt: <LD Pd: <LD	Au: <LD Ag: 0.2 Pt: <LD Pd: 0.6	Au: <LD Ag: 7.4 Pt: <LD Pd: 1.0	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Report dated 10/19/00. Method reported as "Fire assay by Shepherd and Dietrich." \$390.
Colorado Assaying Company, The., Denver, CO Ed Phillips	Au: Tr Ag: 0.10 Pt: none Pd: none	Au: 0.21 Ag: 0.10 Pt: 0.004 Pd: Tr	Au: 0.007 Ag: 0.10 Pt: none Pd: none	Au: 0.005 Ag: 1.20 Pt: 0.03 Pd: 1.27	Au: 0.01 Ag: 1.10 Pt: 0.02 Pd: 1.46	Au: 0.005 Ag: Tr Pt: none Pd: none	\$390. Report dated April 6, 2001. Methods and detection limits not disclosed on report.
Complex Metals Research & Development., Hurricane, UT Jerry C. Henderson, Proprietor	Au: 0.06 Pt Group: 0.11	Not used	Not used	Not used	Not used	Not used	Samples analyzed in 1999 as a part of a concurrent examination. Cost of this portion estimated at \$300.
Cone Geochemical Lakewood, CO Steve Cone	Au: <LD Ag: <LD	Au: 0.240 Ag: <LD	Au: 0.010 Ag: <LD	Au: ITF Ag: ITF	Au: ITF Ag: ITF	Au: <LD Ag: <LD	Report dated 10/05/2000. Gold and Silver only, \$72. Platinum interferences reported for NBMG 6b, which made Au/Ag analyses impossible.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Consolidated Noble, Las Vegas, NV. Formerly Friendship Metals. Stanley J. Wardle, Proprietor	Au: 0.228 Pt: 0.855 Pd: 0.142	Au: 0.971 Pt: 1.24 Pd: 0.557	Au: 0.485 Pt: ND Pd: 0.485	Au: 0.514 Pt: ND Pd: 0.428	Au: 0.257 Pt: ND Pd: 0.257	Au: 0.428 Pt: 0.473 Pd: 0.314	Report dated 9/15/01. "Fire fusion" followed by "digestion and atomic absorption"(?). Wardle formerly operated "Friendship Metals" at the same location.
Copper State Analytical (CSAL) Tucson, AZ. Dnyanendra "D.A." Shah, proprietor	Au: 0.048 Ag: 0.962 Pt: 0.027 Pd: 0.083	Au: 0.036 Ag: 1.432 Pt: 0.125 Pd: <LD	Au: 0.107 Ag: 9.887 Pt: 0.027 Pd: 0.151	Au: 0.071 Ag: 2.112 Pt: 0.021 Pd: 0.095	Au: 0.053 Ag: 2.334 Pt: 0.083 Pd: 0.190	Au: 0.202 Ag: 2.031 Pt: 0.024 Pd: 0.033	Using CSL's usual method, tin fusion. \$2250 for six samples. 15 gram fusion, detection limits not disclosed, but were assumed from data presentation format. Registered Assayer, AZ State Board of Technical Registration
Copper State Analytical (CSAL) Tucson, AZ Dnyanendra "D.A." Shah, proprietor	Au: 0.0045 Ag: 0.247 Pt: 0.009 Pd: 0.081	Not used	Au: <LD Ag: 0.070 Pt: <LD Pd: 0.0986	Au: 0.0023 Ag: 0.1334 Pt: 0.2349 Pd: 0.3074	Not used	Au: 0.0003 Ag: 0.4205 Pt: <LD Pd: 0.1276	Using the "Dr. Donald E. Jordan: Method." \$1500. Report dated 4/4/01. Reported in ppm, converted for this chart. Registered Assayer, AZ State Board of Technical Registration
Dawson Metallurgical Laboratories, Salt Lake City, UT Perry Allen	Au: <LD Ag: <LD	Au: 0.240 Ag: 0.16	Au: 0.016 Ag: 0.18	Au: <LD Ag: 0.97 Pt: 0.12 Pd: 1.03	Au: <LD Ag: 7.51 Pt: 0.16 Pd: 1.01	Au: <LD Ag: <LD	\$170. Report dated May 25, 2001. Pt/Pd analyses sublet to Western Analysis, Inc., SLC. Fire assay, AA. Detection limits not disclosed on report, but were assumed by data display. Pt & Pd were only analyzed where fire assay bead indicated their presence.
Federal Testing Laboratories, Seattle, WA Patrick P. Raney	Au: 0.29 Ag: 0.812 Pt: 0.058 Pd: <LD	Au: 0.348 Ag: 0.667 Pt: 0.145 Pd: <LD	Au: 0.261 Ag: 1.131 Pt: 0.029 Pd: <LD	Au: 0.377 Ag: 0.406 Pt: 0.058 Pd: <LD	Au: 0.29 Ag: 0.464 Pt: 0.087 Pd: <LD	Au: 0.145 Ag: 1.073 Pt: 0.029 Pd: <LD	Report dated 9/30/00. All results reported in percent by weight, converted to Troy ounces per ton for this table.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

