GUIDANCE FOR APPLICANTS SEEKING LICENSES OR PRELIMINARY PERMITS

FOR

CLOSED-LOOP PUMPED STORAGE PROJECTS AT ABANDONED MINE SITES

(Docket No. AD19-8-000)

Federal Energy Regulatory Commission

Office of Energy Projects

Division of Hydropower Licensing

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1.0 INTRODUCTION AND PURPOSE

Section 3004 of the America's Water Infrastructure Act of 2018 requires the Federal Energy Regulatory Commission (Commission) to issue guidance to assist applicants for licenses or preliminary permits for closed-loop pumped storage projects at abandoned mine sites.[1] On April 4, 2019, Commission staff held a workshop at the Commission's headquarters to explore potential opportunities for the development of closed-loop pumped storage projects at abandoned mine sites.[2]

Informed by the discussion at the April 4, 2019 workshop and utilizing the experience and knowledge of Commission staff, this document provides information and identifies resources to assist prospective applicants proposing to develop closed-loop pumped storage projects at abandoned mine sites.

The guidance does not affect the rights or obligations of prospective applicants or any other party. Moreover, the guidance does not add requirements to or substitute for the Commission's regulations. Prospective applicants are expected to prepare applications that comply with the Commission's regulations and policies.

2.0 CLOSED-LOOP PUMPED STORAGE PROJECTS

Pumped storage projects move water between reservoirs located at different elevations (i.e., an upper and lower reservoir) to store and generate electricity. Generally, when electricity demand is low (typically, at night), excess electric generation capacity in the grid is used to pump water from the lower reservoir to the upper reservoir. When electricity demand is high, the stored water is released from the upper reservoir to the lower reservoir through a turbine to generate electricity.

A closed-loop pumped storage project is generally defined as a pumped storage project that utilizes reservoirs situated at locations other than natural waterways, lakes, wetlands, and other natural surface water features, and may rely on temporary withdrawals from surface waters or groundwater for the sole purpose of initial fill or the periodic recharge needed for project operation. Types of reservoirs that lend themselves to a closed-loop project include reservoirs located in surface mine pits or underground mines.

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[1] Pub. L. No. 115-270, § 3004, 132 Stat. 3765, 3867.

[2] *See Final Agenda of the Workshop on Closed-Loop Pumped Storage at Abandoned Mine Sites* (Docket No. AD19-8-000, April 12, 2019).

3.0 ABANDONED MINES IN THE UNITED STATES

3.1 Extent and Types of Abandoned Mines

Abandoned mines[3] can be found in almost every state and include those used for small sand and gravel operations, complex underground coal and metal mines, and surface mines. Abandoned mine sites are located on private, state, tribal, or federal land, including federal land managed by the U.S. Department of the Interior's Bureau of Land Management (BLM), National Park Service, Fish and Wildlife Service, and the U.S. Department of Agriculture's Forest Service. No precise accounting of the number of abandoned mine sites is available, but, according to BLM, there are as many as 500,000 abandoned mines in the United States.[4] Hard-rock abandoned mines (i.e., mines primarily containing ores of metals – e.g., gold, silver, copper, lead, zinc, and nickel) are predominantly in the western states. Abandoned coal mines are mostly found in the eastern states, with sixty percent of these mines located in Pennsylvania, West Virginia, and Kentucky.[5]

3.2 Identifying Abandoned Mine Sites

A variety of federal and state agencies have responsibilities associated with abandoned mine lands. These responsibilities include the identification of mine location and features, assessment of safety and environmental hazards, and remediation or reclamation. Federal and state agencies have developed databases on abandoned mines that include information on mine location, type, and features. The National Mine Map Repository at the Office of Surface Mining Reclamation and Enforcement of the Department of the Interior collects and maintains both coal and non-coal mine information and images for the entire country. The repository provides and stores over 181,000 abandoned mine maps, with mine workings dating from the 1790's to the present day.

Appendix A and Appendix B include a listing of federal and state agencies that are involved with abandoned mines in the United States, respectively, as well as web links for maps and databases on abandoned mines and land records maintained by various agencies.

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[3] This guidance does not define "abandoned mines" and relies on existing, varying definitions provided by federal and state agencies.

[4] *Extent of the Problem*, AbandonedMines.Gov https://abandonedmines.gov/extent_of_the_problem (last visited July 25, 2019).

[5] *About Coal Mines*, AbandonedMines.Gov https://www.abandonedmines.gov/about_coal_mines (last visited July 25, 2019).

Useful information on past mining practices and site-specific information on abandoned mines can also be found in county assessors' records, local newspapers or publications, and old mining magazines.

4.0 LICENSES AND PRELIMINARY PERMITS FOR CLOSED-LOOP PUMPED STORAGE PROJECTS AT ABANDONED MINE SITES

4.1 Required Authorizations

Pursuant to section 23(b)(1) of the Federal Power Act, Commission authorization is required for a hydroelectric project if it: (1) is located across, along, or in navigable waters of the United States; (2) occupies public land or a reservation of the United States; (3) uses the surplus water or water power from a government dam; or (4) is located on a non-navigable Commerce Clause stream, affects the interests of interstate or foreign commerce (e.g., is connected to the interstate power grid), and has undergone construction or major modification after August 26, 1935.[6]

4.2 Obtaining a Preliminary Permit

The Commission may issue a preliminary permit that grants a permittee the priority to file a license application for a site (i.e., guaranteed first-to-file status) while the permittee secures data on the site and prepares a license application.[7] The permit provides a permittee with such priority for up to 4 years. In addition, the Commission has the authority to extend the permit term up to an additional 4 years. Permits do not authorize construction or operation of a project, nor do they authorize any ground breaking activities. In addition, it is not necessary to obtain a permit in order to apply for or receive a license.

Once a preliminary permit application is filed with the Commission, staff reviews the application for adequacy. Upon acceptance of a permit application, staff issues a public notice setting a deadline for filing comments, motions to intervene, or competing applications.

Commission staff, or, in the case of an application that is opposed, the Commission, then acts on the application.

More information pertaining to the Commission's permitting process can be found at https://www.ferc.gov/industries/hydropower/gen-info/licensing/pre-permits.asp.

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[6] 16 U.S.C. § 817(b)(1) (2018).

[7] *Id.* §§ 797(f) and 798.

4.3 Obtaining a License

A license authorizes a licensee to construct and operate a hydroelectric project, subject to the terms and conditions set by the license. License terms and conditions generally include engineering requirements to ensure safe construction and operation of the project; environmental measures to protect, mitigate effects on, or enhance environmental resources; and administrative requirements such as reporting and monitoring measures. A license is issued for a period of 30 to 50 years.

The licensing process involves two stages: pre-filing and post-filing. The pre-filing stage includes: presenting the proposed project to appropriate stakeholders (e.g., state and federal agencies, Indian tribes, local landowners, and non-governmental organizations (NGOs)); consulting with those stakeholders; identifying issues; and gathering information. The purpose of the pre-filing process is to fully inform stakeholders about the proposed project, engage those stakeholders in consultations to identify issues and study needs, conduct studies to identify project-related impacts, develop mitigation and enhancement measures, and prepare a license application.

The post-filing stage begins after an application is filed. Once Commission staff finds an application is adequate, a notice is issued soliciting comments and proposed terms and conditions from agencies and stakeholders. Commission staff then analyzes the anticipated effects of the proposed project and alternatives, and analyzes comments and any agency terms and conditions, and makes recommendations to the Commission as to whether and under what conditions the project should be licensed.

There are three specific licensing processes available to applicants: the Integrated Licensing Process (ILP),[8] Traditional Licensing Process (TLP),[9] and Alternative Licensing Process (ALP).[10] The ILP is the default licensing process. However, an applicant may request to use the TLP or ALP.

