ARIZONA DEPARTMENT OF WATER RESOURCES

POSSIBLE WATER MANAGEMENT ISSUES & REQUIREMENTS FOR CONCENTRATED SOLAR POWER PLANTS IN ARIZONA

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BACKGROUND

The Bureau of Land Management (BLM) has recently received two applications for photovoltaic power plants and more than eight applications for the construction and operation of concentrated solar power plants on BLM lands. Based on meetings the BLM has had to date, an additional thirty applications are expected to be submitted within the next twelve months. The forty or more proposed solar power plants would encompass more than 899,000 acres of land and will generate more than 20 gigawatts. The total generation of electricity from all sources in the State of Arizona is currently around 20 gigawatts.

The identified source of water for the proposed solar plants thus far has been groundwater. Several of the proposed solar power plant sites, however, may be located within the proposed accounting surface area for the Colorado River and therefore may pump Colorado River water. Additionally, several of the applications are proposing to construct large surface water impoundment areas to capture surface water from storm events to prevent flooding. This activity would require the obtainment of a surface water permit and may also require a license, depending on the size, to operate a jurisdictional dam prior to construction.

The applications currently received by the BLM are primarily located in Mohave, La Paz, Yuma, Maricopa and Pinal Counties. The overwhelming majority of these proposed solar power plants are located outside of the State's Active Management Areas (AMA)[1], although some are within the Phoenix and Tucson AMAs. Proposed solar power plants located within AMAs are more restricted in their use of groundwater by State statutes and by rules allowing the Department the ability to protect other water users. Outside of an AMA the Department's ability to protect other water users is limited and may pose serious concerns within some rural communities.

WATER MANAGEMENT REQUIREMENTS

As part of the development of an approval process, the BLM has requested input from the Department on issues to consider. The following identifies information and issues regarding the potential use of ground and surface water for power generation that the BLM needs to be aware of when developing their criteria for consideration in the approval process.

[1] An Active Management Area – means a geographical area which has been designated pursuant to the Groundwater Code as requiring active management of groundwater or, in the case of the Santa Cruz active management area, active management of any water, other than stored water, withdrawn from a well (See attached map of AMAs).

GROUNDWATER FROM WELLS LOCATED INSIDE AN ACTIVE MANAGEMENT AREA (AMA)

Groundwater withdrawals from within an AMA are strictly regulated and a withdrawal authority or grandfathered right is required for <u>all</u> withdrawals from wells with a pump capacity in excess of 35 gallons per minute (non-exempt well)[2].

Definitions

Groundwater: Groundwater means water under the surface of the earth regardless of the geologic structure in which it is standing or moving. Groundwater does not include water flowing in underground streams with ascertainable beds and banks (A.R.S. § 45-101 (5)).

Non-exempt Well: Is a well having a pump that has a maximum capacity of more than thirty-five gallons per minute.

Assured Water Supply (for the purposes of a **General Industrial Use (GUI) Permit**): means that sufficient groundwater of adequate quality will be available to the applicant to satisfy the projected GIU for the duration of the permit (A.R.S. § 45-515 (6)).

Application Process: To pump groundwater from a non-exempt well within an AMA, the applicant would need to file a non-exempt well permit application, Form No. **DWR 55-0001** (A.R.S. § 45-599) and would need one of the following authorities:

- An existing **Irrigation Grandfathered Groundwater Right (GFR)** that can be legally retired to a **Type 1 Non-Irrigation GFR** (A.R.S. § 45-469); or

- An existing **Type 1 Non-Irrigation GFR** (Note: There may be some restriction when using a Type 1 GFR. Factors such as, but not limited to, original ownership, point of withdrawal and place of use must be considered (A.R.S. §§ 45-470, 45-472, 45-473, 45-542)); or

- A **Type 2 Non-Irrigation GFR**: A Type 2 Non-Irrigation GFR can be purchased or leased from another owner within the same AMA (A.R.S. § 45-471).

