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# POTENTIAL ENVIRONMENTAL THREATS IN OLD MINING AREAS—THE HIGH ROLLS (SACRAMENTO) MINING DISTRICT

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**Abstract**—Margaret Anne Rogers & Associates, Inc. performed a site inspection and Hazard Ranking System (HRS) study within the High Rolls (Sacramento) mining district for the USDA Forest Service. The site inspection involved literature review, interviews, site visits and limited sampling. A site inspection relies on readily available information and/or information which can be collected in a single site visit. The information gathered is then used to do the HRS scoring, a particularly complex exercise. Eight historical mining and prospect sites were chosen to represent the study area outlined by the Forest Service. Dump "soil" samples and vegetation samples were collected to assess contaminant level. All eight sites were (according to an Environmental Protection Agency [EPA] verbal definition) contaminated with aluminum, arsenic, barium, boron, chromium, copper, iron, manganese and zinc. Some sites were contaminated with cadmium, cobalt, fluoride, lead, nickel, nitrate, phenol, radium, selenium, silver, sulfate and uranium. Analyte concentrations in the dump samples correlate well with those in the vegetation samples. Using the 1988 Proposed Rule in conjunction with verbal EPA guidance, the derived HRS score of 50.0 is significantly above the 28.5 required for listing on the National Priorities List (NPL). Using this interim method, the degree of environmental threat may be overestimated for the High Rolls (Sacramento) mining district.

## INTRODUCTION

The High Rolls (Sacramento) mining district is one of many old mining areas located primarily on Forest Service administered lands. It was nominated February 20, 1987 by the State of New Mexico as a suspected hazardous waste site under the provisions of the Federal Facilities Compliance Program (FFCP). The nomination was based on literature review; no site visit is known to have taken place nor was information solicited from the Forest Service. Correct procedure was followed in nominating the High Rolls mining district.

The FFCP (Executive Order 12580, dated January 23, 1987) is the mechanism by which federal agencies comply with hazardous waste laws—in this case, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA). Under the FFCP, any entity may nominate a suspected hazardous waste site to the Federal Facilities Docket maintained by the EPA. Based on the site-identification report sent by the nominating entity, the EPA performs a preliminary assessment (PA) to determine whether a site is potentially hazardous. If the EPA determines that it is, then the affected federal agency is directed to do a site inspection so that the site can be scored using the HRS. This pre-remedial process is intended to identify and prioritize sites requiring further investigation and possible cleanup under CERCLA. An HRS score greater than 28.5 is needed to place a site on the National Priorities Liest (NPL). If not removed from the list, NPL sites require remedial action.

Once the EPA determined that the High Rolls mining district in the Lincoln National Forest warranted further action based on the site-identification report sent by the State of New Mexico, Environmental Improvement Division, the Southwest Region of the U.S. Forest Service was required to solicit a site inspection and HRS study. This study began in February 1990 and was completed in May 1990.

## SITE DESCRIPTIONS AND HISTORY

Eight small to medium-sized mine and prospect sites were investigated during the High Rolls site inspection. They are in the Sacramento Mountains within the Lincoln National Forest and are approximately 7.3 km east of Alamogordo, New Mexico (Fig. 1). Historically, mainly copper was mined from the Courtney, Speckled Bird Nose, Pines #2 and Cactus Cut mines. Copper and lead were mined from the unnamed East Warnock area adit, Alamo #2 Tunnel and the Warnock mine. No information was found for activities at the Pender-Gregg. Apparently the adit (now collapsed) was driven a short distance along a shale-sandstone contact within the Pennsylvanian Gobbler Formation. No

