

# AUTOMATED LOW LEVEL TRITIUM IN WATER MONITOR REAL TIME CONTINUOUS

Model ~ NexTritium-H2O

## FEATURES:

- LOW LEVEL TRITIUM
- SENSITIVE TO 0.2  $\mu\text{Ci/l}$  Tritium
- REAL TIME – AUTOMATIC
- EXCELLENT LONG TERM STABILITY
- CONTINUOUS MONITORING
- NOT INFLUENCED BY OTHER NUCLIDES
- NO LIQUID SCINTILLANT REQUIRED
- EASY CALIBRATION
- NEW STATISTICAL SIGNIFICANCE DISPLAY
- RUGGED,
- MOUNTED: CASTER, SKID, or TABLE TOP
- IP 42



Nex-Tritium-H2O  
Electronics



Two Pairs of Matched  
Photo Multiplier  
Tubes

## APPLICATION:

- MEETS EPA DRINKING WATER LEVELS
- MONITOR LEAKS IN CANDU TYPE REACTORS MONITOR TRITIUM
- CONTAMINATION IN GROUND WATER.
- MONITOR LABORATORY OR PLANT LIQUID WASTE STREAM.

## DESCRIPTION:

This system consists of a light tight detector assembly which is interfaced with the sample via male 1/8" pipe fittings with the readout and processor assembly via two BNC connectors.

The sample is passed through a filter and thence to the detector assembly, where it is viewed by two pairs of matched photo multiplier tubes.

The table top or rack mounted processor and display portion of this system conditions and analyzes the output from the photo multiplier tubes by pulse height and validated by a coincidence circuit, thereby permitting the system to eliminate counting most background (noise) counts.

**MEETS CFR/NRC REGULATION OF 1.0  $\mu\text{Ci/L}$  (H-3)**

**Nex-Tritium includes unique statistical Significance Display.**

- This function rates strength of the data preventing most false positives or negatives:
  - Significance : **HIGH, LOW, or NOT SIGNIFICANT.**



**TECHNICAL ASSOCIATES  
OVERHOFF TECHNOLOGY**

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## UNIQUE NEXTRITIUM-H2O DETECTOR CHARACTERISTICS

FEATURE	PURPOSE
<b>Ultra High Sensitivity Achieved Through the Following Physical Features:</b>	
Custom Made Anthracene Scintillation Crystals in Technical Associates' Laboratories	High Beta Sensitivity
Two (2) 5" Diameter Optical Sensor Arrays (Totaling 200 cm <sup>2</sup> ) Sensitive Area	High Count Rate
Special Data Analysis	As Described in Sensitivity Chart
Guard Detector	Cosmic Ray Rejection
Four (4) Photo Sensors	True Tritium Pulse Validation
Five (5) Flow Channels	Assures Smooth Continuous Flow
Temperature Controlled Detector Cooler	Long Term Accurate Signal Stability
Steel, Bronze, and Lead Shielding	Gamma Ray Background Rejection
Real-Time Temperature Compensation Sensor	Improved Sensitivity & Stability



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<b>TRITIUM SENSITIVITY</b>		
<b>PicoCuries</b>	<b>MicroCuries</b>	<b>Time to Count</b>
2,000,000 pCi/l	2.0 $\mu$ Ci/l	2 minutes
500,000 pCi/l	0.5 $\mu$ Ci/l	20 minutes
200,000 pCi/l	0.2 $\mu$ Ci/l	3 hours
100,000 pCi/l	0.1 $\mu$ Ci/l	24 hours
20,000 pCi/l	0.02 $\mu$ Ci/l	7 days
10,000 pCi/l	0.01 $\mu$ Ci/l	14 days
<b>Display updates every 2 minutes</b>		

## FLOW CHART

1. Chiller
2. Refrigerated Detector & Amplifiers to Sustain Constant Low Temperature
3. Flow Cell – 5" Diameter
4. Photo Multiplier Tube
5. Guard Detector

## FEATURES OF SENSOR SYSTEM

- Real-Time Temperature Detection & Correction
- Real-Time Dynamic Gamma Background Detector.



