

INSTRUCTIONS ON AML FORMS

Go to each site and collect the information requested by the forms. At a minimum, fill out the AML Inventory Form. Fill out the AML Reconnaissance Form, if you want to develop a conceptual remediation plan and preliminary cost estimate. As described in Tab III, this plan can be used to execute small projects or used to contact the engineering and construction of larger projects. After project construction, follow up on how well the site has responded to the remediation, and document the resource trends with the AML Monitoring Form. Appendix A, Field Equipment, provides a check list of useful equipment for field work.

Do the best you can in filling out the forms. If you do not know some information, leave the question blank. If you can quantify, please do so. Where the forms have inadequate space, copy additional sheets of the form or continue on blank sheets that clearly refer back to the applicable question. Completed example forms are included after the instructions. Refer to these examples for additional guidance on how to fill out the forms.

If you are confused or have any questions, feel free to call MMB and ask:

MMB - (303)969-2092 or FTS 327-2092

AML INVENTORY FORM

TITLE BLOCK

Fill in the requested information as indicated in the Title Block.

Note that there is space for name and date of both the person conducting the original inventory and the person making any subsequent revisions. If additional revisions become necessary, continue to leave a trace of all revisions by repeating the previous inventories and adding the name and date of the latest revision in the form margins or attached sheets. The revised inventories should only show changes from the previous inventory so that it is clear what has been changed.

The Title Block asks for either the mine or district name. One inventory may be adequate for small mining districts. In addition, this block asks for the claim names. While historical records generally refer to the mine or district names, government land records use claim names. To avoid confusion, both names are required to clearly identify the site. The sources for this information include park historical records, county records [Phil

can you help on this], and MILS: Mineral Industry Location System of the Federal Bureau of Mines, Information Circular 8815.

LOCATION BLOCK

Location information is critical to the AML program. This information allows others to find the site, insures against duplication of sites in the AML inventory, and preserves a record of the site after remediation.

You will need the 7.5' quadrangle topographic map that covers the site. Obtain this map from the U.S. Geological Survey. First locate the site on the map. Then select a central or nearby reference point that is easily identified on both the map and ground. The reference point should be within the site, large and permanent, and accessible to field verification. Remember that both natural and man-made features can change with time. For quality assurance, provide both the Universal Transverse Mercator (UTM) coordinates and the land subdivision of the reference point. If you are unsure, Appendix B explains how to obtain this information.

Describe how to get to the site, particularly the part that leads up to the Location Map given in the next block.

LOCATION MAP

On the 7.5' topographic map, mark the 1) access route, 2) reference point with cross hairs and UTM coordinates, and 3) boundaries of the site including the area encompassing the AML features and their environmental impacts. Cut this part out of the map or copy, and attach to the space provided. Alternatively, attach the map frame prepared as described in Appendix B and add items 2) and 3).

Locate the AML features on the map. Number each feature for reference and describe the feature as instructed below in the Hazards and Environmental Impacts block.

If the surrounding terrain has significant relief, the location can be determined simply by matching the map contours and features with the actual ground surface. Alternatively, if the land surface is not distinctive or verification is required for hidden AML locations, the compass and pace survey explained in Appendix C is adequate for the AML inventory and preliminary planning.

GENERAL DESCRIPTION

In the first two lines, simply check the type of mining facilities present at the site, and list the commodities or minerals that were of interest. If commodities are unknown, research park records and MILS: Mineral Industry Location System of the Federal Bureau of Mines, Information Circular 8815.

Describe the salient features of the site in a concise statement that provides other readers an overall picture and general impression. Some features that might be described include the major mining impacts, environmental impacts, terrain, site aspect and slope, dominant vegetation, historic/cultural resources, scenic/visual resources, wildlife, and so on.

Describe evidence of visits to the site and inside underground openings and structures.

Fill in the overall site hazard and environmental ratings from the individual ratings given below for each hazard and environmental impact. The overall ratings should equal the highest individual ratings. These ratings will be used in deciding which sites to remediate first. Take care not to dilute their usefulness by inflating the ratings.