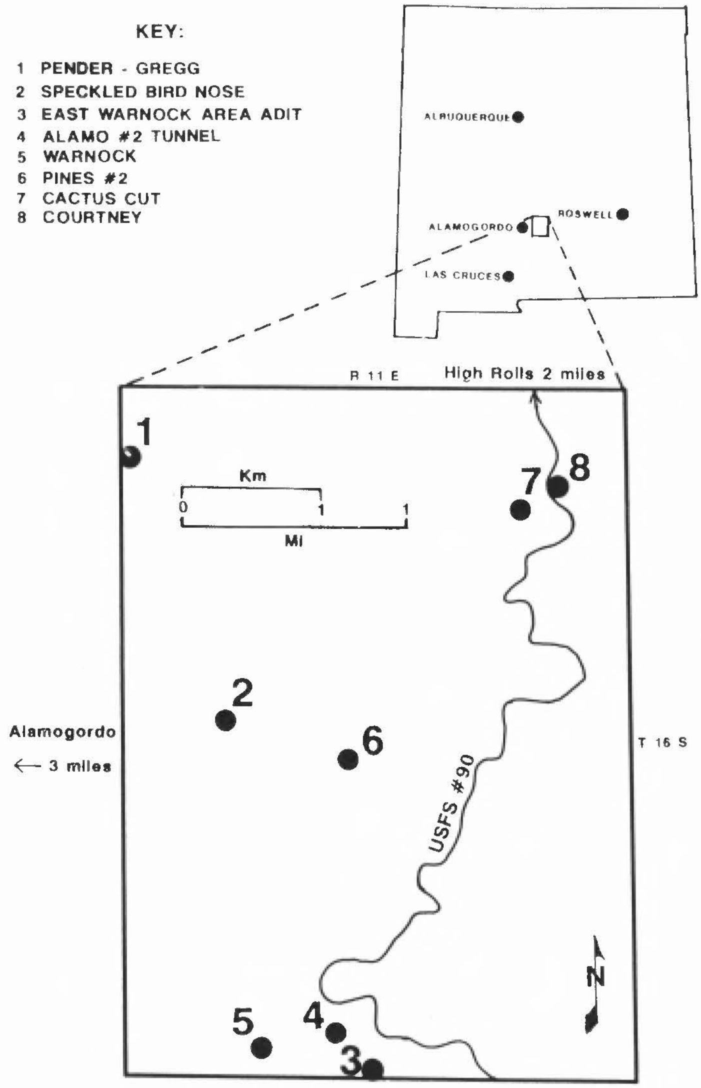


FIGURE 1. Location map and index for the High Rolls (Sacramento) mining district sites investigated in this study.

mineralization was observed at the Pender-Gregg during the site visit.

Mineralization at all sites except the Pender-Gregg is in the middle arkose member of the Permian Abo Formation. The unit consists of red and chocolate shales and siltstones with about 40% interbedded arkose. Ore is similar to typical stratabound "red-bed" deposits in which mineralization is stratigraphically controlled. The ore is primarily syngenetic with a minor epigenetic overprint related to ambient groundwater remobilization (Jerome et al., 1965). The ore-bearing arkose beds range in thickness from less than a meter to 6 m, with an average thickness of 2 m. Mineralization is generally widespread and low-grade, but localized concentrations have been exploited in the past.

Mining began about 1883. During the 1920s, there was a period of increased activity. When New Jersey Zinc discontinued further development in 1949, activity waned. Currently, fifteen unpatented lode claims exist in the Warnock mines area. In the foreseeable future, renewed mining activity is unlikely because of ore tenor, base metal prices and environmental constraints.

There is little evidence that any ore was processed on-site except for a ball-mill foundation and a few balls observed at the Warnock mine. Available literature and R. W. Eveleth (personal comm., 1990) of the New Mexico Bureau of Mines and Mineral Resources indicate that ore from all sites was shipped to El Paso for smelting. At present, the area is exposed to relatively heavy recreational use. The old mining roads have been allowed to deteriorate. Although some attempt has been made to control erosion on the roads, most of the work was done to ensure closure to vehicular use.

## WASTE CHARACTERISTICS

The High Rolls mining district has many mines and prospect pits. In the site inspection area, the eight sites were selected primarily on geographic distribution and availability of information. U.S. Forest Service color aerial photographs and 7.5-min U.S. Geological Survey topographic maps were used to locate the sites. No observations in the field changed the original selection of mine sites.