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Florin Analytical Services, Reno, NV. Richard A. Grondin, QC Manager	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.212 Ag: <LD Pt: <LD Pd: <LD	Au: 0.012 Ag: <LD Pt: <LD Pd: <LD	Au: 0.025 Ag: 0.39 Pt: 0.4075 Pd: 1.3502	Au: 0.028 Ag: <LD Pt: 0.5423 Pd: 1.6295	Au: <LD Ag: <LD Pt: <LD Pd: <LD	\$465. Report dated 04/19/01. Fire Assay, ICP. Detection limits implied in report. Reported in oz per ton and ppm, which was converted for this report.
General Engineering Laboratories, Charleston, SC Tom Seabrook, "Project Manager"	Au: 0.0027 ^e Ag: 0.0024 ^e Pt: ND Pd: 0.0144 ^e	Au: 0.0890 Ag: 0.0095 Pt: ND Pd: 0.0160 ^e	Au: 0.1035 Ag: 1.1571 Pt: ND Pd: 0.0076 ^e	Au: 0.0091 ^e Ag: 0.0129 Pt: 0.0386 Pd: 0.1549	Au: 0.0100 ^e Ag: 0.0130 Pt: 0.0363 Pd: 0.1102	Au: 0.0023 ^e Ag: 0.0026 ^e Pt: ND Pd: 0.0125 ^e	\$528. Report dated April 12, 2001. Superscript of "e" denotes an "estimated" value. Reported in PPB, converted to ounces per ton. Digestion with ICP-MS. Detection limits disclosed. (Primarily a wastewater laboratory.)
Grand Junction Laboratories, CO. John C. Kephart & Co. Illegible signature.	Au: 0.006 Ag: 0.016 Pt: 0.022% Pd: 0.26%	Au: 0.332 Ag: 0.35 Pt: 0.012% Pd: 0.032%	Au: 0.017 Ag: 0.08 Pt: 0.01% Pd: 0.006%	Au: 0.012 Ag: 1.31 Pt: 0.24% Pd: 1.56%	Au: 0.002 Ag: 1.23 Pt: 0.24% Pd: 1.55%	Au: 0.011 Ag: 0.186 Pt: 0.008% Pd: 0.016%	Report dated 10/5/00. Methodology not stated. Pt and Pd values were reported in percent (%). \$507.30
Hazen Research Golden, CO	Au: <LD Ag: 0.07 Pt: <LD Pd: <LD	Au: 0.236 Ag: 0.08 Pt: <LD Pd: <LD	Au: 0.016 Ag: 0.13 Pt: <LD Pd: <LD	Au: 0.026 Ag: 2.93 Pt: 0.345 Pd: 1.12	Au: 0.030 Ag: 2.60 Pt: 0.335 Pd: 1.13	Au: <LD Ag: 0.07 Pt: X X Pd: <LD	\$348

Expected Results for Standards and Blanks. See Attachments 1 - 4.

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NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2

NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Higgins, William D., Weldon, CA (Formerly Phoenix Precious Metals, Ltd.)	Au: 0000 Ag: 0000 Ptg: XX	Au: 0.261 Ag: 0.039 Ptg: XX	Au: 0.104 Ag: 0.015 Ptg: XX	Au: *** Ag: *** Ptg: XX	Au: *** Ag: *** Ptg: XX	Au: 0.128 Ag: 0.072 Ptg: :XX	Report dated July 10, 2001. \$240, includes visual microscopic description. Detection limits not disclosed. Ptg = "Platinum Group." *** = "Mostly PT Group Metals 2.9 oz. Per Ton. With small amount of Au and Ag." XX assumed to denote "Not Detected," even though it makes little sense in conjunction with "****"
Humble, Jim, Walker Lake, NV	Au: 0 Ag: 0	Au: 0 Ag: 0	Au: 0 Ag: 0	Au: 0 Ag: 0	Au: Tr Ag: Tr (Tr = <0.01)	Au: 0 Ag: 0	Report dated March 26, 2001. "Special" assay, method not specified. \$90 for all six. Humble had requested approx. 2 lbs of each. We provided about 1/2 pound of each, with a request to do the best he could.
Ida-Met, Inc Nampa, ID, Robert Fischer, PE, proprietor.	Au: 1.0 Pt: 35.0 Pd: 1.0 Rh: 40.0	Not used	Not used	Not used	Not used	Not used	Uses proprietary aqua regia leach with inquant method and a Vreeland spectroscope. Charges \$200 to \$400 per sample. Report dated Feb 07, 2002. Values are in ounces per ton.
Ida-Met, Inc Nampa, ID, Robert Fischer, PE, proprietor. (Values in ounces per ton.)	Au: 10.1 Pt: 200.0 Pd: 0	Au: 3.3 Pt: 300 Pd: 0	Au: 2.1 Pt: 145 Pd: 0.6	Au: NR Pt: 330 Pd: 1.2	Au: NR Pt: 320 Pd: 3	Au: NR Pt: 186 Pd: 0.8	Telefax report dated 26 Oct 2001, received 06 Sep 2002. \$1200 for all six. Platinum and two palladium results are reported in whole numbers. Statement on report: "They [the analyses] were performed using an investigative atomic absorption method which is somewhat proprietary and by no means intended to be certified and the results, for that matter, may not be recoverable."

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

<LD = below lower detection limit. PGM = platinum group metal ND = not detected or recovered NR = not reported
ITF = Platinum group interference prevented quantitative Au & Ag assay. Tr = Trace Nil = nil

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
International Plasma Lab (IPL), Vancouver, BC	Au: 0.0006 Ag: <LD Pt: <LD Pd: <LD	Au: 0.2088 Ag: 0.0522 Pt: <LD Pd: <LD	Au: 0.0113 Ag: <LD Pt: <LD Pd: <LD	Au: 0.0232 Ag: 0.0348 Pt: 0.4417 Pd: 1.1116	Au: 0.0215 Ag: 0.0377 Pt: 0.3761 Pd: 1.1696	Au: 0.0006 Ag: <LD Pt: <LD Pd: 0.0003	US\$156.60. Report dated April 2, 2001. Methods and detection limits disclosed. Fire assay, with AA or gravimetric finish.
Iseman Consulting, Gilbert, AZ with mailing address in Henderson, NV Gregory J. Iseman, proprietor	Au: 0.435 Ag: 0.268 Pt: 0.168 Pd: 0.487	Au: 0.596 Ag: 0.204 Pt: 0.099 Pd: 0.309	Au: 0.258 Ag: 0.408 Pt: 0.327 Pd: 0.338	Au: 0.316 Ag: 0.245 Pt: 0.630 Pd: 1.971	Au: 0.353 Ag: 0.257 Pt: 0.986 Pd: 1.801	Au: 0.195 Ag: 0.152 Pt: 0.073 Pd: 0.017	Report dated 12/28/2001 \$900 Although the assay "certificate" used a Henderson, Nevada address, the letter was postmarked Phoenix, AZ with a return address of Gilbert, AZ. The Henderson, NV address used is a commercial "Mailboxes Etc." facility.
Jacobs Assay Office, Tucson, AZ Michael Jacobs	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.236 Ag: <LD Pt: <LD Pd: <LD	Au: 0.013 Ag: 0.20 Pt: 0.016 Pd: 0.003	Au: <LD Ag: 3.40 Pt: 0.138 Pd: 0.173	Au: <LD Ag: 2.40 Pt: 0.125 Pd: 0.188	Au: 0.006 Ag: 0.05 Pt: 0.022 Pd: 0.038	\$390. Report dated 9/27/00. Registered Assayer, AZ State Board of Technical Registration
Kimball Laboratories and Consulting, Lehi, UT G. Lyn Kimball	Au: 0.052 Ag: 0.031 Pt: 0.048 Pd: 0.044	Au: 1.540 Ag: 0.116 Pt: 0.060 Pd: 0.040	Au: 0.044 Ag: 0.18 Pt: 0.002 Pd: 0.002	Au: 0.130 Ag: 0.030 Pt: 0.024 Pd: 0.560	Au: 0.102 Ag: 0.034 Pt: 0.016 Pd: 0.525	Au: 0.016 Ag: 0.038 Pt: 0.004 Pd: 0.018	\$270. Assay Method not specified on report, which was dated April 4, 2001.
Knight, Alfred H. North America Columbia, SC	Au: <LD Pt: <LD	Au: 0.232 Pt: 0.029	Au: <LD Pt: <LD	Au: <LD Pt: 0.348	Au: 0.087 Pt: 0.319	Au: <LD Pt: <LD	Report dated Oct19, 2000. \$1860. Lower detection limit of 1 ppm. Fire assay.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Lakefield Research, Ontario, Canada	Au: <LD Ag: 0.0145 Pt: 0.0887 Pd: <LD	Au: 0.2265 Ag: .0145 Pt: 0.0145 Pd: 0.0133	Au: 0.0136 Ag: 0.0232 Pt: 0.5974 Pd: 0.0006	Au: 0.0328 Ag: 0.0290 Pt: 0.4176 Pd: 1.3630	not reported	Au: <LD Ag: <LD Pt: 0.2024 Pd: <LD	US\$240. Method not disclosed on report, dated April 9, 2001. Detection limits implied. QA/QC analysis made of X-3 (blank), which duplicated original result, including Pt.
Ledoux, Inc Teaneck, NJ Certificates signed by C. P. Bucknall	Au: <LD Ag: <LD	Au: 0.2175 Ag: <LD	Au: <LD Ag: <LD	Au: <LD Ag: <LD	Au: <LD Ag: <LD	Au: <LD Ag: <LD	\$1,165 for gold and silver, including \$25 environmental fee. Report dated 09-Sep-02. Lower detection limit of 1 ppm (0.029 oz/ton).
McLaughlin, Pete Ridgecrest, CA	Au: ND Ag: ND Pt: ND Pd: ND	Au: ND Ag: ND Pt: ND Pd: ND	Au: ND Ag: ND Pt: ND Pd: ND	Au: ND Ag: ND Pt: ND Pd: ND	Not Used	Au: ND Ag: ND Pt: ND Pd: ND	\$700 Sent: August 17, 2000 Rept: August 29, 2000
Metallurgical Research and Assay Laboratory (MRAL), Phoenix, AZ, Donald E. Jordan, Proprietor David Graham, Technician Kathleen Watson, Technician. New owners: Gary Schmitt and Kathleen Schmitt..	Au: 1.20 Ag: 0.10 Pt: 2.86 Pd: 0.43 Os: 10.91 Rh: 6.52	Au: 2.01 Ag: 1.42 Pt: 7.23 Pd: 0.76 Os: 24.5 Rh: 14.22	Au: 0.68 Ag: 0.06 Pt: 2.03 Pd: 0.33 Os: 7.64 Rh: 5.56	Au: 1.56 Ag: 1.11 Pt: 7.47 Pd: 2.04 Os: 26.11 Rh: 11.81	Au: 1.60 Ag: 1.44 Pt: 7.70 Pd: 2.16 Os: 27.27 Rh: 12.46	Au: 0.62 Ag: 0.57 Pt: 2.71 Pd: 0.47 Os: 10.91 Rh: 6.61	\$1800. Formerly of Henderson, NV. Report dated 4/5/01. Method not disclosed, suspected to be acid digestion and direct coupled plasma arc (DCP). Detection limits not disclosed. Tested for: Au, Ag, Pt, Rh, Os, Ru, Pd, and Ir. Osmium and Rhodium values listed due to their unusually high reported concentrations, even in the blanks. Registered Assayer, AZ State Board of Technical Registration

