

gINT Support

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INTRODUCTION

The purpose of the VDOT.EXE software package is to provide the Virginia Department of Transportation (VDOT) Materials Division and its consultants with a standard set of tools to present subsurface geotechnical data. These tools are designed to streamline geotechnical program delivery and produce consistent output. The use of this methodology is mandated on all VDOT geotechnical projects. VDOT consultants are requested to coordinate the submittal of geotechnical data with the Materials Division personnel. VDOT contact information can be accessed at <http://www.viriniadot.org/about/districts.asp>.

SOFTWARE LIST

The following files are installed on the local computer by running VDOT.EXE:

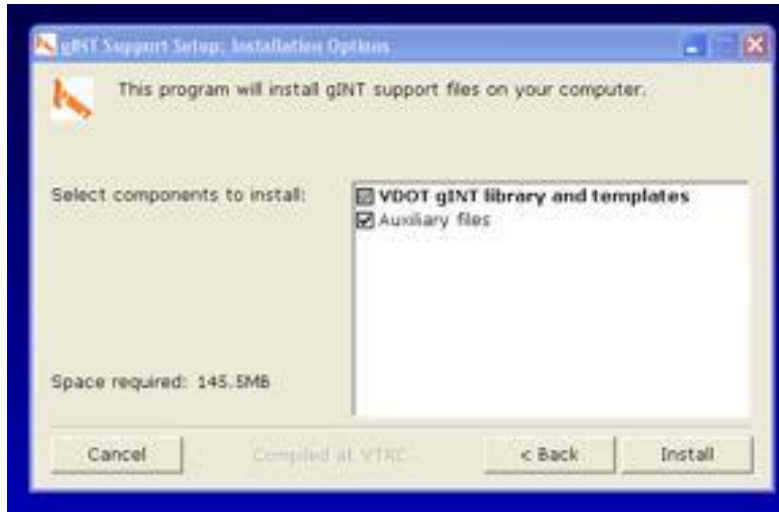
VDOT_README.PDF	- instructions file
Support Files	- documentation and examples
VTRC7.GLB	- VDOT gINT library
SPT7.GDT	- gINT data entry template for SPT logs
CPT7.GDT	- gINT data entry template for CPT logs
SPT_CPT7.GDT	- combined data template for SPT and CPT logs
CPT_DATA.EXE	- CPT data processor
7_BOREHOLE_ENGLISH.GCX	- file for exporting gINT SPT logs to GEOPAK (English units)
7_BOREHOLE_METRIC.GCX	- file for exporting gINT SPT logs to GEOPAK (Metric units)
SAMPLE.MDB	- GEOPAK data structure
SPT627.GSC	- Script for SPT project conversion to the latest structure
CPT627.GSC	- Script for CPT project conversion to the latest structure
METRIC2ENGLISH.GSC	- Script for Metric to English unit conversion
ENGLISH2METRIC.GSC	- Script for English to Metric unit conversion
DXF-SPT_LOG_COMP.GSC	- Script for generating DXF log files
DXF-SPT_FENCE.GSC	- Script for generating DXF fence files
SPT627.GCX	- SPT project conversion correspondence file
CPT627.GCX	- CPT project conversion correspondence file
7_METRIC2ENGLISH.GCX	- Metric to English unit conversion correspondence file
7_ENGLISH2METRIC.GCX	- English to Metric unit conversion correspondence file

INSTALLATION

Note that all files already present in your local **C:\gINT_materials** folder (created by the previous VDOT.EXE installer) will be replaced. Do not store any project files in this folder.

1. Make sure that **gINT** software is not running.
2. Copy **VDOT.EXE** installer to your computer.
3. Double-click on **VDOT.EXE** icon to begin installation.