Indicate the presence of historic/cultural resources and the possibility of threatened and endangered species by circling the applicable answer. Before undertaking an AML inventory, the investigators must become familiar with 1) NPS and park policy on what constitutes an historic/cultural resource, and 2) local threatened and endangered species and their habitat.

HAZARDS AND ENVIRONMENTAL IMPACTS

Locate each feature on the Location Map with a unique reference number. List these features and their reference numbers in the space provided. Name the feature, describe the overall dimensions, hazards, and environmental impact. Recommend remedial action. Some features to look for include:

Hazards

- * Are there hazardous underground openings such as shafts, adits, and subsidence; and surface excavations such as pits and quarries?
- * Are there any highwalls or unnatural benches?
- * Are there any pools of water evident in the mine workings or water draining from the mine workings?
- * Are there any abandoned explosives in the workings?
- * Are there tailings, spoil, refuse piles, or waste rock piles around? Comment on the size.
- * Is there evidence of erosion, surface slumping, cave-ins, or landslides in and around the site (e.g. on the hillside in which the mine is located)?
- * Is there evidence of active or past burning in underground workings or surface spoil piles?
- * Are there structures, machinery, or debris around the site? If so, describe their number, type, and condition.
- * Is the rock in which the mines are excavated stable (competent)? Does it appear that rock slabs and chunks

could easily be dislodged? A good indicator is how much loose rock is lying on the floor of underground openings (visible from entrance), pits, or quarries.

Resources and Environmental Impacts

- * **Water:** Flowing out of mine or standing in mine workings; flowing onto, over, or through any dumps; stunted vegetation around and downstream from the site; discolored stream bottoms or ground; and no life in drainages.

Take samples and pH readings upstream and downstream from site. Locate sampling sites on map.

- * **Air:** Airborne dust from barren mine workings or dumps.
- * **Soil:** Topsoil removed or damaged; erosion; sedimentation; acidic or alkaline materials; heavy metals are almost always present at mill sites.

Take grab samples and locate on map.

- * **Vegetation:** Healthy, stunted, or dead.

Describe plants that are damaged and why, if you know. Quantify damage.

- * **Wildlife:** What kinds inhabit or visit the site.

Look for droppings, nests, and tracks particularly at the openings of underground workings. Evidence of animal habitation in underground workings is not a good clue to the air quality. Dead animals are fairly common in abandoned mine openings for a variety of reasons. Pay special attention to possible presence of threatened and endangered species.

- * **Visual:** Landscape scars or easily spotted.

Rate each hazard and environmental impact with the evaluation criteria given in Appendix D.

