

FSH 2509.22 - SOIL AND WATER CONSERVATION HANDBOOK
R-10 AMENDMENT 2509.22-96-1
EFFECTIVE 10/31/96

17 - MINERALS MANAGEMENT. Minerals (including oil, gas, and geothermal resources) exploration and development activities on National Forest System lands fall into 3 categories: Locatable, Leasable, and Saleable.

1. Locatable. The General Mining Law of 1872, as amended, governs the prospecting for and the appropriation of metallic and most non-metallic minerals with a distinct and special value on National Forest System lands that were reserved from the public domain. This applies to most hard rock and placer mineral deposits.

Instruments that analyze and approve locatable mining activities which could affect water quality on National Forest System lands are Notice of Intent to Operate, Plan of Operations, Environmental Analysis, Special-Use Permit(s), Road-Use Permits and State and/or other Federal agency permits and certification (36 CFR 228, Subpart A and FSM 2810).

A Notice of Intent to Operate is required to conduct mining-related activities which may cause disturbance of surface resources on National Forest System lands. The proposed operations described in the Notice must be evaluated and the operator informed that either the operation is exempt from the requirement for a Plan of Operations, or that one is required. If it is determined that significant disturbance of surface resources will likely result from the proposed operations, the operator must submit a Plan of Operations to the District Ranger.

A written Plan of Operations is required from all operators who will likely cause a significant disturbance of surface resources. Prior to approval of the plan, the operator may be required to furnish a bond in the form of a surety or other security to perform reclamation work. All hazardous materials to be used should be listed in the Plan of Operations which shall be submitted to the Forest Service for review and analysis.

A Plan of Operations is also required for construction or reconstruction of roads for access to mining claims if the cross National Forest System lands. Plans of Operation may include supplementary plans for water quality monitoring and erosion control. All Plans of Operation must include how operations are to be conducted to minimize adverse environmental impacts, including compliance with State and Federal Standards.

Special-use permits may also be required and issued for water diversions, water transmission facilities, and electric transmission lines outside of mining claims but needed for mining activities. Permits are required for commercial use of National Forest System roads.

State and other Federal agency permits and/or certification may be required and issued for air quality, water quality, tidelands development, reclamation, disposal and treatment of solid wastes, and so forth. When required, the Forest Service will advise the operator to obtain the

appropriate permits or certification. If the proposed operation will involve the use or generation of hazardous substances, the operator is required to incorporate the permitting requirements of the appropriate regulatory agencies (36 CFR Subpart A 228.8).

2. Leasable. The Mineral Leasing Act of February 25, 1920, as amended and supplemented, subjects certain mineral and energy resources to disposal through leasing actions. These energy and mineral resources include, but are not limited to, coal, oil, gas, geothermal, oil shale, potassium, sodium, and phosphate. The Mineral Leasing Act for Acquired Lands of August 7, 1947, makes all minerals on acquired (purchased) National Forest System lands, unless otherwise reserved or held as outstanding rights, subject to the provisions of the 1920 Minerals Leasing Act.

The Forest Service and Bureau of Land Management (BLM) make a determination, through the NEPA process, as to whether or not a permit, license, or lease should be issued by the BLM. The Forest Service and BLM develop the stipulations needed to protect water quality and other resource values. Provisions for special-use permits, and State and/or Federal Agency Permits or Certification also apply (36 CFR 228, Subpart E and FSM 2820).

Mitigation measures are developed by an interdisciplinary team during the environmental analysis and are written into the special stipulations section of the permit, license, or lease. Conditions of approval are also developed by the interdisciplinary team to be included in the operating plan.

By interdepartmental agreement, all applications to lease lands under Forest Service jurisdiction are referred to the Forest Service for review, recommendation, and development of special stipulations to protect the surface resources. Administration of oil and gas surface operations on National Forest System land is the responsibility of the Forest Service, but BLM administers the lease.

3. Saleable (Common Variety) Minerals. The Materials Act of July 31, 1947, provides for the disposal and use of common variety mineral materials such as sand, stone, gravel, pumice, cinders, and clay located on National Forest System lands. Disposal can be by sale or free-use permit to private entities or Federal, State, and local units of government, when consistent with good public land management and in the public interest (Refer to 36 CFR 228, Subpart C and FSM 2850).