The following menu choices will appear:



VDOT.EXE installer will unpack files in the following locations on your computer:

Support Files	C:\gint_materials
VTRC7.GLB library	C:\gint\library
Data entry templates	C:\gint\datatmpl
Script files	C:\gint\projects

After the installation is completed, shortcut icon **VDOT Materials** will be created on your desktop to allow access to various support files. A shortcut will also be created for the **c:\documents\cfms_local** folder used for saving gINT reports in DGN format.



CONFIGURATION

gINT

Library, data entry templates, and script files must be moved manually to folders corresponding to your gINT installation. Some of the file paths may include network folders, depending on the local configuration.

Example file paths for gINT software installation are as follows (your particular installation may be different):

Library File: **C:\Program Files (x86)\gint**

Drawings: C:\Program Files (x86)\gint\drawings\
Project Databases: C:\Program Files (x86)\gint\projects\
Data Templates: C:\Program Files (x86)\gint\datatmpl\
Scripts: C:\Program Files (x86)\gint\projects\
Temporary Files: C:\Program Files (x86)\gint\temp\
Project Manager: C:\Program Files (x86)\gint\projects\

After moving the library and template files to proper folders, make sure that gINT is configured to access these files. Start gINT and go to **File -> System Properties -> File Location Defaults**. Then, enable **VTRC7.GLB** as the active library.

Go to **File -> System Properties -> DXF Files** and make the following settings:
Font Conversion -> Arial -> Ht Fac 1 = 0.7 Wid Fac 1 = 0.7
Solid Fills Output as Solids (checked)
Point Entities Output as Points
Multiple Page Output to Separate Files (checked)
Override Degree Symbol – blank field

Go to **File -> System Properties -> Output** and make the following settings:
Unspecified Line Thickness = 0.007
Unspecified Point Thickness = 0.01
Default Print Management Option = Print as data sets are completed

Do not merge VTRC7.GLB library with another gINT library. Note that VDOT library is compatible only with VDOT data entry templates.

Do not store any project files in **C:\gINT_materials** folder. It contains various documentation and example files. It will be erased and modified in future updates.

MicroStation

Customized version of **MicroStation v8i** is required to convert gINT reports to DGN format in conformance with VDOT drafting standards (preserving line weights and fonts). It includes conversion macro called Gint Converter. Users are requested to contact the VDOT CADD Support Team for assistance with the software download and installation. Contact information is as follows:

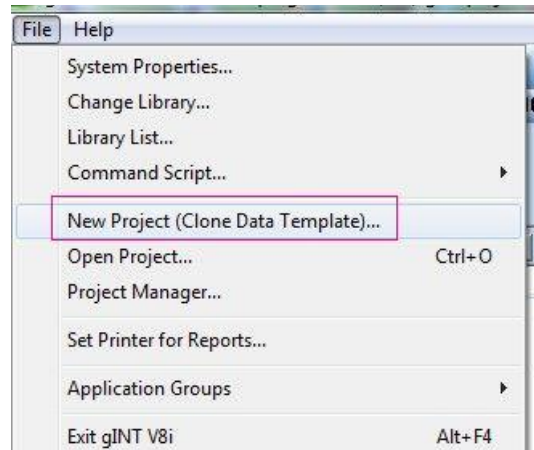
Larry S. Perkins Jr. (Sam)
Cadd Support Team Leader
Tel.: 804-786-1280
Larry.perkins@vdot.virginia.gov

Gint Converter looks for the DXF input file (generated by gINT) in the user-specified folder, such as **C:\Program Files (x86)\gINT\drawings**. The resulting DGN output file is saved in **C:\documents\cfms_local**.

The seed file used in the gINT-MicroStation conversion process should be **matseedv8i.dgn**.

gINT DATA ENTRY

A new gINT project file is started by selecting VDOT data entry template (spt7.gdt or cpt7.gdt) from **File -> New Project (Clone Data Template)**.



Borehole Naming Convention

Recommended borehole designations are as follows:

YYBH- ###	Soil/rock boring
YYCP- ###	Cone penetrometer sounding

where **YY** indicates year of drilling and **###** indicates borehole number. The entire label string should not exceed 8 alphanumeric characters.