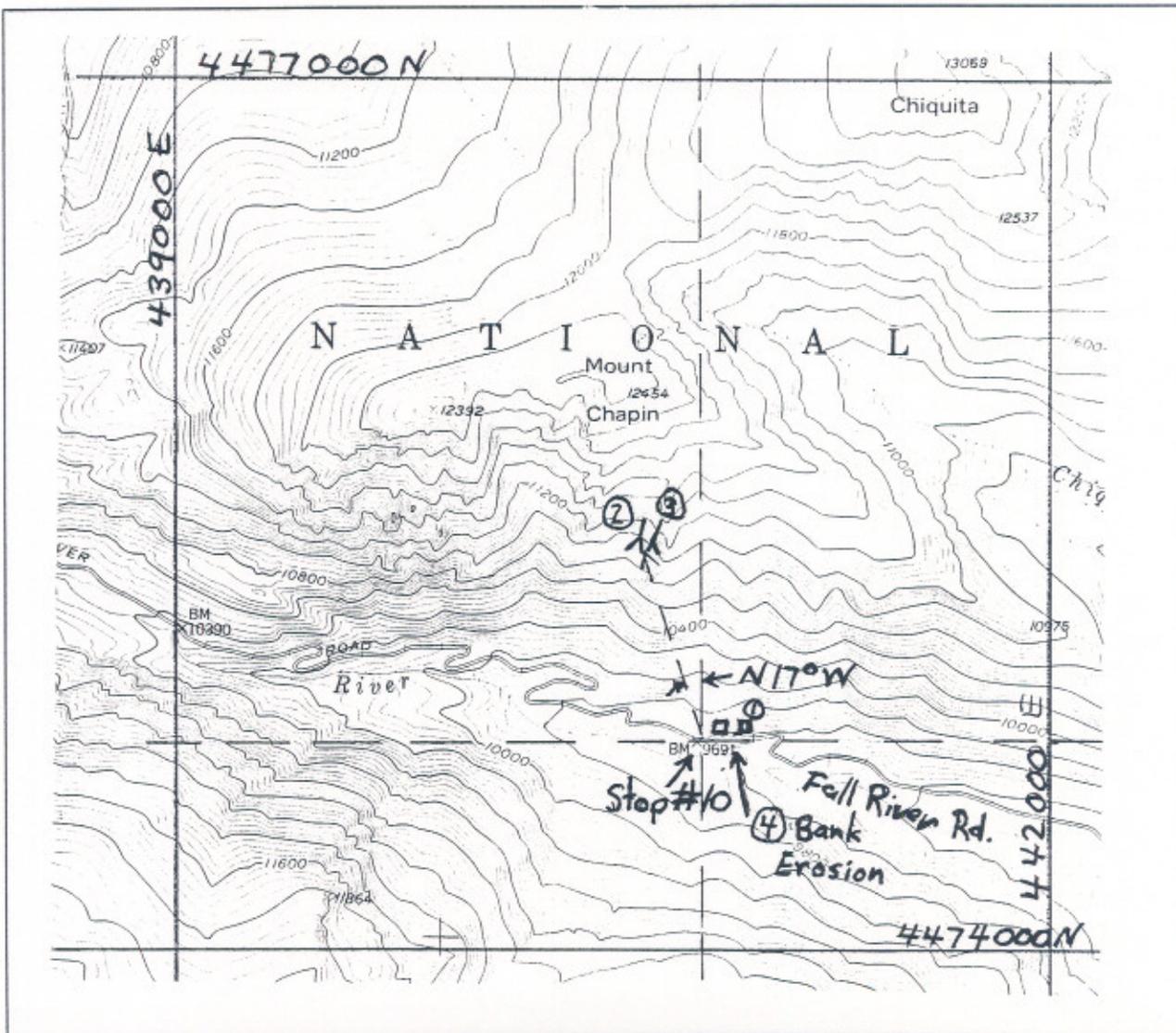
TITLE BLOCK

NPS Unit Rocky Mtn. N.P. Inspector Bob Higgins Date 8-7-90
 Mine/~~District~~ Miner Bill's Revised By _____ Date _____
 Access From Estes Park, take highway 34 to Fall River
Road to Stop #10 (BM 9691)

LOCATION BLOCK

State CO County _____ USGS 7.5' Quad Trail Ridge
 UTM Coordinates 4474730 N 440800 E
 T 5N R 74W Sec _____ 1/4 _____ 1/4

LOCATION MAP



GENERAL DESCRIPTION

Type: Pit/Quarry Underground Placer Mill Buildings
 Historic Resources: Threatened or Endangered Species:

Hazard Rating 1B Environmental Rating Z

Description Cabin foundations at head of trail; vague 1/4 mi. trail to mine site; two small adits and associated waste rock, one adit collapsed

Visitation (site and underground) Infrequent, only mountain climbers may stumble onto site. No evidence of visits.

HAZARDS AND ENVIRONMENTAL IMPACTS

Ref/HR/ER*	Description
① / 3A / 3	Foundations of several cabins and head of trail.
/ /	
/ /	
② / 1B / 3	Lower adit - Portal partially timbered which is rotten. Opening is 5' wide by 7' high and is open more than 15'. Waste rock does not appear to have any sulfide minerals. Waste rock is too coarse for revegetation.
/ /	
/ /	
/ /	
/ /	
③ / 3B / 3	Upper adit - Either collapsed or only a test pit. Very little waste rock and no visible timbering. Some revegetation has occurred. between the limited amount of waste rock.
/ /	
/ /	
/ /	
/ /	
④ / NA / 2	Miners cut river bank to access water. Cut continues to erode.
/ /	

