LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY

1299 HARRISBURG PIKE
P.O. BOX 4425
LANCASTER, PA 17604
PHONE:(717) 397-9968
FAX: (717) 397-9973
www.lcswma.org

December 29, 2005

Mr. Thomas J. Hanlon, P.E.
Sanitary Engineer III – Waste Management Program
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

REF: Lancaster County Solid Waste Management Authority (LCSWMA)
Frey Farm Landfill (FFLF); Manor Township, Lancaster County
Minor Permit Modification; Form 54

Dear Mr. Hanlon,

I am pleased to enclose one (1) original and two (2) copies of the Minor Permit Modification referenced above as prepared by LCSWMA in conjunction with our consultant (ARM Group Inc., Hershey, PA). The application includes:

- The DEP Form 54 (Meteorological Monitoring)
- DEP "administrative" forms (General Information, A, B, B1, and C1)
- A check in the amount of $300

Accordingly, I believe the application to be administratively complete and look forward to the Department's review.

Thank you for your efforts both with this project and our various other permit related activities. Feel free to contact me if I can provide additional information or be of further assistance in any regard.

Sincerely,

Brooks K Norris

Brooks K. Norris
Senior Manager, Technical Services

Enclosure

cc: Manor Township Supervisors (w:enc.)
LCSWMA: Jim Warner; Bob Zorbaugh; Bob Eshbach (w:enc.)
ARM: Bill Tafuto (w:enc.)

L:\WPDATA\BKN\WORD\FFLF\FORM 54 MINOR MOD APP LETTER.doc

LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY

1299 OLD HARRISBURG PIKE
P.O. BOX 4425
LANCASTER, PA 17604-4425
PHONE (717) 397-9968
FAX (717) 397-9973

Fulton Bank
LANCASTER, PA 17604
VOID AFTER 90 DAYS

60-142
313

CHECK NO. 1162525

DATE	AMOUNT
12/29/2005	$300.00

Three Hundred Dollars And 00 Cents

PAY TO THE ORDER OF

COMMONWEALTH OF PENNSYLVANIA
2301 NORTH CAMERON STEET
HARRISBURG PA 17110-9408

TWO SIGNATURES REQUIRED

⑈1162525⑈ ⑆031301422⑆ 2018 25459⑈

1162525

LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY

VENDOR ID	NAME	ACCOUNT NO.	CHECK NO.	CHECK DATE
COMMO005	COMMONWEALTH OF PENN		1162525	12/29/2005

VOUCHER	INVOICE	DATE	AMOUNT	DISCOUNT	OTHER	NET
	122305	12/23/2005	$300.00	$0.00		$300.00
			$300.00	$0.00		$300.00

COMMENT

MINOR PERMIT MODIFICATION APPLICATION

for the

LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY

FREY FARM LANDFILL

BUREAU OF WASTE MANAGEMENT

PERMIT #101389

regarding

Installation of Meteorological Monitoring Equipment

Prepared by:

Lancaster County Solid Waste Management Authority

1299 Harrisburg Pike

Lancaster, PA 17604-4425

and

ARM Group Inc.