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Metallurgical Research and Assay Laboratory Henderson, NV (MRAL), Donald E. Jordan, Proprietor David Graham, Technician (In 1999)	First Blank Au: 0.11 Ag: 1.01 Pt: 0.14 Pd: 0.04 Os: 0.23 Rh: 0.02	Au: 1.92 Ag: 6.06	Not used	Not used	Not used	Replicate Blank Au: 0.00 Ag: 0.00 Pt: 0.00 Pd: 0.00 Os: 0.00 Rh: 0.00	Analyses done in 1999 as a part of a concurrent validity examination. Estimated cost of this portion \$250. Registered Assayer, AZ State Board of Technical Registration. Note: First blank was marked with a sample number. Replicate blank was marked "BLANK."
Micron Gold, International DeSoto, TX P. R. Witherspoon, Proprietor.	X-3 TPM: 0.434	X-4 TPM 0.748	X-16 TPM: 1.196	X-17 TPM: 1.599	X-18 TPM: 1.815	X-19 TPM: 0.684	\$1500 for six samples. Results are in ounces per ton of total precious metals (TPM). In addition to testing the material with a standard fire assay, this process purports to test the precious metals volatilized in "the smoke," and therefore assertedly lost in the conventional fire assay process.
Mineral Assay Office, Inc., Mina, NV Gene Gates, proprietor.	Au: Tr Ag: Nil	Au: 0.2266 Ag: Nil	Au: 0.0116 Ag: Nil	Au: * Ag: *	Au: * Ag: *	Au: Tr Ag: 0.06	\$60. Report dated April 2, 2001. Gold and silver only. *Report indicated loss of the unusual black beads on X-17 and X-18, and requested additional material to test. Also recommended a spectrographic analysis, which they do not do.
Mineral Labs, Inc. Salyersville, KY Brandon Minnix Alan Branham (sp?)	Au: 2.32 Ag: 3.48 Pt: 40.6 Pd: 2.32	Au: 1.74 Ag: 1.74 Pt: 23.2 Pd: 1.74	Au: 1.74 Ag: 2.9 Pt: 34.8 Pd: 1.74	Au: 2.32 Ag: 1.16 Pt: 34.8 Pd: 3.48	Au: 1.74 Ag: 2.9 Pt: 29.0 Pd: 2.90	Au: 1.74 Ag: 2.9 Pt: 34.8 Pd: 2.32	\$900. Method and detection limits not disclosed. Report not dated. Envelope postmarked April 23, 2001

