GIS DATA ATTACHMENTS
FORM 2A, 12, 20, 20A, 44, 45, AND CAP

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With the implementation of new COGCC rules on January 15, 2021, operators are now required to provide GIS data with select forms. The new GIS data requirements will allow review and management of spatial data in a more efficient and effective way.

The following forms require GIS data to be attached in eForms:

- Form 2A - Oil and Gas Location Assessment
- Form 12 - Gas Gathering Systems
- Form 20 - Permit to Conduct Seismic Operations
- Form 20A - Completion Report for Seismic Operations
- Form 44 – Off-Location Flowlines, Crude Oil Transfer Lines, and Produced Water Transfer Systems
- Form 45 - Location Construction Report

Additionally, Comprehensive Area Plan (CAP) applications now require the CAP boundary polygon to be provide as a GIS dataset using the new eFiling system. Please reach out to the COGCC Hearings or GIS staff for questions about how to attach GIS data for CAP applications.

The COGCC currently accepts GIS data in the following file formats:

- ✓ Geodatabase (GDB)
- ✓ Shapefile (SHP)
- ✓ Google Keyhole Markup Language (KML)

Please note we encourage use of GDB and SHP file formats as they allow more robust feature attribute management. Google Earth KML files should only be submitted in cases when (1) GIS software is not available AND (2) the volume of GIS data attachment that an operator will be submitting is limited.

Guidance in this document has been split into three parts:

Part I – Preparing the GIS Data

- GPS Measurement Accuracy and Coordinate Reference System (CRS)
- Form 2A and Form 45 GIS Attachments
- Form 12 and Form 44 GIS Attachments
- Form 20 and Form 20A GIS Attachments

Part II – Zipping the GIS File

- Zipping Shapefiles (SHP)
- Zipping Geodatabases (GDB)
- Google Keyhole Markup Language (KML)

Part III – Attaching the GIS File

- Uploading GIS Data Attachments in eForms
- Removing GIS Data Attachments in eForms
- What Happens Next?

While much of this guidance is universally applicable to all GIS data attachments, the data preparation instructions (Part I) are often form specific. Please make sure you are looking at subsections applicable to your particular eForm!

Finally, if you have any questions about the data submission process or what happens after you submit GIS data please contact us!

PART I – PREPARING THE GIS DATA

GPS Measurement Accuracy

- As per COGCC Rule 216, measurement accuracy must be 1m or less for all GIS features (including points, lines, and polygons) surveyed by Global Positioning System (GPS).
- Further, GPS receivers (whether consumer hand-held or commercial/survey) should be 'differential grade' – meaning a differential correction is applied to improve accuracy during or post-acquisition.
- Refer to COGCC Rule 216 for more information regarding GPS accuracy requirements.
- If you are planning to submit GIS data mapped using a non-GPS method, please contact us.

Coordinate Reference System (CRS)

- COGCC expects operators to submit their GIS data using the NAD83 datum in the appropriate geographic or projected (UTM 13) coordinate reference system (CRS).

- COGCC, however, will accept data in most any CRS as long as the CRS can be identified in the submitted GIS data file. GIS data that does not include the necessary CRS information will be rejected.

PART I – PREPARING THE GIS DATA

Form 2A and Form 45 GIS Attachments

Rule 304.b.(8) and Rule 407.b.(1) require GIS data for the oil and gas location AND the working pad surface be submitted for all new Form 2A and Form 45. The oil and gas location is a definable area where an operator has disturbed or intends to disturb the land surface in order to locate an oil and gas facility. The working pad surface is the portion of an Oil and Gas Location that has an improved surface upon which oil and gas operations take place. The oil and gas location does not typically include access roads. If available, the COGCC encourages submission of access roads as a separate feature. Example of an oil and gas location (blue) and working pad surface (green) with optional access road (red):

Geodatabase (GDB) and Shapefile (SHP)

If you are submitting Form 2A/Form 45 GIS data as a geodatabase or shapefile, you **must have an attribute field named *FeatTyp*** for identifying the polygon feature. This *FeatTyp* attribute field should be a text field, ideally set to a length of 50 characters:

PART I – PREPARING THE GIS DATA

- Operators are required to submit a boundary polygon feature for the oil and gas location AND working pad surface, thus you should have **at least two** features in your geodatabase or shapefile attachment as shown above. Alternatively, you can submit separate files – one for each feature – if you prefer.

- COGCC encourages operators to submit access roads (or other relevant surface disturbances) as separate features from the oil and gas location and working pad surface. These features, however, are optional.

- You MUST populate the FeatTyp field with a text string value of either "Oil and Gas Location" or "Working Pad Surface" when identifying the location and working pad features.

  If you provide a different text string value in the *FeatTyp* field, such as "Thomas Ranch 376d-pad" or "Anderson 14 Site", the feature will not be recognized correctly by our system.

- If including access roads, please use the text string value "Access Road" to identify.

- Finally, please note that having additional attribute fields in your GIS data attachment is not a problem. However, these fields will be ignored by our system and not ingested into the GIS database.

Google Keyhole Markup Language (KML)

For operators that do not have access to GIS software, or will be submitting a limited number of GIS data attachments, using Google's KML file format may be the best option. We do not encourage use of KML files as feature attributes outside of Google Earth can be more difficult to manage. That being said, we do recognize the utility of this file format for some operators.

If you are submitting KML files, please create and/or manipulate your data only in **Google Earth Pro** to avoid problems.

