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October 24, 1995

Mr. Larry Kirkman
DOE/LAAO
528 35th Street
Los Alamos, New Mexico
87545

Dear Mr. Kirkman:

A review of the Cal West Metal Contaminated Soil Treatability Study information indicates that media used in this project meet the requirements for treatability studies and exemption under 40 CFR § 261.4 (e and f). Any unused portion of the Media must be analyzed to determine if it is a hazardous waste and disposed of under the provisions of 40 CFR 261 through 268 and § 270 accordingly as required by 40 CFR § 261.4(f)(10).

Should you or your staff have any questions about this review contact Mr. Robert S. Dinwiddie of my staff at the above address or by phone at (505) 827-1561.

Sincerely,

Barbara Hoditschek
Barbara Hoditschek
Program Manager, RCRA Permits

cc:
Robert S. Dinwiddie
file

9669

Ref
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Public Health Assessment for

CAL WEST METALS (USSBA)
LEMITAR, SOCORRO COUNTY, NEW MEXICO
CERCLIS NO. NMD097960272
OCTOBER 24, 1995

For Public Comment

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

Comment Period Ends:

DECEMBER 28, 1995

PUBLIC HEALTH ASSESSMENT

CAL WEST METALS (USSBA)

LEMITAR, SOCORRO COUNTY, NEW MEXICO

CERCLIS NO. NMD097960272

ARMY SECTION
FEDERAL FACILITIES ASSESSMENT BRANCH
DIVISION OF HEALTH ASSESSMENT AND CONSULTATION
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment-Public Comment Release was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate. This document represents the Agency's best efforts, based on currently available information, to fulfill the statutory criteria set out in CERCLA section 104 (i)(6) within a limited timeframe. To the extent possible, it presents an assessment of the potential risks to human health. Actions authorized by CERCLA section 104 (i)(11), or otherwise authorized by CERCLA, may be undertaken to prevent or mitigate human exposure or risks to human health. In addition, ATSDR will utilize this document to determine if follow-up health actions are appropriate at this time.

This document has been provided to EPA and the affected state in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. Where necessary, it has been revised in response to comments or additional relevant information provided by them to ATSDR. This revised document has now been released for a 30 day public comment period. Subsequent to the public comment period, ATSDR will address all public comments and revise or append the document as appropriate. The public health assessment will then be reissued. This will conclude the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

Agency for Toxic Substances and Disease Registry.....David Satcher, M.D., Ph.D., Administrator
Barry L. Johnson, Ph.D., Assistant Administrator

Division of Health Assessment and Consultation..... Robert C. Williams, P.E., DEE, Director
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Exposure Investigations and Consultations Branch..... Edward J. Skowronski, Acting Chief

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Program Evaluation, Records, and Information Services Branch.....Max M. Howie, Jr., Chief

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Please address comments regarding this report to:

Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Attn: Chief, Program Evaluation, Records, and Information Services Branch, E-56
1600 Clifton Road, N.E., Atlanta, Georgia 30333

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, is an agency of the U.S. Public Health Service. It was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperataive agreements.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists then evaluate whether or not there will be any harmful effects from these exposures. The report focuses on public health, or the health impact on the community as a whole, rather than on individual risks. Again, ATSDR generally makes use of existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further research studies are needed.

Conclusions: The report presents conclusions about the level of health threat, if any, posed by a site and recommends ways to stop or reduce exposure in its public health action plan. ATSDR is primarily an advisory agency, so usually these reports

identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When infomed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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SUMMARY

Cal-West Metals (CWM) is a former secondary battery recycling facility in Lemitar, New Mexico. The company processed an estimated 20,000 automobile batteries between 1979 and 1981. Lead, plastics, and hard rubber components were recycled from the used batteries. Contaminants from this process and crushed battery components were discarded on-site. After 1981, batteries were no longer accepted at the facility. Battery recycling research was continued at CWM from 1982-1984. In 1985, the Small Business Administration (SBA) foreclosed on the property. Following several studies by the US Environmental Protection Agency (EPA) and the New Mexico Environment Department (NMED), the site was officially listed on EPA's National Priorities List (NPL) on March 31, 1989.

Lead, antimony, arsenic, and polyaromatic hydrocarbons (PAHs) were detected in soil on site at levels that could cause health problems if people were repeatedly exposed to them over a long period of time. The only contaminant found off site at concentrations above levels of possible health concern was lead. Lead was detected in arroyos (surface water drainages) approximately 200 feet outside the site fence. Groundwater was not found to be contaminated with any substances from CWM.

Site cleanup was completed in spring 1995; no environmental pathways pose a human health threat. There were two potential exposure pathways in the past. Trespassers at CWM could have been exposed to on-site contamination if they inhaled, ingested, or had skin contact with contaminated media; people could have also been exposed to contaminated soils in the off-site drainage areas. Because of the site's isolated location, only repeated contact with contaminants over a long period of time could have produced adverse health effects, and it is highly unlikely that such exposures occurred. The cleanup plan carried out by EPA reduced average soil lead levels on site low enough to allow the land to be used for residential purposes without producing harmful health effects in future residents.

The Cal-West Metals site presents no apparent past or present public health hazard because past human exposures, if any, would have been intermittent at worst and highly unlikely to result in harmful health effects. The soil both on site and off site has been cleaned up, and all chemical and physical hazards have been removed from the site.

BACKGROUND

A. Site Description and History

Information for this section was attained from the September 1992 Record of Decision (ROD) for CWM (1) unless otherwise noted. A ROD is a site evaluation through which the best cleanup method for a site is selected.

Cal-West Metals (CWM) was a battery recycling facility. The site had been used as a cotton gin prior to the CWM battery operation. Aerial photographs by the New Mexico State Highway Department indicate that the cotton gin was active between 1961 and 1972.

The property is located in Lemitar, 8 miles north of Socorro in Socorro County, New Mexico (Figure 1). As a result of foreclosure in 1985, CWM currently belongs to the Small Business Administration. The property covers 43.8 acres, 12.5 of which are enclosed by a fence. Before remediation, the site consisted of two evaporation ponds, soil and battery waste piles, earth berms, a concrete surface pad, three buildings, and a salvage area (Figure 2). The northernmost building was used for research and development activities. The central building was used for the battery separation process, and was later used as a storage area for crushed battery components (plastics, hard rubber, and lead oxides). Those battery components have since been removed as part of site cleanup. The south building was used for smelting processes, to store and repair equipment, and as offices. The earthen berms were created by surface soil grading on the site. The larger evaporation pond was lined, and the smaller one was unlined.

There are currently nine monitoring wells and two supply wells on site. The monitoring wells are sampled quarterly. The supply wells are used for monitoring at this time and may be closed in the future (2).

An estimated 20,000 automobile batteries were processed to recycle lead, plastics, and hard rubber components from 1979 to 1981. The lead, plastics, and hard rubber were separated by flotation and centrifugation in a separator drum. Water was recycled through the separator drum, and was eventually discharged into the lined pond. Once the discharge lines became clogged, the sludges were discarded onto the concrete pad. It has been reported that battery acid was neutralized with calcium hydroxide, and was then disposed into the lined pond or onto the concrete pad. Crushed battery components were stored outdoors uncovered from the beginning of the operation until 1989 or 1990, when they were moved inside one of the buildings. The battery components have been removed from the site.

Batteries were no longer accepted at the facility after 1981, but the owners continued to research recovery methods for old automobile batteries from 1982-1984. Work was decreased after 1984, and in 1985 the SBA foreclosed on the property.

