



## GTS™ NORM Processing System to Support Fracking Processing

The NORM Processing System, NPS, is based on our Handheld NaI (optionally we can provide a high-resolution LaBr3) Identifier model RIIDEye with a "lightweight" lead shield to reduce background levels. We then measure multiple on-site soil samples before the fracking process to determine the NORM background. The process continues by conducting identical tests with each coded and tracked fracking soil sample and perform a background subtraction of the NORM to determine the required TENORM levels, which if it exceeds the expected standard, nominally 185Bq/kg level, set by local regulatory agencies as exceeding the worker's safety limits. The ESP GTS™ sensor system is capable of accurately measuring down to levels below 10Bq/Kg, or 5% of acceptable levels.

NPS utilizes advanced algorithms, including time-slicing and pattern-recognition techniques, it can detect traces amounts in as little as one second and provide highly accurate isotopic identification in only a few seconds more. Temperature stabilization guarantees accurate identification results in less than one minute after a power-up, even after a lengthy power-down.

The GTS provides indication of multiple radionuclides concurrently within one second (real time) at dose rates well below 1  $\mu$ R/hr. Multiple identification techniques are used, including peak fitting, least squares analysis, and expert-systems approaches.

Using our gamma-spectroscopic procedure with direct on-site NORM samples of the Ra226/Ra228 from the daughter decays allows us to measure a reference NORM, not relying on a laboratory reference and waiting for sufficient

collection of radon gas for measurement. This allows us to perform a much faster measurement decreasing holding time and maximizing safety. It is also important to note that this on-site reference measurement is also a standard mandated by Federal Guidance for cleanup of contamination nuclear sites!

The NPS allows for the tracking of samples, reporting of findings in many formats, as all the data is stored in a local MS Access Database. The system is complete with all of the components you will need, the RIIDEye Sensor, Field Support Kit, "Lightweight" Lead Shielding, Compatible Marinelli Beakers and management software. Optionally ESP can provide a Bar Code Kit complete with handheld scanner and printer.

### Key NPS features include:

- ANSI N42.42 compliant data format Auto calibration & background update
- Background subtraction
- 2" x 2" NaI Detector (LaBr optional)
- "Lightweight" lead shield
- Custom Marinelli beakers
- Field Kit with cables



ESP GTS Handheld



Lightweight Lead Shield

## NPS™ System Specifications

GTS sensors, integrated with ESP architecture that is connected to a server, create a grid of threat-level radiation protection. Defentect DM3 software, triggers alerts to incident command centers or mobile clients.

Operating Indicated Use  
Isotope Energy Library (Note 1)

Gamma Detection: 18keV—3.0MeV  
Onboard MCA for energy identification  
99 isotopes can be defined

Sensitivity  
Sampling Rate  
Temperature Range

1  $\mu$ R/hr for Cs-137  
1 Millisecond  
-20 to 50°C

### Power

Batteries:	Internal, 8 x 2900mAh NiMH AA batteries
AC:	35W 12V or 15V universal AC adapter (depending on system revision)
Auto:	9V fused accessory adapter

### Gamma Detector

Crystal:	2" x 2" or 3" x 3" NaI
Bias:	Integral HV supply from 0 – 1200V Actual operating voltage calibrated to each detector
Connection:	IP67 watertight LEMO

### Neutron Detector (if present)

Crystal:	$^6\text{LiI}$
Moderator:	1cm polypropylene
Discriminator:	Digital pulse shape and energy discrimination