4.3.1 Integrated Licensing Process (ILP)

The ILP is the default licensing process and most appropriate for projects with controversial and/or complex issues and study needs that require close coordination and cooperation with agencies and stakeholders during the pre-filing stage. Commission staff is actively involved during an ILP, and conducts scoping as required by the National Environmental Policy Act (NEPA) to identify issues and focus on study needs. After formally seeking study requests from agencies and the public, the applicant prepares a study plan. Commission staff makes a final determination on studies that need to be

[8] 18 C.F.R. pt. 5 (2019).
[9] *Id.* pt. 4, subpt. D-H.
[10] *Id.* § 4.34(i).

conducted. If parties cannot agree on studies or the scope of studies, a dispute resolution process is available. Compared to the TLP or ALP, this process has specific timeframes and filing requirements for various steps in the licensing process, and requires adherence to those by all participants.

Once an application is filed, Commission staff evaluates the application for compliance with the regulations and any outstanding studies. Once the application is found complete, staff gives notice that the application is ready for NEPA environmental analysis and solicits interventions, comments, and terms and conditions. Commission staff then prepares and issues its environmental analysis (i.e., Environmental Assessment (EA) or Environmental Impact Statement (EIS)). The Commission then makes a licensing decision based on staff's recommendations in the EA or EIS.

4.3.2 Traditional Licensing Process (TLP)

To use the TLP for preparing an application, an applicant must make a written request to the Commission and include justification for the request and any written comments on the request from stakeholders. In its TLP request, an applicant must address: the likelihood of timely license issuance; the complexity of the resource issues; the level of anticipated controversy; the relative cost of the traditional process compared to the integrated process; the amount of available information; and potential for significant disputes over studies; and other factors believed by the applicant to be pertinent. The TLP process is most appropriate for projects with relatively low complexity requiring fewer studies. In the pre-filing stage of a TLP, an applicant consults with agencies and stakeholders, and conducts studies usually with no Commission staff involvement. Although generally there are no set time frames for most activities during the pre-fling, it involves a three-stage consultation process: Stage 1 - once a request to use the TLP is approved, the applicant conducts a joint agency/public meeting to discuss the proposed project, scope potential environmental issues, and prepare study plans; Stage 2 – the applicant conducts reasonable and necessary studies, prepares a draft license application, and provides the draft application to resource agencies and tribes for comments; Stage 3 – the applicant files a final application with the Commission and sends copies to agencies and tribes.

The TLP post-filing process is similar to that of the ILP, except after an application is filed, Commission staff conducts NEPA scoping and provides opportunities to agencies and the public to comment on the application. Based on scoping and comments received, an applicant may need to conduct studies to provide additional information needed for Commission staff's environmental analysis (EA or EIS). Based on staff's recommendations in the EA or EIS, the Commission makes a decision on whether to issue a license.

4.3.3 Alternative Licensing Process (ALP)

The ALP is a more collaborative approach to pre-filing consultation and also requires Commission authorization. A potential applicant needs to show justification in its request to use this process, and must demonstrate that a reasonable effort has been made to contact all resource agencies, Indian tribes, NGOs, and others who may be affected by the project's proposal. The request must also demonstrate that a consensus exits that the use of the ALP is appropriate and include a communication protocol that is supported by interested entities, governing how the applicant and other participants, including the Commission staff, will communicate with each other in the pre-filing consultation. Similar to the ILP, this process encourages coordination among the applicant, resource agencies, and the public, and involves some Commission staff participation. However, unlike the ILP, timelines for various steps are not specified by the regulations, and are developed collaboratively by the applicant and stakeholders early in the pre-filing process. The ALP encourages the applicant and stakeholders to invest time and resources during the pre-filing stage to work toward agreement on key issues and strive for agreement on the scope and level of effort necessary for studies. It also encourages the applicant and stakeholders to come to agreement on proposed protection, mitigation, and enhancement measures, ultimately leading to a settlement agreement. Once necessary studies are completed, the applicant prepares its license application and prepares either a preliminary draft EA, or funds a Commission-approved third-party contractor to prepare a preliminary draft EIS, to include with the license application.

In the post-filing stage, Commission staff reviews the application and the preliminary draft EA or EIS to ensure that they meet the Commission's regulations and requirements. Commission staff may edit the preliminary draft EA or EIS, as necessary, to include, among other things, Commission staff's recommendation on whether to issue a license for the proposed project. Commission staff then issues its own EA or EIS for public comment.

More information about the three processes is available on the Commission's website at https://www.ferc.gov/industries/hydropower/gen-info/licensing/licen-pro.asp.

A matrix comparing the three licensing processes is shown below:

	Integrated Licensing Process (ILP)	Traditional Licensing Process (TLP)	Alternative Licensing Process (ALP)
General	Projects with complex issues and study needs; Integrated approach; Predictable scheduling	Projects with less complex issues and study needs; paper driven; no set timeframes	Projects that are conducive to a self-driven collaborative pre-filing process; Collaboratively approach and schedule in pre-filing stage
FERC Staff Involvement (pre-filing)	FERC oversight in pre-filing	No FERC oversight in pre-filing	Some FERC involvement
Deadlines	Defined deadlines for all participants (including FERC) throughout the pre- and post-filing process	Some deadlines in pre-filing for participants; defined deadlines for participants in post-filing	Collaboratively defined deadlines in pre-filing; defined deadlines for participants in post-filing
Study Plan Development	Plan developed through study plan meetings with all stakeholders; plan approved by FERC	Plan developed by applicant based on early stakeholder recommendations	Developed by collaborative group – FERC staff may assist

4.3.4 Expedited Process for Closed-Loop Pumped Storage Projects

Closed-loop pumped storage projects may qualify to use the Commission's expedited process for processing applications for original licenses as long as they meet certain criteria. Under the expedited process, the Commission will seek to ensure that a final decision (i.e., issuance of an order) on a license application is made no later than two years after the Commission receives a completed license application. An applicant wishing to use the expedited licensing process must apply for and receive authorization from the Commission under 18 C.F.R. Part 7.[11]

More information and specific details of the expedited licensing process can be found at the Commission's website at https://www.ferc.gov/industries/hydropower/gen-info/water-infr-act.asp.

5.0 BEST PRACTICES AND CONSIDERATIONS

5.1 Typical Environmental Issues

Developing closed-loop pumped storage projects at abandoned mine sites may involve a variety of environmental issues, including, but not necessarily limited to:

Geology and Soil Resources

- Potential effects could include existing and project-induced effects such as seismic hazards, ground subsidence, landslides and mass movements, soil liquefaction, and erosion.

Water Resources

- When used as a source for the initial fill and periodic recharge of project reservoir(s) –
  - Potential effects on groundwater, including fluctuations in groundwater level, recharge, yield, flow direction, and quality, and other uses (e.g., drinking water, irrigation, and industrial uses).
  - Potential effects on surface water, including surface water flow, quantity, quality, and uses.

[11] *See Hydroelectric Licensing Regulations Under the America's Water Infrastructure Act of 2018*, Order No. 858, 167 FERC ¶ 61,050 (2019) (final rule establishing the expedited licensing process).

- Potential effects on groundwater-surface water connectivity and interactions, including quantity and quality of surface water and/or groundwater.

- Potential effects on surface and/or groundwater quality from discharge of acid mine drainage or other contaminated substances from abandoned mine sites.

- Potential effects on water quality of project surface reservoirs due to evaporation, resulting in concentration of water quality constituents and degradation of water quality, and potential water quality effects on groundwater due to seepage from project reservoir(s).

Fish and Aquatic Resources

- Potential effects on fish and other aquatic communities and their habitats in surface water used as a source for initial fill and periodic recharge, or in surface water hydraulically connected to groundwater used for project purposes.

- Potential effects on fish and other aquatic communities and their habitats in surface water from reservoir seepage, spills, or underground mine water dewatering (e.g., acid mine drainage or contaminated water).

Terrestrial Resources – Wildlife, Vegetation, and Wetlands

- Potential effects on wildlife, vegetation, and wetlands from project construction and operation, including effects on sensitive botanical or animal species and their habitats from project facilities, such as transmission lines, access roads, and other structures.