The CWM site has been studied by state and federal authorities numerous times since 1979. From 1981 to 1989, initial investigations were undertaken by the New Mexico Environmental Improvement Division, now the New Mexico Environment Department (NMED), EPA, and the owners. On June 24, 1988, the site was proposed for inclusion on EPA's National Priorities List (NPL). The site was officially listed on March 31, 1989. The extent and types of environmental contamination were studied, and the ROD was signed in September 1992. As a result of the ROD, all contaminated soil was mixed with concrete and buried and covered with a layer of concrete, a 12-inch layer of clean topsoil, and vegetation. All physical and chemical hazards were removed from the site and all buildings were cleaned and secured. Site cleanup was completed in spring 1995 (2).

B. Site Visits

ATSDR personnel, accompanied by a representative of the NMED, conducted a site visit on May 10-15, 1992 (3). ATSDR health assessors met with officials from the NMED, the New Mexico Department of Health, the New Mexico Bureau of Mines, EPA, the city of Socorro, and the town of Lemitar. A meeting was also held with the petitioner for the site.

During the first site visit it was discovered that the fence was down in at least two locations, so the property was readily accessible. There was evidence of trespassing, such as graffiti on walls and smashed windows and locks. Heavy equipment that was on site was not secured. One of the buildings was unsecured; marked and unmarked containers of chemicals were found in that building. Acids and bases were stored together. Large piles of lead battery wastes were found on the concrete pad. Large quantities of a white crystalline material (later identified as calcium hydroxide) were found partially buried in a concrete trench (3).

ATSDR staff conducted a second site visit July 29-31, 1992 (4). The purpose of that visit was to attend a second public availability meeting in conjunction with EPA's presentation of the 1992 Remedial Investigation and Feasibility Study (RI/FS) (5,6). A representative of the New Mexico Health Department went along on the site visit. The perimeter fence had been repaired but trespassing on the site was still possible. The building was unsecured and still contained the chemicals seen on the first visit. Acids and bases were still stored

together. Subsequent site remediation resulted in the removal of all chemical and physical hazards from the site.

C. Demographics, Land Use, and Natural Resources

Demographic data provide information on population and housing characteristics of communities living near hazardous waste sites. Demographic information from the 1990 Census relating to the population living in the CWM area are presented below for general information.

CWM is located in a rural area one-half mile northwest of Lemitar, the nearest village. The eastern boundary of the site is the frontage road for US Interstate 25. The interstate is approximately 250 feet from CWM. Cal West is two miles west of the Rio Grande and four miles east of the Lemitar Mountains. The site is located 8 miles north of Socorro.

The general area around the site is barren and very sparsely populated. Approximately 250 people live within one mile of the site. The nearest residences are across Interstate 25, 1000 feet to the northeast and to the southeast. There are at least three households 1100-1300 feet south of the fence at CWM (see Figure 3).

Data from the 1990 Census for the census blocks that extend out to approximately one-half mile east of the site and include most of Lemitar are presented in Tables 1 and 2; data for Socorro County are included in the tables for purposes of comparison. Only 201 persons lived in that area in 1990. Nearly the entire population was white and approximately two-thirds were of Hispanic origin; the Hispanic percentage was considerably higher than the county average. Almost 28% of the population was under age 18, which is relatively high but still under the county average. Over 80% of all households were owner occupied, which suggests a relatively nontransient population (i.e., renters tend to move much more frequently than do homeowners). The average value of owner-occupied households and average monthly rent paid for renter-occupied housing units are roughly the same as the county averages.

The privately owned land near the site is not irrigated. Agricultural land lies on the opposite side of Interstate 25. Land lying west and north of CWM is owned by the US Bureau of Land Management. That land is primarily grazing rangeland, which has been overgrazed by cattle. The soil in the area has been ranked by the US Soil Conservation Service as being fair to poor for a potential

wildlife habitat (1). The types of wildlife that are expected to exist in the area are small to medium sized birds, birds of prey, and small mammals and reptiles.

The Rio Grande is two miles east of CWM, and is the only perennial (i.e., water is constantly flowing) stream within fifteen miles. The Rio Grande flows north to south. The Lemitar Mountains are drained by a number of ephemeral (i.e., water seldom flows in them) arroyos in the area. There are two west-east ephemeral arroyos located to the north and south of CWM within one-half mile of the site (Figure 5). Those arroyos flow into channelized irrigation ditches that eventually lead to the Rio Grande.

The Sierra Ladrones Formation and Quaternary deposits form the upper shallow groundwater aquifer in the Lemitar area (groundwater is defined as being water beneath the earth's surface that supplies springs and wells); that aquifer is the primary source of groundwater. No known private drinking water wells have been completed deeper than the shallow aquifer in the Socorro and La Jencia Basins (5). All residences in the area use the Polvadera municipal water supply as their potable water source, according to the most recent data. Polvadera is about seven miles north of the site; the municipal water comes from a deep groundwater aquifer. The shallow wells near CWM are now used mainly for irrigation (2). Groundwater surface contours indicate that groundwater beneath CWM flows predominately to the south-southwest (1).

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

Findings from previous investigations of environmental contamination at CWM have been reviewed by ATSDR. Unless otherwise stated, the environmental data presented are from the EPA Record of Decision (ROD) (1). The environmental data presented relate to possible exposure pathways at CWM as discussed above. ATSDR selects and discusses contaminants based on several factors: sample design, field and laboratory data quality, and comparison of chemical concentrations to levels that could cause cancer or other health effects. Community health concerns are also considered.

Table 2 lists contaminants detected in on-site surface soil and sediment (0-6 inches) at concentrations exceeding comparison values. Comparison values are amounts of contaminants found in specific environmental media (i.e., air, groundwater, soil, and sediment) that are used to determine whether those contaminants should be discussed further in the PHA. Those values were developed by ATSDR and other agencies as guidelines for estimating how much of a contaminant per day an average person can be exposed to with no harmful health effects. Comparison values are very conservative (i.e, they are very protective of public health) and are calculated based on "worst case scenarios."

Environmental contamination relating to possible exposure pathways at CWM is grouped by the type of medium (e.g., soil, groundwater, etc.) in which contaminants were detected. The media discussed are soils and sediments, contaminant waste source, groundwater, and air.

A. On-site Contamination

1. Soils and Sediments

Analytical measurements made by the EPA found three inorganic contaminants at levels above comparison values in soils and sediments: lead (maximum of 7,690 ppm in surface soil and 836,000 ppm in sediments), antimony (maximum of 101 ppm in surface soil and 1,160 ppm in sediments), and arsenic (maximum of 32 ppm in surface soil and 704 ppm in sediments in the trench area) (see Table 3). Cadmium, mercury, nickel, and silver were detected, but at levels below comparison values (i.e., levels of concern for further analysis). Semi-volatile organic compounds identified for further evaluation are the polynuclear aromatic hydrocarbons (PAHs) (6).

The EPA modeled exposure source contributions of lead using the Uptake/Biokinetic (UBK) model. That model determined that the battery source waste materials posed a threat to public health through inhalation and ingestion of contaminated soil (i.e., dust containing contaminant particles) if people were to come into close contact with the site.

The future scenario for the CWM property is residential use. The UBK model was used to calculate blood lead concentrations in children ages 0-6 using given environmental exposures. The following exposure routes were examined using the model: 1) ingestion of soil and dust, 2) ingestion of water, 3) ingestion of food, 4) inhalation of air, 5) exposure of a fetus through the maternal route (lead from the mother readily passes the placenta [8]), and 6) ingestion of paint chips (which is not applicable at this site). The UBK model, then, estimates the risk from lead using concentrations from all environmental media (1).

For CWM, only soil concentrations were varied in the UBK calculations. Site-specific concentrations that were detected during sampling were used for air and drinking water. In other words, at CWM the UBK model estimates the maximum amount of lead that could be present in soil to help ensure that harmful lead exposures do not occur if the site is used for residential purposes in the future. Since the estimates were based on exposures to children from ages 0-6, the findings are very conservative and protective of public health (i.e.,

children are typically affected more by a given level of exposure than are adults).

