

# Unique Interface for Integrating Borehole Logs and Cross-Section Data Ensures Environmental Data Accuracy

Engineering organizations typically manage their geological, environmental and Quality Assurance (QA) data in numerous file formats and software packages. Often this requires entering data multiple times, increasing the chance for transcription errors as well as reducing productivity.

New technology now successfully enables information captured in various software systems to be fully integrated for analysis and reporting tasks.

## ***ESDAT Integrates Environmental Data***

Australian company EarthScience Information Systems has created a link between gINT and its EarthScience Data Manager (ESDAT) system. This will allow ESDAT to access gINT's borehole logging and cross-section reporting, creating a robust, end-to-end groundwater and contaminated site data management system.

ESDAT addresses the lack of a transparent and customisable system for effectively dealing with hydro-geological and time-series environmental data. It can consolidate, manipulate and report data and export to a variety of common third-party applications, such as ArcGIS, MapInfo, EVS, Surfer and gINT.

"Engineers performing groundwater investigations often have difficulty managing chemistry and groundwater data; particularly laboratory and chemistry QA data. This is typically managed in Excel, which can be ad-hoc, or in high end database systems that only a limited number of users can operate." states Warwick Wood, Director of EarthScience Information Systems. "ESDAT provides a database system that is simple, intuitive, and transparent."

## ***Customizable Database Automates Key Reporting Requirements***

Management of the data is just one part of the equation; engineers must also consolidate and output their data to satisfy a variety of requirements, whether as visual maps, guideline exceedance tables, or QA reports, as well as require the flexibility to go beyond an 'out of the box' solution . Most solutions simply can't cope with these specialized data requirements.

ESDAT's customizable database automates reporting while assisting in data analysis and manipulation. ESDAT is simple enough that no database skills are required, intuitive enough that data analysis and reporting are easy to perform, and flexible enough so that you can make any customizations necessary. ESDAT lets you:

- Import laboratory, QA, borehole and other hydro-geological data
- Produce formatted chemistry result and other tables with guideline exceedance values highlighted
- Integrate borehole, chemistry, stratigraphic, and other data on borehole logs and data tables
- Produce a QA output report (duplicates, holding times etc..)
- Generate maps with "intelligent" staked labeling
- Create graphs that can be automatically updated as new data becomes available

This combination of functionality means that you can, for example, import laboratory data and use this to produce a QA report (ie field duplicates etc..), generate a chemistry result table showing guidelines and exceedances, produce charts and maps, and show the data on a borelog, all from within the one system.

Therefore, instead of storing data in, for instance, Excel spreadsheets, engineers can now store data in ESDAT which provides a more systematic, easily accessible storage solution, and also greatly increases user productivity thanks to the numerous automatic functions.

Should the default functionality need to be expanded, ESDAT incorporates database, spreadsheet and GIS tools to allow customization of data structure and outputs. ESDAT also allows changes to be made in the back end database, enabling custom queries to be analyzed through the main user interface. Users can readily experiment with conceptual ideas and outputs during the process of developing an understanding of the data, while avoiding the need to reformat that data.

### Link to gINT Avoids Data Duplication, Expedites Analyses

ESDAT provides a live link from gINT directly into the ESDAT database. The connection to gINT integrates borehole logs and cross-section reporting with the ESDAT database to greatly increase user productivity. This avoids duplication of data and allows users to customize the data sent to gINT or customize the gINT reports in the usual manner.

“Users of contaminated site and groundwater data benefit from being able to store their borehole data in conjunction with their groundwater and geo-chemical data, while retaining all the power of gINT” states Warwick Wood, Director of EarthScience Information Systems.

Specifically, the link with gINT allows borehole data to be stored with the remainder of the site data, such as chemistry results (imported directly from the lab, or from the field), water levels, and geological interpretations. This means that all the data is stored in one spot and can be combined on a borehole, map, table or other output (Figure 1).

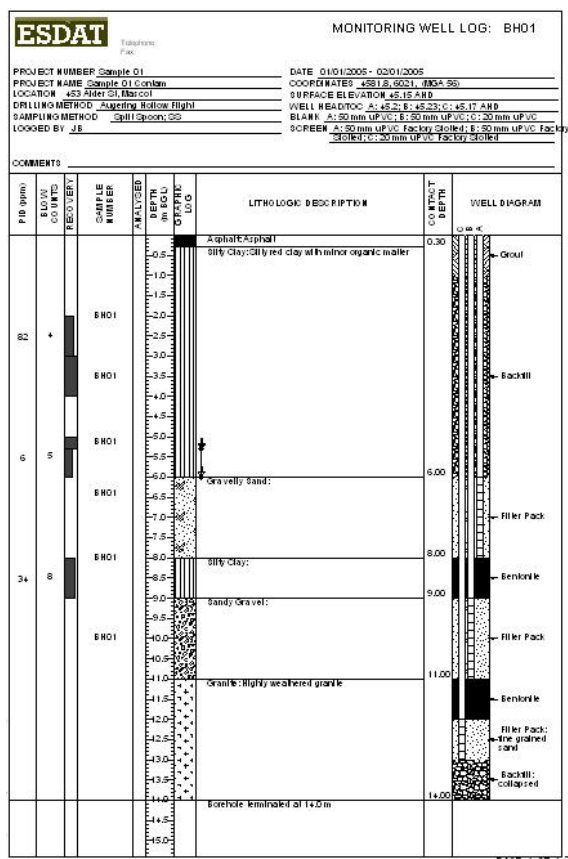


Fig 1. This borehole well log report combines ESDAT and gINT log data.