During the site visits, site-specific conditions were noted and photographed, dump-volume estimates were made, and authoritative shallow-borehole, dump "soil" samples were taken using the Trier method. Samples of vegetation growing on the mine dumps were taken at two sites. Because of limited funding for the study, neither background nor quality control sampling could be included in the project work plan. Although general regional background data might be inferred from other sources, e.g., NURE Project data, such data would not be directly comparable, or internally consistent, with the study data.

A Sampling and Analysis Plan (SAP) was prepared before entering the field. Field sampling, decontamination procedures, and chain-of-custody procedures were given in the SAP. All EPA protocols were strictly followed to assure a quality result. Laboratory analyses were performed according to the EPA document, Test Methods for Evaluating Solid Waste, SW-846 (1982, 1986). Sample preparation procedures were EPA Methods 3000 and 3050.

## RESULTS

The U.S. Forest Service requested analyses of aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, radium, radon, selenium, silver, uranium, zinc, chloride, cyanide, fluoride, nitrate as nitrogen, phenols, sulfate, total dissolved solids and pH. Analytical results are presented in Table 1. At the time of sampling, no surface water was present at any site or in any adjacent drainage. Eight dump-"soil" samples (i.e., one from each site) were taken with a stainless steel Trier sampler. These samples were composites taken from depths of less than 46 cm. Two composite vegetation samples were also taken. Arsenic, radium, selenium, phenols and pH were not determined for the plant samples because of inherent problems with volatilization during the ashing preparation-for-analysis process or because of inappropriateness.

The EPA has not established contaminant-level criteria for soils or plants. In the absence of contaminant-level criteria, a level of three times the detection limit is considered contaminated (D. Vaughn-Wright, EPA Region VI, personal comm., March 22, 1990). Using the EPA verbal guidelines, all sites were found to be contaminated with aluminum, arsenic, barium, boron, chromium, copper, iron, manganese and zinc. Table 2 shows these and other contaminants for each site, with the sites ranked in descending number of total contaminants.

Under the Resource Conservation and Recovery Act (RCRA), a waste is hazardous if the Toxicity Characteristic (TC), as determined by the Extraction Procedure (EP) toxicity method, is equal to or greater than the regulatory level in mg/L. EP toxicity is a test method designed for landfill-leach analysis. For this study, EPA Method 3050 was used to prepare samples for analysis. Method 3050 is a standard preparation procedure used to determine total analyte content in samples. The values produced by Method 3050 are approximately equal to 20 times the values produced by EP toxicity (F. B. Schweitzer, Vice-President Chemistry, Raba-Kistner Consultants, Inc., personal comm., 1990). The last column in Table 2 gives the regulatory-level-equivalent for those analytes in the study which were regulated under RCRA. Viewed in this context, the data indicate that lead concentrations exceed contaminant levels at HRS-3 (East Warnock adit), HRS-5 (Warnock mine) and HRS-8 (Courtney mine).

Oak and fir samples were taken on dump materials at the Alamo Tunnel No. 2 (HRP-1) and at the Courtney mine (HRP-2), respectively. Using the EPA verbal guidelines, both vegetation samples were found to be contaminated with aluminum, barium, boron, chromium, copper, cyanide, iron, lead, manganese, nitrate, silver, sulfate and zinc. For most contaminants, there is excellent correspondence between vegetation samples and their respective dump-"soil" samples. For most of the exceptions, the plant sample exhibits contamination while the corresponding "soil" sample does not. The data suggest that these oak and fir species are concentrators for certain analytes; oak for cobalt, fluoride, silver and sulfate, and fir for chloride, fluoride, nitrate and sulfate.

Low levels of cyanide were detected in five soil samples and in both the oak and fir samples. However, cyanide was not detected in the Courtney mine "soil" sample (HRS-8; location of the fir sample). All the ore from the district is believed to have been taken to El Paso for processing, as indicated by the literature and R. W. Eveleth (personal comm., 1990). Therefore, it is likely that the cyanide is naturally occurring (similar to the natural occurrence of cyanide in peach seed and almonds) and related to plant metabolism or organic decomposition in the soils. The fir trees apparently do not accumulate cobalt (beneath detection limit) and uranium (at detection limit) even though the Courtney mine "soil" sample is considered to be contaminated with both constituents.