Threatened and Endangered Species

- Potential effects on various threatened and endangered species, including bats,[12] mammals, and birds, and their habitats.

[12] Of the 45 bat species native to the United States, 29 rely on mines for a portion of their habitats. *See Mines as Habitat*, National Park Service, https://www.nps.gov/subjects/abandonedminerallands/mines-as-habitat.htm.

Recreation, Land Use, and Aesthetics

- Potential effects of project construction and operation on public access, safety, and recreational use in the project area.
- Potential effects on land use and aesthetics in the project area.

Cultural and Tribal Resources

- Potential effects on historic resources, archaeological resources, and traditional cultural properties that are included or may be eligible for inclusion in the National Register of Historic Places.
- Potential effects on Tribal resources, including properties of traditional religious and cultural importance to an Indian tribe.

Socioeconomics

- Potential project effects on socioeconomics of the area, including low-income and minority populations.

5.2 Site Selection – Issues to Consider

Selecting a site for a closed-loop pumped storage project where there are few environmental concerns or a site that avoids sensitive environmental resources can expedite the licensing process. In addition to various design and environmental issues, a project at a site with the following characteristics could be cost-prohibitive, take longer to process a license application, and may delay project development:

- Proximity to active faults or high seismic risk areas.
- Areas of high subsidence risks, including presence of carbonate rock or evaporites (sedimentary rock containing non-carbonate salts), which could dissolve, especially in contact with acidic water (i.e., rain water mixed with carbon dioxide), causing subsidence and structural failure of project facilities.
- Presence of species or their critical habitats listed under the Endangered Species Act.
- Existing real property and mineral rights associated with the mine site.[13]

[13] *See* Appendix A of this Guidance (providing links to databases on federal land conveyance records, patented and unpatented claims, withdrawals, and land status

To gather more site-specific information and provide a basis for site selection and design parameters, a prospective applicant may consider conducting a geotechnical study. In addition, conducting a seismic hazard evaluation may be warranted, depending on site-specific conditions and proposed project facilities. The Commission's engineering guidance for geotechnical investigation, seismic evaluation, dam and water conveyance, instrumentation and monitoring, and other requirements can be found at https://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp.

Off-limits Sites

Licensing projects at certain locations may be prohibited by law or policy. The following are examples.

Wilderness Areas

The Wilderness Act of 1964 (16 U.S.C. §§ 1131-1136) established a National Wilderness Preservation System and prohibits any commercial enterprise, structure, or installation within any wilderness area. A "wilderness area" is defined, in part, as an area "where the earth and community of life are untrammeled by man, where man himself is a visitor who does not remain."[14] For more information about the Wilderness Act and wilderness areas, visit Wilderness Connect at https://wilderness.net/default.php.

National Parks

The National Park System includes all properties managed by the National Park Service, including national parks, trails, monuments, recreation areas, and heritage areas. The Commission is prohibited from issuing an original license for any hydroelectric project located within the boundaries of any unit of the National Park System that would have a direct adverse impact on federal lands within that unit.[15] To determine if a project is located within the boundaries of any unit in the National Park System, visit the National Park Service at https://www.nps.gov/findapark/index.htm.

Superfund Sites

There are many abandoned mine sites that are contaminated and are proposed for listing or are listed in the U.S. Environmental Protection Agency's (EPA) Superfund National Priorities List (NPL). Commission policy is not to issue a preliminary permit or license for project development at such sites until the cleanup of the site is completed.[16]

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records) and Appendix B of this Guidance (providing links to state agencies that may maintain such property records).

[14] 16 U.S.C. § 1131(c) (2018).

[15] 16 U.S.C. § 797c (2018).

[16] *See Green Energy Storage Corp.*, 150 FERC ¶ 61,042 (2015).

The abandoned mine sites that are in the NPL list can be found on the EPA's website at https://www.epa.gov/superfund/abandoned-mine-lands-site-information.

5.3 Early Consultation with Agencies, Tribes, and NGOs

Project developers are encouraged to identify and consult with federal and state resource agencies, tribes, and citizen groups that have or are likely to have an interest in the project early in the planning stage. This will help identify and prioritize potentially controversial or critical issues early, and focus on scoping of project alternatives and development of any proposed environmental protection, mitigation, and enhancement measures. A list of federal and state mining, geology, and environmental agencies is in Appendices A and B. A more comprehensive list of federal, state, and interstate resource agencies, Indian tribes, and NGOs can be found on the Commission's website at https://www.ferc.gov/industries/hydropower/enviro/consultlist.aspx. In addition, information on various federal and state agencies, permits, and regulatory approvals that are required for developing hydropower projects can be found in the Department of Energy's "Hydropower RAPID Toolkit" at https://www.energy.gov/eere/water/hydropower-rapid-toolkit.

5.4 Preparation of Permit Application

Applications for a preliminary permit must include project-related information in sufficient detail as stipulated by the Commission's regulations.[17] More specifically, a preliminary permit application should include such project related information as an engineering description of project components, estimated average annual energy production and installed capacity, studies conducted or to be conducted with respect to the proposed project, a map or series of maps showing the location of the project and its components in relation to water bodies and towns/municipalities, and a project boundary enclosing the principal project features.

A permit application should provide a clear description of project reservoirs, including storage capacity and normal maximum water surface elevation; the source of water to be used for initial fill and periodic recharge; and, if applicable, how the water would be conveyed to the project reservoir. If an underground mine is used as a project reservoir, staff recommend that the application include a description of the extent of the mine to be used for project purposes, including a vertical profile. Pursuant to 18 C.F.R. § 4.81(d), the project boundary must enclose all project facilities, including project reservoirs, spillways, tunnels, penstocks, pipelines or conduits to convey water to the project, and transmission lines up to the point of interconnection. If an underground mine is to be used as a project reservoir, staff recommend that the boundary enclose the above-

[17] 18 C.F.R. § 4.81 (2019).

ground surface area to the extent of all mine openings to be used as a reservoir and for any other underground project facilities.

5.5 Preparation of License Application

As required by the Commission's existing regulations, a license application for a project must include a detailed description of project components and facilities, and their operation; an analysis of environmental resources that includes a description of the affected environment, an analysis of potential effects on environmental resources from project construction and operation, and any proposed environmental protection and mitigation measures; and a record of consultation.[18] The following are staff suggestions as to what should be included, among other information, in a license application for a closed-loop pumped storage project at an abandoned mine site, as well as specific issues that should be considered and/or addressed.

Project Facilities and Operation

- Maps showing project facilities, lands, transmission lines, and any conveyance pipelines and tunnels.
- Composition, dimensions, and configurations of dams, spillways, penstocks, tunnels, powerhouses, pipelines, and conduits.
- Reservoir surface area, capacity, and normal maximum water surface elevation. When an underground mine is used as a reservoir, description on how the reservoir capacity is calculated and the sources of information used for deriving the capacity estimate. Also, geological cross-sectional profiles of the underground mine, including vertical profiles of mine openings to be used as reservoir and for other project facilities.
- Water source to be used for initial fill and periodic recharge of project reservoirs, including the amount of water needed for such purposes, and how frequently the recharge would be needed.
- Numbers, types, and capacities of turbines and generators.
- Transmission line numbers, length, voltage, and interconnections.

[18] *Id.* §§ 4.41, 4.38, and 5.18.

Analysis of Environmental Resources

Affected Environment

Geology and Soil Resources

- Surficial and bedrock geologic settings of the project area and areas that may be directly or indirectly affected by the project, including bedrock lithology, structures, and stratigraphy.
- Past and recent seismic events.
- Existing geologic hazards such as active and potentially active faults and fault zones (regional and local), areas susceptible to landslide or slumping, areas of potential subsidence, areas of potential soil liquefaction, and areas of potential surficial fault rupture. Topographic maps showing locations of these geologic hazards.
- Geologic conditions of mines to be used as project reservoirs, including slope stability and seepage potential of open mine pits, and structural stability of mine openings, pillars, or supports, and seepage potential of underground mines.
- Geologic conditions of any other existing surface or underground mines at or near the project, including areas of any mine related subsidence or hazards.
- Existing mineral resources and mining history of the area in general, including other active and abandoned mines. Topographic maps showing locations of these mines.