- In order to identify the "Oil and Gas Location" –or– "Working Pad Surface" you MUST use the 'Name' field of the polygon to identify the feature. This can happen when you initially create the feature in Google Earth Pro, or you can modify the 'Name' by right clicking on the feature and selecting properties:
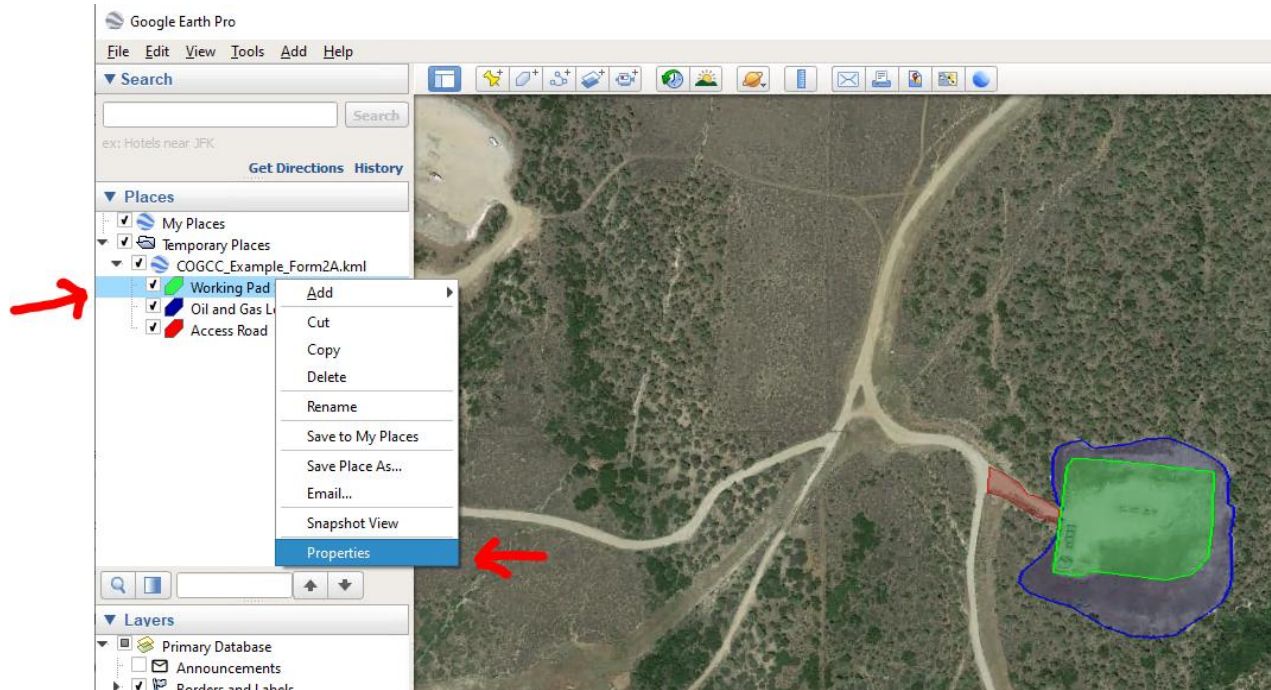
Then change the feature name in the 'Name' box:
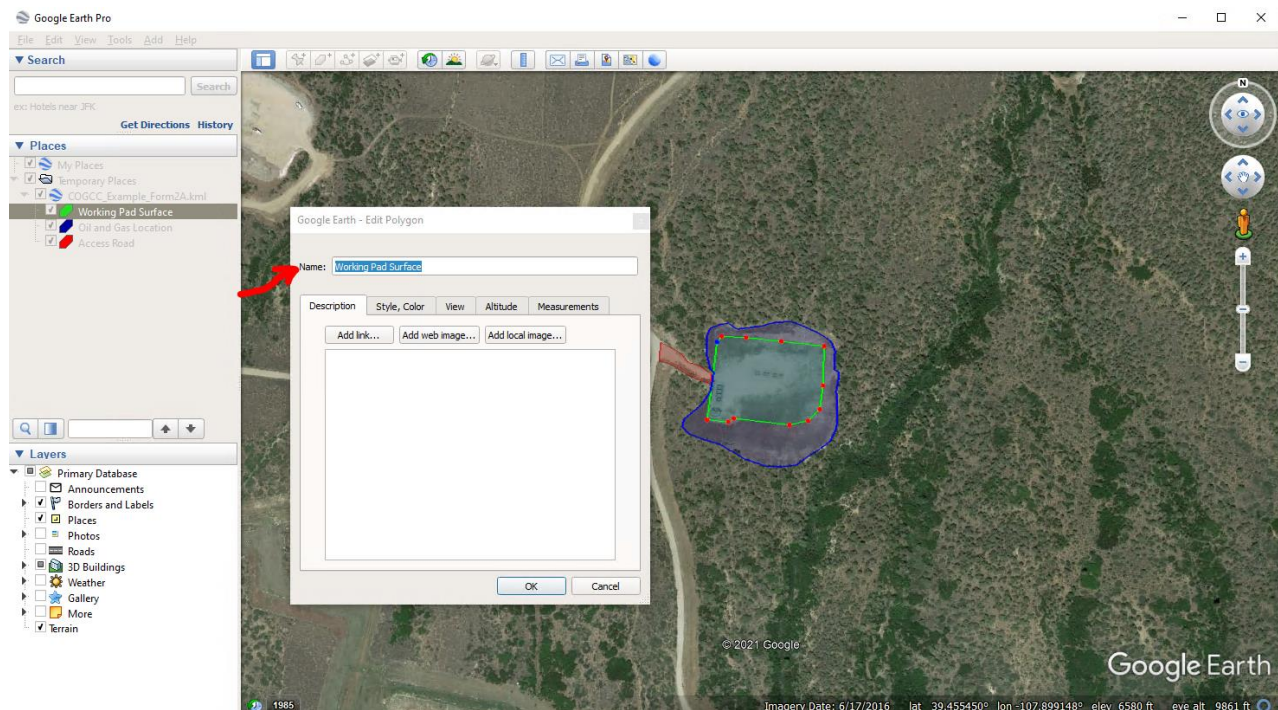
PART I – PREPARING THE GIS DATA

- You MUST provide a text string value of either "Oil and Gas Location" –or– "Working Pad Surface" when identifying the location and working pad features.