## HAZARD RANKING SYSTEM

The Proposed Rule (December 23, 1988) for the Hazard Ranking System for Uncontrolled Hazardous Substance Releases; Appendix A of the National Oil and Hazardous Substances Contingency Plan (40 CFR Part 300) is used as the screening device to evaluate the relative potential for uncontrolled hazardous substances to cause human health or safety problems or ecological or environmental damage. The HRS does not, as quoted from the Proposed Rule, ". . . address the feasibility, desirability or degree of cleanup required" (53 FR 51962). The Final Rule was expected for some time and was published on December 14, 1990. The Final Rule (55 FR 51532) will differ from the Proposed Rule (D. Vaughn-Wright, personal comm., March 22, 1990).

The site inspection for the High Rolls investigation area is the third step (after site discovery and the PA) in the pre-remedial process under CERCLA. The site inspection should collect sufficient data to allow the site to be scored using the HRS. During the site inspection, a limited number of samples may be collected for chemical analysis. According to the Proposed Rule, "The required HRS data should be information that, for most sites, can be collected in a single site visit, or that are already available." (53 FR 51963)

The Proposed Rule requires much detailed information to evaluate the four HRS contamination pathways: air migration, ground water migration, surface water migration and onsite exposure. Within the time and budgetary constraints of a limited project, the required infor-

TABLE 1. Analytical results for soil and plant samples from the High Rolls (Sacramento) mining district. All data in parts per million (ppm) unless otherwise noted.

| Analyte | HRS-1 | HRS-2 | HRS-3 | HRS-4 | HRS-5 | HRS-6 | HRS-7 | HRS-8 | HRP-1 | HRP-2 | RLE (Soil/Plant)*** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag | 0.6 | 1.6 | 0.7 | 0.5 | 1.1 | 2.5 | 1.9 | 2.5 | 0.67 | 1 | 0.5/0.3 |
| Al | 26300 | 2300 | 3900 | 4400 | 14300 | 5200 | 5200 | 11000 | 644 | 305 | 3/0.06 |
| As* | 1.9 | 1.3 | 1.8 | 1.9 | 1.7 | 2.1 | 1.4 | 1.9 | nd | nd | 3/0.06 |
| B | 28 | 14 | 12 | 23 | 3 | 14 | 11 | 7 | 9 | 5 | 3/0.06 |
| Ba | 67 | 35 | 630 | 325 | 255 | 55 | 70 | 690 | 36 | 13 | 0.3/0.06 |
| Cd | <1 | <1 | 6 | <1 | <1 | <1 | <1 | <1 | <0.4 | <0.3 | 15/3 |
| Co | 14 | <5 | 6 | <5 | 3 | 10 | <5 | 20 | 1.1 | <1 | 0.6/0.15 |
| Cr | 46 | 14 | 25 | 22 | 26 | 15 | 19 | 14 | <0.5 | <0.5 | 0.3/0.06 |
| Cu | 4.5 | 1500 | 85 | 11 | 50 | 160 | 10 | 18000 | 18 | 24 | 0.15/0.3 |
| Fe | 45000 | 14500 | 29700 | 31600 | 28800 | 24200 | 24300 | 14400 | 733 | 227 | 3/0.6 |
| Hg | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.2 | <0.2 | 0.3/0.06 |
| Mn | 170 | 70 | 210 | 130 | 250 | 80 | 190 | 270 | 178 | 146 | 3/0.6 |
| Mo | 2.3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <0.2 | <0.2 | 3/0.6 |
| Ni | 55 | <10 | 21 | <10 | <10 | <10 | <10 | <10 | <0.2 | <0.2 | 30/12 |
| Pb | 17 | 15 | 112 | 84 | 1360 | 49 | <10 | 425 | 6.2 | 19 | 30/3 |
| Ra pCi/g | 0.9 | 2.6 | 0.9 | 1.2 | 1.1 | 4.7 | 0.4 | 8 | nd | nd | 1.5/1.5 |
| Se* | 1.7 | <0.3 | 1.7 | <0.3 | 0.7 | 0.9 | 1.2 | <0.3 | nd | nd | 0.9/0.9 |
| Sb* | 25 | 13 | 25 | 11 | 15 | 15 | 35 | 14 | nd | nd | 39/39 |
| U3O8 | <.001 | <.001 | <.001 | <.001 | <.001 | 0.003 | <.001 | 0.003 | 0.03 | <0.00 | 0.003/0.003 |
| Zn | 60 | 130 | 190 | 180 | 110 | 290 | 50 | 180 | 80 | 183 | 0.3/0.015 |
| F | 3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0.2 | 0.4 | 3/0.3 |
| Cl | 0.4 | <0.4 | <0.4 | 1 | <0.4 | <0.4 | <0.4 | <0.4 | 0.2 | 0.3 | 1.2/0.6 |
| CN | <0.01 | 0.05 | 0.01 | 0.08 | <0.01 | 0.08 | <0.01 | 0.02 | 0.03 | 0.09 | 0.03/0.006 |
| NO3-N* | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | nd | nd | 1.5/1.5 |
| NO3 | 3 | 2 | 3 | 4 | 8 | 0.5 | 2 | 2 | 0.8 | 0.4 | 3/0.06 |
| Phenol* | 0.14 | 0.11 | 0.19 | 0.24 | 0.19 | 0.17 | 0.17 | 0.14 | nd | nd | 0.15/0.15 |
| SO4 | 4000 | 2 | 62 | 2 | 10000 | 9900 | 5800 | 1 | 8 | 8.5 | 3/1.2 |
| Rn pCi/g x 1000 | 0.58 | 1.7 | 0.58 | 0.77 | 0.71 | 3 | 0.26 | 5.2 | nd | nd | nd |