Water Resources

- Existing flow regime and water quality conditions of surface water used as a source.
- Hydrogeological conditions of aquifers used as a source, including aquifer characteristics, hydraulic gradient, recharge, yield, and groundwater quality.
- Degree to which groundwater and surface water are hydraulically connected.
- Water rights, if any, and non-power uses of the water source (e.g., irrigation, industrial, and municipal uses).

Fish and Aquatic Resources

- Fishery resources in source water or water receiving any project discharge, including sensitive species.
- Aquatic habitats (e.g., riffles, pools, etc.), and types of substrates.
- Applicable state and federal resource management plans and essential fish habitats.

Terrestrial Resources – Wildlife, Vegetation, and Wetlands

- Seasonal abundance and distribution of key wildlife species.
- Dominant cover types and plant species.
- Special status wildlife and plants.
- Quantity and quality of habitats with special botanical or wildlife value.

Threatened and Endangered Species

- Background of species (e.g., periods when a species may be most sensitive to disturbance), including distribution and special status.
- Description, geographical extent, and the essential elements of habitats (e.g., sites for breeding, reproduction, and rearing, etc.) of species, including designated and proposed critical habitats.
- Existence of any recovery plans for the listed species.

Recreation, Land Use, and Aesthetics

- Existing recreational opportunities and facilities in and around the project area, including in underground mines, and importance of recreational opportunities and facilities to the public.
- Description of any regionally or nationally important recreation areas in the vicinity.
- Existing uses of land in the project area, such as farming, forestry, grazing, etc., and any existing land use plans for the area.
- Specially designated areas in project vicinity (e.g., national trails, wilderness areas, etc.), and federal land management restrictions, if applicable (e.g., standards outlines in Forest Service Plans).
- Visual characteristics and quality of the project area, including significance of aesthetic resources to surrounding communities.

Cultural and Tribal Resources

- Description of any historic or archaeological sites in the project vicinity especially those listed in or recommended for listing in the National Register of Historic Places.
- Historical and cultural use and occupation of the area, including underground areas.
- Indian tribes and significance of any tribal traditional cultural and religious properties.

Socioeconomics

- Existing social and economic conditions of the project area, including population, demographics, and employment and income.

Environmental Effects

The environmental effects section of the license application must include a description of the anticipated environmental effects of project construction and operation.[19] The analysis should be specific to various resources, and should include description of specific project feature, as well as construction, and operational elements, and how project construction or operation would affect environmental resources.

Environmental Mitigation, Protection, and Enhancement

A license application must include, depending on project's effects, a description of measures recommended by Federal and state agencies and proposed by the applicant for mitigation of impacts on environmental resources, including protection or enhancement measures.[20]

Documentation of Consultation

A license application must include documentation of consultation with federal and state agencies, NGOs, and the public.[21] Providing a detailed step-by-step written documentation of consultation is important as it allows the Commission staff to see if the applicant has met the regulatory requirements as well as identify specific concerns and issues related to the project.

[19] *Id.* §§ 4.41 and 5.18.
[20] *Id.*
[21] *Id.* §§ 4.38 and 5.18.

6.0 CONCLUSION

This guidance fulfills the requirement of section 3004 of the America's Water Infrastructure Act of 2018 by providing information to assist applicants for licenses or preliminary permits for closed-loop pumped storage projects at abandoned mine sites.

In addition to the resources discussed in this guidance, the Commission's website, https://www.ferc.gov/industries/hydropower/gen-info.asp, provides more information regarding the hydropower licensing process and the preparation of a license application. Moreover, the Commission's eLibrary can be used to search for Commission documents and filings for specific licensed projects.

Appendix A

Federal Resources on Abandoned Mines

Federal Land Management Agencies and Agencies Involved with Abandoned Mines
Bureau of Land Management (BLM) – The BLM manages 246 million acres of public lands (one in every 10 acres of land in the United States) and 30 percent of the nation's minerals. Most BLM-managed lands are in the western states. BLM administers onshore federal energy and mineral resources, covering approximately 700 million acres of federal subsurface mineral estate. It also supervises the mineral operations on about 60 million acres of Indian trust lands. BLM maintains databases and information on abandoned mines and abandoned mine lands reclamation. (https://www.blm.gov/)
U.S. Forest Service (Forest Service) – The Forest Service manages 193 million acres of public land for multiple uses, including forests, recreation, and minerals and geology. It maintains information on abandoned mines through its mission to restore land disturbed by past mining activities. (https://www.fs.fed.us/)
National Park Service (NPS) – The NPS administers 80 million acres of federal land in all 50 states and the District of Columbia. It addresses abandoned mines through its mission of maintaining nationwide inventory of abandoned mine lands, and works with other agencies to address multitude of safety, environmental and cultural issues. (https://www.nps.gov/index.htm)
Office of Surface Mining Reclamation and Enforcement (OSMRE) – OSMRE is a bureau within the Department of the Interior, and was created to reclaim abandoned coal mines and regulate active coal mines by the Surface Mining Control and Reclamation Act of 1977. It maintains a repository of abandoned mine maps (mostly coal mines) and other

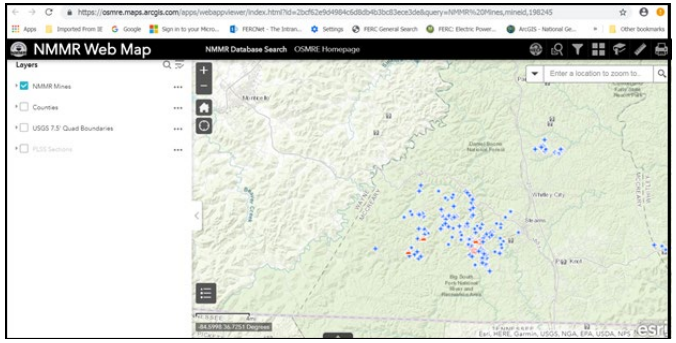
information, including databases of abandoned mines that have been reclaimed and in need of reclamation with priorities given to sites that pose danger to public health and safety. (https://www.osmre.gov/)

U.S. Geological Survey (USGS) – USGS collects, monitors, analyzes, and provides scientific analysis about natural resource conditions, issues, and problems. USGS has a vast collection of maps, databases, and geological and environmental conditions of numerous abandoned mine sites. (https://www.usgs.gov/)

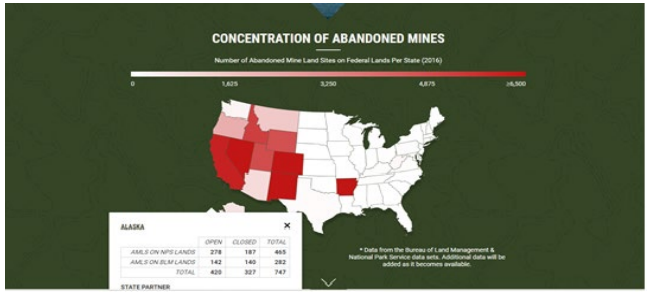
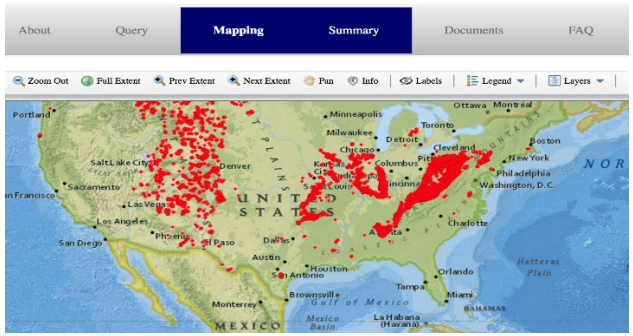
Note: Other agencies are involved with abandoned mine lands reclamation, remediation, and/or cleanup. Information regarding those agencies can be found at https://www.abandonedmines.gov/federal-partners.