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Mineral Research Laboratory, Monrovia, CA Ralph Pray, proprietor.	Au: Tr Ag: nil Pt: nil Pd: nil	Au: 0.23 Ag: nil Pt: nil Pd: nil	Au: nil Ag: nil Pt: nil Pd: nil	Au: 0.14 Ag: 0.80 Pt: 1.51 Pd: 5.20	Not used	Au: nil Ag: nil Pt: nil Pd: Tr	Fire Assay and chemical analysis Report dated 10/10/2000, \$1200 NBMG 6b replicated and reported. Lab reported probable contamination of NBMG 6b with "an extraneous agent" and recommended submitting the unpulverized rock. We did not provide sufficient quantity sample for multiple replicate reassays.
Mineral Research Laboratory, Monrovia, CA <i>Replicate</i>	Not replicated	Not replicated	Not replicated	Replicate Au: 0.12 Ag: 0.21 Pt: 1.47 Pd: 5.19	Not replicated	Not replicated	
Mother Lode Assaying, Foresthill, CA Don Robinson	Au: 0.000 Ag: 0.000	Au: 1.989 ¹ Ag: 0.542 ¹	Au: 0.000 Ag: 0.000	Au: ITF ² Ag: ITF ²	Au: ITF ² Ag: ITF ²	Au: 0.012 Ag: 0.000	Report dated 6/4/81 (MS, 2/12/03). Fire assays, at a total of \$90. Detection limits not disclosed. Notes: ¹ Samples run in triplicate, results averaged. ² Presence of platinum and/or palladium identified, but that analytical service was not offered. Results indicate a possibility that the blank and NBMG Std. 4b may have been switched. Not investigated further
Mountain States Research and Development, Vail, AZ	Au: 0.001 Ag: ND Pt: ND Pd: ND	Au: 0.028 Ag: 0.63 Pt: ND Pd: ND	Au: 0.200 Ag: ND Pt: ND Pd: ND	Au: 0.024 Ag: 0.59 Pt: 0.324 Pd: 1.23	Au: 0.024 Ag: 0.59 Pt: 0.316 Pd: 1.16	Au: 0.005 Ag: 0.012 Pt: ND Pd: ND	\$180. Fire assay. Detection limits not on report. Report dated 10/08/01. Registered Assayer, AZ State Board of Technical Registration

Expected Results for Standards and Blanks. See Attachments 1 - 4.

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NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Mount Powell Laboratories Deer Lodge, MT Wayne Olmstead, proprietor.	Au: 0.0104 Ag: 0.14	Au: 0.233 Ag: 0.08	Au: 0.0114 Ag: 0.14	Au: 0.0212 Ag: 0.84	Au: 0.0182 Ag: 0.86	Au: 0.0026 Ag: 0.10	Report dated 10/11/00. Fire assay with AA finish, \$135, for all six.
PTL Testing Trenton, NJ	Au: 0.03 Ag: 0.04 Pt: ND Pd: ND	Au: ND Ag: 0.02 Pt: 0.02 Pd: 0.02	Au: ND Ag: 0.03 Pt: ND Pd: ND	Au: 0.06 Ag: 0.04 Pt: 0.49 Pd: 2.03	Au: 0.06 Ag: 0.04 Pt: 0.58 Pd: 2.07	Au: ND Ag: ND Pt: ND Pd: ND	Report dated June 29, 2001. \$600. Method and detection limits not disclosed.
Rare Metals Corporation, 29 Palms, CA Frank Snyder, proprietor. <i>Fire Assay</i>	Au: 0.0029 Ag: 0.0470 Pt: 0.0002 Pd: 0.0002	Au: 0.4125 Ag: 0.2860 Pt: 0.0003 Pd: 0.0008	Au: 0.0060 Ag: 0.0940 Pt: 0.0001 Pd: 0.0001	Au: 0.0280 Ag: 0.6250 Pt: 0.3148 Pd: 0.9783	Au: 0.0241 Ag: 0.9530 Pt: 0.3061 Pd: 0.8154	Au: 0.0027 Ag: 0.0430 Pt: 0.0207 Pd: 0.0335	\$1200
Rare Metals Corporation, 29 Palms, CA Frank Snyder, proprietor <i>Aqua Regia Leach, DCP</i>	Au: ND Pt: ND Pd: ND	Au: 0.4290 Pt: ND Pd: ND	Au: 0.0078 Pt: ND Pd: ND	Au: 0.0312 Pt: 0.3029 Pd: 0.9560	Au: 0.0238 Pt: 0.3210 Pd: 0.7952	Au: ND Pt: 0.0296 Pd: 0.0345	