  If you provide a different text string value for the 'Name' field such as "Thomas Ranch 376d-pad" or "Anderson 14 Site", or use the KML filename to identify the feature, the feature will not be recognized correctly by our system.

- If including access roads, please use the text string value "Access Road" to identify.

- You can attach separate KML files – one for each feature – if you prefer, but you still need to identify the feature in the 'Name' field as described above for each attached file.

If you need further help or have questions about how to prepare KML files, please contact Chris Eisinger (chris.eisinger@state.co.us) or David Gates (david.gates@state.co.us).

Form 12 and Form 44 GIS Attachments

Rule 220.a.(6).D, Rule 1101.b.(2).A, and Rule 1101.d.(2).A requires operators to submit GIS data for Gas Gathering Systems, Off-Location Flowlines, Crude Oil Transfer Lines, and Produced Water Transfer Systems. Required spatial data includes alignments (line features) and isolation valves (point features) with the following associated attributes: fluid type, pipe material type, pipe size, operator feature ID*, and feature status*. For more details or specific questions about required attributes, please see relevant rules, other form guidance documents, and/or contact COGCC Flowline Integrity staff. Example of off-location flowlines (red) and isolation valve (yellow):
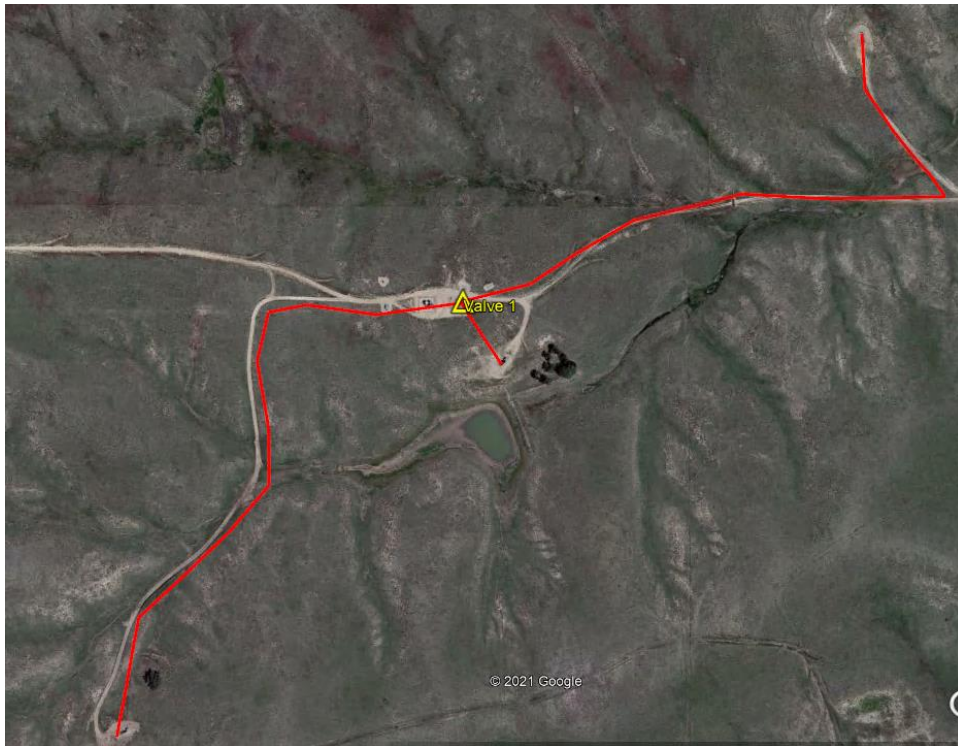
Geodatabase (GDB) and Shapefile (SHP)

If you are submitting Form 12/Form 44 GIS data as a geodatabase or shapefile, you will include the following five attribute fields:

FluidTyp	Text, 50	Fluid Type
MatTyp	Text, 50	Pipe Material Type
PipeSize	Float	Max Pipe Diameter (inches)
OperFeatID	Text, 50	Operator Feature ID
Status	Text, 50	Line Status

PART I – PREPARING THE GIS DATA

When using ESRI ArcGIS software to view data, your attribute table(s) should look similar to this:

COGCC_Example_Form_44_12_Lines

FID	Shape *	FluidTyp	MatTyp	PipeSize	OperFeatID	Status
0	Polyline ZM	Multiphase	Carbon Steel	2	Flowline A	Active
1	Polyline ZM	Multiphase	Carbon Steel	2	Flowline B	Active
2	Polyline ZM			0	Flowline C	Abandonded

COGCC_Example_Form_44_12_Valves

FID	Shape *	FluidTyp	MatTyp	PipeSize	OperFeatID	Status
0	Point ZM	Multiphase	Carbon Steel	2	Valve 1	Active

- Please note that shapefiles, due to the nature of the file format, can only contain features of a single geometry – e.g. points or lines or polygons. Thus, if you are submitting shapefiles for an eForm GIS attachment that requires both lines and valves, you would need to submit two shapefiles – one for the lines and another for the valves. Geodatabase files, on the other hand, can contain different geometries and therefore do not require a separate file for each of the feature types.

- Also note that as long as you have added all the required attribute fields in the correct data type, the GIS data attachment should process correctly – even if attribute values are left blank.

- Having additional attribute fields in your GIS data attachment is not a problem. However, these fields will be ignored by our system and not ingested into the GIS database.