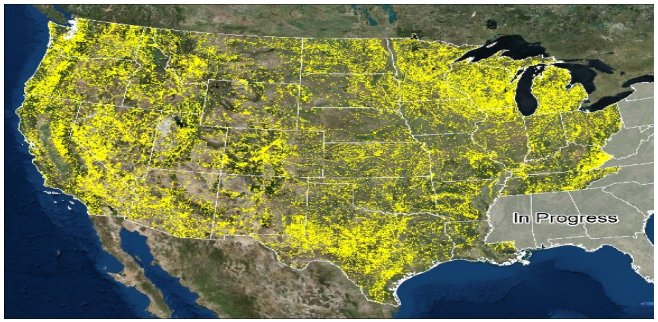
Abandoned Mine Maps, Databases, and Other Resources

The National Mine Map Repository (NMMR) is a repository that holds old mine maps of coal and non-coal mines in the United States. The repository is maintained by the Office of Surface Mining Reclamation and Enforcement at the Department of the Interior. The NMMR collects mine maps and other information for both surface and underground mines, and has over 181,000 abandoned mine maps. Some of the information that can be found in the map repository includes mine and company names; mine plans; closure maps; information on shafts and mine surface openings; and geological information, including geological bed thickness, depth, cross-sections, elevation contours, outcrops, and mineral assays. Many maps in the repository are currently available in digital format. The NMNR also includes a searchable database of mines by state and county, as well as by name, and latitude and longitude.



https://mmr.osmre.gov/

AbandonedMines.gov is a federal website managed by the BLM and represents the Federal Mining Dialogue (FMD) that comprises federal environment and land management agencies. The FMD oversees the environmental, health and safety impacts of abandoned mine lands across the country. The site maintains a database of abandoned mine land sites on lands managed by BLM and the NPS. The site also contains names and contact information of various federal and state agencies involved with abandoned mines, as well as other resources.	 https://www.abandonedmines.gov/
The Abandoned Mine Land Inventory System (e-AMLIS) is the Office of Surface Mining Reclamation and Enforcement's database of reclamation problems at known abandoned mine lands. The database includes mines that are in need of reclamation and those that have been reclaimed.	 https://www.osmre.gov/programs/amlis.shtm

The USGS USMIN Project is a compilation of digitized mine-related features from historical topographic maps, and it includes information on prospect mine pits, mine shafts and adits, quarries, open-pit mines, gravel and borrow pits, and other features.	 https://mrdata.usgs.gov/usmin/
USGS Interactive Maps of Minerals and Mines: The USGS maintains a mapping system that includes information on past and present mines, mine prospects, and processing plants.	https://mrdata.usgs.gov/mrds/map-us.html
USGS Mineral Resources Online Spatial Data: The USGS maintains a website of various maps and databases on mineral resources, mining claims, and active and past mining operations. It also includes maps and databases of geological and geochemical resources in the United States.	https://mrdata.usgs.gov/
U.S. Bureau of Mines (USBM) Publications: The former Bureau of Mines was the principal agency responsible for gathering information on production of mineral resources from 1910 through 1995. The USBM was abolished in 1996 and certain mineral	https://www.usgs.gov/faqs/how-can-i-find-us-bureau-mines-publications?qt-news_science_products=0#qt-news_science_products

information functions were transferred to the U.S. Geological Survey. In addition to results of analysis and research in minerals utilization, mining engineering, and mine safety, many of the USBM reports contain site-specific mine information. Formal report series of USBM publications include Reports of Investigations (RI series), Information Circulars (IC series), Bulletins, and Mineral Yearbooks. Informal reports include Open-file Reports, Mineral Land Assessment Reports, and other special publications.	
BLM's Legacy Rehost System (LR2000) provides information on BLM land and mineral use authorizations, coal and other mineral development, land and mineral title, and unpatented mining claims and withdrawals, and more on federal lands or on federal mineral estate.	https://reports.blm.gov/reports/lr2000/
BLM's General Land Office (GLO) Records provide access to federal land conveyance records, patented claims, surveys, and land status records. The site provides access to more than five million federal land title records issued between 1788 and the present.	https://glorecords.blm.gov/default.aspx

Appendix B

State Abandoned Mine Resources

Alabama	
Abandoned Mines Program	
Alabama Department of Labor	https://www.labor.alabama.gov/Inspections/Mining/reclamation.aspx
Geology and Other Mine-Related Agencies	
Geological Survey of Alabama Alabama Surface Mining Commission	https://www.gsa.state.al.us/ http://www.surface-mining.state.al.us/
Primary Environmental Agencies*	
Alabama Department of Environmental Management	http://www.adem.state.al.us/default.cnt
Alaska	
Abandoned Mines Program	
Alaska Department of Natural Resources, Division of Mining, Land, and Water	http://dnr.alaska.gov/mlw/mining/aml/
Geology and Other Mine-Related Agencies	
Alaska Division of Geological & Geophysical Surveys	https://dggs.alaska.gov/
Primary Environmental Agencies	
Alaska Department of Natural Resources Alaska Department of Environmental Conservation	http://dnr.alaska.gov/ http://dec.alaska.gov/

Arizona	
Abandoned Mines Program	
Arizona State Mine Inspector	https://asmi.az.gov/services/abandoned-mines
Geology and Other Mine-Related Agencies	
Arizona Geological Survey	https://azgs.arizona.edu/minerals/mining-arizona
Primary Environmental Agencies	
Arizona Department of Environmental Quality	https://azdeq.gov/
Arkansas	
Abandoned Mines Program	
Arkansas Department of Environmental Quality, Surface Mining and Reclamation Division	https://www.adeq.state.ar.us/mining/
Geology and Other Mine-Related Agencies	
Arkansas Geological Survey	https://www.geology.arkansas.gov/index.html
Primary Environmental Agencies	
Arkansas Department of Environmental Quality	https://www.adeq.state.ar.us/
California	
Abandoned Mines Program	
California Department of Conservation, Abandoned Mine Lands Unit	https://www.conservation.ca.gov/dmr/abandoned_mine_lands

Maps and Databases	
California About Mines Online	http://maps.conservation.ca.gov/mol/index.html
Geology and Other Mine-Related Agencies	
California Geological Survey California State Mining and Geology Board	https://www.conservation.ca.gov/cgs https://www.conservation.ca.gov/smgb/Pages/Index.aspx
Primary Environmental Agencies	
California Department of Conservation California State Water Resources Control Board	https://www.conservation.ca.gov/ https://www.waterboards.ca.gov/
Colorado	
Abandoned Mines Program	
Colorado Department of Natural Resources, Division of Reclamation Mining and Safety	https://mining.state.co.us/pages/home.aspx
Maps and Databases	
Colorado Abandoned Mine Map and Database	https://gis.colorado.gov/dnrviewer/Index.html?viewer=drms
Geology and Other Mine-Related Agencies	
Colorado Geological Survey	http://coloradogeologicalsurvey.org/
Primary Environmental Agencies	
Colorado Department of Natural Resources Colorado Department of Public Health and Environment	https://cdnr.us/#/start https://www.colorado.gov/cdphe
Connecticut	

Abandoned Mines Program	
Connecticut Department of Energy and Environmental Protection	http://www.ct.gov/dep/site/default.asp
Geology and other Mine-Related Agencies	
Connecticut Geological Survey	https://www.ct.gov/deep/cwp/view.asp?a=2701&q=487928&deepNav_GID=1641
Primary Environmental Agencies	
Connecticut Department of Energy and Environmental Protection	http://www.ct.gov/dep/site/default.asp
Delaware	
Abandoned Mines Program	
Delaware Department of Natural Resources and Environmental Control	https://dnrec.alpha.delaware.gov/
Geology and other Mine-Related Agencies	
The Delaware Geological Survey	https://www.dgs.udel.edu/
Primary Environmental Agencies	
Delaware Department of Natural Resources and Environmental Control	https://dnrec.alpha.delaware.gov/
Florida	
Abandoned Mines Program	
Florida Department of Environmental Protection, Mining and Minerals Regulation Program	https://floridadep.gov/water/mining-mitigation
Geology and other Mine-Related Agencies	
Florida Geological Survey	https://floridadep.gov/fgs