It was determined that the cleanup level would have to be 640 ppm for the land to be used as residential property; that level complies with limits set by EPA's Office of Solid Waste and Emergency Response (Directive 9355.4-02), which sets recommended cleanup levels for lead in soil of 500-1,000 ppm (1). In other words, an average lead concentration in soil at CWM of 640 ppm would not cause blood lead levels to rise to harmful levels in future residents.

A field portable x-ray fluorescence (FPXRF) survey was taken during Phase II of the Remedial Investigation by EPA to find out if lead contamination at the site is widespread. An X-Met 880 field portable instrument was used to measure lead concentrations. Grids measuring 100 feet x 100 feet were surveyed and staked at the site. The area was extended 400 to 500 feet north, south, and west of the fenced area (Fig 3). The X-Met was used to measure lead concentrations at the grid intersections and at points outside the grid area. Of the 203 samples taken, 145 were surface samples. Using the results from this survey, an isopleth diagram outlining the areas of contamination and their approximate lead concentrations was drawn (Figure 4). It was determined that approximately 8 of the 43.8 acres of surface area were contaminated above the cleanup level of 640 ppm. According to the figure, those eight acres included both an area north of CWM outside the fence and a large area inside the fence (6).

Antimony was detected at levels above comparison values in the battery and sludge sediments (1,160 ppm), as well as in the pond (581 ppm). Arsenic was detected above comparison values only in the trench area (704 ppm). Again, those comparison values are very protective of public health. A person would have to be exposed to the contaminants at the levels detected on a daily basis and for long periods of time to experience adverse health effects; such exposures were unlikely at the CWM site.

2. Contaminant Waste Source

Field investigations, which took place during the Phase I and Phase II Remedial Investigation by EPA, showed that hazardous substances were present in several sources. Those sources included the broken battery waste piles, dried sludge waste sediments, and sediment from the evaporation ponds.

The highest concentrations of contaminants were found within the fenced area of the CWM site. The highest concentrations of lead were found in the battery and sludge sediments. Polynuclear aromatic hydrocarbons (PAHs), which are

associated with plastics and rubber products, were the predominant semi-volatile organic compounds detected in the samples.

As part of testing for chemical contamination on site, the southwest berm area was trenched and then sampled. Arsenic (704 ppm) and lead (51,100 ppm) were the only contaminants found to be above the comparison levels in the trench area (Table 3).

3. Groundwater

Groundwater was tested from a pre-existing monitoring well (CWMW-2) and two supply wells (CWSW-1 and CWSW-2) during Phase I investigations on site (see Figure 2). Six wells were constructed for the Phase II investigation (CWMW-4 to CWMW-9) and were sampled at that time along with the three pre-existing monitoring wells (CWMW-1, 2, and 3). The monitoring wells were used only for sampling, not as potable water sources. Those samples were all tested for target analyte list (TAL) metals; TAL metals are metals that are commonly found in the environment and that are typically sampled for in site investigations. Only unfiltered samples were targeted during Phase I examination. Samples from the new and old monitoring wells were taken October 29-30, 1991, during Phase II. Filtered and unfiltered samples were examined for TAL metals. Lead levels from all of the newly constructed monitoring wells on-site were below the New Mexico ground water standard of 0.05 ppm, and the EPA action level of 0.015 ppm. Unfiltered samples from the old monitoring wells were slightly elevated for lead levels during Phase II testing. Wells CWMW-1, CWMW-2, and CWMW-3 had levels of 0.090, 0.043, and 0.035 ppm, respectively. Groundwater samples collected during Phase I and from wells CWMW-5, CWMW-7, and RW-1 during Phase II were also analyzed for TAL organic compounds, but no volatile or semi-volatile organic compounds were detected.

4. Air

Air samples were collected during field activities of Phase II of the remedial investigation, during the week of September 23, 1991. Temperatures ranged from 48° to 86°F. Winds were from a southerly direction at average speeds of 5 to 13 miles per hour (1).

Samples were taken next to the trenching operations, and upwind and downwind of the source waste materials found on site at CWM (1). Thirty-two samples were collected and analyzed for PAHs and 11 metals (1). Lead was detected at concentrations below standards in most of the air samples tested. One air

sample measured 35.6 micrograms per cubic meter (1), which was above the National Ambient Air Quality Standard of 1.5 micrograms per cubic meter for lead. That sample was collected during trenching operations when soil was being disturbed; on-site remedial workers took proper safety precautions so that chances of harmful exposures were minimal. The nearest households are 1,000 feet northeast and southeast of the site on the other side of Interstate 25 and Lemitar is one-half mile to the southeast, also on the other side of the highway, so it is highly unlikely that lead concentrations of that magnitude would have reached populations off site, especially for a period of time that would cause adverse health effects.

B. Off-site Contamination

1. Soils and Sediments

An assessment was made to determine if contaminants had migrated off-site. Sediment samples were collected off-site north and south of CWM (Figure 5). The samples were taken from the drainage areas of the arroyos. Eight samples were taken in these areas during the Phase I investigation. All samples were surface samples. Two samples were taken south of CWM (one 100 feet away from the fence and the other 200 feet away), and six samples were taken 200 feet or less north of the fenced area, as seen in Figure 5. A background sample was collected about 200 feet west of the site (1).

The samples were analyzed for TAL metals and organic compounds. Lead was the only substance detected at concentrations above the comparison level in the north and south sampling areas. Runoff from the battery waste piles is the most likely source of drainage contamination because the piles were outside where no containment measures were used. The arroyos off site are not in an area that people are likely to pass through very often, so it is not likely that anyone was exposed to lead in this area long enough to suffer any ill health effects.

2. Groundwater

Residential wells north and south of CWM were monitored for contamination in 1979, 1981, 1985, 1990, and 1991. Residents at those locations had already switched to municipal water prior to sampling because their well water tasted bad and they thought that it may have been contaminated. Water from the wells is still used for irrigation. All of the wells draw water from the aquifer of concern, which lies beneath the CWM site. The water samples, which were all unfiltered, were tested for TAL metals and for general water quality. The northernmost residential well (RW-1) was chosen for background comparisons.

Lead was below 0.002 ppm and all other metals were also detected below health standards in RW-1 (1).

Analytical results from the sampling of private wells "indicate that there has not been a release of hazardous substance metal contaminants from site waste sources to the groundwater beneath the Cal West site" (1). The highest lead concentration found was 0.06 ppm detected in RW-2 in 1981; that level is slightly above New Mexico's action level for lead of 0.05 ppm and EPA's maximum contaminant level (MCL) of 0.015. All other lead concentrations from RW-2 were below both EPA and New Mexico action levels. RW-2 is not in the path of groundwater flow from CWM, which means that the one slightly elevated lead sample most likely resulted from another source (1,5). One such common source of slightly elevated lead is leaching of lead solder from plumbing (8).

Manganese was detected in groundwater at concentrations above the MCL of 0.05 ppm in all residential wells tested. Iron concentrations in groundwater also exceeded the MCL of 0.3 ppm in RW-2, RW-3, RW-4, and RW-5. Those levels of iron and manganese measured in the residential wells represent the background water quality in the area because elevated levels were detected in all domestic wells tested, including those both upgradient and downgradient of the site. In addition, the MCLs for iron and manganese are for taste and odor, not health purposes (8). In other words, someone would have had to consume those metals in amounts substantially higher than detected to suffer any health problems. Groundwater from all residential wells also contained Total Dissolved Solids (TDS) at levels above the EPA water quality standard of 500 ppm. The sulfate level in RW-2 was 593 ppm, which exceeds EPA's water quality standard of 250 ppm. Those iron, manganese, TDS, and sulfate levels indicate that groundwater in the area is of relatively poor quality (1). Again, those wells are no longer used as potable water sources; the residences had switched to the Polvadera water supply prior to any sampling.