1129 West Governor Road

Hershey, PA 17033-0797

December 2006

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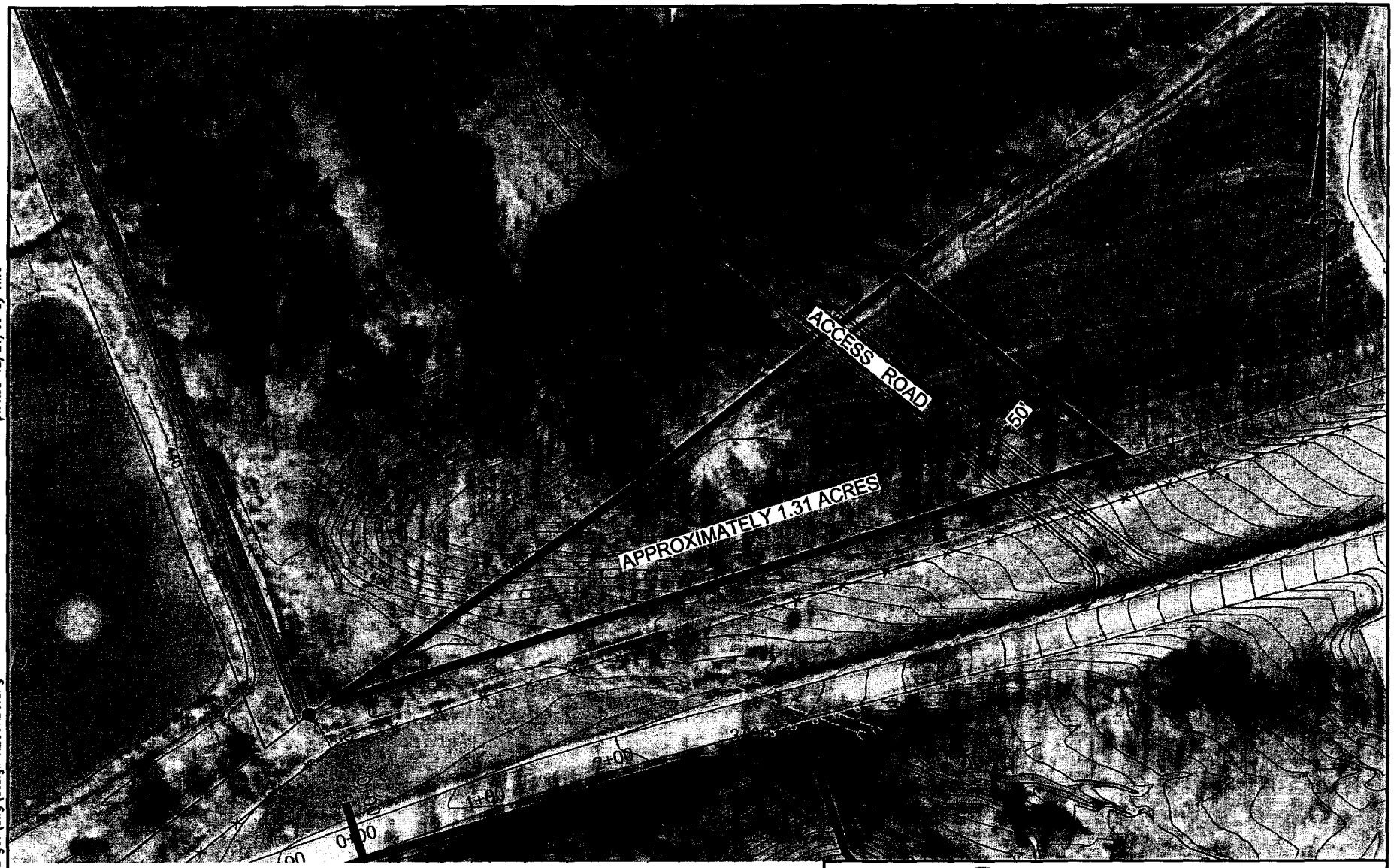
Figures

Attachments



plotted 12/21/05 by RWG

L:\Autocad Projects 2005\LF PPL gas\dwg\design RECORDS.dwg

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1299 Harrisburg Pike
PO Box 4425
Lancaster, PA 17604
717-397-9968
Fax 717-397-9973
www.lcswma.org

LFGTE PROJECT

FIGURE 1 - 1 TRIANGLE PROPERTY

Drawn By: RWG	Scale: 1"= 100'	Date: 12/21/05	Dr	No: 050118-20

2. Narrative

2540-PM-LRWM0503 Rev. 2/2001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

Date Prepared/Revised 12/16/2005
DEP USE ONLY
Date Received

FORM 54
BACKGROUND METEOROLOGICAL MONITORING

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 54, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Chapter 273.136 and 277.136; February 2000 EPA document, "Meteorological Monitoring Guidance for Regulatory Modeling Applications," EPA-454/R-99-005, http://www.epa.gov/scram001/guidance/guide/mmgrma.pdf.