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## SPECIFICATIONS:

<b>Display Update:</b>	Every 2 minutes.
<b>Tritium Sensitivity:</b>	See Tritium Sensitivity Chart above
<b>Range:</b>	20,000 - 20,000,000 pCi/liter Optional : Other ranges higher or lower.
<b>Flow Rate:</b>	Minimum -1 ml/min
<b>Maximum -</b>	100 ml/min
<b>Sample Temperature: Standard -</b>	< 80°F (liquid); (optional - to 115°F)
<b>Ambient Temperature:</b>	Detector - < 80°F ( <b>Optional</b> - to 115°F) Readout-< 115°F
<b>Lead Shielding:</b>	1" thick is standard 2" thick is optional

## WEIGHT & DIMENSIONS:

<b>Dimensions:</b>	Electronics: 23"H x 16"L x 21" W Detector: 12"H x 10"D x 27" W Pump: 10"H x 10"D x 6" W
<b>Weight (Standard Unit):</b>	Detector Housing: 35 lbs. (Unshielded) Electronics Housing: 40 lbs. Pump: 8 lbs
<b>Shipping Weight:</b>	90 lbs.

➤ **Weight and Dimensions shown above do not include Sample Chiller and Refrigeration Unit.**

<b>Optional Shielding:</b>	65 lbs.
<b>Display:</b>	5" color monitor

## OPTIONS

- Data Archive and Data Retrieval; records readings for up to 5 years.
- Remote readout via Ethernet
- Network reporting and communication via the ORO overdrive network
- "Deionizer and Filter" specification (SSS-33M8/D and SSS-33M8/F).



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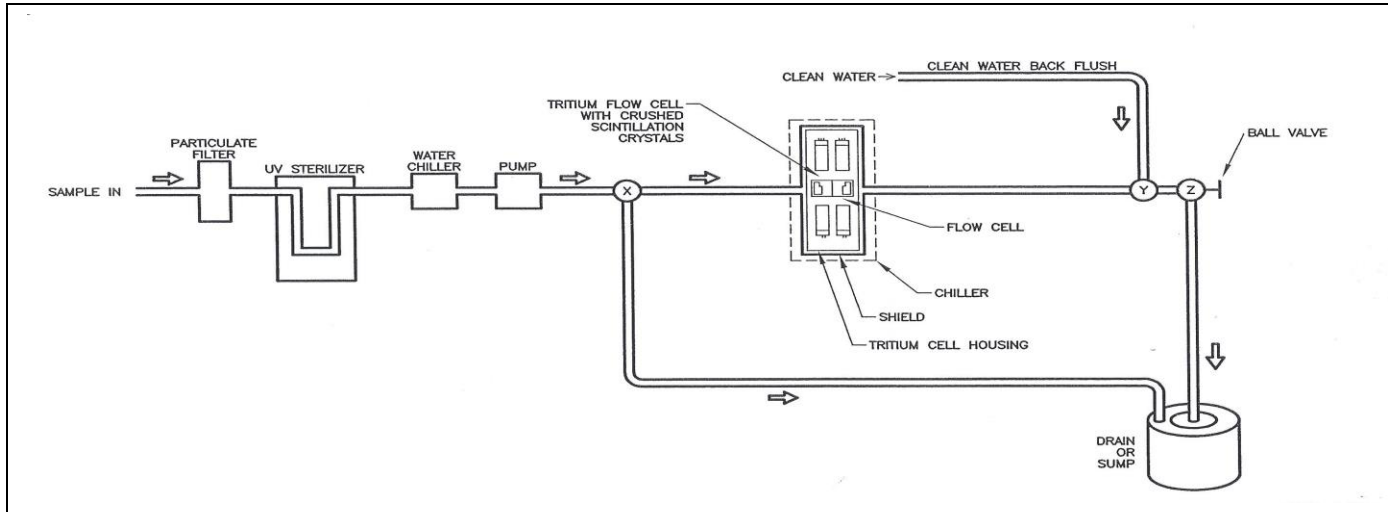
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## NexTRITIUM-H2O FLOW CHART



## IF YOU HAVE TRITIUM IN WATER & OIL MIXTURES: WE RECOMMEND THIS STRATEGY FOR MEASUREMENT OF TRITIUM

### STRATEGY

Tritium is radioactive hydrogen, and hydrogen atoms regularly jump or exchange between different adjacent molecules.

In a mixture of normal water mixed with tritiated oil, both components will, over time, share the Tritium equally.

In **LIQUID** Samples, this allows a separation strategy, in which we,

1. Pull a sample from the mixture
2. Run this sample through a oil-water separator
3. Collect the relatively clean water
4. Pull this water into the SSS-33M81 tritium measurement flow cell
5. Get a good reading
6. Without contaminating or degrading the cell

In **GASEOUS** Samples, the same principles apply.

1. A vapor separation system is utilized.
2. A [PTG-9](#) Tritium Measurement Ion Chamber is used to make the measurements.

**PLEASE CONTACT US WITH INFORMATION ON YOUR SITUATION.  
WE WILL ADVISE &/OR QUOTE ON A SUITABLE SYSTEM TO OBTAIN YOUR OBJECTIVE.**



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