*Sketch Reference Number/Hazard Ranking/Environmental Ranking

AML RECONNAISSANCE FORM

TITLE BLOCK

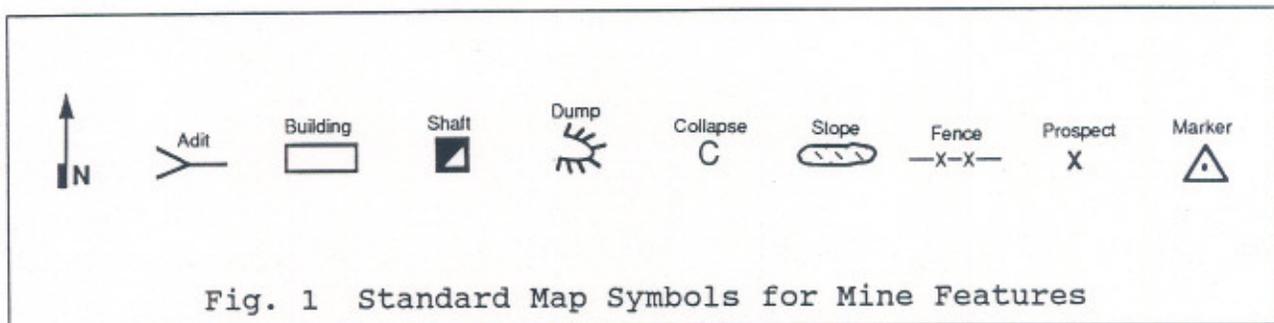
The Title Block must be exactly the same -- letter for letter -- as the Title Block in the AML Inventory Form; otherwise, computers are not likely to treat the information as coming from the same site.

SITE SKETCH

The Site Sketch must be drawn on a much smaller scale than the Location Map of the AML Inventory Form. Access shown in the Location Map need not be included in the Site Sketch. However, the reference point should be shown as it is the base for surveys.

For small sites, use a scale of 1:500 (1:480 is equivalent to 1 in. = 40 ft). The most common scale for the layout of mining facilities is 1:1200. A scale of 1:6000 is the maximum in common use. It is used to show an overview of large mining operations such as coal strip mines.

When plotting the site features, use the standard symbols shown in Fig. 1.



Plot the inventory reference points at the selected scale. At each reference point, sketch in the AML feature with approximate dimensions. Pace off the dimensions, and if the feature is large or irregular in shape, conduct a compass and pace survey as described in Appendix C.

If you are unsure about what to measure, check the following instructions for the dimensions required for each type of feature. In some cases such as underground openings, a vertical cross section of the feature will significantly help in developing a remediation plan. The sample AML Reconnaissance Form illustrates the use of cross sections.

HAZARDS AND ENVIRONMENTAL IMPACTS

This section guides the investigators in obtaining the additional information required for conceptual project planning and preliminary cost estimating. In the following blocks of the form, the hazards and environmental impacts inventoried previously are classified into types to simplify the work. The impacts are grouped by underground closures, surface remediation, erosion and sedimentation control, revegetation, site characterization, and historical/cultural resources.

Keep a record of all calculations in the field notebook so that later on they can be checked.

Underground Closures

List all the underground openings in this block along with their reference number from the AML Inventory Form. Decide on a closure method, and measure the applicable dimensions.

Listed below are the dimensions required for each closure method. In some cases, all that is required for cost estimating is a count of the closure type. In other cases, the investigators must measure various dimensions to obtain lengths, areas, and volumes. Appendix E provides formulas for common geometric shapes.

For all closures, the investigators should draw a detail sketch with dimensions on the last page of the form.

<u>Closure Method</u>	<u>Required Dimensions</u>
Backfill Adits	Number of adits.
Backfill Shafts	Volume- cu yd.
Blasting	Number of openings.
Cast-In-Place Cap	Number of shafts.
Precast Cap	Length and width- ft; overlap competent rock by minimum of 1 ft.
Monolithic Plug	Riprap- cu yd; concrete- cu yd; backfill- cu yd.
Standard Grates	Area- sq ft; for shafts, overlap competent rock by 1 ft and incompetent rock by 3 ft.
Bat Grates	Area- sq ft; for shafts, overlap competent rock by 1 ft and incompetent rock by 3 ft.
Cable Nets	Area- sq ft; for surface installation, extend dimensions minimum 2 ft beyond opening.
PUF	PUF volume, cu yd.
Adit Bulkhead	Number of openings up to 8 x 8 ft; number of larger openings up to maximum 15 x 15 ft.