Common variety mineral materials may be disposed of and developed when their use is consistent with good public land management and in the public interest. Use authorizations will require reasonable erosion control and rehabilitation and

revegetation of the surface. Removal may be approved if adequate measures can be accomplished to prevent erosion or stream pollution, and satisfactory arrangements can be made for rehabilitation and restoration as outlined here. New road construction, if allowed, will be located, constructed, and maintained to protect the soil and water.

A project plan or Mineral Material Permit identifies the location and conditions of mineral material removal and disposal. Both will be preceded by an environmental analysis. Project location, the scope of the proposal, and detailed mitigative measures are developed using an interdisciplinary approach. Compliance with the project design standards, the terms and conditions of the permit, and applicable Federal and State regulations is assured by the Forest Service. Mineral extraction sites can be evaluated for possible post-operation utilization as fish habitat.

All developed mineral material sites will have a site plan developed for the construction and operation of the site. The site plan will include a 1-inch to 400-foot scale map showing the limits of the development, location of structures, top soil stock piles, hazardous areas, and contours and excavated configuration of site.

Operation plans should include the period of operation, equipment and methods of operation, safety requirements (State and Federal), environmental compliance (requirements, monitoring and standards), and a reclamation plan showing final closure envisioned.

17.1 - PRACTICE. Mining Site Conditions, Planning, and Design.

OBJECTIVE. To incorporate soil and water resource considerations into the Plan of Operations for exploration and extraction of locatable and saleable minerals.

EXPLANATION. This is an administrative and preventive practice. The exploration and extraction of locatable and saleable minerals must follow an approved Plan of Operations. This plan should address soils and water resource concerns in the design and operation of the project. It should include descriptions, maps, and sketches of the proposed mine site and onsite riparian areas. Overall plans and schedules for sequential site operations, surface and groundwater monitoring, and site rehabilitation should be presented for the duration of planned mining at the site.

Section 505(a) of ANILCA (PL 96-487) gives special direction for mining in Alaska:

"The Secretary of Agriculture shall...maintain the habitats to the maximum extent feasible, of anadromous fish and other foodfish, and to maintain the present and continued productivity of such habitat, when such habitats are affected by mining activities on National Forest lands in Alaska."

Related BMPs for soil and water protection have been identified here to cover the full scope of planning for mining operations. The following categories, where

applicable, should be described in narrative form and/or sketch in the mining Plan of Operation:

1. Existing Site Conditions:

a. Physical site characteristics:

- Legal claim location description
- Map of streams, diversions, natural ponds, water treatment ponds, tailings, waste rock, and ore piles within and immediately adjacent to the mining claim
- Floodplain Analysis and Evaluation (BMP 12.4)
- Wetlands Analysis and Evaluation (BMP 12.5)
- Riparian Area Designation and Protection (BMP 12.6 and 12.6.1)
- Protection of Potentially Unstable Areas (BMP 14.7)

b. Biological characteristics:

- Amount and type of vegetation
- Presence of fish
- Value of stream aquatic habitat for risk evaluation

c. Stream characteristics:

- Scale map of existing stream pattern
- Water quality
- Timing, magnitude and duration of flood events
- Drainage pattern for overland flow during intense rainfall events

2. Location, Design, Construction, and Operations:

a. Exploratory drill holes:

- Scale map and descriptions of the proposed drill sites, drill hole depths, and use of any drilling compounds

b. Operations camp:

- Scale map and description of the proposed mining camp
- Sanitary facilities/temporary camps (BMP 12.15)
- Control of solid waste disposal (BMP 12.16)

c. Processing facilities:

- Proposed method of milling or materials handling
- Chemicals (including, where applicable, Material Data Safety Sheets) and chemical processes to be used in milling

- Runoff collection, runoff dispersion, sediment collection, soil stabilization, seeding, and revegetation

d. Access routes:

- Location of transportation facilities (BMP 14.2)
- Design of transportation facilities (BMP 14.3)
- Measures to minimize mass failure (BMP 14.7)
- Measures to minimize surface erosion (BMP 14.8)
- Drainage control to minimize erosion & sediment (BMP 14.9)
- Bridge and culvert design and installation (BMP 14.17)
- Development and rehabilitation of gravel sources & quarries (BMP 14.18)

e. Control, treatment, and disposal of mine drainage and/or mill effluent:

- Slurry and wastewater pipelines
- Water treatment ponds and other facilities

f. Water withdrawal:

- Diversion ditches and headgates
- Water impoundments

g. Waste rock and tailings disposal areas:

- Mineralogic chemical characteristics of waste rock tailings
- Potential for production of metal leachates, acid rock drainage, and sediment
- Runoff collection, runoff dispersion, sediment collection, soil stabilization, seeding, and revegetation

h. Storage and handling of fuel and other toxic material:

- Oil Pollution Prevention & Refueling Operations (BMP 12.8)
- Oil and Hazardous Substance Pollution Planning (BMP 12.9)

i. Clearing and stockpiling of overburden:

- Type of material
- Method and timing for clearing
- Storage location for materials
- Erosion control techniques for the stockpiles
- Right of way and roadside debris (BMP 14.19)

3. Current Year's Mining Activities - Location and Schedule

A schedule of annual operations should be included as part of the annual Plan of Operations for placer mining, and as an update to the hardrock Plan of Operations.

- Map of the area to be mined or developed this year. Mining should be based on
 - sample pits, trenches, or drilling where possible
- When equipment will be moved on and off site
- Timing of proposed mining activities near streams. Instream work on fish streams
 - needs to be scheduled to minimize impacts on fish passage, and fish spawning and rearing habitat

4. Water quality monitoring:

- Location of sampling sites and sampling schedule for any water quality monitoring
 - that is required of the operator
- Soil & Water Resource Monitoring Evaluation
- NPDES Permitting Process

IMPLEMENTATION. Description for mining site conditions, planning, design, and scheduling are given in each mining plan of operation. Responsibility for developing the Plan of Operation belongs to the individual operator and/or lessor. The District Ranger or staff is responsible for reviewing the plan and requesting additional information if necessary. Review can involve using a Forest Service interdisciplinary team.

The District Ranger acknowledges receipt of the Plan and informs operator that the:

1. Plan is approved; or
2. Operations are such that the operator does not need a plan; or
3. Plan needs to be modified or changed to include items necessary to meet the purpose of the regulations in 36 CFR 228 subpart A; or
4. Plan is being reviewed and additional time is needed to complete the review (cannot exceed 60 days); or
5. Plan cannot be approved until an FEIS is prepared and filed with the CEQ (36 CFR 228.5).

REFERENCES. 36 CFR 228, 36 CFR 251, and 30 U.S.C. 612; FSM 2810 and 2827; Reference Manual (Alaska Department of Fish and Game, Jan. 1986), Alaska Statute 16.05.840 and 16.05.870. ANILCA (Public Law 96-487)

sec 505

17.2 - PRACTICE. Placer Mining - (NPDES) Permits.

OBJECTIVE. To incorporate soil and water resource considerations into NPDES Permits for placer mining plans of operation for placer mining.

EXPLANATION. This is an administrative and preventive practice. Mining Plan of Operations must explain the annual work, including reference to the handling processing and discharge of mining materials. For placer mining operations using mechanized equipment (including suction dredges), EPA requires the following best management practices be followed for issuance of a NPDES wastewater discharge permit:

1. Surface Water Diversion. The flow of surface water into the plant site shall be interrupted and these waters diverted around and away from incursion into the plant site.

2. Berm Construction. Berms, including any pond walls, dikes, low dams, and similar water retention structures shall be constructed in a manner such that they are reasonably expected to reject the passage of water.

3. Pollutant Material Storage. Measures shall be taken to assure that pollutant materials removed from the process water and wastewater streams will be retained in storage areas and not discharged or released to the waters of the United States.

4. New Water Control. The amount of new water allowed to enter the plant site for use in ore processing shall be limited to the minimum amount required as make-up water for processing operations.

5. Effluent Limitations. The concentration of pollutants discharged in process wastewater from an open-cut mine plant site shall not exceed an instantaneous maximum for: settleable solids of 0.2 milliliters per liter; turbidity of 5 NTU's above "natural" background; and total recoverable arsenic of 0.18 micrograms per liter with no "natural" background measurements.

6. Maintenance of Water Control and Solids Retention Devices. All water control devices such as diversion structures and berms, and all solid retention structures such as berms, dikes, pond structures, and dams shall be maintained to continue their effectiveness and to protect from unexpected and catastrophic failure. Water control and retention structures shall be designed and constructed to contain the design storm runoff event.