Examples: **17BH-001, 17CP-021**

Station and Offset Naming Convention for GEOPAK

Boreholes are typically located by Station and Offset, Latitude and Longitude, or Northing and Easting. Particular conventions must be observed if the gINT project file is to be exported into GEOPAK format. In GEOPAK, the offset field must be a numeric value only (negative for left offsets and positive for right offsets), which differs from a more descriptive gINT entry. The automated gINT to GEOPAK conversion process will result in a correct translation provided that the following convention is adhered to in the gINT entry of the offset field:

- The numeric value is followed by a space. **Do not** append any symbols, such as **12'**.
- Include **only** one of these words to denote direction: **left, right, LT, RT**. The letter case does not matter.

Example: gINT offset entry: **12.5 ft LT of centerline**.
This offset will be automatically translated to a GEOPAK offset of **-12.5**.

Borehole Coordinates

Borehole coordinates should be entered as **Latitude and Longitude**, with **NAD 1983** datum. These coordinates should originate from a post-processed GPS file, with a **negative** value for **Longitude**. VDOT borehole log reports will automatically display these coordinates rounded to six places past the decimal, positive longitude, and with **N** and **W** suffixes for latitude and longitude, respectively. Alternatively, borehole coordinates can be entered as **Northing** and **Easting** (feet). This designation requires that the **SPCS Zone** be specified (VA North or VA South).

Input Templates

SPT logs should be entered using the **spt7.gdt** template.

CPT logs should be entered using the **cpt7.gdt** template.

Combined logs should be merged into a single project file using the **spt_cpt7.gdt** template. Use the “Import from Database” or “Batch Import from Databases” command.

SPT Data Entry Template

The **spt7.gdt** template for SPT data entry has provisions for one extra column of field data and two additional columns of lab data that can appear on the output report (“smart form” setup). Titles for these optional columns of data can be selected from a drop-down list or typed in.

Strata Dip and Joint Dip angle values can be entered as single numbers or as alphanumeric characters if the average dip angle value is required. For example, the entry of “**avg23**” will display “**avg**” just above “**23**” on the log.

When completing the SPT borehole log, enter “BOH” in the “Stratum Description” field; enter the “Depth to Top” value corresponding to the actual borehole termination depth; and leave the “Depth to Bottom” blank. Select the blank “Classification_Symbol,” and choose “Solid” for “Line Type.” The resulting report will automatically generate **Bottom of Hole @ XX Elevation** at the terminal depth, accounting for any borehole inclination.

Depth to Top (ft or m)	Depth to Bottom (ft or m)	Stratum Description	Classification_S ymbol	Line Type
68		SAME: soft below 68.0 feet		
76.5	81.5	Brown-black, fine clayey GRAVEL, with sand, contains highly weathered shale limestone rock fragments, very loose, wet	GC	
78		SAME: dense below 78 feet		
80		SAME: medium dense below 80 feet		
81.5	82.3	DECOMPOSED ROCK sampled as: black, highly weathered limestone, with clay and sand, moist	HWR	
82.3		BOH		Solid

CPT Data Entry Template

The **cpt7.gdt** template for cone penetrometer data should be used with an input file (*.cpd) collected from CPT rig. The input file can be set up in English or metric units, but in both cases depth is expressed in meters, at an interval of 0.05 meters. The typical VDOT file is formatted as follows:

```

CPT31406-09-04 11:09 baker           English
209+00 57'lt c1 776tc                0165-134-108,c50 3 0 .05 .1 1 2 3 4
 0.05    4.0    0.35    -0.1    0.05
 0.10    12.9    0.59    -0.0    0.05
 0.15    15.9    0.80     0.0    0.05
 0.20    18.7    0.87     0.0    0.05
 0.25    14.4    0.78     0.1    0.05
 0.30    10.4    0.59    -0.1    0.05