Surface Remediation

On the Site Sketch, outline the various surface impacts and drainages that require remediation.

Distinguish the different types of areas with the recommended line types. Measure dimensions of the impacts and calculate volumes or areas with the formulas given in Appendix E. Total various areas and volumes of the same type and enter totals in the blanks.

Reference location of mine drainage on the Site Sketch, estimate flow rates, and fill in amount.

Collect grab samples of mine soils and drainage according to laboratory sampling protocols.

Erosion and Sedimentation Control

There is a large variety of erosion and sedimentation control methods each with their own estimating requirements. This block provides blanks for filling in selected control methods and applicable quantities.

Listed below are the quantities required for each method. Locate selected methods on the Site Sketch along with a unique reference number. For each selected method, find required quantities in the following list, measure dimensions, calculate quantities, and fill in the blanks.

<u>Control</u>	<u>Quantities</u>
Reshaping and Dozing	Earthmoving volume- cu yd.
Riprap Drop Struct.	Excavation volume- cu yd; structure length, width, height- yd.
Geologic Drop Struct.	Excavation volume- cu yd; drill & blast volume- cu yd.
Diversion Ditches	Total ditch length- ft; matting & grass lining- acres; outfall riprap- cu yd.
Culverts	Length- ft; diameter- in.
Basins	Embankment volume- cu yd; liner- acres; spillway riprap- cu yd.
Handbuilt Ditches	Length- ft.
Handbuilt Waterbars	Length- ft.
Handbuilt Whattling	Length- ft.
Handbuilt Ravel Catch.	Length- ft.
Handbuilt Rock Armour	Cover area- sq ft.
Handbuilt Checkdams	Number of checkdams.

Revegetation

On the Site Sketch, outline various surface areas that require topsoil replacement, fertilization and seedbed preparation, seeding, transplanting, mulching, and irrigation.

Distinguish the different types of areas with the recommended line types. Measure dimensions of the areas and calculate the required volumes or areas with the formulas given in Appendix E. Total areas and volumes of the same type, and enter totals in the blanks.

Site Characterization

Site characterization requirements were deliberately left towards the end of the site reconnaissance tasks. This way the investigators will have a more in-depth understanding of the site, and hence any needs for further site characterization.

Locate study areas and monitoring sites on the Site Sketch. Outline study boundaries with the recommended line types, and reference monitoring sites with unique reference numbers. Estimate areas, count monitoring sites, and enter results in applicable blanks.

From park wildlife surveys, summarize the potential for threatened or endangered species. For these species, describe the presence of habitat and report sightings or spoor.

Describe the natural and environmental resource trends -- improving, deteriorating, or no apparent trend.

Access to the site influences the selection of remediation methods. Access may not be feasible for heavy construction equipment, and may be limited to backpacking, helicopter, small overland vehicles, etc. Describe the site access in sufficient detail for making decisions on construction methods.

HISTORICAL/CULTURAL RESOURCES

Check-off the presence of various types of historical and cultural resources. In addition, indicate the possible presence of buried or subsurface features by circling the applicable answer.

In the space provided, record historical/cultural features, and locate them on the Site Sketch with unique reference numbers. There is no need to repeat listing of features already referenced in other blocks.

Describe significant structures, roads, objects, the relationship of these features to each other, building materials, and artifacts. Report characteristics that seem special or unique. In addition, describe general condition of the features and trends -- improving, deteriorating, or no apparent trend.

PHOTOGRAPHS BLOCK

Photographs have great value as a memory aid, and a check on data collected for the inventory and reconnaissance. Most importantly, photographs help in understanding and visualizing the site, specially for those who do not have an opportunity to participate in the field work. The space provided in this block will help in recording photographs and eliminating confusion over their identity.

First, the roll of film should be identified with some unique marking. Locate the photographic site on the Site Sketch and give this point a unique reference number. Fill in this reference number in the first column of the Photographs Block. In the next two columns list the film marking and frame number of the photograph. From the point where the photograph is taken, measure the azimuth or bearing to the photographed feature, and record this direction in the fourth column. Alternatively, fill in the reference number of the photographed feature. Finally, give the photograph a title and add any explanatory comments.

