

FES 12-41

Proposed Land Use Plan Amendments for Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the Bureau of Land Management in Colorado, Utah, and Wyoming and Final Programmatic Environmental Impact Statement

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Bureau of Land Management



BLM Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in this document. Some acronyms used only in tables may be defined only in those tables.

GENERAL ACRONYMS AND ABBREVIATIONS

| | |
|---------|---|
| ACEC | Area of Critical Environmental Concern |
| AGR | aboveground retort |
| AIRFA | American Indian Religious Freedom Act |
| AMSO | American Shale Oil, LLC |
| ANFO | ammonium nitrate and fuel oil |
| APE | Area of Potential Effects |
| API | American Petroleum Institute |
| APLIC | Avian Power Line Interaction Committee |
| APP | Avian Protection Plan |
| AQRV | air quality–related value |
| ARCO | Atlantic Richfield Company |
| ATP | Alberta Taciuk Process |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| AWEA | American Wind Energy Association |
| AZGFD | Arizona Game and Fish Department |
| | |
| BA | biological assessment |
| BCD | barrels per calendar day |
| BLM | Bureau of Land Management |
| BMP | best management practice |
| BO | biological opinion |
| BOR | U.S. Bureau of Reclamation |
| BPA | Bonneville Power Administration |
| BSD | barrels per stream day |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| | |
| CAA | Clean Air Act |
| CAPP | Canadian Association of Petroleum Producers |
| CARB | California Air Resources Board |
| CASTNET | Clean Air Status and Trends Network |
| CBOSC | Cathedral Bluffs Oil Shale Company |
| CCR™ | Conduction, Convection, and Reflux |
| CCW | coal combustion waste |
| CDC | Centers for Disease Control and Prevention |
| CDOT | Colorado Department of Transportation |
| CDOW | Colorado Division of Wildlife (now Colorado Parks and Wildlife) |

| | |
|--------|--|
| CDPHE | Colorado Department of Public Health and Environment |
| CEQ | Council on Environmental Quality |
| CFR | <i>Code of Federal Regulations</i> |
| CHAT | Critical Habitat Assessment Tool |
| CHL | combined hydrocarbon lease |
| CIRA | Cooperative Institute for Research in the Atmosphere |
| CNHP | Colorado Natural Heritage Program |
| COGCC | Colorado Oil and Gas Conservation Commission |
| CPC | Center for Plant Conservation |
| CPW | Colorado Parks and Wildlife (formerly Colorado Division of Wildlife) |
| CRBSCF | Colorado River Basin Salinity Control Forum |
| CRD | Comment Response Document |
| CRSCP | Colorado River Salinity Control Program |
| CRWQIP | Colorado River Water Quality Improvement Program |
| CSS | cyclic steam stimulation |
| CSU | Controlled Surface Use |
| CWA | Clean Water Act |
| CWCB | Colorado Water Conservation Board |
| CWS | Canadian Wildlife Service |
| | |
| DoD | U.S. Department of Defense |
| DOE | U.S. Department of Energy |
| DOI | U.S. Department of the Interior |
| DOL | U.S. Department of Labor |
| DOT | U.S. Department of Transportation |
| DRMS | Division of Reclamation Mining & Safety (Colorado) |
| DRUA | Dispersed Recreation Use Area |
| | |
| EA | environmental assessment |
| EGL | EGL Resources, Inc. |
| EIA | Energy Information Administration |
| E-ICP | bare electrode in situ conversion process |
| EIS | environmental impact statement |
| EMF | electric and magnetic field |
| E.O. | Executive Order |
| EOR | enhanced oil recovery |
| EPA | U.S. Environmental Protection Agency |
| EPRI | Electric Power Research Institute |
| EQIP | Environmental Quality Incentives Program |
| ESA | Endangered Species Act of 1973 |
| | |
| FAA | Federal Aviation Administration |
| FLPMA | Federal Land Policy and Management Act of 1976 |
| FONSI | Finding of No Significant Impact |
| FR | <i>Federal Register</i> |