“Entering data into ESDAT is as easy as entering it into gINT,” explains Wood, “and final gINT reports can be produced at the click of a button – without the need to open gINT independently. For example, groundwater consultants, who need to analyze piezometric levels or other data by aquifer unit, and need to have the same data appear on their borehole logs will find this solution particularly useful, as will contaminated site consultants who want their chemistry data to appear on the logs, tables and maps without having to re-enter the data,”

## Increased User Productivity

Reports that previously took hours to produce, such as chemistry tables and maps, can be produced in less than a minute. The ability to rapidly turn around project reports not only greatly improves user productivity but also increases the time that can be allocated for detailed conceptual analysis of that data.

The QA Reporting available through ESDAT is particularly valuable for contaminated site consultants. The solution automatically performs the QA checks and presents the results as an Excel based report containing a series of tables ready for printing. The non-conformances are flagged and comments, explanations and corporate logos are included as footers. QA Checks can include Relative Percent Difference (RPD) values for duplicate results, holding time exceedances, detects in blanks, spike recoveries and a host of other checks. All settings are customizable as shown on the form shown below.

The screenshot shows the ESDAT Chemistry QA Checker interface. On the left, there is a 'Filter By SDG' table with columns for SDG, First Sample, and Last Sample. Below it is an 'Export All Data' checkbox and 'Output to Excel' and 'Output to Explorer' buttons. A 'QA Summary and QA Errors' button is also present. The main area is titled 'QA Profile' and contains a dropdown menu. Below this are tabs for 'LCS/CRM', 'Inorganics', 'Matrix/Trip Spikes', and 'Surrogates'. Under 'LCS/CRM', there is a 'Duplicates' section with a 'Data Summary' box containing a checked 'Summarise Duplicates' checkbox and 'Output Style' options (Tabular selected, List unselected). Below that is an 'Error Summary' table with columns for 'Applies to results' and 'RPD Acceptability (%)'. The table has three rows for different RPD ranges and three columns for different RPD values. A legend at the bottom explains that RPD is Relative Percent Difference and EQL is Estimated Quantitation Limit (also called LOR).

SDG	First Sample	Last Sample
001265	01 Jan 04	23 May 04
16716	30 Apr 04	30 Apr 04
16715	30 Mar 04	30 Mar 04
16714	27 Feb 04	27 Feb 04
16713	30 Jan 04	02 Feb 04
30 Jan 04	30 Jan 04	30 Jan 04
8 Jan 04	08 Jan 04	08 Jan 04

Applies to results	Field and Interlab Duplicate RPD Acceptability (%)	Laboratory Duplicates RPD Acceptability (%)
5 – 10 x EQL	30	30
10 – 30 x EQL	30	30
> 30 x EQL	30	30

\*RPD = Relative Percent Difference  
EQL = Estimated Quantitation Limit (also called LOR)

Fig 2. This screen highlights ESDAT’s easy to use Quality Assurance (QA) checking capabilities that enable users to quickly review QA profile data by either sample delivery group (SDG) or sample date for duplicates, blanks, holding times, etc. as well as export data to an Excel based report at the click of a button.

## Implementation

ESDAT is implemented as a desktop application and is installed from a standard executable. Single User Licences, Office Licences, and Corporate Licences are available.

Evaluation versions with tutorials and demo data sets can be downloaded from [www.esdat.com](http://www.esdat.com).

## **Summary**

Managing, analyzing, and reporting environmental data is traditionally an ad-hoc and manually intensive process. ESDAT provides a systematic but flexible and expandable system so that users can realize the efficiencies of automating repeatable tasks, but retain the ability to customize it for extended requirements.

Utilizing a shared database and standard data exchange enables greater data accuracy, consistency of data handling, easy portability, reduced transcription errors, and delivers better reporting functionality. Storage of data in one location and one format ensures greater ability to integrate data of different types and to share data between different users.

## **About EarthScience Information Systems**

EarthScience Information Systems has developed ESDAT in partnership with market-leading geoscientific software organizations worldwide. EarthScience Information Systems developers have geoscientific backgrounds and experience and they understand the data, analysis, and outputs that scientists and engineers require. As a result, ESDAT is the most widely used contaminated site data management package in Australia and SE Asia. The ESDAT product is now also being offered to markets in Europe and North America. For details, visit [www.esdat.com](http://www.esdat.com).