SECTION A. SITE IDENTIFIER

Applicant/permittee Lancaster County Solid Waste Management Authority (LCSWMA)

Site Name Creswell Landfill and Frey Farm Landfill

Facility ID (as issued by DEP) Permit Nos. 100008 and 101389, respectively.

SECTION B. TYPE OF FACILTY

- ☐ New Municipal Waste Landfill
- ☐ New Construction/Demolition Waste Landfill
- ☒ Existing Municipal Waste Landfill
- ☐ Existing Construction/Demolition Waste Landfill
- ☐ Expansion or Increase in Daily Volume of a Municipal Waste Land
- ☐ Expansion or Increase in Daily Volume of a Construction/Demolition Waste Landfill

SECTION C. DATA COLLECTION PROTOCOL

A permit application for construction of a new landfill, or for an expansion in capacity or daily volume of an existing landfill, must include a determination of normal and adverse weather conditions based on site-specific meteorological data for odors. Prior to the installation of equipment and collection of meteorological data, a protocol for the installation and data collection shall be approved by the Department. One year of meteorological data is required, unless a shorter period of time is approved by the Department. In addition, on existing landfill can install meteorological equipment at anytime as part of a minor permit modification. This form must be completed and submitted as part of the minor permit application.

A data collection protocol shall include the following: **Refer to Attachment 54-1**

1. Indicate the proposed data collection point as latitude and longitude.
2. When will data collection begin and end?
3. Describe instruments used for monitoring. The data collection device must, at a minimum, measure wind speed and direction and record the information electronically on an hourly basis.
4. Describe how data will be collected.
5. Describe how the data will be processed and quality assured.

Attachment 54-1

FORM 54
BACKGROUND METEOROLOGICAL MONITORING
SECTION C. DATA COLLECTION PROTOCOL

Lancaster County Solid Waste Management Authority (LCSWMA)

Frey Farm Landfill and Creswell Landfill

Below are responses to each data collection protocol requirement listed on Form 54 Section C. Data Collection Protocol. The responses below correspond numerically to the protocol requirements numbered on From 54.

1. ***Indicate the proposed data collection point as latitude and longitude.***

Generally the latitude and longitude of the three proposed weather station locations are:
1. N39° 57' 15" W 76° 26' 36",
2. N39° 57' 26" W 76° 26' 22", and
3. N39° 57' 18" W 76° 27' 11".

The weather station locations are illustrated on Figure 1 of the Meteorological Monitoring Plan. Three locations are provided because the physical location of the weather station may need to change during the life of the landfill to accommodate construction and avoid obstructions, as defined by the February 2000 EPA document, "Meteorological Guidance for Regulatory Monitoring Applications," EPA-454/R-99-005.

If the weather station must be relocated to a location on site other than the three listed above, advance approval from PaDEP will be requested.

2. *When will data collection begin and end?*

Upon approval of this permit modification, a weather station system will be bid, ordered and installed. The collection and storage of the data will be initiated after completion of the installation and acceptance testing of the weather station. The weather station will then be maintained and calibrated and data will be collected until the certification of the last stage of the landfill closure construction is received from the PaDEP for this facility.

3. *Describe instruments used for monitoring. The data collection device must, at a minimum, measure wind speed and direction and record the information electronically on an hourly basis.*

The weather station will measure, at a minimum, wind speed and wind direction. LCSWMA may also install instruments to measure precipitation, atmospheric pressure and temperature. The instruments utilized to monitor the meteorological variables will meet the following accuracies, resolutions, and senor specifications, as recommended in the February 2000 EPA document, "Meteorological Guidance for Regulatory Monitoring Applications," EPA-454/R-99-005, and as noted below.