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4.

NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2

NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Recovery Metals & Refinery Development & Depository, Inc., San Diego, CA Brian Tomlinson, proprietor	Received: Laboratorium Number 10.003 Au: 1 Ag: 1 Pt: 2 Pd: 1 Rh: 3 Os: 1/2 Cu: 1/2	Not reported?	Not reported?	Not reported?	Not reported?	Not reported?	Answering machine initially identified company as "Recovery Metals and Hollywood Movie Company," later with variations on "RMRD." Results arrived, for ONE sample. It is not certain which sample was analyzed, but blank was assumed due to the similarity of the "laboratorium number" reported by RMRD. The results are reproduced verbatim. Mr. Tomlinson called on 9/4/01 to confirm fax receipt. I said that I received one result, but had sent six samples. He said that was the result for all six. I asked if they had been mixed together, and he said that they each had exactly the same results, (and weren't they from the same location in Arizona?). Mr. Tomlinson would not say who did the work, just their scientist on the staff. Mr. Tomlinson explained that the very long time to complete assays was due to the extreme complexity of the ore we sent him. \$300 paid for the one result.
Reed Labs, Carlsbad, CA (Relocated to Oak Harbor, WA) P. Reed, Assayer	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.21 Ag: <LD Pt: <LD Pd: <LD	Au: 0.02 Ag: <LD Pt: <LD Pd: <LD	Au: 0.031 Ag: 0.02 Pt: 0.376 Pd: 1.356	Not Used	Au: 0.009 Ag: 0.217 Pt: <LD Pd: <LD	\$294.25 August 17, 2000 Rept: 9/11/2000
RMS, Los Angeles, CA	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Did not report results.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Rocky Mountain Geochemical Inspectorate, Sparks, NV	Au: <LD Ag: <LD Pt: <LD Pd: <LD	Au: 0.2346 Ag: 0.0058 Pt: <LD Pd: <LD	Au: 0.0140 Ag: 0.0087 Pt: <LD Pd: <LD	Au: 0.0263 Ag: 0.0203 Pt: 0.3918 Pd: 1.2635	Au: 0.0290 Ag: 0.0203 Pt: 0.3457 Pd: 1.2472	Au: <LD Ag: <LD Pt: <LD Pd: <LD	\$810. Report dated April 27, 2001. Fire assay preconcentration followed by ICP. Detection limits not disclosed on report, but were assumed by data display.
Rogers Research, Salt Lake City, UT Clair Rogers by XRF	Au: 0.05 Ag: Trace Pt: Trace Pd: Trace	Au: 0.12 Ag: 4.11 Pt: 0.03 Pd: 0.04	Au: 0.06 Ag: 3.31 Pt: Trace Pd: Trace	Au: 0.05 Ag: 5.21 Pt: Trace Pd: Trace	Au: 0.06 Ag: 11.31 Pt: N.D. Pd: Trace	Au: 1.51 Ag: 23.51 Pt: 0.07 Pd: 0.10	Report 9/14/2000 \$1200
Rogers Research, Salt Lake City, UT, Clair Rogers, by Fire Assay	Au: 0.008 Ag: Tr	Au: 0.009 Ag: Tr	Au: 0.007 Ag: Tr	Au: 0.006 Ag: Tr	Au: 0.009 Ag: Tr	Au: 0.007 Ag: Tr	
SES Engineering, Lucerne Valley, CA Frank Ross	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Did not report results.	Never returned results. Business defunct.
Shiva Technologies, Syracuse, NY	Au: 0.0029 Ag: <LD Pt: <LD Pd: <LD	Au: 0.1775 Ag: <LD Pt: <LD Pd: <LD	Au: 0.0122 Ag: <LD Pt: <LD Pd: <LD	Au: 0.0209 Ag: 0.0290 Pt: 0.2262 Pd: 1.276	Au: 0.0191 Ag: 0.0290 Pt: 0.1813 Pd: 1.3601	Au: <LD Ag: <LD Pt: <LD Pd: <LD	\$540. Samples shipped to NY, but analyzed in India. Results in ppm, converted for this list. Detection limits and methods disclosed. QA/QC samples run and reported.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