Flowing water was not present in the arroyos during the period of time when sampling occurred, and there are no rivers in the immediate vicinity of CWM. There was therefore no surface water to test during the remedial investigations (5).

C. Quality Assurance and Quality Control

In preparing this Public Health Assessment, ATSDR relied on the information provided in the referenced documents. The Agency assumed that adequate quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of the

analyses and the conclusions drawn in this document are determined by the availability and reliability of the referenced information.

Upon review of documents related to CWM, it appeared that the appropriate samples were collected at the site. Contaminants which would be of concern at a battery smelting operation were examined by the laboratories. Any discrepancies that were detected by EPA were clarified by the contract laboratories. Data were clearly marked to indicate the types of dilutions used in the laboratory determinations. Data that were not within the detection limits of the assays were clearly marked on the data sheets (1,4).

D. Physical and Other Hazards

Buildings on the CWM property were not properly secured at the time of the site visit. A number of physical hazards were present, and a variety of chemicals were found in one building. The site has since been cleaned up, however. All physical hazards have been removed, along with the chemicals. The buildings have been cleaned and secured.

PATHWAYS ANALYSIS

To determine whether people are exposed to contaminants migrating from CWM, ATSDR evaluated the environmental and human components that lead to human exposure. A pathways analysis consists of five elements: a source of contamination (e.g., landfills or lead piles), an environmental medium (media) through which contaminants move (e.g., movement of contaminants through groundwater or the air), a human exposure point (e.g., contaminated private wells or dust containing contaminants on a site), a human exposure route (e.g., ingestion, breathing, or contact with the skin), and a potentially exposed population (e.g., people using private well water or breathing in the dust particles). Unless noted, the information used in the pathways analysis was found in the ROD and the trip reports.

ATSDR identifies exposure pathways as completed or potential. Completed exposure pathways exist when the five elements of a pathway link the contaminant source to an exposed population. Potential exposure pathways exist when information on one or more of the five elements is missing.

A. Completed Pathways

Although there were sources of environmental contamination on-site at CWM before the site was cleaned up, one or more of the five elements of a pathway discussed above were absent for the pathways developed at this site. No

completed human exposure pathways were therefore identified at the CWM site.

B. Potential Pathways

1. On-Site Media

Trespassers may have been exposed to environmental contaminants on-site, but, again, types of exposures to trespassers, if any occurred, cannot be determined due to insufficient information about their activities at the site. Those exposures would have been intermittent at worst.

A potential existed for short-term exposures to contaminated sediments and soils, ambient air, and lead wastes from batteries to anyone who visited the site. A variety of laboratory chemicals were found in one of the buildings. Those chemicals represented a potential exposure pathway for trespassers on the CWM site; those exposures would have been short term if they occurred at all. The soils and sediments on and around the site have been cleaned up and the chemicals have been removed. The potential for any exposures has therefore been eliminated.

2. Off-Site Media

Lead from battery wastes that got into the soil may have been dispersed to nearby off-site areas by strong winds in the past. However, the lead levels detected in soil samples taken 200 to 300 feet outside the fenced area do not suggest that depositional lead through the air was a substantial problem. The maximum lead level beyond the fenced area was 1,550 ppm in a drainage area about 200 feet north of the fence; the nearest residence is over 1,000 feet from the fence. That level is considerably lower than many on-site levels and, since it was detected in a drainage area that received runoff from the site, it is unlikely that very much of the lead was wind-borne. Lead carried off site by the wind would therefore have been present only intermittently, and it is highly unlikely that it would have been present at levels of human health concern in any off-site areas. Lead dispersion to off-site areas at levels of health concern is no longer possible since soil lead has been lowered to safe levels.

Children playing in the soil off-site could have been exposed to lead. Since there are no homes immediately adjacent to the arroyos, it is unlikely that this is a frequent play area. Such exposures, if any, would therefore have been intermittent. Those off-site areas have also been cleaned up.

As stated above, no area residences use a private well for potable water. Groundwater quality in the CWM area is naturally poor, and there is no

evidence that site-related substances contaminated off-site drinking water wells. No exposure through groundwater is therefore possible.

PUBLIC HEALTH IMPLICATIONS

In this section, ATSDR discusses health effects that may result from exposures to site contaminants. Chemicals released into the environment do not always result in human exposure, and exposure does not necessarily result in adverse health effects. People can only suffer the ill effects of exposure to a site contaminant if they breathe, eat, drink, or come in contact with that contaminant for a certain length of time. Based on available evidence, it is highly unlikely that anyone came into contact with contaminants at CWM long enough to suffer any adverse health effects. Since the site has been successfully remediated, there is no longer any danger of such exposures.

A. Toxicological Evaluation

There are no current completed pathways resulting from past activities at CWM. The soil on site has been cleaned up so that contaminant levels, if any remain, are not harmful to human health. All physical and chemical hazards have been removed and the buildings have been secured. Although nearby residents, trespassers on the site, and children playing in the arroyos just off site may have been exposed to site-related contaminants in the past, those exposures would have been intermittent and unlikely to cause any health problems. Although no adverse health effects are expected at CWM due to lead exposure, ATSDR's toxicological profile on lead may be consulted for information on lead toxicity.

B. Health Outcome Data

Health outcome data (HOD) document health effects that occur in populations. The data can provide information on the general health status of the community living near a hazardous waste site. They can also provide information on patterns of specified outcomes. The New Mexico Department of Health maintains a tumor registry and vital statistics data. Those databases are not available for small areas and therefore would not supply reliable information for the area near CWM.

COMMUNITY HEALTH CONCERNS EVALUATION

1. One primary health concern of the state public health officials was whether the superficial aquifer had been contaminated. Concern was also expressed about off-site residential wells. Citizens were concerned that although those wells are clean and they now use the Polvadera municipal water supply, there may have been groundwater contamination in the past to which they could have been exposed.

The most recent information indicated that all residences in the area use the Polvadera municipal water supply. The shallow wells in the nearby vicinity are used for irrigation (2). Groundwater flows in a south-southwesterly direction. Monitoring wells located southwest of the contaminated soils do not indicate that groundwater contamination has occurred. According to groundwater testing conducted after the households had been switched to the Polvadera municipal water supply, the residential wells have not been contaminated by substances found at CWM. Also, the remediation plan enacted by EPA has stabilized contaminants so that they are no longer a concern.

Iron and manganese were detected above drinking water standards in Phase II sampling, which took place after local residents had switched to the Polvadera water supply. Those standards, however, are for aesthetic purposes (i.e., taste and odor); no health effects would have been expected from drinking that water in the past. The high levels of iron and manganese, along with relatively high levels of total dissolved solids indicate that groundwater throughout the area is of generally poor quality; none of those substances can be linked to contamination from CWM.

2. Concerns were raised on several occasions about lead exposures in the children of the community. Concerns were raised about the lead oxide piles located on-site at CWM. Citizens are concerned that the seasonal prevalence of strong winds could distribute the lead off-site.

Under the selected remediation plan, the contaminated soil was stabilized with cement, buried, and capped. Therefore, there are no longer any concerns about distribution of that soil off-site by strong winds.

Strong winds could have carried contaminants off site in the past. Off-site soil sampling was conducted in several drainage areas north and south of the site. The maximum lead concentration detected was 1,550 ppm at a location approximately 200 feet north of the fenced area, most

of which was due to drainage from the site (i.e., very little would have come from wind borne particles). Given that the nearest homes are approximately 800 feet north of that sampling location, it is unlikely that exposure to harmful lead levels could have occurred through the air pathway.