  (Note: All of the above have annual volumetric allotments and therefore would need to be large enough to meet the annual withdrawal demands of the proposed solar power plants).

- A **GIU Permit**: An applicant can apply for a GIU permit to pump groundwater from a point outside of the exterior boundaries of the service area of a city, town or private water company for non-irrigation purposes (A.R.S. § 45-515) subject to the following:
  - The applicant must demonstrate that it has explored all other possibilities of source water (A.R.S. § 45-515 (A)), i.e. does not own grandfathered rights; does not have

[2] For information on withdrawals from wells of 35 gallons or less, see section on Exempt Wells, below.

access to uncommitted CAP, effluent or surface water; is not within an existing service area and has received denial of service if located within 3 miles of the exterior boundaries of a service area.
  - The general demand calculation provided by the applicant must clearly demonstrate the demand for the proposed GIU permit.
  - The applicant must show that there is an "assured water supply" for the intended use at the intended point of withdraw (A.R.S. § 45-515 (A) (6)).
  - The permit may be granted for a period of up to fifty years. An application for renewal may be submitted and will be reviewed under the same criteria used in granting the original permit (A.R.S. § 45-515).
  - If during the life of the permit, the Department determines that uncommitted municipal and industrial central Arizona project water is available, or that effluent or other water of adequate quality is available at a cost comparable to groundwater, the Department may require the permittee to use such water in lieu of groundwater (A.R.S. § 45-515 (C)).

- All groundwater withdrawals pursuant to the above authorities are subject to annual reporting requirements (A.R.S. § 45-632).

- All groundwater withdrawals for beneficial use pursuant to the above authorities are subject to withdrawal fees (A.R.S. §§ 45-611, 45-612, and 45-613).

If the applicant needs to drill a new well or increase a permitted volume on an existing well drilled after June 12, 1980, the following applies (A.R.S. § 45-599 (C)):

- If a new well is proposed, the well must be drilled by a well driller that is licensed by the Department and has a valid license issued by the Registrar of Contractor that is of the type to construct the well described in the application (A.R.S. § 45-596 (11)).

- The applicant may be required to submit a hydrologic impact analysis to assist the Department in determining if any existing wells are impacted within a 5-year, 10-foot drawdown impact radius of the well. If any existing wells are within that radius, the new well may not be drilled (or the permitted pumping volume may not be increased) unless the applicant obtains the consent of all affected well owners (Arizona Administrative Code (A.A.C.) R12-15-1302).

- The Department will also consider land subsidence issues, as well as the migration of contaminated groundwater when permitting a new well or increasing the permitted volume of an existing well (A.A.C. R12-15-1302).

Conservation Requirements: The Department's Third Management Plans[3] state that any power plant using groundwater and built after 1984 within an AMA must reach 15 cycles of concentration before blowing down their cooling tower water (See attached).

GROUNDWATER FROM WELLS LOCATED INSIDE AN IRRIGATION NON-EXPANSION AREA (INA)

Application Process: To drill a well in an INA, a person must file a **Notice of Intent to Drill , Deepen, Replace, or Modify a Well, Form No. DWR 55-40** (A.R.S. § 45-596).

- A person withdrawing groundwater from a non-exempt well within an INA, must use a measuring device and measuring method to record water use. The water use must be reported to the Department by March 31 of the following calendar year (A.R.S. § 45-437).

- A person may not pump over 100 acre-feet of water in the Harquahala INA for commercial or industrial purposes unless a number of pumping restrictions are met, including restrictions on the location of withdrawal of water and quantity of pumping (A.R.S. § 45-440).

GROUNDWATER FROM WELLS LOCATED OUTSIDE AN AMA AND FROM EXEMPT WELLS LOCATED WITHIN AN AMA

Exempt Well: An exempt well is a well used for non-irrigation purposes with a maximum pumping capacity of not more than thirty-five gallons per minute (A.R.S. §§ 45-402 (8) and 45-454).