```

CPT data processing tools can be accessed in the **C:\gINT_materials\CPT** folder. Data entry into gINT is performed as follows:

1. Collect the electronic data file (*.cpd) from a CPT rig (Hogentogler format). Convert it from **cpt** to **cpd** format using **Cleanup.exe** if needed.
2. Process the **cpd** data file using the **CPTINT** software as follows:
Copy CPTINT.INI (make a backup copy of your existing CPINT.INI), CPTu.IDF, METRIC.IDF, and GINT.ODF (modify as required) from the C:\gINT_Materials\CPT folder into your CPTINT program folder and follow these steps:
 - Start **CPTINT.EXE**, enter name, and press ENTER.
 - Highlight **Input Data File** and press ENTER.
 - Press ENTER on the highlighted **Enter File Spec.**
 - Browse to **DATA** folder and press ENTER.
 - Scroll to select the **cpd** file, highlight it, and press ENTER.
 - Highlight **Input Format** and press ENTER.
 - Scroll to **Custom Define** and press ENTER.
 - Scroll to **IDF file: [get]** and press ENTER.

- Press ENTER on the highlighted **Enter File Spec (*.IDF)**.
- Go to File Directory and highlight **CPTU.IDF** and press ENTER (if data were acquired in metric, select **METRIC.IDF**).
- Scroll to **Return to File Menu** and press ENTER.
- Highlight **Output Data File** and press ENTER.
- Type in the name of the intended **.INT** output file (for example, CPT023.INT) and press ENTER.
- Highlight **Output Format** and press ENTER.
- Scroll to **Custom Define** and press ENTER.
- Scroll to **[Get]** and press ENTER.
- Highlight **Enter File Spec (*.ODF)** and press ENTER.
- Highlight **GINT.ODF** and press ENTER.
- Scroll to **Return to File Menu** and press ENTER.
- Move along the top menu bar to **PARAM** and check/edit settings.
- Move along the top menu bar to **RUN** and use the down-arrow to select **Begin Execution** and press ENTER.
- Repeat all of the above for other CPT soundings.
- Move along the top menu bar to **QUIT** and press ENTER.

3. Format data for gINT input as follows:

- Start the **CPT_Data.exe** program.
- Enter data in each box. Enter latitude in the “Northing” box and longitude (negative) in the “Easting” box. Leave “State Northing” and “State Easting” blank.
- Click on the **Select Input File** box and select the **.INT** file (for example, CPT023.INT) corresponding to your entry.
- Click on the **Enter Borehole** button.
- If you have other soundings to enter, repeat the last three steps.
- Optional: if you want to indicate dissipation tests, create a text file (*.TXT) in the following format:

Hole# Depth D

See **dissip_test1.txt** for an example of the file structure. Note that the dissipation test data file contains information for all soundings (entire project). This file is entered into the CPT_Data program only once by clicking on the **Select Input File** button associated with the dissipation data section.

- Upon entering all data, click on the **Save and Exit** button.
- You will find the processed file named **results.csv** in the same folder as the **CPT_Data.exe** program.

4. Import the **results.csv** file into gINT as follows:

- Start **gINT** and click on the *Input* tab.
- Click on *File -> New Project -> Clone Data Template*.
- Select **cpt7.gdt** and click OK.

- Enter new project name and click OK.
- Click on *File -> Import/Export -> Import from Text File*.
- Select <path> **results.csv** and click OK. Your CPT project file is ready.

SPT/CPT Data Entry Template

The **spt_cpt7.gdt** template should not be used for raw data entry. It is designed for merging separate databases already compiled with **spt7.gdt** (SPT data) and **cpt7.gdt** (CPT data) templates. Merging is done using the **File -> Import/Export -> Batch Import from Databases** menu commands. Specify the files to be imported and select the “Overwrite Option: Data Sets.” The resulting single database allows for generating combined SPT and CPT fence diagrams.