<LD = below lower detection limit. PGM = platinum group metal ND = not detected or recovered NR = not reported
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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Sierra Laboratories, Silver City, NM. Charles Ray Steele	Au: 0.003 Ag: 0.015 Pt: 0.011 Pd: 0.720 Rh: 1.005 Ir: 0.113	Au: 0.925 Ag: 0.180 Pt: 0.025 Pd: 0.198 Rh: 0.280 Ir: 0.788	Au: ND Ag: 0.003 Pt: 0.008 Pd: 0.005 Rh: 0.703 Ir: ND	Au: 2.008 Ag: 2.140 Pt: 0.160 Pd: 0.095 Rh: 0.800 Ir: 0.078	Au: ND Ag: 4.248 Pt: 0.011 Pd: 0.175 Rh: 0.133 Ir: 0.080	Au: ND Ag: 3.928 Pt: ND Pd: 0.193 Rh: 0.605 Ir: 0.305	Report dated June 13, 2001. \$960. "Carbon Arc Fused." Detection limits not disclosed.
Smid, Roger J., Las Vegas, NV	Au: 0.018 Ag: nil Pt: 0.005 Pd: 0.001	Au: 0.116 Ag: 0.0181 Pt: 0.008 Pd: 0.005	Au: 0.005 Ag: 0.028 Pt: 0.001 Pd: nil	Au: 0.164 Ag: 0.104 Pt: 0.011 Pd: 0.008	Au: 0.127 Ag: 0.076 Pt: 0.009 Pd: 0.008	Au: 0.158 Ag: 0.076 Pt: 0.010 Pd: 0.011	\$900. Report dated April 23, 2001. Method not disclosed. No detection limits disclosed.
SVL Analytical, Kellogg, ID (Formerly Silver Valley)	Au: 0.003 Ag: 0.032 Pt: 0.001 Pd: 0.003	Au: 0.234 Ag: 0.034 Pt: <LD Pd: 0.001	Au: 0.015 Ag: 0.049 Pt: <LD Pd: 0.001	Au: 0.030 Ag: 0.049 Pt: 0.383 Pd: 1.212	Au: 0.022 Ag: 0.043 Pt: 0.354 Pd: 1.175	Au: 0.002 Ag: 0.026 Pt: <LD Pd: 0.007	Reported in ppb Au, remainder ppm. Values are converted to oz/ton. \$150.
Technical Metals Recovery, Vacaville, CA K. W. Keltner (Extraction)	Au: 0.0001 Ag: 0 Pt: 0 Pd: 0	Au: 0.2227 Ag: 0 Pt: 0 Pd: 0	Au: 0.0142 Ag: 0.0093 Pt: 0 Pd: 0	Au: 0.0464 Ag: 0.0174 Pt: 0.323 Pd: 1.078	Au: 0.0284 Ag: 0.0203 Pt: 0.30 Pd: 1.18	Au: 0.0020 Ag: 0.0012 Pt: 0 Pd: 0	Reported as "extraction results," dated May 2, 2001. Report not signed. \$1200 for "extraction" and "analysis." Assay sheets use a 702 area code for contact telephone number.
Technical Metals Recovery, Vacaville, CA K. W. Keltner (Analysis)	Au: 0.0001 Ag: NR Pt: <LD Pd: <LD	Au: 0.2284 Ag: NR Pt: <LD Pd: <LD	Au: 0.0145 Ag: 0.0116 Pt: <LD Pd: <LD	Au: 0.472 Ag: 0.0232 Pt: 0.330 Pd: 1.100	Au: 0.0285 Ag: 0.0261 Pt: 0.310 Pd: 1.200	Au: 0.0002 Ag: <LD Pt: <LD Pd: 0.001	Received: Unsigned photocopy of report dated April 26, 2001 with Technical Metals Recovery listed as client. Units of concentration hand written on report.

Expected Results for Standards and Blanks. See Attachments 1 - 4.

Complex Blank: Below lower detection limits for Au, Ag, Pt, Pd. May show ppb Au with very sensitive methods. See Attachment 4. NBMG Std 4b: Mesquite Mine, CA, Au: 0.012 oz/ton, Ag: 0.03 oz/ton Ag. See Attachment 1.