| | |
|-----------------|--|
| FTE | full-time equivalent |
| FY | fiscal year |
| GCR | gas combustion retort |
| GHG | greenhouse gas |
| GIS | geographic information system |
| GPO | Government Printing Office |
| GSENM | Grand Staircase–Escalante National Monument |
| HAP | hazardous air pollutant |
| HAZCOM | hazard communication |
| HFC | hydrofluorcarbon |
| HMA | Herd Management Area |
| HMMH | Harris Miller Miller & Hanson, Inc. |
| I-70 | Interstate 70 |
| IARC | International Agency for Research on Cancer |
| ICP | in situ conversion process |
| IEC | International Electrochemical Commission |
| IM | Instructional Memorandum |
| IPPC | Intergovernmental Panel on Climate Change |
| ISA | Instant Study Area |
| ISWS | Illinois State Water Survey |
| IUCNNR | International Union for Conservation of Nature and Natural Resources |
| JMH CAP | Jack Morrow Hills Coordinated Activity Plan |
| KOP | key observation point |
| KSLA | Known Sodium Leasing Area |
| LAU | Lynx Analysis Unit |
| L _{dn} | day-night average sound level |
| L _{eq} | equivalent sound pressure level |
| LETG | Laramie Energy Technology Center |
| LM | Office of Legacy Management (DOE) |
| LPG | liquefied petroleum gas |
| LWC | lands having wilderness characteristics |
| M&I | municipal and industrial |
| MFP | Management Framework Plan |
| MIG, Inc. | Minnesota IMPLAN Group, Inc. |
| MIS | modified in situ recovery |
| MLA | Mineral Leasing Act |
| MMC | Multi Minerals Corporation |
| MMTA | Mechanically Mineable Trona Area |
| MOU | Memorandum of Understanding |

| | |
|----------|--|
| MPCA | Minnesota Pollution Control Agency |
| MSDS | Material Safety Data Sheet |
| MSHA | Mine Safety and Health Administration |
| MSL | mean sea level |
| MTR | military training route |
| | |
| NAAQS | National Ambient Air Quality Standards |
| NADP | National Atmospheric Deposition Program |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NCA | National Conservation Area |
| NCDC | National Climate Data Center |
| NEC | National Electric Code |
| NEPA | National Environmental Policy Act of 1969 |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NFS | National Forest Service |
| NHPA | National Historic Preservation Act of 1966 |
| NLCS | National Landscape Conservation System |
| NMFS | National Marine Fisheries Service |
| NNHP | Nevada Natural Heritage Program |
| NOA | Notice of Availability |
| NOI | Notice of Intent |
| NORM | naturally occurring radioactive materials |
| NOSR | Naval Oil Shale Reserves |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRA | National Recreation Area |
| NRHP | <i>National Register of Historic Places</i> |
| NSC | National Safety Council |
| NSO | No Surface Occupancy |
| NTSA | National Trails System Act |
| NTT | National Technical Team |
| NWCC | National Wind Coordinating Committee |
| NWR | National Wildlife Refuge |
| | |
| OHV | off-highway vehicle |
| OOSI | Occidental Oil Shale, Inc. |
| OPEC | Organization of Petroleum Exporting Countries |
| OSEC | Oil Shale Exploration Company |
| OSEW/SPP | Oil Sands Expert Workgroup/Security and Prosperity Partnership |
| OSHA | Occupational Safety and Health Administration |
| OSTS | oil shale and tar sands |
| OTA | Office of Technology Assessment |
| | |
| PA | Programmatic Agreement |
| PADD | Petroleum Administration for Defense District |
| PAH | polycyclic aromatic hydrocarbon |