Primary Environmental Agencies	
Florida Department of Environmental Protection	https://floridadep.gov/
Georgia	
Abandoned Mines Program	
Georgia Department of Natural Resources, Environmental Protection Division	https://epd.georgia.gov/
Geology and other Mine-Related Agencies	
Georgia Geological Survey Information	https://epd.georgia.gov/georgia-geologic-survey-maps
Primary Environmental Agencies	
Georgia Department of Natural Resources Georgia Environmental Protection Division	https://gadnr.org/ https://epd.georgia.gov/
Hawaii	
Abandoned Mines Program	
Hawaii Department of Land and Natural Resources	http://dlnr.hawaii.gov/
Geology and other Mine-Related Agencies	
Hawaii – USGS Geological Survey Information	https://www.usgs.gov/science/regions/pacific/hawaii?qt-states_l2_landing_page_tabs=0#qt-states_l2_landing_page_tabs
Primary Environmental Agencies	
Hawaii Department of Land and Natural Resources	http://dlnr.hawaii.gov/

Idaho	
Abandoned Mines Program	
Idaho Department of Lands' Minerals Program, Abandoned Mine Lands Program	https://www.idl.idaho.gov/mining/abandoned-mines/index.html
Geology and other Mine-Related Agencies	
Idaho Geological Survey	https://www.idahogeology.org/index.php/
Primary Environmental Agencies	
Idaho Natural Resources Idaho Department of Environmental Quality	https://www.idaho.gov/about-idaho/natural-resources/ https://www.deq.idaho.gov/
Illinois	
Abandoned Mines Program	
Illinois Department of Natural Resources, Abandoned Mine Land Reclamation Program	https://www.dnr.illinois.gov/mines/AML/Pages/AMLProgram.aspx
Maps and Databases	
Illinois Mine Permits	http://maps.dnr.illinois.gov/portal/apps/webappviewer/index.html?id=38159388ea94457186846bec1beb16ab
Geology and other Mine-Related Agencies	
Illinois State Geological Survey	https://www.isgs.illinois.edu/
Primary Environmental Agencies	

Illinois Department of Natural Resources	https://www.dnr.illinois.gov/NaturalResources/Pages/default.aspx
Indiana	
Abandoned Mines Program	
Indiana Department of Natural Resources, Division of Reclamation	https://www.in.gov/dnr/reclamation/
Maps and Databases	
Indiana Coal Mine Information System	https://www.in.gov/dnr/reclamation/9310.htm
Geology and other Mine-Related Agencies	
Indiana Geological and Water Survey	https://igws.indiana.edu/
Primary Environmental Agencies	
Indiana Department of Natural Resources Indiana Department of Environmental Management	https://www.in.gov/dnr/ https://www.in.gov/idem/
Iowa	
Abandoned Mines Program	
Iowa Department of Agriculture and Land Stewardship, Mines and Minerals Bureau	https://iowaagriculture.gov/mines-and-minerals-bureau
Maps and Databases	
Iowa Coal Mines	https://programs.iowadnr.gov/maps/coalmines/
Geology and other Mine-Related Agencies	

Iowa Geological Survey	https://www.iihr.uiowa.edu/igs/
Primary Environmental Agencies	
Iowa Department of Natural Resources	https://www.iowadnr.gov/
Kansas	
Abandoned Mines Program	
Kansas Department of Health and Environment, Abandoned Mine Land Program Kansas Department of Agriculture, Surface Mining Reclamation	http://www.kdheks.gov/mining/abandoned_mineland.html https://agriculture.ks.gov/divisions-programs/division-of-conservation/surface-mining-reclamation
Geology and other Mine-Related Agencies	
Kansas Geological Survey	http://www.kgs.ku.edu/
Primary Environmental Agencies	
Kansas Department of Health and Environment	http://www.kdheks.gov/environment/index.html
Kentucky	
Abandoned Mines Program	
Kentucky Department of Natural Resources, Division of Abandoned Mine Lands	https://eec.ky.gov/Natural-Resources/Mining/Abandoned-Mine-Lands/Pages/default.aspx
Maps and Databases	

Kentucky Mine Mapping Information System	http://minemaps.ky.gov/Default.aspx?Src=InteractiveMaps
Geology and other Mine-Related Agencies	
Kentucky Geological Survey	http://www.uky.edu/KGS/
Primary Environmental Agencies	
Kentucky Department of Natural Resources Kentucky Department of Environmental Protection	https://eec.ky.gov/Natural-Resources/Pages/default.aspx https://eec.ky.gov/Environmental-Protection/Pages/default.aspx
Louisiana	
Abandoned Mines Program	
Louisiana Department of Natural Resources, Abandoned Mine Land Program	http://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=133
Geology and other Mine-Related Agencies	
Louisiana Geological Survey	https://www.lsu.edu/lgs/
Primary Environmental Agencies	
Louisiana Department of Natural Resources Louisiana Department of Environmental Quality	http://www.dnr.louisiana.gov/ https://deq.louisiana.gov/
Maine	
Abandoned Mines Program	
Maine Department of Agriculture, Conservation, and Forestry; Maine Geological Survey	https://www1.maine.gov/dacf/mgs/explore/mining/index.shtml

Geology and other Mine-Related Agencies	
Maine Geological Survey	https://www.maine.gov/dacf/mgs/
Primary Environmental Agencies	
Maine Department of Agriculture, Conservation and Forestry Maine Department of Environmental Protection	https://www.maine.gov/dacf/ https://www.maine.gov/dep/
Maryland	
Abandoned Mines Program	
Maryland Department of the Environment, Abandoned Mine Lands and Acid Mine Drainage	https://mde.maryland.gov/programs/LAND/mining/Pages/AbandonedMineLandsDivision.aspx
Maps and Databases	
Maryland Mining Locations Mapping	https://mde.maryland.gov/programs/LAND/mining/Pages/mapping.aspx
Geology and other Mine-Related Agencies	
Maryland Geological Survey	http://www.mgs.md.gov/
Primary Environmental Agencies	
Maryland Department of Natural Resources Maryland Department of the Environment	http://dnr.maryland.gov/Pages/default.aspx https://mde.maryland.gov/Pages/index.aspx
Massachusetts	
Abandoned Mines Program	

Massachusetts Department of Environmental Protection	https://www.mass.gov/orgs/massachusetts-department-of-environmental-protection
Geology and other Mine-Related Agencies	
The Massachusetts Geological Survey	https://mgs.geo.umass.edu/
Primary Environmental Agencies	
Massachusetts Department of Conservation and Recreation Massachusetts Department of Environmental Protection	https://www.mass.gov/orgs/department-of-conservation-recreation https://www.mass.gov/orgs/massachusetts-department-of-environmental-protection
Michigan	
Abandoned Mines Program	
Michigan Department of Environment, Great Lakes, and Energy, Oil, Gas, and Minerals Division	https://www.michigan.gov/egle/0,9429,7-135-3311_18442---,00.html
Geology and other Mine-Related Agencies	
Michigan Geological Survey	https://wmich.edu/geologysurvey
Primary Environmental Agencies	
Michigan Department of Natural Resources Michigan Department of Environment, Great Lakes, and Energy	https://www.michigan.gov/dnr/0,4570,7-350-79137_84659-121638--,00.html https://www.michigan.gov/egle/
Minnesota	
Abandoned Mines Program	