Log Depth per Page

Log depth per page can be controlled in the following ways:

1. Autoscaling. No user input is required as glNT selects the best fit per page.
2. Modified autoscaling. The first stratum depth is entered as “**0.001**” instead of “**0**.” The resulting log depth is fixed to 40 ft or 12 m per page if the borehole depth is greater than or equal to 40 ft or 12 m. Scaling dependent on the borehole depth is applied when the hole depth is less than 40 ft or 12 m.
3. Global override. Specific user entry in the “**Depth Log Page**” field of **INPUT -> Project**. This method selects the same fixed depth per page for all logs. Make sure that the first stratum depth is **not “0.001.”**
4. Local override. Specific user entry in the “**Depth Log Page**” field of **INPUT -> Borehole**. This method selects fixed depth per page for the particular log. Make sure that the first stratum depth is **not “0.001.”**

Keep in mind that overriding default values may require adjustments to certain runtime user inputs, such as **depth_interval**, **elevation_interval**, and **in_line_spt**, when generating reports.

PROJECT QUERIES

Customized SQL database queries are available to analyze project data. To access these queries, click on **Tools -> Queries...** in the **INPUT** mode. **QUERY LIST** will be displayed as follows:

Name	Description	Date
BD	Borehole description	1/23/2008 1:06:18 PM
TLD	Number of boreholes and total length of drilling, including coring.	1/23/2008 1:18:00 PM
TLD50	Total length of drilling beyond 50 ft depth.	2/10/2011 2:05:21 AM
*		

To run, highlight SQL query and click **Execute**.

The summary report generated by a query can be exported into an Excel spreadsheet by clicking on the **Export** button.

OUTPUT REPORTS

The following gINT reports are user-selectable:

Logs:

SPT_LOG - Single SPT Borehole Log
 SPT_LOG_COMP - Composite SPT Borehole Log (up to 3 logs side by side)
 SPT_LOG_LEGAL - Single SPT Borehole Log on legal size paper (8.5"x14")

CPT_LOG - Single CPT Log
 CPT_LOG_COMP - Composite CPT Log (up to 3 logs side by side)

Composite logs are designed for MicroStation conversion for inclusion in project drawings. They contain side-by-side logs.

Fences:

SPT_FENCE - SPT Fence Diagram
 CPT_FENCE - CPT Fence Diagram
 SPT_CPT_FENCE1 - Combined SPT and CPT Fence (Type 1)
 SPT_CPT_FENCE2 - Combined SPT and CPT Fence (Type 2)
 SPT_CPT_FENCE3 - Combined SPT and CPT Fence (Type 3)
 WIDE_SPT_FENCE - SPT Fence Diagram for output to HP DesignJet 500 PS (ANSI E-34x44, Landscape, Fit to Page)

Note various optional runtime user inputs when generating reports.

Most of these runtime inputs are self-explanatory. Here are some additional details:

SPT_LOG and SPT_LOG_COMP reports:

- Show_DRAFT - Enter "y" to display DRAFT message across the log.

- N - Enter “y” to plot N-values instead of individual blows.
- in_line_spt - Enter “y” to plot the blow counts in one horizontal line.

* **_FENCE_** * reports:

- show_Lat_Long - Enter “y” to show Latitude and Longitude on the x-axis. (Station and offset are shown by default.)
- draw_site_map - Enter “y” to display a plan of borehole layout.

LOG PRINT ORDER

By default, gINT does not output borehole logs in a sequential order. You can force the print order by assigning integer values (1, 2, 3, etc.) in the **PrintOrder** field of the **Borehole** data input section. After the print order is assigned, go to **OUTPUT**, specify logs to print out (or view), and left-click on the **Sort 1** field, next to the **FILTER** window. Set the Table to **POINT** and set the **Field** to **PrintOrder**. Click on the **Paste** button above the field list. You will see the string **[POINT].[PrintOrder]** appear in the **Sort 1** field. Now you are ready to print or view logs in the specified order.