Google Keyhole Markup Language (KML)

For operators that do not have access to GIS software, or will be submitting a limited number of GIS data attachments, using Google's KML file format may be the best option. We do not encourage use of KML files as feature attributes outside of Google Earth can be more difficult to manage. That being said, we do recognize the utility of this file format for some operators.

If you are submitting KML files, please create and/or manipulate your data only in **Google Earth Pro** to avoid problems.

- In order to provide the multiple feature attributes required with Form 12 and Form 44 GIS data, you will need to open the 'Description' tab associated with each individual feature accessible by right clicking on the feature and selecting properties:
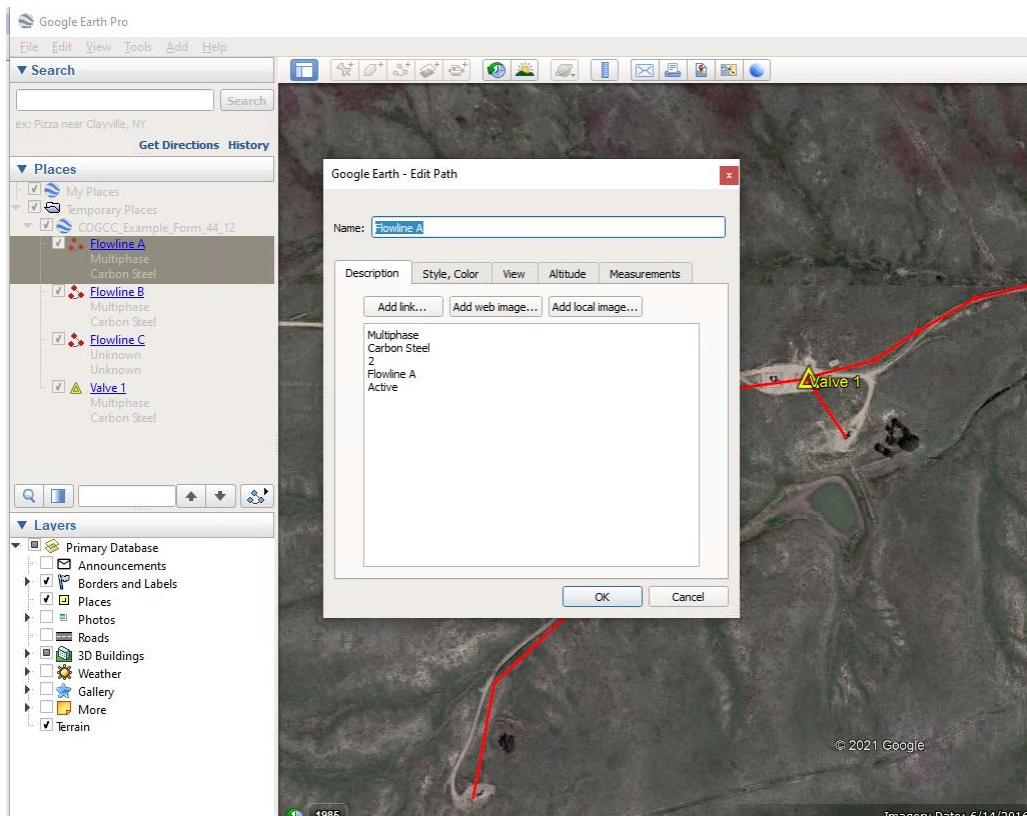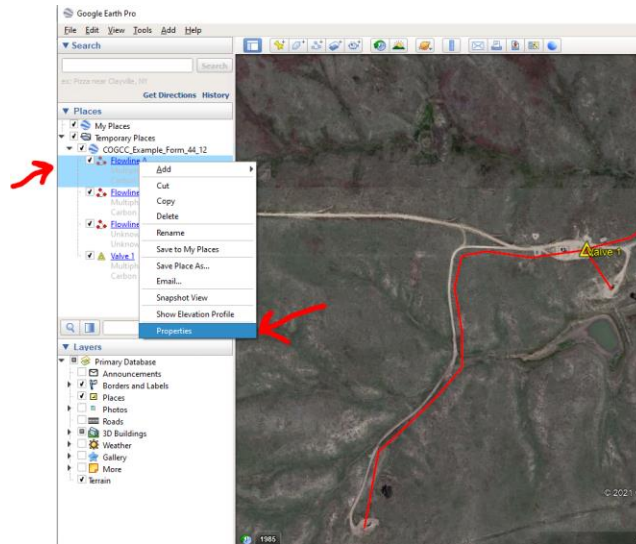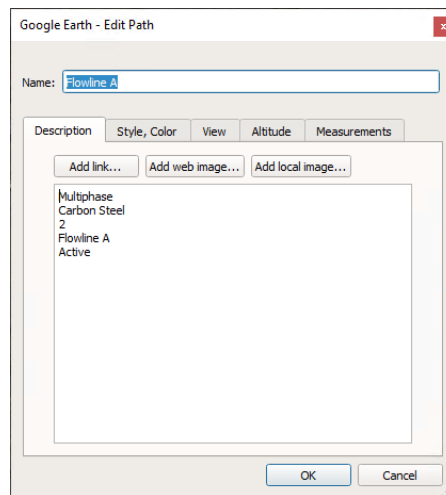
- With the 'Description' tab open, you MUST provide every required attribute value – ONE per line – in this EXACT order:

  Fluid Type
  Material Type
  Pipe Size (max diameter as inches)
  Operator Feature ID
  Status

- You MUST have five lines in your 'Description', with only one attribute value on each line like this:

- DO NOT include the name of the attribute field (e.g. fluid type), JUST the attribute value. And you MUST include something for every value – even those you don't know. Some examples of what you might submit for unknown or missing values includes 'unknown', 'NA', 'no value', 'missing'. You CANNOT leave a line blank or add additional lines. Thus for the above example, if the pipe size was unknown, the 'Description' tab would then look something like this:
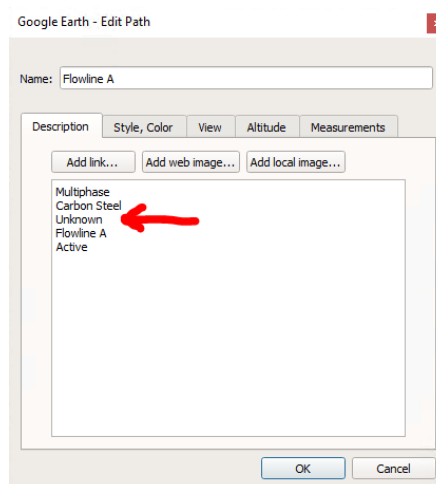
PART I – PREPARING THE GIS DATA

- As with other GIS data formats, you can attach separate KML files – one for each feature – if you prefer, but it is often better and easier to just submit all of that Form 12/44 features in a single KML file.

If you need further help or have questions about how to prepare KML files, please contact Chris Eisinger (chris.eisinger@state.co.us) or David Gates (david.gates@state.co.us).

PART I – PREPARING THE GIS DATA

Form 20 and Form 20A GIS Attachments

Rule 313.b.(2) and Rule 436.f.(2).B require operators to submit GIS data for seismic project boundaries, energy source points, and receiver locations.
Example of a seismic operation with project boundary (blue), energy source points (red), and receiver locations (green):
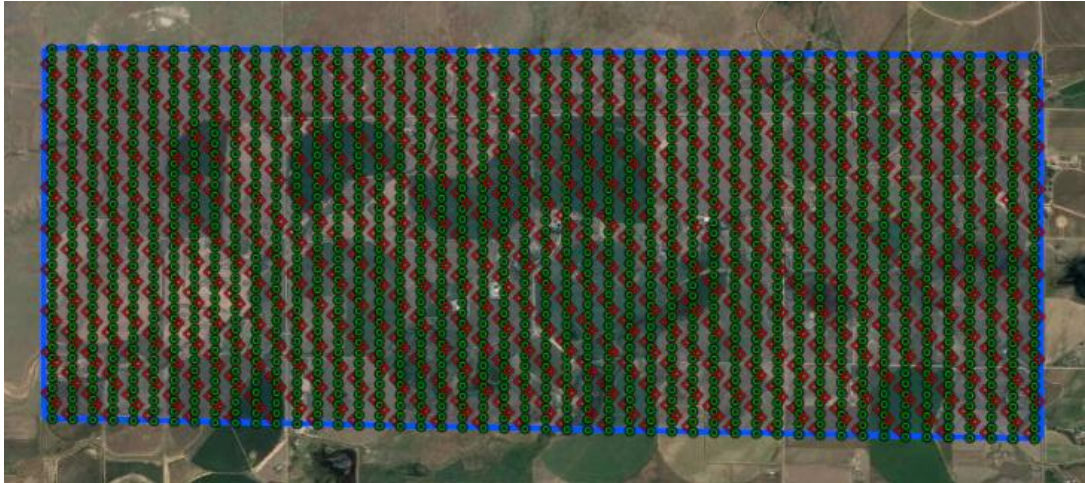
Geodatabase (GDB) and Shapefile (SHP)

If you are submitting Form 20/20A GIS data as a geodatabase or shapefile, you **must have an attribute field named *FeatTyp*** for identifying the polygon and point features. This *FeatTyp* attribute field should be a text field, ideally set to a length of 50 characters:

COGCC_Example_Form_20_20A_Project_Boundary

	FID	Shape	FeatTyp
▶	0	Polygon ZM	project boundary

COGCC_Example_Form_20_20A_Source

	FID	Shape	FeatTyp
▶	0	Point	energy source point
	1	Point	energy source point
	2	Point	energy source point
	3	Point	energy source point
	4	Point	energy source point

COGCC_Example_Form_20_20A_Receivers

	FID	Shape	FeatTyp
▶	0	Point	receiver location
	1	Point	receiver location
	2	Point	receiver location
	3	Point	receiver location
	4	Point	receiver location
	5	Point	receiver location

PART I – PREPARING THE GIS DATA

- Operators are required to submit a project boundary polygon feature as well as receiver and energy source locations as points.

- You MUST populate the *FeatTyp* field with a text string value of "project boundary", "energy source point", or "receiver location" when identifying the feature.

  If you provide a different text string value in the *FeatTyp* field the feature will not be recognized correctly by our system.

- Please note that having additional attribute fields in your GIS data attachment is not a problem. However, these fields will be ignored by our system and not ingested into the GIS database.

Google Keyhole Markup Language (KML)

Due to the nature of GIS data associated with seismic projects, we advise against using the KML file format to provide GIS data attachments for Form 20 and 20A.

If an operator does not have access to GIS software for submitting Form 20 or 20A required GIS attachments or has the data in a KML format, please contact Chris Eisinger (chris.eisinger@state.co.us) or David Gates (david.gates@state.co.us) for additional guidance.

PART II – ZIPPING THE GIS FILE

After preparing the GIS data file, it needs to be zipped and renamed before attaching in eForms. While not difficult, it does require careful attention based on what file format you are submitting.

Zipping Shapefiles (SHP)

A GIS 'shapefile' actually consists of several files with the same name, but different file extensions. Only three of these files are required: .shp (feature geometry), .shx (index of feature geometry), and .dbf (attributes). Other shapefile extensions including .prg, .cpg, .sbn, .sbx, and .xml are optional, but can and should be included if available.