Minnesota Department of Natural Resources, Division of Lands and Minerals	https://www.dnr.state.mn.us/lands_minerals/index.html
Maps and Databases	
Underground Mine Mapping	https://www.dnr.state.mn.us/lands_minerals/underground/index.html
Geology and other Mine-Related Agencies	
Minnesota Geological Survey	https://www.mngs.umn.edu/
Primary Environmental Agencies	
Minnesota Department of Natural Resources Minnesota Pollution Control Agency	https://www.dnr.state.mn.us/ https://www.pca.state.mn.us/
Mississippi	
Abandoned Mines Program	
Mississippi Department of Environmental Quality, Mining and Reclamation	https://www.mdeq.ms.gov/geology/work-areas/mining-and-reclamation/
Geology and other Mine-Related Agencies	
Mississippi Department of Environmental Quality, Office of Geology	https://www.mdeq.ms.gov/geology/
Primary Environmental Agencies	
Mississippi Department of Wildlife, Fisheries, and Parks Mississippi Department of Environmental Quality	https://www.ms.gov/node/353 https://www.mdeq.ms.gov/
Missouri	

Abandoned Mines Program	
Missouri Department of Natural Resources, Abandoned Mine Lands	https://dnr.mo.gov/geology/lrp/reclamation/aml/amlinfo.htm
Maps and Databases	
Missouri Abandoned Mine Lands Viewer	https://dnr.mo.gov/geology/lrp/amlviewer.htm
Geology and other Mine-Related Agencies	
Missouri Geological Survey	https://dnr.mo.gov/geology/
Primary Environmental Agencies	
Missouri Department of Natural Resources	https://dnr.mo.gov/
Montana	
Abandoned Mines Program	
Montana Department of Environmental Quality, Abandoned Mine Lands	http://deq.mt.gov/Land/abandonedmines
Geology and other Mine-Related Agencies	
Montana Bureau of Mines and Geology	https://www.mbmg.mtech.edu/
Primary Environmental Agencies	
Montana Department of Natural Resources and Conservation Montana Department of Environmental Quality	http://dnrc.mt.gov/ http://deq.mt.gov/
Nebraska	

Abandoned Mines Program	
Nebraska Department of Environment and Energy, Reclamation at Aggregate Mining Sites	http://deq.ne.gov/Publica.nsf/PubsForm.xsp?documentId=21B7DAED8D9B34548625771C005B4B7A&action=openDocument
Geology and other Mine-Related Agencies	
Nebraska Geological Survey	http://snr.unl.edu/csd/
Primary Environmental Agencies	
Nebraska Department of Natural Resources Nebraska Department of Environment and Energy	https://dnr.nebraska.gov/ http://www.deq.state.ne.us/
Nevada	
Abandoned Mines Program	
Nevada Division of Environmental Protection, Abandoned Mine Lands Program	https://ndep.nv.gov/land/abandoned-mine-lands
Maps and Databases	
Nevada Mining Districts Interactive Map	http://www.nbmg.unr.edu/Collections/MiningDistricts/MiningDistricts.html
Geology and other Mine-Related Agencies	
Nevada Bureau of Mines and Geology Nevada Commission on Mineral Resources	http://www.nbmg.unr.edu/ http://minerals.nv.gov/Commission/
Primary Environmental Agencies	
Nevada Department of Conservation and Natural Resources Nevada Division of Environmental Protection	http://dcnr.nv.gov/ https://ndep.nv.gov/

New Hampshire	
Abandoned Mines Program	
New Hampshire Geological Survey	https://www.des.nh.gov/organization/commissioner/gsu/index.htm
Geology and other Mine-Related Agencies	
New Hampshire Geological Survey	https://www.des.nh.gov/organization/commissioner/gsu/index.htm
Primary Environmental Agencies	
New Hampshire Department of Natural and Cultural Resources New Hampshire Department of Environmental Services	https://www.dncr.nh.gov/ https://www.des.nh.gov/index.htm
New Jersey	
Abandoned Mines Program	
New Jersey Department of Environmental Protection, Division of Water Supply and Geoscience	https://www.nj.gov/dep/njgs/
Maps and Databases	
Abandoned Mines of New Jersey database Map Archive of New Jersey's Abandoned Mines	https://www.nj.gov/dep/njgs/geodata/dgs03-2.htm https://www.nj.gov/dep/njgs/enviroed/minemaps.htm
Geology and other Mine-Related Agencies	
New Jersey Geological and Water Survey	https://www.nj.gov/dep/njgs/
Primary Environmental Agencies	
New Jersey Department of Environmental Protection	https://www.nj.gov/dep/

New Mexico	
Abandoned Mines Program	
New Mexico Energy, Minerals, and Natural Resources Department, Abandoned Mine Land Program	http://www.emnrd.state.nm.us/MMD/AML/amlmain.html
Maps and Databases	
New Mexico Mine Maps and Database	http://www.emnrd.state.nm.us/MMD/gismapminedata.html
Geology and other Mine-Related Agencies	
New Mexico Bureau of Geology and Mineral Resources	https://geoinfo.nmt.edu/
Primary Environmental Agencies	
New Mexico Energy, Minerals, and Natural Resources Department New Mexico Environment Department	http://www.emnrd.state.nm.us/ https://www.env.nm.gov/
New York	
Abandoned Mines Program	
New York Department of Environmental Conservation, Division of Mineral Resources	http://www.dec.ny.gov/lands/5020.html
Maps and Databases	
New York Mine Maps and Database	http://www.dec.ny.gov/lands/42041.html
Geology and other Mine-Related Agencies	

New York State Geological Survey	http://www.nysm.nysed.gov/research-collections/geology
Primary Environmental Agencies	
New York State Department of Environmental Conservation	https://www.dec.ny.gov/
North Carolina	
Abandoned Mines Program	
North Carolina Department of Environmental Quality, Division of Energy, Mineral, and Land Resources	https://deq.nc.gov/about/divisions/energy-mineral-land-resources
Geology and other Mine-Related Agencies	
North Carolina Geological Survey	https://deq.nc.gov/about/divisions/energy-mineral-land-resources/north-carolina-geological-survey
Primary Environmental Agencies	
North Carolina Department of Environmental Quality	https://deq.nc.gov/
North Dakota	
Abandoned Mines Program	
North Dakota Public Service Commission, Abandoned Mine Lands	https://www.psc.nd.gov/jurisdiction/aml/index.php
Maps and Databases	
Abandoned Mine Lands Site Location Map	https://www.psc.nd.gov/jurisdiction/aml/index.php
Geology and other Mine-Related Agencies	
North Dakota Geological Survey	https://www.dmr.nd.gov/ndgs/

North Dakota Department of Trust Lands – Surface and Minerals Management	https://www.land.nd.gov/surface-minerals-management
Primary Environmental Agencies	
North Dakota Department of Environmental Quality	https://deq.nd.gov/
Ohio	
Abandoned Mines Program	
Ohio Department of Natural Resources, Division of Mineral Resources Management	http://minerals.ohiodnr.gov/
Maps and Databases	
Mine Locators: Mines of Ohio	http://minerals.ohiodnr.gov/abandoned-mine-land-reclamation/mine-locators
Geology and other Mine-Related Agencies	
Ohio Geological Survey	http://geosurvey.ohiodnr.gov/
Primary Environmental Agencies	
Ohio Department of Natural Resources Ohio Environmental Protection Agency	http://ohiodnr.gov/ https://www.epa.state.oh.us/
Oklahoma	
Abandoned Mines Program	
Oklahoma Conservation Commission, Abandoned Mine Land Reclamation Division	https://www.ok.gov/conservation/Agency_Divisions/Abandoned_Mine_Land_Reclamation_Division/index.html