GOOGLE EARTH INTEGRATION

Google Earth functionality is incorporated into the **VTRC7.GLB** library. You can publish KML files and/or verify borehole locations (Google Earth must be installed). To access this feature in gINT INPUT mode, go to **Add-Ins -> GE1 -> View Features in Google Earth**. You will be asked to name a newly created KML output file and then Google Earth will automatically open to display borehole locations. Borehole coordinates must be entered in the gINT Borehole menu as Latitude and Longitude (negative Longitude). The resulting Google Earth image is displayed as follows:



Clicking on the icon results in a display of borehole properties, as follows:



The line “Click [here](#) for the log” provides a web link to a server containing borehole logs in PDF format. It allows distributing a single KML file pointing to all boreholes on a project. This functionality is currently disabled because it requires customized settings. It can be activated upon user request.

You can overlay Virginia geology layer on the current Google Earth map by opening C:\gINT_materials\Geology of Virginia\vageol.kml.

Other potential overlays can be accessed as follows:

<http://csmgeo.csm.jmu.edu/geollab/Whitmeyer/web/visuals/maps.html>

<https://mrdata.usgs.gov/geology/state/state.php?state=VA>

Typically, overlay layers require transparency adjustment in Google Earth.

Note that KML and KMZ files must be associated with Google Earth software prior to using this feature. Potential problems are addressed here - [File associations - Google Earth Blog](#)

gINT-MICROSTATION CONVERSION PROCESS

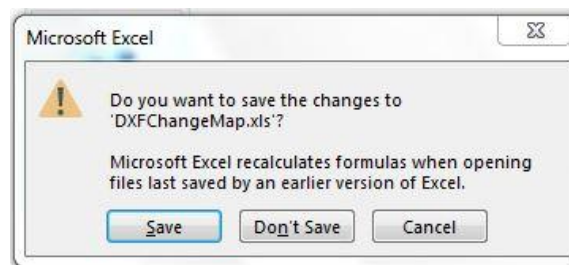
Note: Check the native gINT-MicroStation conversion functionality available in gINT software before proceeding with the steps outlined below. There were conversion problems observed with the past versions of gINT.

Conversion of gINT reports to DGN format is available using a customized version of **MicroStation v8i**. The conversion macro is accessed by clicking on the “Gint to DGN” icon located in the lower left of the drop-down menu for Tools -> VDOT Tools (under Geotechnical tab).



The conversion process is performed as follows:

1. Open gINT and export your output report to the DXF file.
2. Open Microstation and click on the “Gint to DGN” conversion icon.
3. Select the **matseedv8i.dgn** seed file.
4. Click on the magnifying glass selection tool.
5. Select the DXF file to be converted to DGN format.
6. Make sure that the “File Type” associated with the selected DXF file is correctly displayed in the box located to the right of the file name. You can override file type if needed.
7. Click on the **Convert Files** button and wait until the converted drawing appears on the screen. It may take a few minutes.
8. The resulting DGN file is automatically saved in the **C:\documents\cfms_local** folder.
9. The following Excel window may appear after you exit MicroStation:



Click on “Don’t Save.”

After the macro is run, all line weights and fonts should conform to VDOT standards. Some minor editing in MicroStation may be required, depending on the complexity of the drawing.

At this stage, the client, typically the VDOT Structure & Bridge Division, is notified that the geology drawings are completed. Final processing of DGN drawings is performed by the Structure & Bridge Division, as described in

C:\gINT_materials\DXF_DGN_TIFF\BridgeMatlPlanSheet_r1.pdf.

TIFF files are also created if needed. Guidelines are provided in **Tiff_Files.pdf.**

PDF OUTPUT FROM GINT

It is possible to generate various sizes of PDF drawings directly from gINT. This procedure is described in

C:\gINT_materials\PDF\GENERATING PDF REPORTS FROM GINT.pdf.