** Calculated from Ra226 assuming equilibrium. (d) x (Ra) = (d) x (Rn), where d (i.e., decay constant) = 0.693/H HLRa=1625 yr; HLRn=3.82d.

nd = Not determined *Units in mg/kg *** Regulatory Level Equivalent (3 x LDL)

mation may not be readily extractable from a single site inspection visit, site data may be abbreviated, and other existing HRS-pertinent data may not be readily available. This apparent contradiction between the stated level of effort and the questions on the scoresheets hopefully will be resolved in the Final Rule.

HRS scoring of the High Rolls mining district for each pathway is based on information collected through literature review, interviews, and site visitation and on the chemical analyses for selected analytes in eight "soil" and two vegetation samples.

### Air migration pathway

The Air Migration Pathway score is 1.8778485. The score may not be rounded to the nearest integer. Factors which contributed to this score are: (1) Source Type (waste pile); (2) Source Containment (substantially devoid of vegetation with no other cover); (3) Source Mobility (Thornthwaite precipitation effectiveness index for the Sacramento Mountains); (4) Toxicity/Mobility (the maximum inhalation toxicity factor exists for arsenic, barium and manganese, contaminants at all eight sites); (5) Hazardous Waste Quantity (source volume for all eight sites exceeds that necessary to give the maximum value); (6) Maximally Exposed Individual (the distance to the nearest residence is >1 but <2 mi for the Courtney mine); (7) Population (there are at least 27 residences within a 2-mi radius of the Courtney mine); (8) Land Use (nonprime agricultural); and (9) Sensitive Environments (Cloudcroft Experimental Forest is within a 4-mi radius of the Courtney mine).

