



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Office of Groundwater
411 National Center
Reston, Virginia 20192

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MEMORANDUM

OFFICE OF GROUNDWATER TECHNICAL MEMORANDUM 2016.02

SUBJECT: Policy for Documenting, Archiving, and Public Release of Numerical Groundwater Flow and Transport Models

Summary

This Technical Memorandum describes documentation, archival, and public-release requirements for numerical groundwater flow and transport models (groundwater models) and their electronic model archives. This memorandum is effective October 1, 2016 and is not retroactive. The following bullets describe the contents of the memorandum:

- New numerical groundwater models, existing models that have undergone substantial modification, and model scenarios that require interpretation must be documented in a [new interpretive information product](#);
- Groundwater model archives are required, must conform with the USGS Public Access Plan, and must be formally distributed online to the public as a [USGS data release](#) concurrent with the information product that describes the model;
- To facilitate uniformity and usability of electronic model archives, there is a required format for groundwater model archives;
- Scenario models using (and minor updates of) existing, documented, and published groundwater models can, in some cases, be distributed solely as a new [USGS data release](#) that references the original model information product(s).

Implementation details for this policy are described on the [Groundwater Model Archiving Website](#).

Background

Nationally-consistent data collection, management, and archival are hallmarks of the USGS. As a result of the [2013 Federal Open Data Policy](#), the USGS released Instructional Memorandum (IM) [2015-03](#) regarding review, approval and release of scientific data. Policies related to the IM are expected to be fully implemented in Fiscal Year 2017. In keeping with the USGS standard of national consistency and to comply with the Federal Open Data Policy, the [USGS Public Access Plan](#), and USGS Fundamental Science Practices, the Office of Groundwater (OGW) has developed an updated policy for documenting and archiving numerical groundwater models and making the archives available to the public.

The purpose of this memorandum is to reiterate, revise, and establish policy regarding the documentation, archival, and release of numerical groundwater models. OGW Technical Memorandum [2015.02](#) defines the conditions under which an electronic model archive is required as well as the review process for the archive. These same conditions also define when an electronic model archive is required for a numerical groundwater model. This Technical Memorandum provides additional requirements to OGW Technical Memorandum [2015.02](#) in that when an electronic model archive for a numerical groundwater model is required, the structure of the archive must follow a [specified format](#). In addition, to comply with the USGS Public Access Plan and USGS IM, the electronic model archive must be distributed to the public as a [USGS data release](#), include the appropriate metadata, and be released concurrently with the model documentation. This Technical Memorandum does not supersede the existing policy on documenting the use of groundwater simulations in project reports outlined in [OGW 96.04](#); reports with the required documentation are still required for all new groundwater models. Also, this Technical Memorandum does not supersede the policy to document interpretive results of new simulations using previously published groundwater models ([OGW 2005.02](#)); however, this Technical Memorandum allows for releasing new simulation input and output, without interpretation.

Documentation Policy

1. The description and application of all new numerical groundwater models must be documented in a new interpretive information product (IP) in accordance with OGW Technical Memorandum [96.04](#).
2. All numerical groundwater model applications that have been substantially revised require updated model documentation as a new interpretive IP. Substantial revisions are defined as those that require new interpretive explanations. To determine if specific changes to a model are considered substantial and require supporting interpretive material, discuss the specific application with Water Mission Area (WMA) Headquarters personnel—the Water Science Field Team (WSFT) Groundwater Specialist or OGW staff at the time of this memorandum.
3. Model updates and scenarios that contain interpretations of the output must be published as a new interpretive IP.
4. Documentation of the model in a new interpretive IP will be reviewed by a designee of the WMA (the WSFT Groundwater Specialist at the time of this memorandum) as part of their review of the archive (see #5 under Archive and Data Release Policy, below). Review of model documentation by a WMA designee has been in practice for several years, but this memorandum establishes this review as policy.

Archive and Data Release Policy

1. All new groundwater models and existing groundwater models with any updates must be archived internally by the originating office, and the archive must be distributed to the public as a [USGS data release](#). Thus, a separate entry is needed in the Information Product Data System (IPDS) with a unique Digital Object Identifier for the data release of the archive.

2. The numerical model archive must be prepared in accordance with the tools, resources, templates, and other details necessary to implement the policy as described on the [Groundwater Model Archiving Website](#). The website includes formalization of a [model archive structure](#) and details for preparing the required [metadata](#).
3. Archives for models requiring only minor revision (for example, change in multipliers, pumping, or recharge; i.e. a ‘scenario model’) can be distributed to the public solely as a new [USGS data release](#), but **only if** the data release “does not discuss, explain, compare, analyze, or extrapolate upon those data” (in other words, the information is noninterpretive). Minor changes to the model can be described as metadata in the data release and must contain the information outlined in OGW Technical Memorandum [2005.02](#). The USGS data release must reference the original model information product(s).
4. The model archive data release must receive at least one review by a colleague familiar with groundwater modeling. The metadata for the model archive also requires a separate review; however, the same reviewer may perform both the data and metadata review. Reviewers should follow [specific instructions](#) to ensure that the archive meets these and other policy requirements. Colleague reviewers can include reviewers of the model application report, the Center Groundwater Specialist, or other knowledgeable experts.
5. As per OGW memorandum [2015.02](#), the Center submits a completed Model Archive Verification and Approval Form (MAVF) to the WMA designee (the Water Science Field Team Groundwater Specialist at the time of this memorandum). The WMA designee will ensure the archive has been adequately reviewed and will sign the MAVF and return it to the originating Center. The Center adds the approved MAVF in the [IPDS](#) record for the archive.
6. The model archive is submitted for the appropriate approval as a USGS data release. The model archive is paired with the model documentation report, but the archive and report are considered to be separate products.
7. Each Center must still maintain an internal model archive repository for numerical groundwater models. Archives in the Center repository serve as a backup for those in the national repository and likely will contain additional information not released to the public. The Center repository must be located on disks that are routinely backed up as done for other mission-critical information.
8. Once approved, the model archive must be stored in the Center’s internal model archive repository AND distributed to the public online as a USGS data release in accordance with the instructions on the [Groundwater Model Archiving Website](#). The model archive and the model documentation report must be released concurrently. A link to the model archive will be provided on the Publications Warehouse page for the model documentation report. It is the Center’s responsibility to ensure that both copies of the model archive (the online public copy and the Center archive copy) are consistent with one another and remain consistent over time.

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Distribution: GW-W All

Related Policy:

This memorandum supersedes the following Technical Memoranda on groundwater model archival:

[Office of Ground Water Technical Memorandum No. 93.01](#) -- PROGRAMS AND PLANS--Establishment of a National Policy to Archive Ground-Water Flow and Transport Models

[Office of Ground Water Technical Memorandum No. 00.02](#)-- PROGRAMS AND PLANS--Update of the National Policy to Archive Ground Water Flow and Transport Models

[Office of Groundwater Technical Memorandum 2011.01](#)