7. Seasonal Closure. The operator shall take whatever reasonable steps are appropriate to assure that, after the operating season, all mine areas, including ponds, are in a condition which will not cause additional degradation to the receiving waters over those resulting from natural causes. (See BMP 17.5)

IMPLEMENTATION. Each mining operator is responsible to file for an NPDES wastewater discharge permit through the U.S. Environmental Protection Agency. The permit requires all mechanized placer mining operations to follow the practices listed above. Enforcement for compliance with these practices is the direct responsibility of the EPA; however, responsibility may also be taken by the ADEC, or by the Forest Service District Ranger or representative.

The District Ranger or representative can do the following in the event of operator non-compliance:

1. Issue non-compliance notice
2. Issue a citation
3. File a court injunction
4. Pursue civil and/or criminal prosecution.

These actions should be coordinated through the Forest Minerals Specialist.

REFERENCES. Federal Register, Vol. 53, No. 100, 5/24/88, Part 440, Subpart M, USEPA NPDES Permit No: AK-00.

17.3 - PRACTICE. Hard Rock Mining.

OBJECTIVE. To incorporate soil and water resource considerations into the planning process for mining plans of operation for lode mining operations.

EXPLANATION. Hard rock mining consists of developing a tunnel system or, for open pit, the extraction of lodes of ore-bearing rock. Areas of high-grade ore require little surface disposal of wastes; generally these wastes can be backfilled or contained in the areas where the ore has been removed. However, the majority of deposits contain low-grade ore combined with large amounts of waste rock. This requires surface disposal and presents a high potential for degradation of water quality from sedimentation and acid contamination. Drainage of water from the mine is another potential contaminate.

While most development at these sites is below ground, surface facilities include roads, dump or waste disposal areas, equipment storage and service sites, administrative buildings, and supply storage. Associated activities generally include milling operations. Waste disposal from mills present an even greater potential for adverse effects on water quality. Mill waste (tailings) is generally finely ground and transported and stored as a slurry. Storage is generally in surface ponds.

The following applies to hard rock mining operations:

1. Development of surface facilities should conform with appropriate practices as detailed in other chapters. These include measures to protect water quality

during exploration, construction, and developmental activities. Related practices are: 12.8, 12.9, 12.10, 12.14, 12.15, 12.17, 14.6, 14.9, 14.15, 14.17, 14.18, 14.19, 14.20, 14.24, 16.4, and 16.5. In addition, practice 14.3 would apply to the location and design of saltwater transportation facilities.

2. Mine waste will be disposed of in a manner to prevent unacceptable damage to the soil and water resources and should include: location of the waste material where sedimentation potential is minimized; stabilization of waste material to prevent movement; treatment of waste with potential for acid production with lime or caustic soda to prevent leaching into surface or subsurface waters; and revegetation of waste disposal sites to prevent erosion.

3. Water from mines should be released slowly to reduce deposition of suspended particulate matter and the introduction of oxygen-deficient water into streams, and to prevent downstream flooding. Water that has become acidic should be treated prior to release. Mine water may be directly used in mill boilers where it may be recycled to reduce contamination of surface waters.

4. When feasible, mill tailings should be returned underground if they will not contaminate the groundwater. Surface disposal sites (ponds) should be sited to prevent embankment erosion by surface water and in a location to minimize flooding potential. Where necessary, construct catchment ponds downstream from the embankment to collect seepage and tailing eroded from the face of the embankment. Use decanting systems, as appropriate, to remove water from the pond after solids separation.

5. When toxic solutions, as a result of dissolved salts or metals, are found as leachates from tailings, monitor and treat effluent as required in NPDES Permits.

IMPLEMENTATION. The Forest Service will designate locations for facilities and waste and tailings disposal sites as identified in the environmental analysis. Detailed mitigation measures are developed by an interdisciplinary team during the environmental analysis and are incorporated into the plan of operations. The mining operator is responsible for the development of the operating plan with review and approval by the Forest Service.

REFERENCES. 36 CFR 228, Subpart A and FSM 2810.

17.4 - PRACTICE. Permits and Administration of Geophysical Operations.

OBJECTIVE. To protect the quality of surface and groundwater from degradation resulting from geophysical activities on National Forest System lands.

EXPLANATION. This is an administrative practice. Geophysical activities will be managed in a manner that is both timely and offers protection to other multiple-use values and management objectives. Many activities have no effects. However, if effects are identified, standard seismic hole plugging procedures will be followed to prevent contamination of groundwater resources, and shot hole

placement will be examined for potential impacts to other resource values. New road construction, if allowed, will be located, designed, constructed, and maintained to protect the soil and water resources. Roads will be obliterated when no longer needed (BMP 14.24).