| | |
|-------------------|---|
| PCB | polychlorinated biphenyl |
| PEIS | programmatic environmental impact statement |
| PFC | perfluorocarbons |
| PFYC | Potential Fossil Yield Classification |
| PILT | payment in lieu of taxes |
| P.L. | Public Law |
| PM | particulate matter |
| PM _{2.5} | particulate matter with an aerodynamic diameter of 2.5 µm or less |
| PM ₁₀ | particulate matter with an aerodynamic diameter of 10 µm or less |
| PPE | personal protective equipment |
| PPH | Preliminary Priority Habitat |
| PRLA | preference right lease area |
| PSD | Prevention of Significant Deterioration |
| | |
| R&D | research and development |
| R&I | relevance and importance |
| RBOSC | Rio Blanco Oil Shale Company |
| RCRA | Resource Conservation and Recovery Act of 1976 |
| RD&D | research, development, and demonstration |
| RF | radio frequency |
| RFDS | reasonably foreseeable development scenario |
| RMP | Resource Management Plan |
| ROD | Record of Decision |
| ROI | region of influence |
| ROS | Recreation Opportunity Spectrum |
| ROW | right-of-way |
| | |
| SAGD | steam-assisted gravity drainage |
| SAMHSA | Substance Abuse and Mental Health Services Administration |
| SDWA | Safe Drinking Water Act of 1974 |
| SFC | Synthetic Fuels Corporation |
| SHPO | State Historic Preservation Office(r) |
| SIP | State Implementation Plan |
| SMA | Special Management Area |
| SMP | suggested management practice |
| SPR | Strategic Petroleum Reserve |
| SRMA | Special Recreation Management Area |
| SSI | self-supplied industry |
| STSA | Special Tar Sand Area |
| SWCA | SWCA, Inc., Environmental Consultants |
| SWPPP | Stormwater Pollution Prevention Plan |
| SWWRC | States West Water Resources Corporation |
| | |
| TDS | total dissolved solids |
| THAI | toe to head air injection |
| TIS | true in situ recovery |

| | |
|--------|---|
| TL | timing limitation |
| TMDL | Total Maximum Daily Load |
| TOSCO | The Oil Shale Corporation |
| TSCA | Toxic Substances Control Act of 1976 |
| TSDf | treatment, storage, and disposal facility |
| UDEQ | Utah Department of Environmental Quality |
| UDNR | Utah Department of Natural Resources |
| UDWR | Utah Division of Wildlife Resources |
| UGS | Utah Geological Survey |
| UIC | underground injection control |
| ULP | Uranium Leasing Program |
| USACE | U.S. Army Corps of Engineers |
| USC | <i>United States Code</i> |
| USDA | U.S. Department of Agriculture |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish and Wildlife Service |
| USGCRP | U.S. Global Change Research Program |
| USGS | U.S. Geological Survey |
| VCRS | Visual Contrast Rating System |
| VOC | volatile organic compound |
| VRI | Visual Resource Inventory |
| VRM | Visual Resource Management |
| WDEQ | Wyoming Department of Environmental Quality |
| WEQC | Wyoming Environmental Quality Council |
| WGFD | Wyoming Game and Fish Department |
| WRAP | Western Regional Air Partnership |
| WRCC | Western Regional Climate Center |
| WRI | World Resources Institute |
| WRSOC | White River Shale Oil Corporation |
| WSA | Wilderness Study Area |
| WSR | Wild and Scenic River |
| WTGS | wind turbine generator system |
| WYCRO | Wyoming Cultural Records Office |
| WYNDD | Wyoming Natural Diversity Database |

CHEMICALS

| | | | |
|-------------------|---------------------------|------------------|------------------|
| CH ₄ | methane | H ₂ S | hydrogen sulfide |
| CO | carbon monoxide | | |
| CO ₂ | carbon dioxide | NH ₃ | ammonia |
| CO ₂ e | carbon dioxide equivalent | NO ₂ | nitrogen dioxide |

Final OSTs PEIS

| | | | |
|------------------|-----------------|-----------------|---------------------|
| N ₂ O | nitrous oxide | SF ₆ | sulfur hexafluoride |
| NO _x | nitrogen oxides | SO ₂ | sulfur dioxide |
| | | SO _x | sulfur oxides |
| O ₃ | ozone | | |
| Pb | lead | | |