NBMG Std. 2b: Jerritt Canyon, NV, Au: 0.228 oz/ton, Ag: 0.02 oz/ton. See Attachment 2 NBMG Std. 6b: Stillwater Mine, MT Au: 0.023 oz/ton Pt: 0.352 oz/ton, Pd: 1.13 oz/ton. See Attachment 3.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
Thomas, Joseph L., CA State University, Fullerton, CA.	Pt: <LD Pd: <LD	Not used	Not used	Pt: 1.01 Pd: 0.26	Not used	Not used	\$700 per sample for full workup. Professor of Chemistry.
Triad Labs, Buhl, ID, and Venezuela	Au: 0.0029 Ag: 0.331 Pt: <LD Pd: <LD	Au: 0.2187 Ag: 0.441 Pt: 0.0009 Pd: 0.0003	Au: 0.0061 Ag: 0.236 Pt: 0.0104 Pd: 0.0218	Au: 0.0090 Ag: 0.3863 Pt: 0.3500 Pd: 0.3065	Au: 0.0101 Ag: 0.364 Pt: 0.3370 Pd: 0.3089	Au: 0.0058 Ag: 0.330 Pt: <LD Pd: 0.0032	Report dated 8/30/2002. \$300 for all six analyses. Samples analyzed in Venezuela.
Wendell & Co. Englewood, CO Michael Wendell	Au: 0 Ag: <1.14 Pt: 0 Pd: 0	Au: 0 Ag: 0 Pt: 0 Pd: 0	Au: 0.54 Ag: 0 Pt: 1.5 Pd: 0.42	Au: 0.48 Ag: 0 Pt: 1.14 Pd: 0.54	Au: 0.9 Ag: 39.6 Pt: 2.4 Pd: 2.04	Au: 0 Ag: 0.24 Pt: 0.12 Pd: 1.62	Report dated November 5, 2000. \$1500 for job. For one blank, silver value was reported as "<1.14" ounces per ton. It's uncertain what is meant by that.
White, Merwin. White Technology. St. George, UT	Au: 0.092 Ag: 0.400	Not used	Not used	Not used	Not used	Au: 0.200 Ag: 0.260	Samples analyzed in 1999 as a part of a concurrent examination. Cost of this portion estimated at \$50.
White, Merwin. White Technology, St George, UT							Results pending, 10/23/02

Expected Results for Standards and Blanks. See Attachments 1 - 4.

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Laboratory	Complex Blank	2b Au: 0.228 Ag: 0.02	4b Au: 0.012 Ag: 0.03 Ag.	6b Au: 0.023 Pt: 0.352 Pd: 1.13	6b Au: 0.023 Pt: 0.352 Pd: 1.13	Complex Blank	Examiners' Remarks
XRAL Labs. Don Mills, ON	Au: <LD Ag: <LD Pt: <LD Pd: 0.00003	Au: 0.1552 Ag: <LD Pt: 0.0012 Pd: 0.0005	Au: 0.0099 Ag: <LD Pt: <LD Pd: 0.0001	Au: 0.028 Ag: 0.102 Pt: 0.3422 Pd: 1.018	Au: 0.029 Ag: 0.099 Pt: 0.3306 Pd: 1.117	Au: <LD Ag: <LD Pt: 0.0035 Pd: 0.0038	Report dated 9/26/00. Results reported in grams per tonne and in ppb. XRAL ran and reported a replicate of N-3 with nearly identical results. \$189.90
Yen, W.T., Queens Univ., Kingston, Ontario <i>Fire Assay</i>	Au: 0.002 Ag: 0.707	Not Used	Au: 0.009 Ag: 0.469	Not Used	Not Used	Au: 0.002 Ag: 0.010	\$792 Report: 9/11/2000
Yen, W.T. <i>Aqua Regia Leach</i>	Au: 0.001 Ag: 0.474		Au: 0.015 Ag: 0.178			Au: 0.001 Ag: 0.009	
Yen, W.T. <i>"Hyperchlorite" Leach</i>	Au: 0.001 Ag: 0.923		Au: 0.053 Ag: 0.356			Au: 0.001 Ag: 0.009	
Yen, W.T., Queens Univ., Kingston, ON <i>Fire Assay</i>	Au: 0.003 Ag: 0.377	Au: 0.450 Ag: 0.223	Au: 0.006 Ag: 0.271	Au: 0.017 Ag: 0.405	Not Used	Au: 0.002 Ag: 0.088	\$60 August 17, 2000 Report: 9/11/2000

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