The closest active source of lead emissions is a smelter located approximately four miles south of Lemitar. As part of the public health assessment process, we consulted the Toxic Release Inventory (TRI) database. According to TRI, that smelter had a total air release of 255 pounds of lead in 1993 (9). That amount of lead in a year is not expected to produce any adverse health effects. The lead would be so dispersed after traveling four miles that any exposures would be quite minimal.

3. Concerns were raised about the appropriateness of the proposed remediation plan for the type of contamination found at CWM.

The remediation alternative chosen for CWM involved solidification with Portland cement and subsequent on-site burial of approximately 15,000 cubic yards of contaminated soil, sediment, and source waste materials. The excavation was then filled with clean soil, capped with concrete, and covered with another layer of clean soil and vegetation. Continued groundwater monitoring was also part of the remediation chosen. That alternative was one of six considered by EPA. The alternatives were thoroughly screened and were presented and discussed in public meetings prior to the actual selection of the most appropriate cleanup method. EPA determined that the method chosen was the most cost-effective way to provide maximum protection for both the environment and the health of area residents. We concur with EPA that the selected remediation is protective of public health.

4. What kind of monitoring will be performed in the future for off-site contamination once the remediation has been completed?

Existing monitoring wells located downgradient to the disposal site will be monitored yearly. Selected site wells will also be monitored quarterly. The effectiveness of the remediation will be reevaluated every five years (1).

5. The 640 ppm soil lead level chosen as the target for remediation by EPA was questioned by the citizens of the community. They questioned the variation of lead cleanup levels chosen at different NPL sites.

According to the UBK model, which is based on some quite conservative site-specific assumptions relating to the possibility of human exposure to contaminants, an average concentration of lead in soil of 640 ppm at the CWM site would not pose any health problems for residents who move there. The cleanup level for lead at some sites has been set at 500 ppm, but those sites typically have only limited data upon which to base a decision, so the most conservative level is used as a default. In fact, cleanup levels close to 1,000 ppm have been set at some sites for which sufficient data were available.

CONCLUSIONS

1. The Cal-West Metals site currently presents no public health hazard for area residents. Contaminated soil has been mixed with cement, buried, and capped. Current soil lead levels have been greatly reduced, so that there is no health threat even if people were to build homes and live on the site. Physical and chemical hazards have been removed from the site and the buildings have been secured.

2. The Cal-West Metals site presents no apparent public health hazard due to past exposures. Children playing in the arroyos and trespassers inside the fence may have been exposed to contaminants, especially lead, from the site in the past. However, such exposures, if any, would have been intermittent in nature and highly unlikely to result in adverse health effects.

3. There is no site-related groundwater contamination of area potable wells, and all nearby residents use a municipal water source.

RECOMMENDATIONS

1. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, requires ATSDR to perform public health actions needed at hazardous waste sites. To determine if public health actions are needed, ATSDR's Health Activities Recommendation Panel (HARP) has evaluated the data and information in the Cal-West Metals Public Health Assessment. The site has been cleaned up so that no human exposures to hazardous substances or physical hazards can occur; only intermittent exposures are believed to have been possible in the past. There were past public health concerns regarding the possibility that people may have been exposed to harmful levels of lead in dust blowing from the site, but the data do not indicate that this occurred. There are no known current public health concerns. HARP therefore recommends no further public health actions. In addition, a health consultation previously conducted at Cal-West recommended that blood lead testing be carried out in the site area; based on current information, that recommendation is no longer considered necessary.

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REFERENCES

1. US Environmental Protection Agency. Record of Decision. September 1992.

2. Lyke, Jennifer. Personal communication. February 16, 1995.

3. Agency for Toxic Substances and Disease Registry. Cal-West Metals Trip Report #1. May 10-15, 1992.

4. Agency for Toxic Substances and Disease Registry. Cal-West Metals Trip Report #3. July 29-31, 1992.

5. US Environmental Protection Agency. Remedial Investigation. 1992.

6. US Environmental Protection Agency. Feasibility Study. 1992.

7. Agency for Toxic Substances and Disease Registry. Case Studies in Environmental Medicine: Lead Toxicity. June 1990.

8. US Environmental Protection Agency. The Safe Drinking Water Act: A Pocket Guide to the Requirements for the Operators of Small Water Systems. September 1990.

9. Toxic Chemical Release Inventory. Socorro County, New Mexico, 1993.

TABLES

TABLE 1. HOUSING DATA TABLE

	Lemitar Area	Socorro County
Households*	76	5,217
Persons per household	2.65	2.75
% Households owner-occupied	81.6	68.7
% Households renter-occupied	19.4	31.3
% Persons in group quarters	0.0	2.9
Mean value, owner-occupied households, $	53,460	56,800
Mean rent paid, renter-occupied households, $	264	227

* A household is an occupied housing unit, but does not include group quarters such as military barracks, prisons, and college dormitories.

Source: 1990 Census of Population and Housing, Summary Tape File 1B Extract on CD-ROM (New Mexico) [machine-readable data files]. Prepared by the Bureau of the Census. Washington, DC: The Bureau [producer and distributor], 1991.

TABLE 2. POPULATION DATA TABLE

	Lemitar Area	Socorro County
Total persons	201	14,764
% White	98.5	77.4
% Black	0.5	0.8
% American Indian, Eskimo, or Aleut	0.0	10.1
% Asian or Pacific Islander	0.0	1.4
% Other races	1.0	10.3
% Hispanic origin	65.7	47.8
% Under age 18	27.9	30.3
% Age 65 and older	13.9	10.4

Source: 1990 Census of Population and Housing, Summary Tape File 1B Extract on CD-ROM (New Mexico) [machine-readable data files]. Prepared by the Bureau of the Census. Washington, DC: The Bureau [producer and distributor], 1991.

TABLE 3. CONTAMINANTS IN ON-SITE SOILS AND SEDIMENTS

Contaminant	Surface soil	Sediments			Comparison values	
		Battery and sludge	Pond	Trench	Concentration	References
Metals (ppm)						
Antimony	101	1160	581	NA	300	RMEG
Arsenic	32	240	250	704	200	RMEG
Lead	7690	838,000	421,000	51,100	NA	
Semi-volatile organic compounds (ppm)						
Benz(a)anthracene	ND	4.8	ND	NA	NA	
Benzo(a)pyrene	ND	2.8	ND	NA	NA	
Benzo(b)fluoranthene	ND	4.7	ND	NA	NA	

NA - Not Available
ND - Not Detected

TABLE 4. POTENTIAL EXPOSURE PATHWAYS

Pathway name							Time
	Source COCs	Media		Point of exposure	Route of exposure	Exposed population	
Trespassing	On-site waste piles, metals, PAHs, chemicals in buildings	On-site metals	Waste piles, ponds, surface soils	Direct contact with contaminated media	Dermal, inhalation, ingestion	Trespassers	Past, present, and future
		Laboratory chemicals	Chemicals in building				
Off-site surface soils	Lead	Surface soil, off-site sediments in drainage		Drain areas of arroyos, surface soils off-site	Dermal, inhalation, and ingestion	Residents of the area, especially children playing in the soil	Past, present, and future