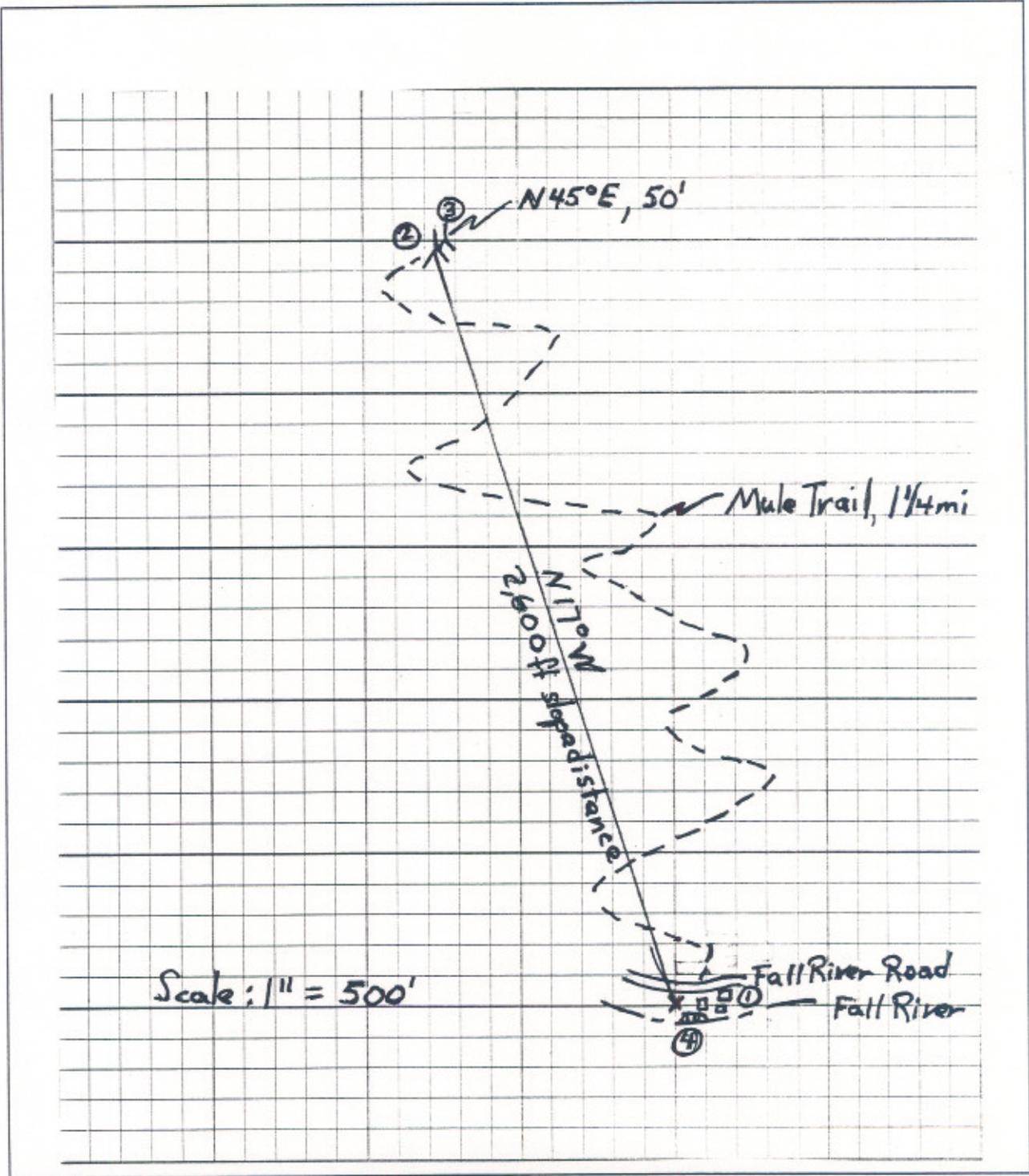
DETAIL SKETCHES

Use this space for detail sketches and cross sections of referenced features. Be sure to label the detail sketch with reference number and scale. For guidance on drafting the sketches, use the instructions given under Site Sketch.