### Ground water migration pathway

The Ground Water Migration Pathway score is 1.560216. The score may not be rounded to the nearest integer. Factors which contributed to this score are: (1) Containment (the waste piles have no liners, no engineered cover, no run-on control or run-off management systems, no leachate collection or removal systems); (2) Net Precipitation (latitude adjusting factor for potential evapotranspiration applied to average annual precipitation for the Sacramento and Mescalero weather sta-

TABLE 2. Sites in High Rolls mining district ranked by descending number of contaminants.

| Rank | Site No. | Name (Sample #) | Contaminants |
|---|---|---|---|
| 1. | 6 | Pines No. 2 Mine (HRS-6) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Ra, Ag, Se, U, Cyanide, Fluoride, Phenol, Sulfate |
| 2. | 3 | East Warnock Adit (HRS-3) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Cd, Pb, Ra, Se, Nitrate, Phenol, Sulfate |
| 3. | 8 | Courtney Mine (HRS-8) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn Co, Pb, Ra, Ag, U |
| 3. | 1 | Pender - Gregg Adit (HRS-1) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Ni, Se, Fluoride, Nitrate, Sulfate |
| 4. | 5 | Warnock Mine (HRS-5) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Pb, Nitrate, Phenol, Sulfate |
| 4. | 7 | Cactus Cut Mine (HRS-7) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Se, Ag, Phenol, Sulphate |
| 4. | 4 | Alamo Tunnel No. 2 (HRS-4) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Pb, Cyanide, Nitrate, Phenol |
| 5. | 2 | Speckled Bird Nose Mine (HRS-2) | Al, As, Ba, B, Cr, Cu, Fe, Mn, Zn, Ra, Ag, Cyanide |

tions); (3) Toxicity/Mobility (the maximum ingestion toxicity factor exists for arsenic contaminant at all eight sites); (4) Hazardous Waste Quantity (same as Air Migration Pathway); (5) Maximally Exposed Individual (distance to nearest water well is <2 mi from the Courtney mine, near the junction of the Courtney mine drainage and Sacramento Gulch); (6) Potential Contamination (assumption that four people [average family] use the above well); (7) Drinking Water Use (private supply, no water from alternate unthreatened sources are presently available).

### Surface water migration pathway

The Surface Water Migration Pathway score is 100. Factors which contributed to this score are: (1) Observed Release (all eight sites show evidence of dump material erosion through slope-wash or cuts); (2) Toxicity/Persistence (maximum factors for ingestion toxicity and for persistence exist for arsenic, a contaminant at all eight sites); (3) Hazardous Waste Quantity (same as Air Migration Pathway); (4) Maximally Exposed Individual (City of Alamogordo drinking water intake approximately 5 mi downstream of the Courtney mine—factor makes no allowance for the first 2.5 mi being an ephemeral stream course; the last 2.5 mi are considered small to moderate stream); (5) Potential Contamination (population of Alamogordo, by a small to moderate stream in Fresnal Canyon); (6) Drinking Water Use (adequate alternative supply has not been developed and no studies have been completed which verify that such a supply is technically and economically feasible); (7) Other Water Use (irrigation from stream in Fresnal Canyon); (8) Potential Human Food Chain Contamination (mountain trout stream fishery, approximately 2.5 mi downstream from the Courtney mine in Fresnal Canyon); (9) Food Chain Population (bioaccumulation potential value for arsenic and human food chain production value of an approximate 10.5-mi small to moderate stream in Fresnal Canyon); (10) Fishery Use (recreation/sport fishing); (11) Ecosystem Toxicity/Persistence (maximum factors for ecosystem toxicity and persistence exist for silver, a contaminant at the Courtney mine).

### Onsite exposure pathway

The Onsite Exposure Pathway is 0. Factors which contributed to this score are: (1) No people attend school or day care or live at any of the eight mine sites or within 1 mi of any site, and (2) Although rare and endangered species live in the Sacramento Mountains, none of the eight mine sites are a known habitat for rare or endangered species.

### HRS site score

The HRS Site Score for the eight mine sites in the investigation area for the High Rolls (Sacramento) mining district equals the square root of the sum of the squares of each pathway, divided by 4; or, the square root of (3.53 plus 2.43 plus 10,000 plus 0, divided by 4). The HRS Site Score is 50.0.