FIGURES

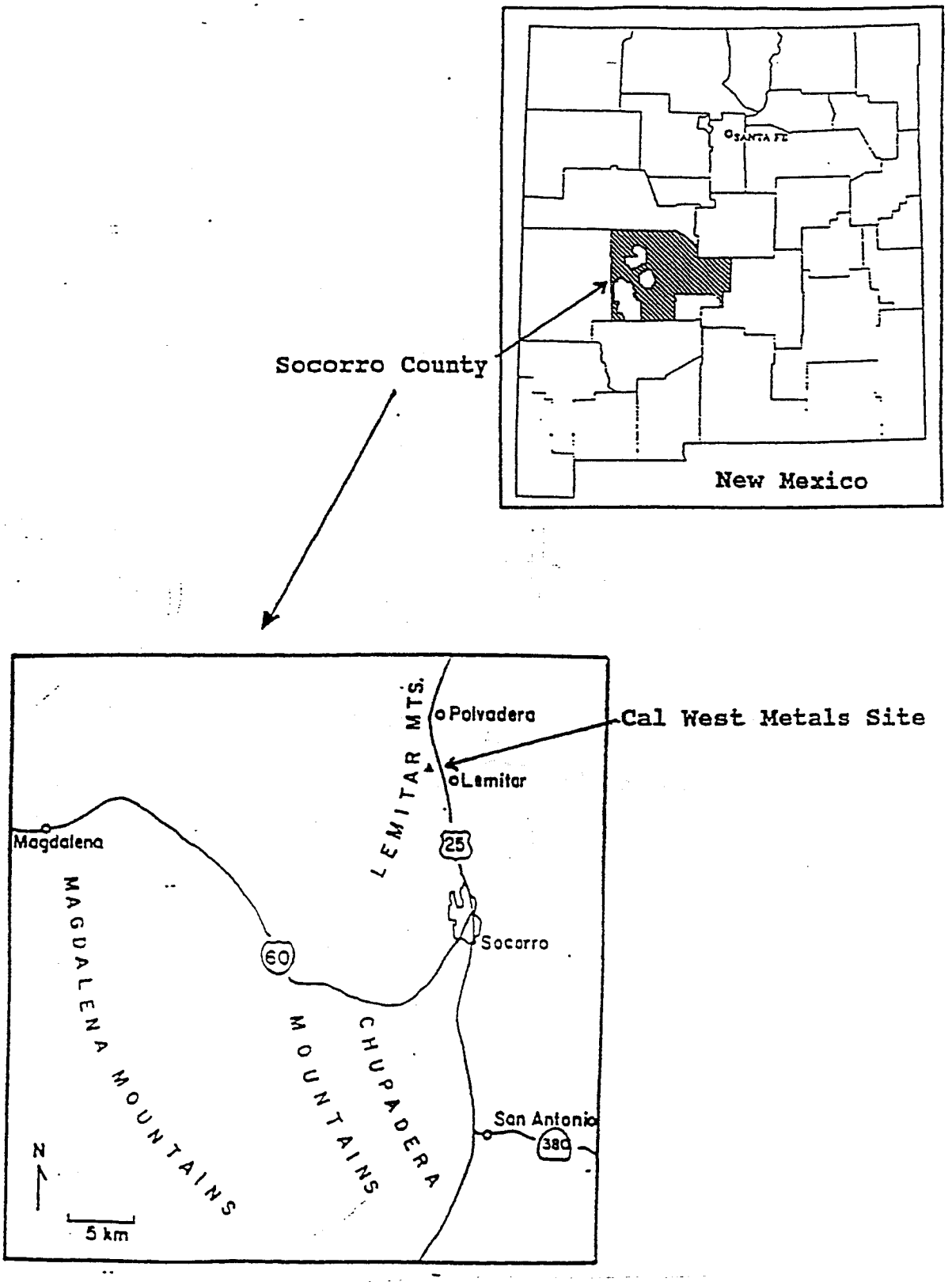

FIGURE 1: LOCATIONS OF SOCORRO COUNTY, NEW MEXICO AND THE CAL-WEST METALS SITE.