GEOPAK OUTPUT FROM GINT

gINT project files compiled with the **spt7.gdt** data entry template can be converted for further processing by GEOPAK. The GEOPAK file conversion process works as follows:

- Open your gINT project file.
- Click on **File -> Import/Export -> Export to Database...**
- Select **SAMPLE.MDB** (select MDB file type first at the bottom) as “Template to create database.”
- Assign a name to the yellow “Database” field (select MDB file type first). This will be the name of the converted file for GEOPAK input (note the full directory path).
- Check the **Use Correspondence File** box.
- Select **7_borehole_english.gcx** as the “Correspondence File” for English units or
- Select **7_borehole_metric.gcx** as the “Correspondence File” for metric units.
- Click on the **OK** button below.
- GEOPAK input file will be created in the **MDB** format and placed in the gINT project folder.

Rock data will be displayed as a string, starting with the **RK** label, followed by **REC** and **RQD** values.

Note that several new fields have been added to the **spt7.gdt** data entry template for GEOPAK compatibility with gINT. They include **JOBNUMBER**, **CHAINNAME** and **AUGER_REFUSAL_DEPTH**. These fields are GEOPAK-specific. For proper GEOPAK conversion, make sure that your gINT “**Station**” and “**Offset**” inputs are entered as specified above.

GEOPAK Cell Library

The cell library is installed in your local **C:\gINT_materials\Geopak** folder. This is the main VDOT cell library file for GEOPAK software. It must be accessible to GEOPAK when processing the MDB file.

SCRIPTS

Scripts are macros that automate and greatly speed up tasks involving correspondence files and project conversion. The easiest way to run a script is to click on the “Command Script” icon in gINT, then click on “Execute script,” and then specify the script file (*.gsc). The names are self-explanatory.

Check your gINT **File -> System Properties -> File Location Defaults** for the script file location. Script files must reside in the same folder as the gINT project file being converted; otherwise the conversion process may not run properly. If you have a project

file to be converted that is stored elsewhere, copy it to your script folder and then run the conversion macro. Currently there are scripts available for converting older data structures (spt6.gdt and cpt6.gdt) to the latest format (spt7.gdt and cpt7.gdt); for converting metric to English units (including parsing of text fields); and for generating DXF output files for MicroStation conversion. For example, to convert a project compiled with the old data structure (spt6.gdt) to the latest format (spt7.gdt), open it in gINT with the vtrc7.glb library active. Then click on the "Command Script" icon and specify the SPT627.gsc script. A converted file opens in gINT and the original file is renamed with the *.org extension.

CHECKLIST FOR SUBMITTAL OF GINT PROJECT FILES FOR ARCHIVING

1. Verify that your gINT project files are compiled in accordance with the latest version of VDOT's Materials Division Manual of Instructions.
2. Verify that you are using the latest VDOT gINT library and data entry templates.
3. When Latitude and Longitude are entered as borehole coordinates, verify the actual borehole locations using Google Earth functionality.
4. When Northings and Eastings are entered as borehole coordinates, make sure that the correct SPCS_Zone is indicated.
5. Verify borehole ground elevations.
6. If the project was compiled using legacy data templates (prior to vtrc7.gdt), convert it to the latest format using spt627.gsc or cpt627.gsc scripts.
7. If the project was compiled using Metric units, convert it to English units using Metric2English.gsc script.
8. Leave the GDBMS ID field blank. This field is for internal VDOT use only.
9. Verify that all text strings do not overrun assigned spaces on the output report.
10. Verify that "Log Depth per Page" is correctly set globally or individually.
11. Name the gINT project file based on the project number, with spaces replaced by dashes and commas replaced by underscores.
12. Verify that each gINT project file that you submit to VDOT for archiving has a unique file name.

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