- The wind speed sensor will be a lightweight three-cup anemometer, five-blade ultra-violet-inhibited Lexan propeller, or similar device capable of a starting speed of ≤ 0.5 meters/second (m/s), distance constant of ≤ 5 meters (m), capable of measuring to the nearest 0.1 m/s, and an accuracy of ± 0.2m/s + 5% of observed.
- The wind direction sensor will be a balanced wind vane, or similar device capable of a starting speed ≤ 0.5m/s @ 10°, damping ratio between 0.4 to 0.7, a delay distance of ≤ 5m, capable of measuring to the nearest 1.0°, and an accuracy of ± 5°.
- If installed, the ambient temperature sensor will be a resistance temperature detector (RTD), thermistor, thermocouple, or similar device capable of a time constant of ≤ 1 minute and of measuring to the nearest 0.1 °C with an accuracy of ± 0.5 °C.
- If installed, the precipitation gauge will be a weighing rain gauge or tipping bucket rain gauge capable of measuring to the nearest 0.3 millimeters (mm), and at an accuracy of ± 10% of observed or ± 0.5mm.
- If installed, the atmospheric pressure will be measured with an aneroid barometer, or similar device capable of measuring to the nearest 0.5mb at an accuracy of at least ± 3 millibars (mb).

The meteorological variables will be recorded electronically on an hourly minimum basis.

4. Describe how the data will be collected.

The data will be collected with a microprocessor-based digital acquisition system. The system will transfer the data such that it can be downloaded and stored in an electronic file format.

5. Describe how the data will be processed and quality assured.

Meteorological data shall be transferred from an electronic format to a hard copy format and stored for analysis on a routine basis (i.e., monthly). The data will be compared to meteorological data from a local NOAA weather station at random dates and times. Further processing of the meteorological data is not currently anticipated.

In order to assure the quality of the data, the following procedures will be conducted:

- The weather station system will be visually inspected on a routine basis (i.e., daily) to ensure the sensors are operating.

- The meteorological data will be compared on a routine basis (i.e., monthly) with data from the nearest National Climatic Data Center (www.ncdc.noaa.gov) weather facilities, or similar nearby weather station. Currently there are seven active cooperative weather stations located in Lancaster County that are registered with NCDC. They are located in or at Holtwood, Lancaster 2 NE Filtration Plan, Lancaster Airport, Landisville, New Holland, Lake Octoraro, and Safe Harbor Dam.

- The meteorological sensors and gauges will be calibrated annually.

Meteorological Monitoring Plan

Lancaster County Solid Waste Management Authority (LCSWMA) Frey Farm Landfill and Creswell Landfill

This Meteorological Monitoring Plan (Plan) is organized to respond to requirements listed in the DEP Instruction, "Preparation of Meteorological Monitoring Plan", Rev. 2/2001. In effort to simplify DEP review, create a functional plan, and ensure compliance, the Plan is organized below in direct response to summarized criteria identified within the DEP Instructions.

Purpose/Scope

1. *General Project Overview*

   The Lancaster County Solid Waste Management Authority herewith submits a minor modification for approval of the following protocol to collect site-specific meteorological data for their Frey Farm and Creswell Landfills. The protocol is prepared and submitted in accordance with Form 54 Background Meteorological Monitoring, 25 Pa Code 273.136, and February 2000 EPA document, "Meteorological Guidance for Regulatory Monitoring Applications," EPA-454/R-99-005 .

   Frey Farm and Creswell Landfills are two municipal solid waste landfill facilities operated by the Lancaster County Solid Waste Management Authority (LCSWMA), and regulated by the Southcentral Region of the Commonwealth of Pennsylvania Department of Environmental Protection (DEP), Permit Nos. 101389 and 100008, respectively. The two facilities are located adjacent to one another, share a common property boundary, and reasonably experience identical weather conditions. Separate permit numbers exist for each landfill unit, but they function as one solid waste facility, sharing property boundaries, buffer property, and various infrastructure. The landfill units at the Creswell Landfill are all closed. The active landfilling of municipal solid waste occurs only at the Frey Farm Landfill. Reference to the two landfills in the remainder of this document is summarized as "landfill facility".

   The landfill facility is located in Manor Township, Lancaster County, Pennsylvania. The landfill facility is located along the Susquehanna River, at the crest of river valley among the low rolling hills of the Piedmont physiographic geologic province.