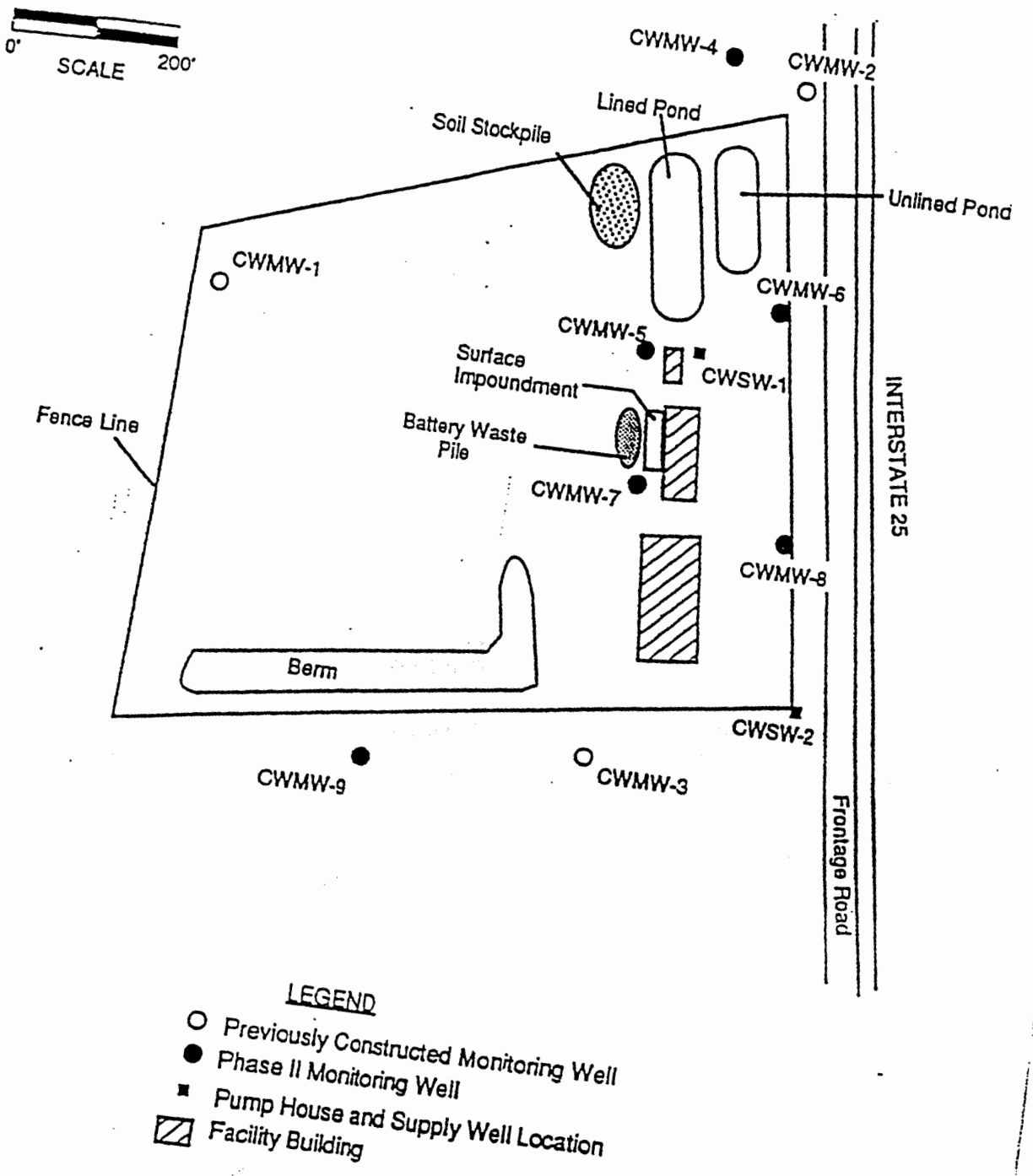

FIGURE 2: CAL-WEST MONITORING WELL LOCATIONS

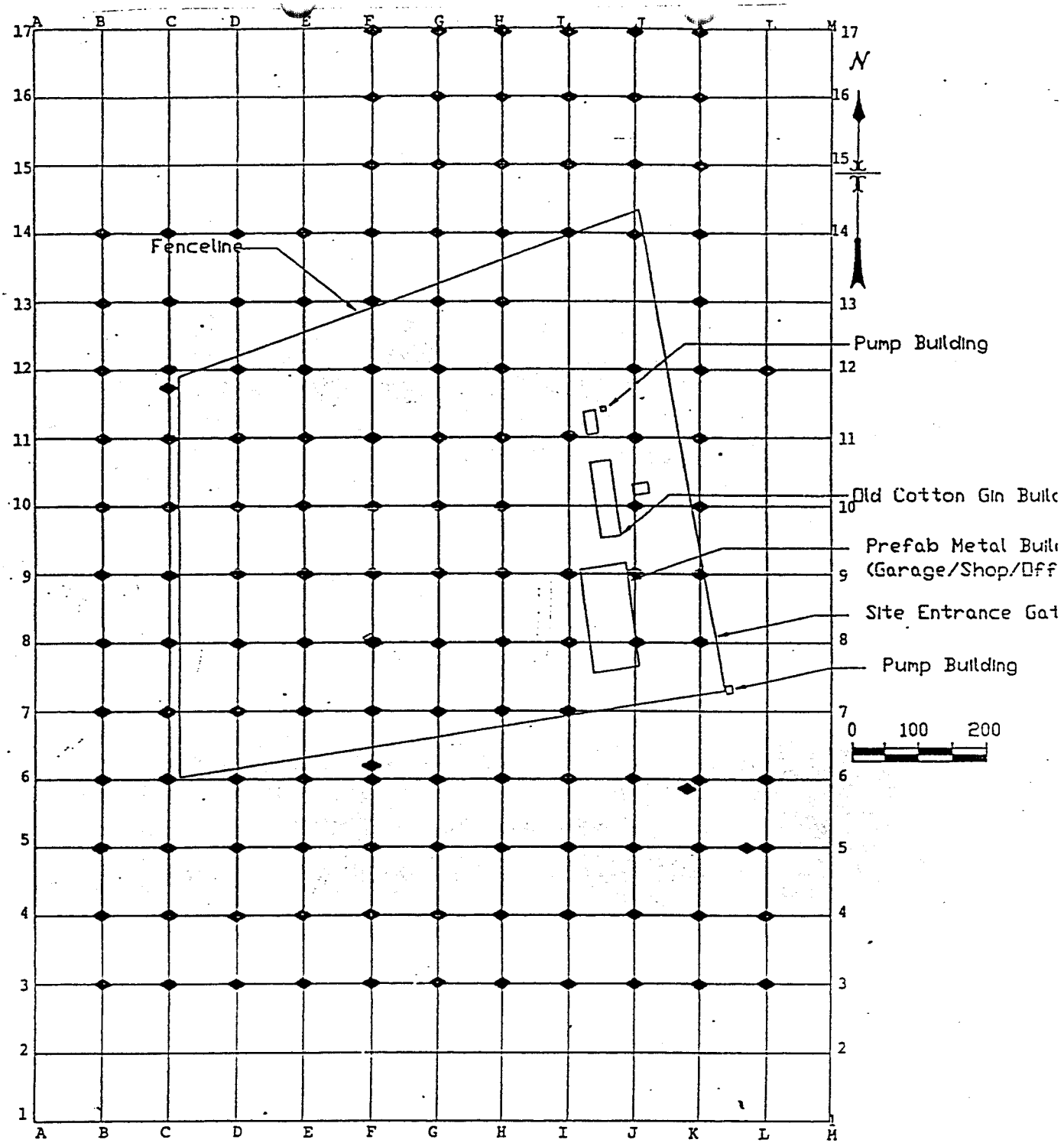

FIGURE 3: GRID LAYOUT AND FPXRF LOCATIONS

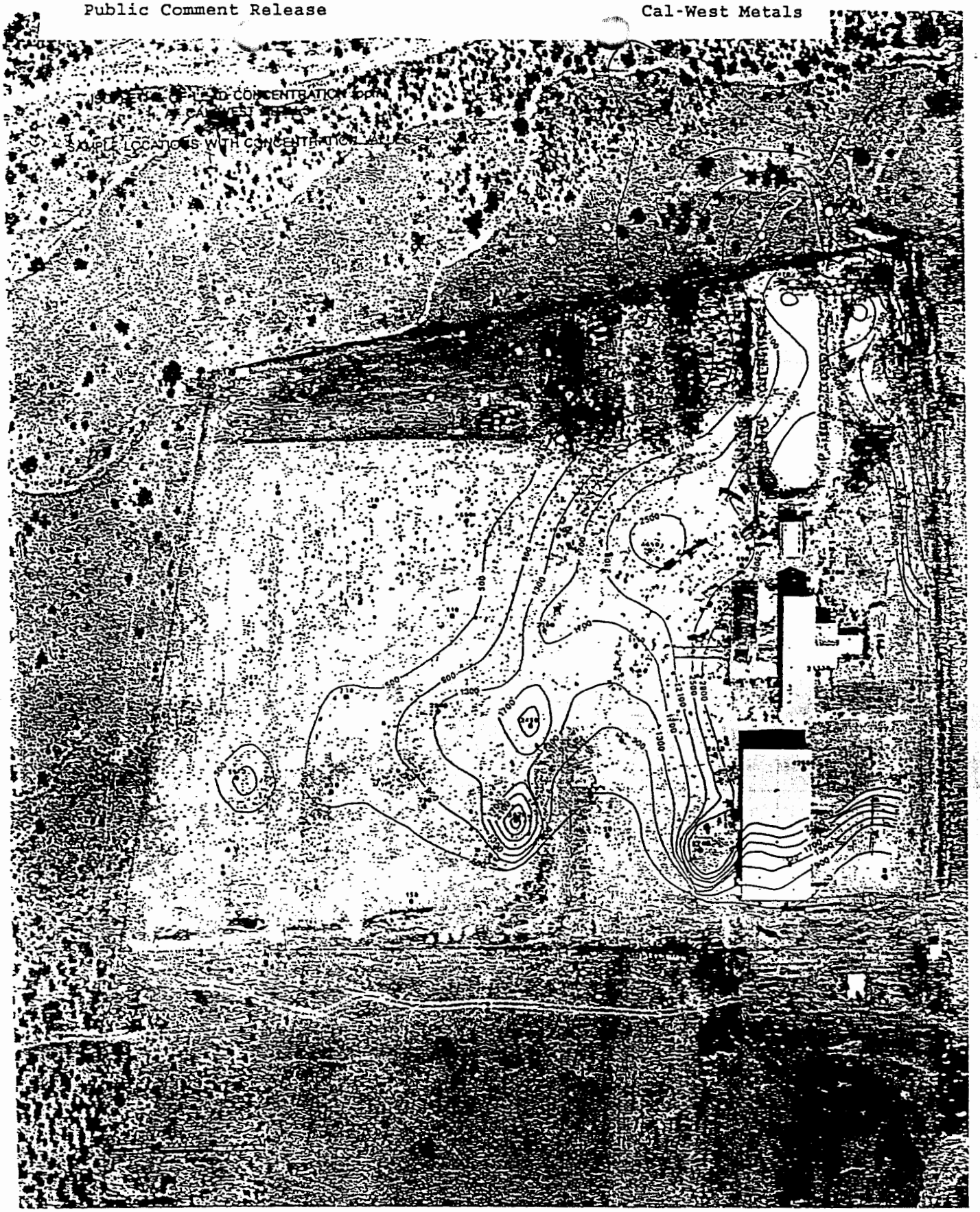

FIGURE 4: CAL-WEST LEAD CONCENTRATION ISOPLETHS (PPM)