UNITS OF MEASURE

| | | | |
|-----------------|------------------------------|-----------------|-------------------------------|
| ac-ft | acre foot (feet) | kPa | kilopascal(s) |
| | | kV | kilovolt(s) |
| bbl | barrel(s) | kWh | kilowatt-hour(s) |
| Btu | British thermal unit(s) | | |
| | | L | liter(s) |
| °C | degree(s) Celsius | lb | pound(s) |
| cfs | cubic foot (feet) per second | | |
| cm | centimeter(s) | m | meter(s) |
| | | m ² | square meter(s) |
| dB | decibel(s) | m ³ | cubic meter(s) |
| dba | A-weighted decibel(s) | mg | milligram(s) |
| | | mi | mile(s) |
| °F | degree(s) Fahrenheit | mi ² | square mile(s) |
| ft | foot (feet) | mJ | megajoule(s) |
| ft ³ | cubic foot (feet) | mm | millimeter(s) |
| | | MMBtu | million Btus |
| g | gram(s) | mph | mile(s) per hour |
| gal | gallon(s) | MW | megawatt(s) |
| GJ | gigajoule(s) | | |
| gpd | gallon(s) per day | ppb | part(s) per billion |
| gpm | gallon(s) per minute | ppm | part(s) per million |
| GW | gigawatt(s) | ppmv | part(s) per million by volume |
| GWh | gigawatt hour(s) | psi | pound(s) per square inch |
| | | | |
| h | hour(s) | rpm | rotation(s) per minute |
| ha | hectare(s) | | |
| hp | horsepower | s | second(s) |
| Hz | hertz | scf | standard cubic foot (feet) |
| | | | |
| in. | inch(es) | yd ² | square yard(s) |
| | | yd ³ | cubic yard(s) |
| K | degree(s) Kelvin | yr | year(s) |
| kcal | kilocalorie(s) | | |
| kg | kilogram(s) | µm | micrometer(s) |
| km | kilometer(s) | | |

ENGLISH/METRIC AND METRIC/ENGLISH EQUIVALENTS^a

The following table lists the appropriate equivalents for English and metric units.

| Multiply | By | To Obtain |
|---|----------|--------------------------------------|
| <i>English/Metric Equivalents</i> | | |
| acres | 0.4047 | hectares (ha) |
| cubic feet (ft ³) | 0.02832 | cubic meters (m ³) |
| cubic yards (yd ³) | 0.7646 | cubic meters (m ³) |
| degrees Fahrenheit (°F) –32 | 0.5555 | degrees Celsius (°C) |
| feet (ft) | 0.3048 | meters (m) |
| gallons (gal) | 3.785 | liters (L) |
| gallons (gal) | 0.003785 | cubic meters (m ³) |
| inches (in.) | 2.540 | centimeters (cm) |
| miles (mi) | 1.609 | kilometers (km) |
| miles per hour (mph) | 1.609 | kilometers per hour (kph) |
| pounds (lb) | 0.4536 | kilograms (kg) |
| short tons (tons) | 907.2 | kilograms (kg) |
| short tons (tons) | 0.9072 | metric tons (t) |
| square feet (ft ²) | 0.09290 | square meters (m ²) |
| square yards (yd ²) | 0.8361 | square meters (m ²) |
| square miles (mi ²) | 2.590 | square kilometers (km ²) |
| yards (yd) | 0.9144 | meters (m) |
| <hr style="border-top: 1px dashed black;"/> | | |
| <i>Metric/English Equivalents</i> | | |
| centimeters (cm) | 0.3937 | inches (in.) |
| cubic meters (m ³) | 35.31 | cubic feet (ft ³) |
| cubic meters (m ³) | 1.308 | cubic yards (yd ³) |
| cubic meters (m ³) | 264.2 | gallons (gal) |
| degrees Celsius (°C) +17.78 | 1.8 | degrees Fahrenheit (°F) |
| hectares (ha) | 2.471 | acres |
| kilograms (kg) | 2.205 | pounds (lb) |
| kilograms (kg) | 0.001102 | short tons (tons) |
| kilometers (km) | 0.6214 | miles (mi) |
| kilometers per hour (kph) | 0.6214 | miles per hour (mph) |
| liters (L) | 0.2642 | gallons (gal) |
| meters (m) | 3.281 | feet (ft) |
| meters (m) | 1.094 | yards (yd) |
| metric tons (t) | 1.102 | short tons (tons) |
| square kilometers (km ²) | 0.3861 | square miles (mi ²) |
| square meters (m ²) | 10.76 | square feet (ft ²) |
| square meters (m ²) | 1.196 | square yards (yd ²) |

^a In general in this PEIS, only English units are presented. However, where reference sources provided both English and metric units, both values are presented in the order in which they are given in the source. Where reference sources provided only metric units, only those units are presented.

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