TITLE BLOCK

NPS Unit Rocky Mtn. N.P. Inspector Bob Higgins Date 8/7/90
Mine/District Miner Bill's Revised By _____ Date _____
UTM Coordinates 4474730 N 440800 E

SITE SKETCH



REVEGETATION

Map Symbol/Ref	Mitigation
<input type="checkbox"/>	Topsoil replacement <u>6</u> cu yd
<input type="checkbox"/>	Fertilization <u>1/4</u> acres Neutralization? yes/no
	Seeding <u>1/4</u> acres Mulching? <u>yes</u> /no
	Transplanting <u>1/4</u> acres
	Irrigation <u>0</u> acres

SITE CHARACTERIZATION

Map Symbol/Ref	Investigation
	Air monitoring station: yes/ <u>no</u> (circle answer)
	Soils study area <u>N/A</u> acres
	Surface water monitoring sites <u>N/A</u> ea
	Groundwater monitoring wells <u>N/A</u> ea
	Vegetation study area <u>N/A</u> acres
	Potential for threatened or endangered species <u>None</u>
Describe environment and impact trends <u>Slightly above tree line; primarily alpine grasses; no erosion at adits; slow, long term vegetation trend. Erosion on river.</u>	
Describe access for construction <u>1 1/4 mi mule trail, overgrown, elevation difference of 1300 ft.</u>	