Public Comment Relea

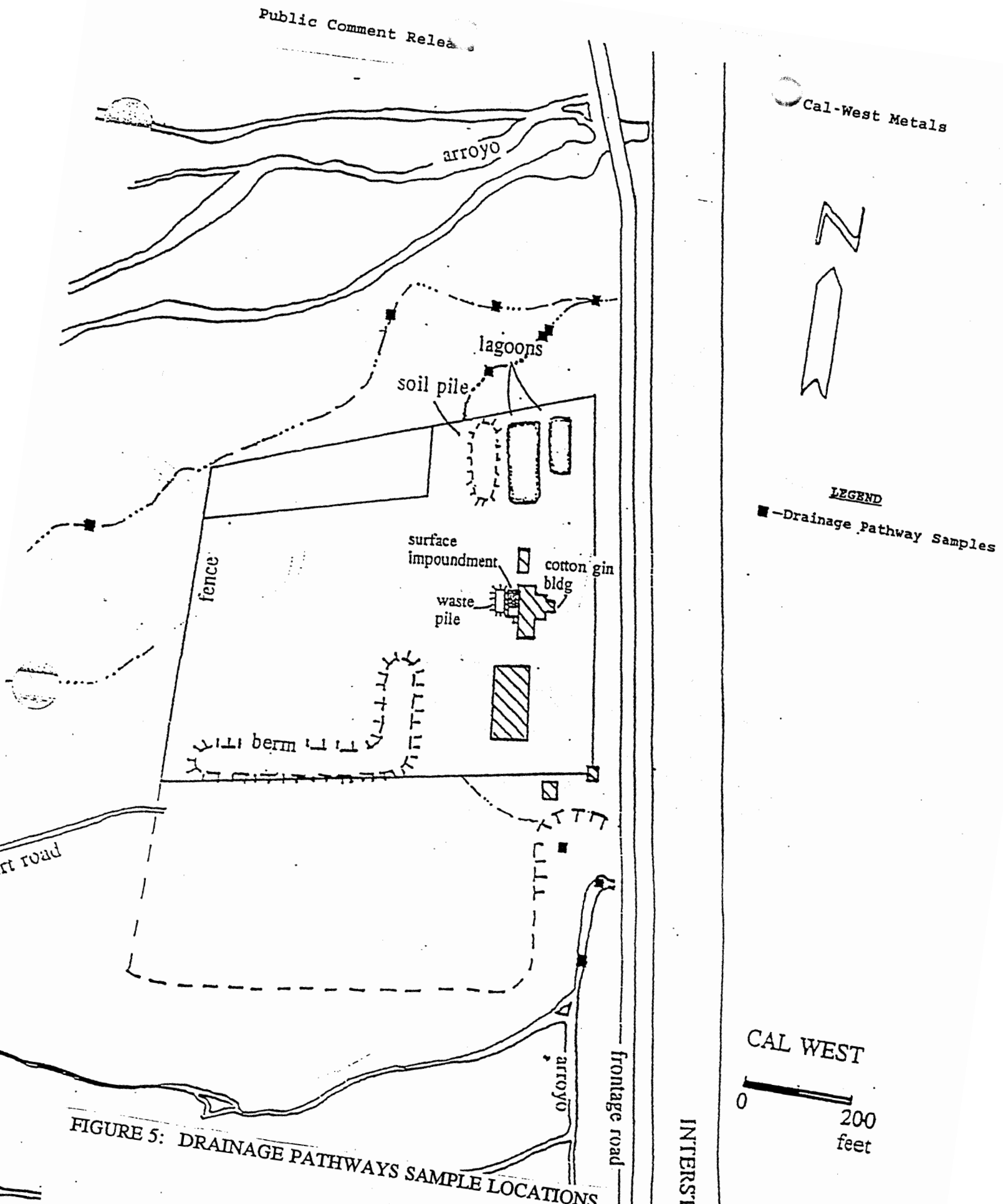

FIGURE 5: DRAINAGE PATHWAYS SAMPLE LOCATIONS

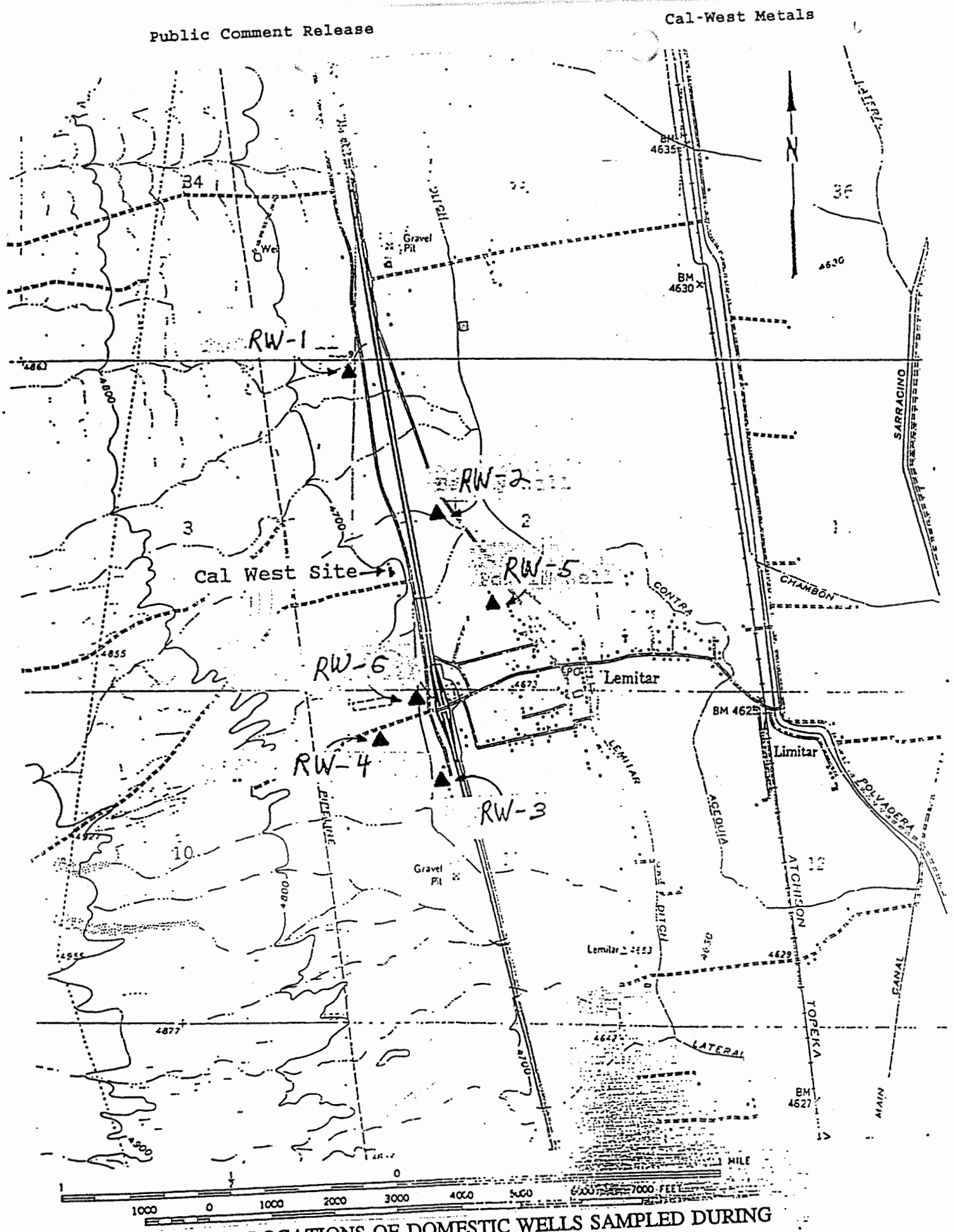

FIGURE 6: LOCATIONS OF DOMESTIC WELLS SAMPLED DURING THE PHASE II FIELD INVESTIGATION