2. *Collection of On-Site Meteorological Wind Fields*

A weather station will be bid, purchased, and installed following approval of this permit modification. The collection and storage of the data will be initiated after completing installation and acceptance testing of the weather station. The weather station will then be maintained and calibrated and data will be collected until the certification of the last stage of the landfill closure construction is received from the DEP for this landfill facility.

The weather station will measure, at a minimum, wind speed and wind direction. LCSWMA may also install instruments to measure precipitation, atmospheric pressure and temperature. The instruments utilized to monitor the meteorological variables will meet the following accuracies, resolutions, and senor specifications, as recommended in the February 2000 EPA document, "Meteorological Guidance for Regulatory Monitoring Applications," EPA-454/R-99-005, and as noted below.

- The wind speed sensor will be a lightweight three-cup anemometer, five-blade ultra-violet-inhibited Lexan propeller, or similar device capable of a starting speed of ≤ 0.5 meters/second (m/s), distance constant of ≤ 5 meters (m), capable of measuring to the nearest 0.1 m/s, and an accuracy of ± 0.2m/s + 5% of observed.
- The wind direction sensor will be a balanced wind vane, or similar device capable of a starting speed ≤ 0.5m/s @ 10°, damping ratio between 0.4 to 0.7, a delay distance of ≤ 5m, capable of measuring to the nearest 1.0°, and an accuracy of ± 5°.
- If installed, the ambient temperature sensor will be a resistance temperature detector (RTD), thermistor, thermocouple, or similar device capable of a time constant of ≤ 1 minute and of measuring to the nearest 0.1 °C with an accuracy of ± 0.5 °C.
- If installed, the precipitation gauge will be a weighing rain gauge or tipping bucket rain gauge capable of measuring to the nearest 0.3 millimeters (mm), and at an accuracy of ± 10% of observed or ± 0.5mm.
- If installed, the atmospheric pressure will be measured with an aneroid barometer, or similar device capable of measuring to the nearest 0.5mb at an accuracy of at least ± 3 millibars (mb).

Attachment A includes specifications for meteorological monitoring equipment that meets the minimum accuracies, resolutions and response characteristics outlined above. The system installed at the landfill facility shall be the equipment presented in Attachment A, or similar devices capable of the performance requirement presented above.

3. *Hourly Averaged Wind Speed and Wind Direction*

   Hourly averaged wind speed and wind direction will be determined using the collected meteorological data. The meteorological variables will be recorded electronically on a minimum hourly basis.

4. *Archive Data*

   The meteorological data will be collected with a microprocessor-based digital acquisition system. The system will transfer the data such that it can be downloaded and stored in an electronic file format.

Site Description

1. *Brief Description of the Facility*

   Frey Farm and Creswell Landfills are two municipal solid waste landfill facilities operated by the Lancaster County Solid Waste Management Authority (LCSWMA), and regulated by the Southcentral Region of the Commonwealth of Pennsylvania Department of Environmental Protection (DEP), Permit Nos. 101389 and 100008, respectively. The two facilities are located adjacent to one another, share a common property boundary, and reasonably experience identical weather conditions. Separate permit numbers exist for each landfill unit, but they function as one solid waste facility, sharing property boundaries, buffer property, and various infrastructure. The landfill units at the Creswell Landfill are all closed. The active landfilling of municipal solid waste occurs only at the Frey Farm Landfill. Reference to the two landfills in the remainder of this document is summarized as "landfill facility".

   The landfill facility is located in Manor Township, Lancaster County, Pennsylvania. The landfill facility is located along the Susquehanna River, at the crest of river valley among the low rolling hills of the Piedmont physiographic geologic province.

2. *Facility Location – Please Include the Township, County, and DEP Region*

   The landfill facility is located in Manor Township, Lancaster County, Pennsylvania, in the Southcentral region of DEP.

3. *Local Terrain Features*

   The landfill facility site is located at the crest of the Susquehanna River valley and among the rolling hills of the Piedmont physiographic geologic province. The surrounding land use is primarily agricultural with scattered residential, industrial and wooded parcels. The subject site is currently being used as a sanitary landfill.