Application Process: To pump groundwater from a new well outside of an AMA or from a new exempt well inside an AMA, the applicant must file a **Notice of Intent to Drill, Deepen, Replace, or Modify a Well , Form No. DWR 55-40** (A.R.S. § 45-596).

- The well must be drilled by a well driller that is licensed by the Department and has a valid license issued by the Registrar of Contractors that is of the type to construct the well described in the application (A.R.S. § 45-596 (11)).

- If the applicant is not the owner of the land where the well will be located, permission must be granted from the land owner. The well must be completed within one year after the date of the application.

- In an AMA, an exempt well may not be drilled on land if any part of the land is within 100 feet of the operating water distribution system of a municipal provider with an assured water supply designation unless the applicant qualifies for an exemption (A.R.S. § 45-454 (C) and (D)).

[3] Management Plans are adopted by the Department every ten years, beginning in 1980, for each of the five AMAs. A.R.S. § 45-561 *et seq.*

- If the applicant will use an existing exempt well, the applicant must notify the Department of any changes in use or places of use by filing a **Change of Well** form.

- In an AMA, with certain limited exceptions, only one exempt well may be drilled or used to serve the same use at the same location (A.R.S. § 45-454(I).

Groundwater Transportation Restrictions

- Groundwater can only be used within the groundwater basin in which it is withdrawn and cannot be transported away from the basin, except as expressly allowed in statute (A.R.S. §§ 45-544 and 45-551). There are no statutory exceptions that would allow groundwater to be transported away from a groundwater basin to another basin outside of an AMA for use by a new power plant.. There are several exceptions that would allow groundwater to be transported away from a groundwater basin into an AMA for use by a new power plant. The exceptions apply to groundwater withdrawn in the McMullen Valley groundwater basin, the Butler Valley groundwater basin, the Harquahala INA and the Big Chino Sub-basin of the Verde River groundwater basin. There are restrictions on who may transport the groundwater, where the groundwater may be withdrawn and the volume of groundwater that may be withdrawn (A.R.S. §§ 45-552, 45-553, 45-554 and 45-555).

Future Colorado River Water Pumping Restrictions

- On July 16, 2008, Reclamation published a proposed rule to regulate the use of Lower Colorado River water without a legal entitlement. Completion of the rulemaking process will activate A.R.S. § 45-596.01 thirty days after the Secretary publishes final rules in the Federal Register. This statute will require a person who files a notice of intent to drill a well that will pump Colorado River water to include with the notice proof that the person has a legal right to use Colorado River water.

  (Note: General maps of the accounting surface can be found in the Federal Register notice, Volume 73, No. 137, Wednesday, July 16, 2008 – Pages 40926 – 40932. Detail maps are posted on the U.S, Bureau of Reclamation website.)

EFFLUENT OR CENTRAL ARIZONA PROJECT WATER USED INSIDE OR OUTSIDE OF AN AMA OR INA

The applicant can directly use 100% effluent or CAP water without authority from the Department and may be exempt from having to comply with mandatory industrial conservation requirements if the use is in an AMA.

The applicant can also pursue use of effluent or CAP water stored underground through the Department's Underground Water Storage and Recovery Program. The applicant would need to file a Recovery Well (RW) Permit (A.R.S. § 45-834.01) that allows the permit holder to recover stored water on an annual basis pursuant to A.R.S. § 45-851.01 or to recover long-term storage credits pursuant to A.R.S. § 45-852.01. If an entity wanting to earn or purchase CAP storage

credits is also withdrawing groundwater, the accrual of or acquisition of CAP storage credits may be subject to statutory limitations (A.R.S. §§ 45-802.01(22), 45-852.01(B)(1) and 45-854.01(C)).