Geology and other Mine-Related Agencies	
Oklahoma Geological Survey	http://www.ou.edu/ogs
Primary Environmental Agencies*	
Oklahoma Conservation Commission Oklahoma Department of Environmental Quality	https://www.ok.gov/conservation/ http://www.deq.state.ok.us/
Oregon	
Abandoned Mines Program	
Oregon Department of Geology and Mineral Industries	https://www.oregongeology.org/historicalmining.htm
Maps and Databases	
Oregon Historical Mining Information Archive	https://www.oregongeology.org/milo/map-minemaps.htm
Geology and other Mine-Related Agencies	
Oregon Department of Geology and Mineral Industries	https://www.oregongeology.org/
Primary Environmental Agencies*	
Oregon Department of Fish and Wildlife Oregon Department of Environmental Quality	https://www.dfw.state.or.us/ https://www.oregon.gov/DEQ/Pages/index.aspx
Pennsylvania	
Abandoned Mines Program	
Pennsylvania Department of Environmental Protection, Office of Active and Abandoned Mine Operations	https://www.dep.pa.gov/Business/Land/Mining/Pages/default.aspx

Maps and Databases	
Pennsylvania Mine Map Atlas	http://www.minemaps.psu.edu/
Geology and other Mine-Related Agencies	
Pennsylvania Geological Survey	https://www.dcnr.pa.gov/about/Pages/Geological-Survey.aspx
Primary Environmental Agencies*	
Pennsylvania Department of Conservation and Natural Resources Pennsylvania Department of Environmental Protection	https://www.dcnr.pa.gov/Pages/default.aspx https://www.dep.pa.gov/Pages/default.aspx
Rhode Island	
Abandoned Mines Program	
Rhode Island Department of Environmental Management	http://www.dem.ri.gov/
Geology and other Mine-Related Agencies	
Rhode Island Geological Survey	https://web.uri.edu/geo/rhode-island-geological-survey/
Primary Environmental Agencies*	
Rhode Island Department of Environmental Management	http://www.dem.ri.gov/
South Carolina	
Abandoned Mines Program	
South Carolina Department of Natural Resources	http://www.dnr.sc.gov/
Geology and other Mine-Related Agencies	
South Carolina Geological Survey	http://www.dnr.sc.gov/geology/index.htm

Primary Environmental Agencies*	
South Carolina Department of Natural Resources South Carolina Department of Health and Environmental Control	http://www.dnr.sc.gov/ https://scdhec.gov/
South Dakota	
Abandoned Mines Program	
South Dakota Department of Environment and Natural Resources	https://denr.sd.gov/
Geology and other Mine-Related Agencies	
South Dakota Geological Survey South Dakota Minerals and Mining Program	http://www.sdgs.usd.edu/ https://denr.sd.gov/des/mm/mmprogram.aspx
Primary Environmental Agencies*	
South Dakota Department of Environment and Natural Resources	https://denr.sd.gov/
Tennessee	
Abandoned Mines Program	
Tennessee Department of Environmental and Conservation, Land Reclamation Section	https://www.tn.gov/environment/permit-permits/water-permits1/surface-mining-permit/mining-land-reclamation.html
Geology and other Mine-Related Agencies	
Tennessee Geological Survey	https://www.tn.gov/environment/program-areas/tennessee-geological-survey.html
Primary Environmental Agencies*	
Tennessee Department of Environment and Conservation	https://www.tn.gov/environment.html

Texas	
Abandoned Mines Program	
Railroad Commission of Texas, Abandoned Mine Land Program	https://www.rrc.state.tx.us/mining-exploration/programs/abandoned-mine-land-program/
Geology and other Mine-Related Agencies	
Texas Geological Survey	http://www.beg.utexas.edu/outreach/state-geological-survey
Primary Environmental Agencies*	
Texas Commission on Environmental Quality	https://www.tceq.texas.gov/
Utah	
Abandoned Mines Program	
Utah Division of Oil, Gas and Mining, Abandoned Mine Reclamation Program	https://www.ogm.utah.gov/amr/index.php
Maps and Databases	
Abandoned Coal Mines in Utah Utah Mining Districts at Your Fingertips Large Mines in Utah (2008)	https://geology.utah.gov/map-pub/maps/interactive-maps/abandoned-coal-mines/ https://geology.utah.gov/map-pub/survey-notes/utah-mining-districts-at-your-fingertips/ https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-515.pdf
Geology and other Mine-Related Agencies	
Utah Geological Survey	https://geology.utah.gov/
Primary Environmental Agencies*	

Utah Department of Natural Resources Utah Department of Environmental Quality	https://naturalresources.utah.gov/ https://deq.utah.gov/
Vermont	
Abandoned Mines Program	
Vermont Department of Environmental Conservation, Sand, Gravel and Mineral Resources	https://dec.vermont.gov/geological-survey/resources-energy/minres
Geology and other Mine-Related Agencies	
Vermont Geological Survey	https://dec.vermont.gov/geological-survey
Primary Environmental Agencies*	
Vermont Agency of Natural Resources	https://anr.vermont.gov/
Virginia	
Abandoned Mines Program	
Virginia Department of Mines, Minerals and Energy, Abandoned Mine Land Program	https://www.dmme.virginia.gov/dmlr/dmlramllandingpage.shtml#
Maps and Databases	
Virginia Coal Mine Maps	https://www.dmme.virginia.gov/webmaps/AML/
Geology and other Mine-Related Agencies	
Virginia Division of Geology and Mineral Resources	https://www.dmme.virginia.gov/dgmr/divisiongeologymineralresources.shtml
Primary Environmental Agencies*	
Virginia Department of Conservation and Recreation Virginia Department of Environmental Quality	https://www.dcr.virginia.gov/ https://www.deq.virginia.gov/

Washington	
Abandoned Mines Program	
Washington Department of Natural Resources, Surface Mining and Reclamation	https://www.dnr.wa.gov/programs-and-services/geology/energy-mining-and-minerals/surface-mining-and-reclamation
Maps and Databases	
Washington Coal Mine Map Collection	https://www.dnr.wa.gov/programs-and-services/geology/energy-mining-and-minerals/coal-metallic-and-mineral-resources/coal
Geology and other Mine-Related Agencies	
Washington Geological Survey	https://www.dnr.wa.gov/geology
Primary Environmental Agencies*	
Washington Department of Natural Resources Washington Department of Ecology	https://www.dnr.wa.gov/ https://ecology.wa.gov/
West Virginia	
Abandoned Mines Program	
West Virginia Department of Environmental Protection, Office of Abandoned Mine Lands and Reclamation	https://dep.wv.gov/dlr/aml/Pages/default.aspx
Maps and Databases	
West Virginia Underground and Surface Coal Mine Maps	http://www.wvgs.wvnet.edu/GIS/CBMP/all_mining.html
Geology and other Mine-Related Agencies	
West Virginia Geological and Economic Survey	https://www.wvgs.wvnet.edu/
Primary Environmental Agencies*	

West Virginia Division of Natural Resources West Virginia Department of Environmental Protection	http://www.wvdnr.gov/ https://dep.wv.gov/Pages/default.aspx
Wisconsin	
Abandoned Mines Program	
Wisconsin Department of Natural Resources, Mining in Wisconsin	https://dnr.wi.gov/topic/Mines/
Geology and other Mine-Related Agencies	
Wisconsin Geological and Natural History Survey	https://wgnhs.wisc.edu/
Primary Environmental Agencies*	
Wisconsin Department of Natural Resources	https://dnr.wi.gov/
Wyoming	
Abandoned Mines Program	
Wyoming Department of Environmental Quality, Abandoned Mine Land	http://deq.wyoming.gov/aml/
Geology and other Mine-Related Agencies	
Wyoming State Geological Survey	https://www.wsgs.wyo.gov/
Primary Environmental Agencies*	
Wyoming Department of Environmental Quality	http://deq.wyoming.gov/

* Primary Environmental Agencies mainly deal with various environmental issues in the state, including those associated with abandoned mines. In some states, some of the same agencies are also involved with minerals and/or abandoned mines reclamation. A more comprehensive list of various state environmental agencies can be found at the Commission's website - https://www.ferc.gov/industries/hydropower/enviro/consultlist.aspx.