As an example, here is a Form 2 shapefile called "COGCC_2A_Test":

Name	Date modified	Type	Size
COGCC_2A_Test.cpg	1/29/2021 7:29 PM	CPG File	1 KB
COGCC_2A_Test.dbf	1/29/2021 7:29 PM	DBF File	1 KB
COGCC_2A_Test.prj	1/20/2021 1:48 PM	PRJ File	1 KB
COGCC_2A_Test.sbn	1/20/2021 6:20 PM	SBN File	1 KB
COGCC_2A_Test.sbx	1/20/2021 6:20 PM	SBX File	1 KB
COGCC_2A_Test.shp	1/29/2021 7:29 PM	SHP File	1 KB
COGCC_2A_Test.shp.xml	1/29/2021 7:29 PM	XML Document	1 KB
COGCC_2A_Test.shx	1/29/2021 7:29 PM	SHX File	1 KB

Notice there are actually eight files, which will ALL be zipped into one file.

This can be achieved in many different ways depending on the operating system, and file utility applications you might have installed on your computer.

If using Windows, one of the easiest ways to zip a file is to use Windows File Explorer. Before we do this, however, you need to ensure you can see the file extensions in File Explorer. To do this, navigate to your folder containing the shapefiles, and click on "View" tab at top, and make sure there is a check mark for "File name extensions":
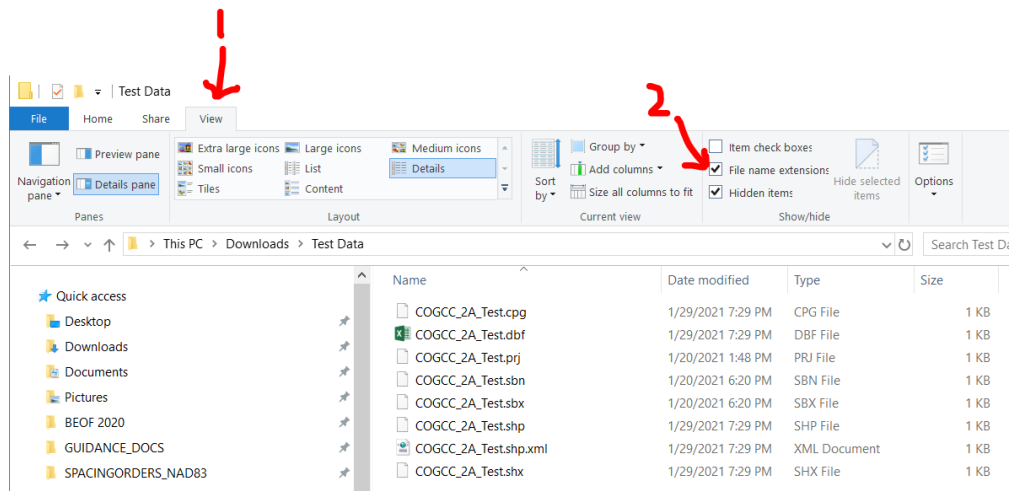
PART II – ZIPPING THE GIS FILE

With filename extensions visible, you can now (1) select all of the associated shapefiles (be careful not to include non-associated files that might be in same directory), (2) right click and choose "Send to", and then (3) select "Compressed (zipped) folder":

This will create a new zipped file in that folder:

And finally you will rename this file, by adding a ".shp" in between the filename and the ".zip" extension to end up with:

This *filename.shp.zip* file is what you will attach in eForms. If you should have more than one shapefile to submit with a particular form (e.g. for points and lines in the case of a Form 12/44), you may have two or more zipped files like this to attach.

Please note a common error when zipping shapefiles is to zip the entire folder containing the files as opposed to selecting the files within the folder. While this may work, it is not ideal as our system won't always be able to recognize the necessary files when the containing folder has been zipped.

PART II – ZIPPING THE GIS FILE

Zipping Geodatabases (GDB)

An ESRI 'geodatabase' actually consists of a folder with a '.gdb' extension that contains many files.

An example geodatabase:

Name	Date modified	Type
📁 Form_GIS_Attachment.gdb	6/7/2021 9:07 PM	File folder

Which contains:

| Name	Date modified	Type	Size
a00000001.gdbindexes	1/31/2021 12:49 A...	GDBINDEXES File	1 KB
a00000001.gdbtable	1/31/2021 12:50 A...	GDBTABLE File	1 KB
a00000001.gdbtablx	1/31/2021 12:50 A...	GDBTABLX File	6 KB
a00000001.TablesByName.atx	1/31/2021 12:50 A...	ATX File	5 KB
a00000002.gdbtable	1/31/2021 12:49 A...	GDBTABLE File	3 KB
a00000002.gdbtablx	1/31/2021 12:49 A...	GDBTABLX File	6 KB
a00000003.gdbindexes	1/31/2021 12:49 A...	GDBINDEXES File	1 KB
a00000003.gdbtable	1/31/2021 12:50 A...	GDBTABLE File	2 KB
a00000003.gdbtablx	1/31/2021 12:50 A...	GDBTABLX File	6 KB
a00000004.CatItemsByPhysicalName.atx	1/31/2021 12:50 A...	ATX File	5 KB
a00000004.CatItemsByType.atx	1/31/2021 12:50 A...	ATX File	5 KB
a00000004.FDO_UUID.atx	1/31/2021 12:50 A...	ATX File	5 KB
a00000004.gdbindexes	1/31/2021 12:49 A...	GDBINDEXES File	1 KB
a00000004.gdbtable	1/31/2021 12:50 A...	GDBTABLE File	6 KB
a00000004.gdbtablx	1/31/2021 12:50 A...	GDBTABLX File	6 KB
a00000004.spx	1/31/2021 12:50 A...	SPX Audio File (VL...	5 KB
a00000005.CatItemTypesByName.atx	1/31/2021 12:49 A...	ATX File	13 KB
a00000005.CatItemTypesByParentTypeID....	1/31/2021 12:49 A...	ATX File	5 KB
a00000005.CatItemTypesByUUID.atx	1/31/2021 12:49 A...	ATX File	5 KB
a00000005.gdbindexes	1/31/2021 12:49 A...	GDBINDEXES File	1 KB
a00000005.gdbtable	1/31/2021 12:49 A...	GDBTABLE File	2 KB
a00000005.gdbtablx	1/31/2021 12:49 A...	GDBTABLX File	6 KB