## DISCUSSION

". . . the HRS is the primary way of determining whether a site is to be included on the National Priorities List (NPL)." ". . . the revised HRS shall be applied to any site to be newly listed on the NPL after the effective date of the revised HRS. Until the effective date, sites will be scored with the current HRS. In addition, . . . EPA shall not be required to rescore any site evaluated with the current HRS before the effective date." These two quotes from the Proposed Rule (53 FR 51963) raise the issue of what should be the next step for evaluating the High Rolls (Sacramento) mining district.

Because the Proposed Rule differed significantly from the then current HRS, both the Forest Service and the EPA wanted the Proposed Rule to be used for scoring the High Rolls mining district. At the time of the High Rolls mining district site inspection and HRS scoring (February–May 1990), the Proposed Rule was under revision by EPA. The scoring incorporated some of these unpublished revisions. The revised HRS, the Final Rule (55 FR 51532), was published December 14, 1990. To rescore, using the Final Rule, would require an entire new HRS study.

Besides the regulatory complications involved in the HRS score for the High Rolls mining district, there is reason to question whether a score of 50.0 truly reflects the degree of hazard present. The Proposed Rule was 119 pages of complex questions that required answers to derive a score. Omissions in the list of environmental concerns or considerations, if any, were not readily detectable. The Proposed Rule did address such things as semi-arid conditions, mountain topography, and low population density, but the way they were addressed contributed to the high score for the High Rolls mining district.

The Proposed Rule, in spite of its complexity, did not deal well with environmental or socio-economic conditions common in New Mexico. "Mountain trout stream fishery" and the "recreation/sport fishing" aspect of it were identified, for instance. However, for bioaccumulation in the human food chain in the semi-arid and arid West, it is equally (if perhaps not more) important to address the impact of bioaccumulation on herding (cattle, sheep or goats) and hunting (deer, elk and antelope). Another example is the relationship between the impacted population and water supply. In the West, low population is directly related to the limited availability of water. If the only source of water is contaminated, it does not make a lot of difference how many people are affected; the entire population is impacted and the area may be devastated forever, for all intents and purposes. Although the aim of the Proposed Rule was universal applicability, as a means to reduce environmental variability to a common denominator so that a score meant the same thing for any site in the country, it failed to achieve its goal. Another significant problem in the HRS scoring for the High Rolls mining district is maximum contaminant levels (MCLs). EPA has not established MCLs for soils or plants; a limited number have been established for water. At the time of the site visit, there was no water to sample. In lieu of MCLs and/or site-specific background studies, the EPA suggested using a level of three times the detection limit for a substance to determine contamination. This suggestion may have greater validity for substances which are not naturally occurring. Background sampling may have permitted a more realistic evaluation of the data, and thus eliminated a number of the "contaminants" at the various mine sites.

The purpose of the HRS is to quickly screen and prioritize potential hazardous waste sites. Emphasis is also placed on spending as little money as possible to do this. The idea is to remove from concern those sites with little potential for human health or ecological damage and to identify those sites which need the most immediate attention. It is widely recognized that there is not enough money to address every potential site immediately; therefore, it does seem that some informal screening should be done before a site is nominated to either the Federal Facilities Docket or the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) for federal and non-federal sites, respectively. Pre-screening before nomination is not required; however, once nominated, actions involving time and money must be taken to remove a site from either list. In the case of the High Rolls mining district, the authors feel that pre-screening would have been appropriate, and that time and money might have been better spent on more compelling sites first.

The High Rolls (Sacramento) mining district does not present the appearance of a high-priority site. There have been no adverse environmental impacts reported (e.g., dead plants, dead animals) or adverse epidemiology studies reported (e.g., increase in cancer deaths). However, an HRS score of 50.0 indicates a site of serious concern. Regardless of whether it actually is, more time and money will be required to establish whether the High Rolls (Sacramento) mining district should be taken off the Federal Facilities Docket or placed on the National Priorities List for remedial action.