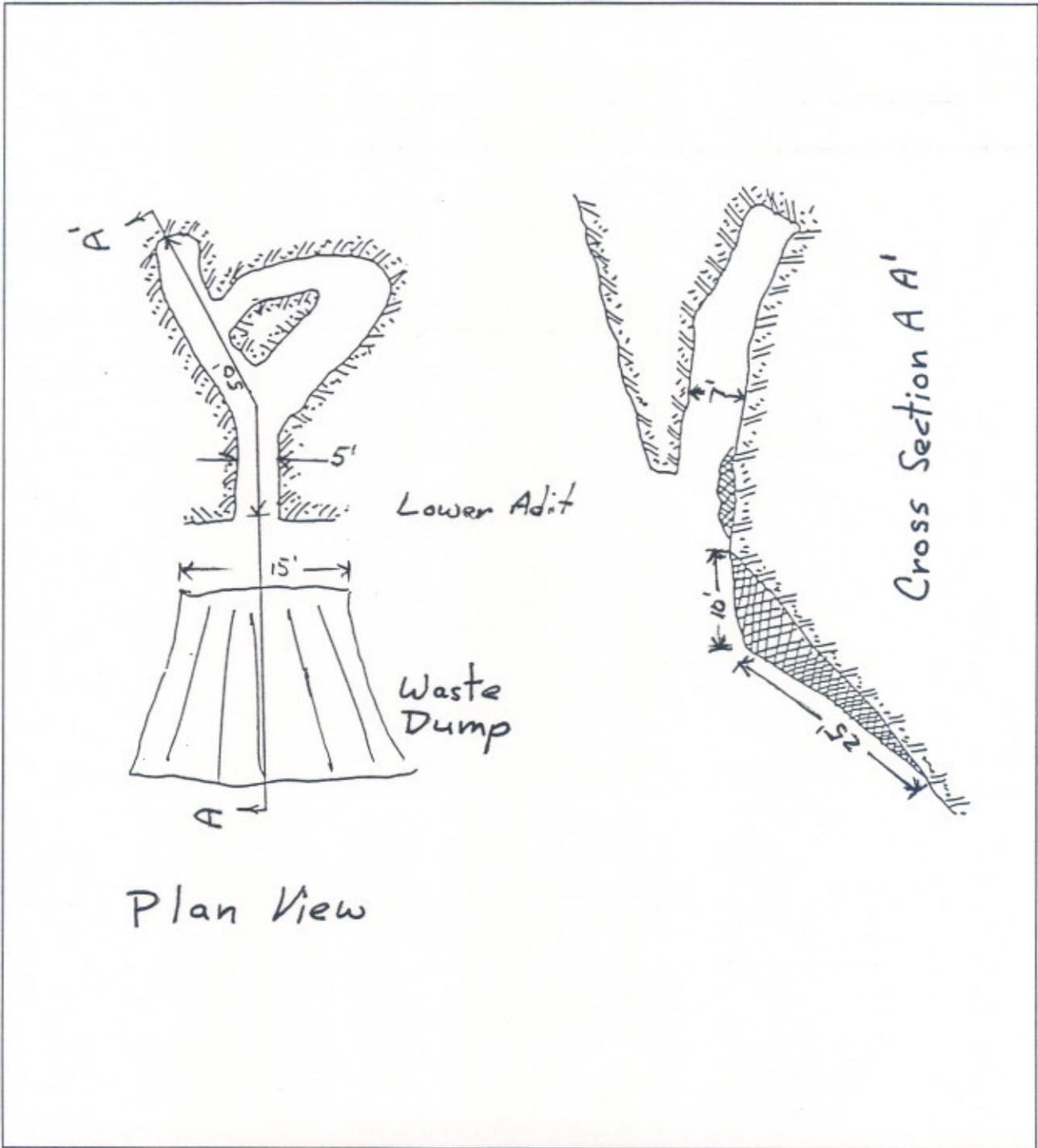
HISTORIC/CULTURAL ALTERNATIVES TO REMEDIATION

Alternatives <u>A. If there are other more complete sites, remediate this site and record history. B. Stabilize lower. edit and foundations, install gate in portal, improve trail, add interpretive signs.</u>
Describe general condition <u>Mine, cabin foundations and stream bank continue to erode</u>
Evidence of subsurface features? yes/ <u>no</u> (circle answer)

PHOTOGRAPHS

Ref	Roll	Frame	Azimuth	Title/Comments
②	1	1	N17°W	Lower adit w/ view of pinnacles
②	1	2	N17°W	Close up of lower adit.
③	1	3	N45°E	Close up of upper adit.

DETAIL SKETCHES



AML SITE MONITORING FORM

This form documents the condition of AML sites during periodic monitoring. It is intended as a follow-up to inventory, reconnaissance, or remediation of a site. A monitoring form should be completed during each site visit, even if no changes are observed. Retain the completed forms as a record of site inspections.

TITLE BLOCK

The Title Block must be exactly the same -- letter for letter -- as the Title Block in the AML Inventory Form; otherwise, computers are not likely to treat the information as coming from the same site.

CURRENT HAZARD AND ENVIRONMENTAL CONDITIONS

Note changes in condition of a site or changes in visitor use patterns so that management of the area can be adjusted accordingly. All mine closures must be monitored because they can become ineffective through weathering or vandalism.

RECOMMENDATIONS

Recommendations should address whether the mine closure, remediation, or restoration that are currently in place are appropriate. The best management of the area will be effected by changes in the type and amount of visitor use; condition of mine closures; remediation or restoration; available funding; and management philosophy.

PHOTOGRAPHS BLOCK

Photographs from the original reference points provide further documentation, and help identify long term trends. See AML Reconnaissance Form for instructions on completing this block.

AML MONITORING FORM

TITLE BLOCK

Park Unit_____	Inspected By_____	Date_____
Mine/District_____		
Claim Name(s)_____		

HAZARD CONDITIONS

Describe original mitigation of hazards_____		

Condition		
Is mitigation functioning?	Yes__	No__ N/A__
Is there evidence of visitation?	Yes__	No__ N/A__
Is there evidence of vandalism?	Yes__	No__ N/A__
Are warning signs in place and functioning?	Yes__	No__ N/A__
Describe current conditions_____		

ENVIRONMENTAL CONDITIONS

Describe original reclamation_____			

Trends			
<u>Resource</u>	<u>Improving</u>	<u>Deteriorating</u>	<u>No Trend</u>
Vegetation	___	___	___
Soils	___	___	___
Water	___	___	___
Visual	___	___	___
Structures	___	___	___
Other_____	___	___	___
Describe current conditions_____			

RECOMMENDATIONS

PHOTOGRAPHS

<u>Ref</u>	<u>Roll</u>	<u>Frame</u>	<u>Azimuth</u>	<u>Title/Comments</u>	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.
—	—	—	—	—	.