For zipping geodatabases, you will **only zip the containing folder.**

To zip, you will (1) select the *geodatabase_folder.gdb*, (2) right click and choose "Send to", and then (3) select "Compressed (zipped) folder":
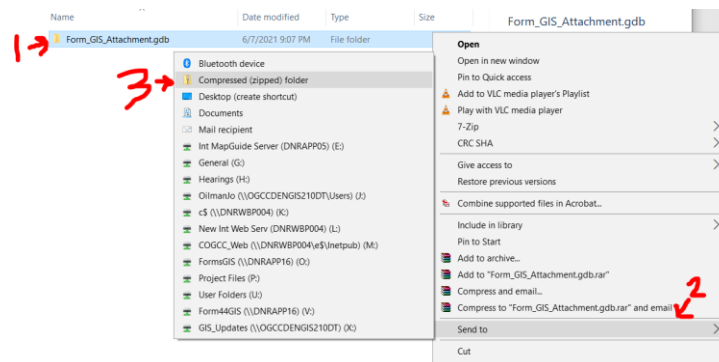
PART II – ZIPPING THE GIS FILE

This will create a new zipped file in that folder with the proper name:

Name	Date modified	Type	Size
📁 Form_GIS_Attachment.gdb	6/7/2021 9:07 PM	File folder	
📦 Form_GIS_Attachment.gdb.zip	6/7/2021 9:18 PM	ZIP File	23 KB

This *filename.gdb.zip* file is what you will attach in eForms. In most cases you will include all of the form-associated GIS data in one geodatabase attachment. But should you need to, you can always attach more GDB attachments to add additional features.

Google Keyhole Markup Language (KML)

Google KML files do not need to be zipped.

They can simply be attached to the eForm as *filename.kml*:

COGCC_Example_Form_44_12.kml
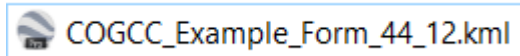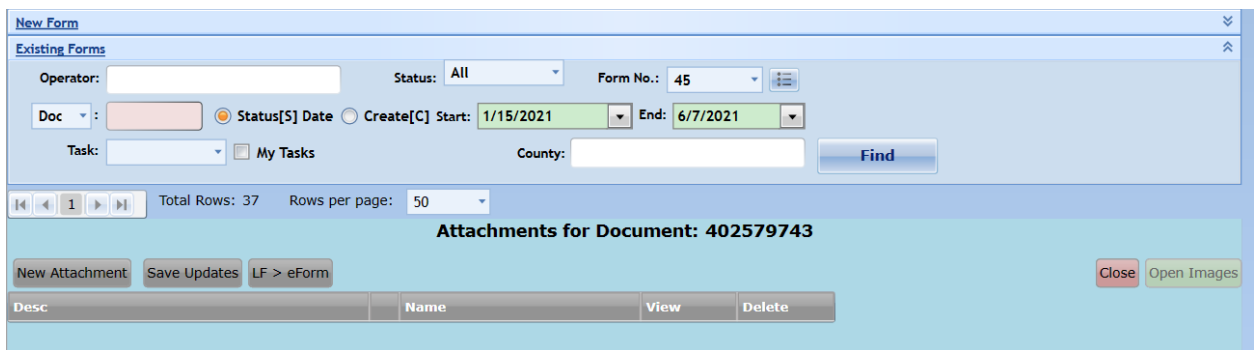
PART III – ATTACHING THE GIS FILE

<u>Uploading GIS Data Attachments in eForms</u>

Once your file attachment has been zipped and renamed correctly (if necessary), it can be attached to a form using the COGCC eForm system.

While the process is similar for all forms requiring GIS data, there is one additional step for Form 2A and Form 45 attachments which as highlighted below.

In order to attach a GIS data file you will:

1. Login to eForms and create a new form.
2. If not already done, fill out basic information including contact info.
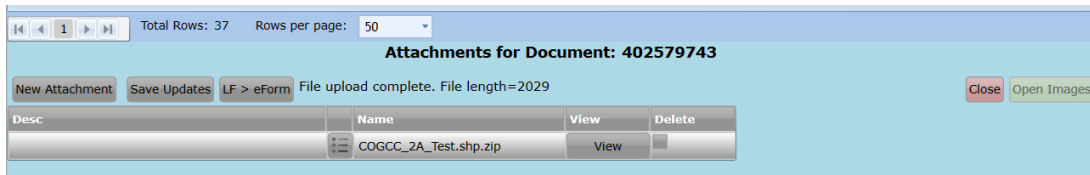3. Navigate to the 'Attachments' tab of the electronic form:

4. Select 'New Attachment' and navigate on local machine to your GIS data attachment, and once selected click 'Open' button. Note you can only submit GIS files with the following extensions – *.gdb.zip, *.shp.zip, and *.kml:
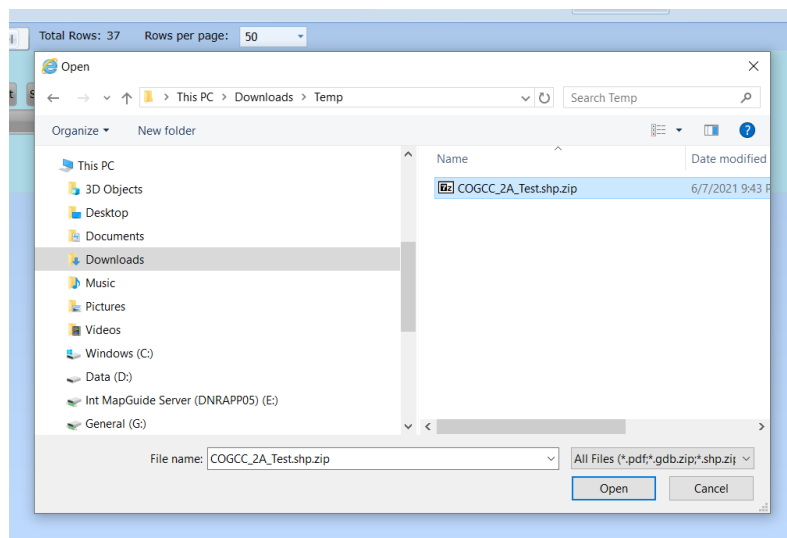
5. This will upload the GIS file:

6. For all forms EXCEPT Form 2A and Form 45 you are now done with your GIS file attachment!

7. For Form 2A and Form 45 you need to do one last important step:
   a. Click the list icon to right of attachment 'Desc' in the row that contains file you just attached.
   b. Choose the appropriate description – i.e. if your file has both the oil and gas location and working pad surface, choose "LOCATION AND WORKING PAD GIS …"; if just the oil and gas location, choose "OIL AND GAS LOCATION GIS …"; and if just working pad surface, then "WORKING PAD SURFACE GIS …".
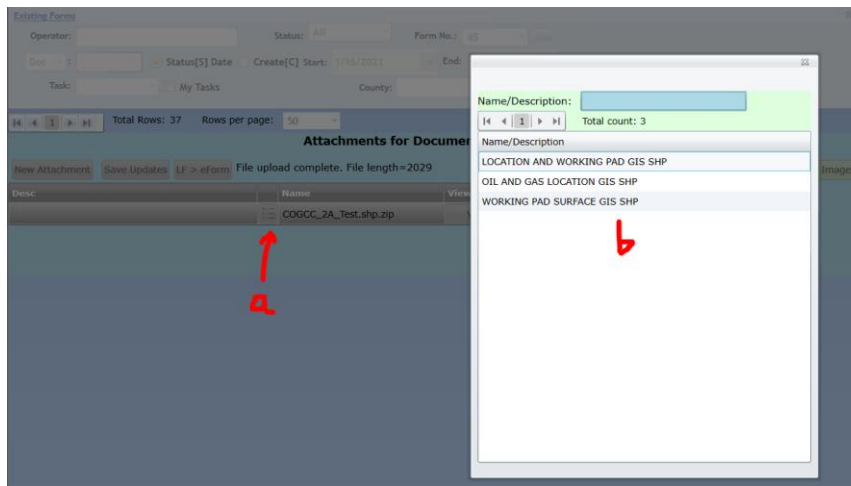

   c. And now you are done with the Form 2A and Form 45 GIS data attachment!

PART III – ATTACHING THE GIS FILE

Removing GIS Data Attachments in eForms

While the eForm is in Draft status, GIS data attachments can easily be removed and replaced if necessary. To do this you will simply put a check in the "Delete" box for the row of the GIS attachment, and then click "Save Updates" button:
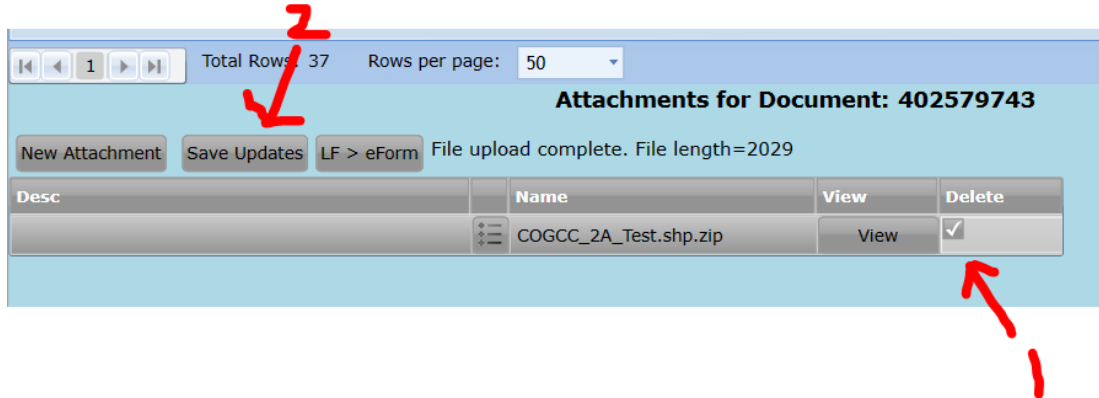
What Happens Next?

After uploading your GIS data attachment, our system will immediately try to read and ingest the spatial information into our database. As part of this automated process, notifications of a successful GIS file attachment will go the relevant COGCC staff indicating that a GIS data attachment has been received and is viewable on the staff interactive map. If there is a problem with the GIS file attachment, COGCC staff will also receive a notification and may reach out to you with troubleshooting help.
GIS data attachments submitted as part of new rules will tentatively display on our public interactive map as follows:

Form	Form Status	Map Viewing Restrictions
2A	In Process, Approved	
12	Approved	Scale > 1:6,000
20	In Process, Approved	
20A	In Process, Approved	
44	Approved	Scale > 1:6,000
45	In Process, Approved	

Additionally, COGCC plans to make aggregate datasets available for download in the future (with the exception of the Form 12 and 44 that are subject to confidentiality restrictions).

Document Change Log

Change Date	Description of Changes
June 1, 2021	Document Created
June 7, 2021	Document Modified