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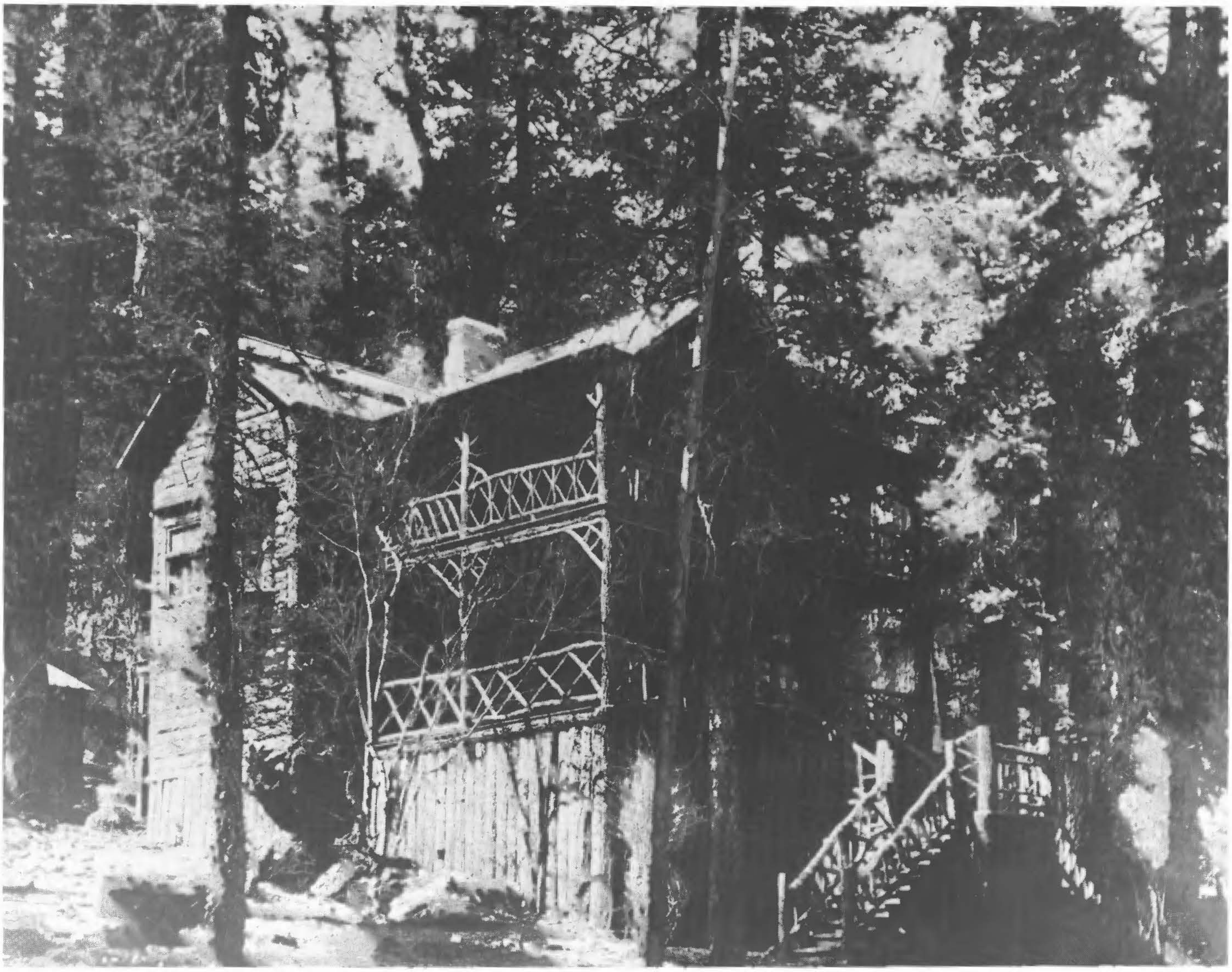

Just a cozy summer "cottage" in the woods at Cloudcroft around 1900. From the Alfred J. Black Collection; courtesy of Spencer Wilson.