An impact analysis is required under certain circumstances to ensure that the recovery of the stored water does not cause unreasonably increasing damage to surrounding land and other water users. In an AMA, if the local average annual groundwater decline is four feet or more, recovery of stored water from the area may be prohibited until local groundwater decline rates improve. More information and details on obtaining a recovery well permit may be found at: http://www.azwater.gov/dwr/Content/Find_by_Program/Recharge/types_of_recharge_permits.htm.

SURFACE WATER USED INSIDE OR OUTSIDE OF AN AMA OR INA

Definition: Surface water is defined by A.R.S. § 45-101(9) as waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, floodwater, wastewater or surplus water, and of lakes, ponds and springs on the surface.

Note:

- Effluent does not become appropriable until it takes on the characteristics of surface water (A.R.S. § 45-101(4)).

- Colorado River Water: The applicant must have the appropriate authority from the Bureau of Reclamation.

- If surface water is being diverted at a rate of over 500 gallons per minute, not being used for irrigation purposes, and is located within the Gila Maintenance Area, the Department must notify the appropriate parties (per the Gila River Indian Water Rights Settlement) of the application. However, the application will continue to be processed.

Beneficial Use: The surface water must be put to beneficial use. Beneficial uses are limited to domestic, municipal, irrigation, stock watering, power, recreation, wildlife, including fish, non-recoverable water storage and mining uses (A.R.S. § 45-151 (A)). Beneficial use is the basis, measure and limit to the use of water (A.R.S. § 45-141 (B)).

Application Process: To divert or retain surface water, the applicant must file an Application to Appropriate Public Water (A.R.S. §§ 45-152 and 153). If the applicant is not the owner of the land where the water will be used, permission must be granted from the landowner.

If the beneficial use of the water is for power, the application shall state (A.R.S. § 45-152(B)(2)):

- The nature of the works by which power is to be developed,
- The pressure head and amount of water to be utilized,

- The points of diversion and release of the water,
- The uses to which the power is to be applied.

If a reservoir is to be constructed, the application shall state (A.R.S. § 45-152 (3)):
- The dimensions and description of the dam,
- The capacity of the reservoir for each foot in depth,
- The description of the land to be submerged,
- The beneficial uses to be made of the impounded waters.

An application for a permit to appropriate surface water for generating electric energy in excess of 25,000 horsepower, or an application for a permit to build a dam for generating hydroelectric energy on a stream in excess of 25,000 horsepower, must be authorized by an act of the Legislature. A.R.S. § 45-156(A).

Impoundments of water that are twenty-five feet or more in height or the storage capacity of which will be more than fifty acre-feet (A.R.S. § 45-1201 (1)) must comply with State Dam Safety Statutes unless they are to be owned, controlled, operated, maintained or managed under the Bureau of Land Management Dam Safety program or another exception applies.

The application must also be accompanied by maps, drawings and data prescribed by the director (A.R.S. § 45-152 (C))

- **Permit**: The application to appropriate public water moves through a number of administrative steps involving public notice and the possibility of an administrative hearing. It culminates in the Department's approval or rejection of the application. The Director must approve an application in proper form unless the application or proposed use conflicts with vested rights, is a menace to public safety or is against the interests and welfare of the public. A.R.S. § 45-153. The Director may require additional information from the applicant to demonstrate that the diversion will not conflict with vested rights or to enable the Department to protect properly the public interest. If the application is approved, a permit to appropriate public water is issued to the applicant. The permit authorizes the permit holder to construct the necessary works and put the water to a beneficial use. Construction of the works shall begin within two years after approval of the application and must be completed within a reasonable time, which shall be fixed in the permit and not to exceed five years from the date of approval. The director shall for good cause shown, extend the term beyond the five-year period if the magnitude, physical difficulties and cost of the work justify extension (A.R.S. § 45-160).

Certificate of Water Right: When the works have been constructed and the surface water has been put to beneficial use in accordance with the provisions of the statute the applicant will be issued a certificate of water right, subject to a preferred right of renewal (A.R.S. § 45-162 (A)).