IMPLEMENTATION. During the environmental analysis, an interdisciplinary team will be assembled to prepare the appropriate NEPA document that evaluates potential impacts, including cumulative, and any needed mitigation measures for the geophysical prospecting permit. The use of water resources for prospecting activities may require non-Forest Service authorizations or permits.

REFERENCES. Organic Act of 1897 (30 Stat. 34, as amended, 16 U.S.C. 472, 475-478, 480-482, 551); Multiple Use--Sustained-Yield Act of 1960 (74 Stat. 215, 16 U.S.C. 528-531); RPA, as amended (88 Stat. 476; 16 U.S.C. 1600-1614); FSM 2860.

17.5 - PRACTICE. Site Closure and Rehabilitation.

OBJECTIVE. To incorporate soil and water resource considerations into the planning process for mining Plan of Operation.

EXPLANATION. This is an administrative and corrective practice. Details of final site rehabilitation measures should be described and mapped in the mining Plan of Operation. Emphasis should be given to steps for speeding site recovery and enhancing the value of rehabilitated areas to fish and wildlife. Topics addressed should include:

1. Stream rehabilitation, including drawings and descriptions of the final location and configuration for the active stream channel, and fish habitat features intended for the restored stream reach.
2. Floodplain rehabilitation, including: plans for final cleaning and/or stabilization of settling ponds; final configuration of drainage control structures; final site sloping and contouring for drainage control; distribution of stockpiled material; and revegetation sites in disturbed areas.
3. Spoils, waste rocks storage areas, and camp sites should be reshaped to provide proper surface drainage and erosion control. All disturbed areas should be stabilized by vegetation.
4. Tailing disposal sites should be reclaimed to prevent erosion and toxic leachates from entering surface drainages and aquifers. Reclamation measures include liming, contouring, capping and revegetation of tailing piles; use of interceptor ditches to divert surface runoff away from tailing disposal sites; and construction of internal drainage system to collect and safely dispose of water which infiltrates the tailings pile.

IMPLEMENTATION. A description of the site closure and rehabilitation plan is given in each mining Plan of Operation. Responsibility for developing the Plan of Operation belongs to the individual operator and/or lessor. The District Ranger or staff is responsible for reviewing the plan and requesting more detail if necessary. Review can involve using a Forest Service interdisciplinary team.

REFERENCES. 36 CFR 228, 36 CFR 251, and 30 U.S.C. 612; Reference Manual (Alaska Department of Fish and Game, January 1986), Surface Environment and Mining (SEAM) Reclamation Users Guide.

17.6 - PRACTICE. Abandoned Mine Land Reclamation.

OBJECTIVE. To reduce erosion and water quality degradation by sediment and toxic substances from abandoned mined lands and mining facilities through reclamation of these lands.

EXPLANATION. This is a corrective practice. Abandoned mined lands are frequently erosive, bare of vegetation, or are exuding toxic substances and/or sediment into nearby streams. Some sites may pose a threat to public health or safety. Reclamation plans for reducing impacts to soil and water resources are needed for each abandoned mine. Specific practices may vary from site to site, ranging from simple revegetation or reshaping with earth-moving equipment, to restoration to pre-disturbance conditions.

It is important that the site be revegetated with plant species that accomplish the purposes of reclamation. Species may be native or introduced and may be both live plants or seed. Fertility of soil and spoil materials and climate will affect species selection and survival, and soil amendment recommendations.

IMPLEMENTATION. This practice is typically implemented through the development of an inventory of all abandoned mined lands. If a soil and water resource problem area is observed and documented, an interdisciplinary team will assess that abandoned mine site, develop the necessary actions to correct the problem, and integrate them into the Forest Planning process for funding and execution. The NEPA process will be followed in the planning and implementation of reclamation measures. The Forest Service should work toward inclusion of the more important abandoned mined lands in State inventories and reclamation plans, since both the State and the Office of Surface Mining (OSM) can provide funding for State projects.

REFERENCES. FSM 2522, 6740, 7442, 7443, and 7460; Abandoned Mine Lands Reclamation Control Handbook, Office of Surface Mining; Surface Environment and Mining (SEAM) Reclamation User Guides.