Certificates for rights to the use of water for power development limit the right or franchise to a period of forty years from the date of application (A.R.S. § 45-162 (B)).

Other Options:
The applicant may use existing surface water rights or claims. The applicant would need to file the appropriate applications to change beneficial uses or places of use.

Change in Use: A change in the beneficial use of water appropriated for domestic, municipal or irrigation uses shall not be made without approval of the Director (A.R.S. § 45-156 (B)).

> **Application Process**: To make a change in beneficial use, the applicant would need to file an Application for a Change in Use. The application moves through a number of administrative steps involving public notice and the possibility of an administrative hearing. It culminates in the Department's approval or rejection of the application. If the application is approved, any issued or reissued permit or certificate will reflect the new beneficial use.

Sever and Transfer: A surface water right or claim may be severed from the land to which it is appurtenant or from the site of its use if for other than irrigation purposes and with the consent and approval of the owner of such right may be transferred for use for irrigation of agricultural lands or for municipal, stock watering, power and mining purposes, and to the state or its political subdivisions for use for recreation and wildlife purposes, including fish, without losing the established priority date.

> **Application Process**: To sever and transfer a water right or claim, the applicant would file an Application to Sever and Transfer. If the applicant also needs to make a change in beneficial use or a change in ownership, the sever and transfer will address all of these without the applicant having to file other applications. The sever and transfer application moves through a number of administrative steps involving public notice and the possibility of an administrative hearing. It culminates in the Department's approval or rejection of the application. If the application is approved, the reissued water right will reflect the changes requested. The following limitation and conditions apply:

- Surface water on or from any watershed or drainage area which supplies or contributes water for the irrigation of lands within an irrigation district, agricultural improvement district or water users' association shall not be severed or transferred without the consent of the governing body of such irrigation district, agricultural improvement district or water users' association.
- The water right or claim to be transferred must have been lawfully perfected under the laws of the territory or the state of Arizona.
- The applicant must show that the water right or claim has not been forfeited or abandoned.
- Vested or existing rights to the use of water shall not be affected, infringed upon nor interfered with.
- In no event shall the water diverted or used after the transfer of such rights exceed the vested rights existing at the time of such severance and transfer. The director shall by order define and limit the amount of water to be diverted or used annually subsequent to the sever and transfer.

- The sever and transfer must be approved by the director and approval of the director shall prescribe the condition of the approval.

OTHER STATEWIDE WATER MANAGEMENT ISSUES TO CONSIDER

Growth

Proposed subdivisions are required to obtain a determination of assured or adequate water supply for 100 years prior to receiving final plat approval. Proposed concentrated solar plants could seriously impact assured or adequate water supply determinations received by development from the Department. Areas anticipating significant growth are as follows:

- More than 350,000 residential lots have been proposed for development in Mohave County.
- More than 35,000 residential lots have been proposed in the Benson area of Cochise County.
- More than 7,000 residential lots have been proposed in the Safford area of Graham County.
- Several subdivisions have been proposed in the Quartzite area of La Paz County.

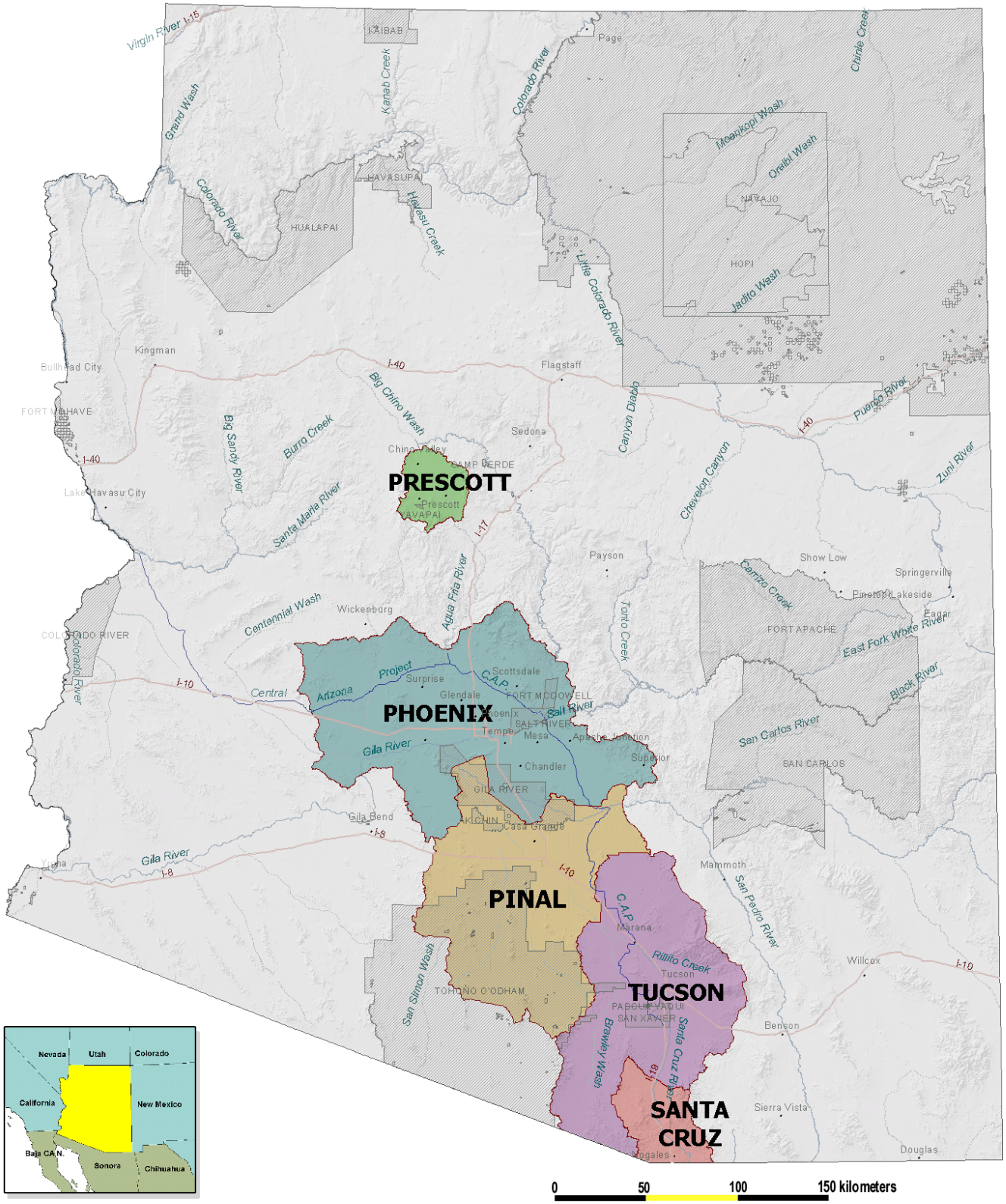
- Assured water supply determinations are required within the State's AMAs, where the majority of the growth has occurred in the State.

Sub-Flow

Wells drilled within an area of the State subject to a general adjudication pursuant to A.R.S. § 45-252 that are determined to be pumping appropriable water will be subject to the jurisdiction of the Adjudication Court.

Other State Agencies' Involvement

In addition to ADWR's requirements, the Arizona Corporation Commission (ACC) and the Arizona Department of Environmental Quality (ADEQ) are two state agencies that may have additional water management requirements for proposed solar power plants in Arizona. Coordination between the BLM and these agencies is highly encouraged.

Finally, in recognition of the large number of solar power plant applications being proposed in Arizona, and the potential involvement of numerous state agencies, the State has recently initiated a multi-agency coordination effort. In addition to holding meetings with the appropriate state agencies, joint meetings with the BLM and possibly other federal agencies have been tentatively scheduled for early 2009.

Active Management Areas