4. *Local Climatology*

   The annual average daily maximum temperature is 62.2°F. The annual average daily minimum temperature is 42.5°F. The annual average daily temperature is 52.3°F. The average yearly precipitation is 43.16 inches. The average yearly snowfall is 26.9 inches. (Taken from Soil Survey of Lancaster County, Pennsylvania)

Monitor Location

1. *Show Site Location on Topographic Map or Aerial Photograph*

   See attached Figure 1 – Meteorological Monitoring System Locations

2. *Show Property Boundary, Cell Locations and Active Fill Areas*

   See attached Figure 1 – Meteorological Monitoring System Locations

3. *Provide Lat/Long or UTM Coordinates*

   Location 1: Latitude: 39° 57' 15" Longitude: 76° 26' 36",

   Location 2: Latitude: 39° 57' 26" Longitude: 76° 26' 22",

   Location 3: Latitude: 39° 57' 18" Longitude: 76° 27' 11".

4. *Schematic Showing Local Obstructions*

   There are no local obstructions that impact the proposed locations. The potential obstruction are presented on the attached drawing, but the locations were selected such that the distances from the potential obstructions are beyond the minimum allowable distance specified in the February 2000 EPA document, "Meteorological Guidance for Regulatory Monitoring Applications," EPA-454/R-99-005. See attached See attached Figure 1 – Meteorological Monitoring System Locations.

   The wind speed and direction sensors shall be mounted on a 10-meter mast at a minimum height of 10-meters above the ground surface and will be located in an area where the distance between the weather station and any obstruction is at least 10 times the height of the obstruction.

   If installed, the ambient temperature measurement device shall be maintained at a height of 2 meters above the ground surface.

   If installed, the precipitation measurement device shall be maintained a minimum 30 cm from the ground surface, and out of range of splashing, with the mouth of the collection device horizontal to the sky. A wind break shelter may be installed to improve precision, but shelter height shall not exceed twice the distance from the instrument. The allowable shelter height may extend to 4 times the distance in open areas.

   Specifications for typical mounting devices are also included in Attachment A.

Quality Assurance Project Plan (QAPP)

1. *Ensure Collection of Good Data*
    a. *Make Sure Instruments Meet Thresholds Established in EPA On-Site Meteorological Guidance*

        Instruments will meet all thresholds established in the EPA On-Site Meteorological Guidance

    b. *Spot Check Data (Landfill Daily Record)*

        On a routine basis (i.e., daily), a designated landfill employee will check ambient temperatures, precipitation, and wind direction to ascertain accuracy of the weather station. If inspections are completed on a daily basis, the daily interval shall only include those days when the landfill facility is in operation.

    c. *Establish Procedures for Collecting and Archiving Wind Field Data*
        i. *Include Instrument Name and Specs*

            The exact instrument name and specifications will be determined after bids are reviewed and the equipment is obtained.

        ii. *Detail Data Archive Method*

            Meteorological data shall be transferred from an electronic format to a hard copy format and stored for analysis on a routine basis (i.e., monthly, semi-annually, etc.).

            Data shall be maintained, as possible, in chronological order with the first label of each data being the year, month, day and hour. The hour shall be the hour for which the averaging period ended.

2. *Detect Problems with Data Collection and Establish Procedures for Correcting Problems*
    a. *Detail Periodic Checks*

        The weather station system will be physically inspected on a routine basis (i.e., daily). If inspections are completed on a daily basis, the daily interval shall only include those days when the landfill facility is in operation.

b. *Provide Procedures to Correct Problems*

The collected data will be compared on a routine basis (i.e., monthly) with the meteorological data obtained from a nearby NOAA weather station. If significant discrepancies are noted, the instruments will be recalibrated. If further discrepancies are evident during later comparisons, the meteorological instrument will be thoroughly inspected and repaired.

c. *Maintain a Log Detailing Problems and Corrective Actions*

A log detailing problems and corrective actions will be maintained.

3. *Auditing/Calibrating/Maintenance*
   a. *Instruments Should Be Calibrated and Maintained to Ensure Collection of Valid Data*

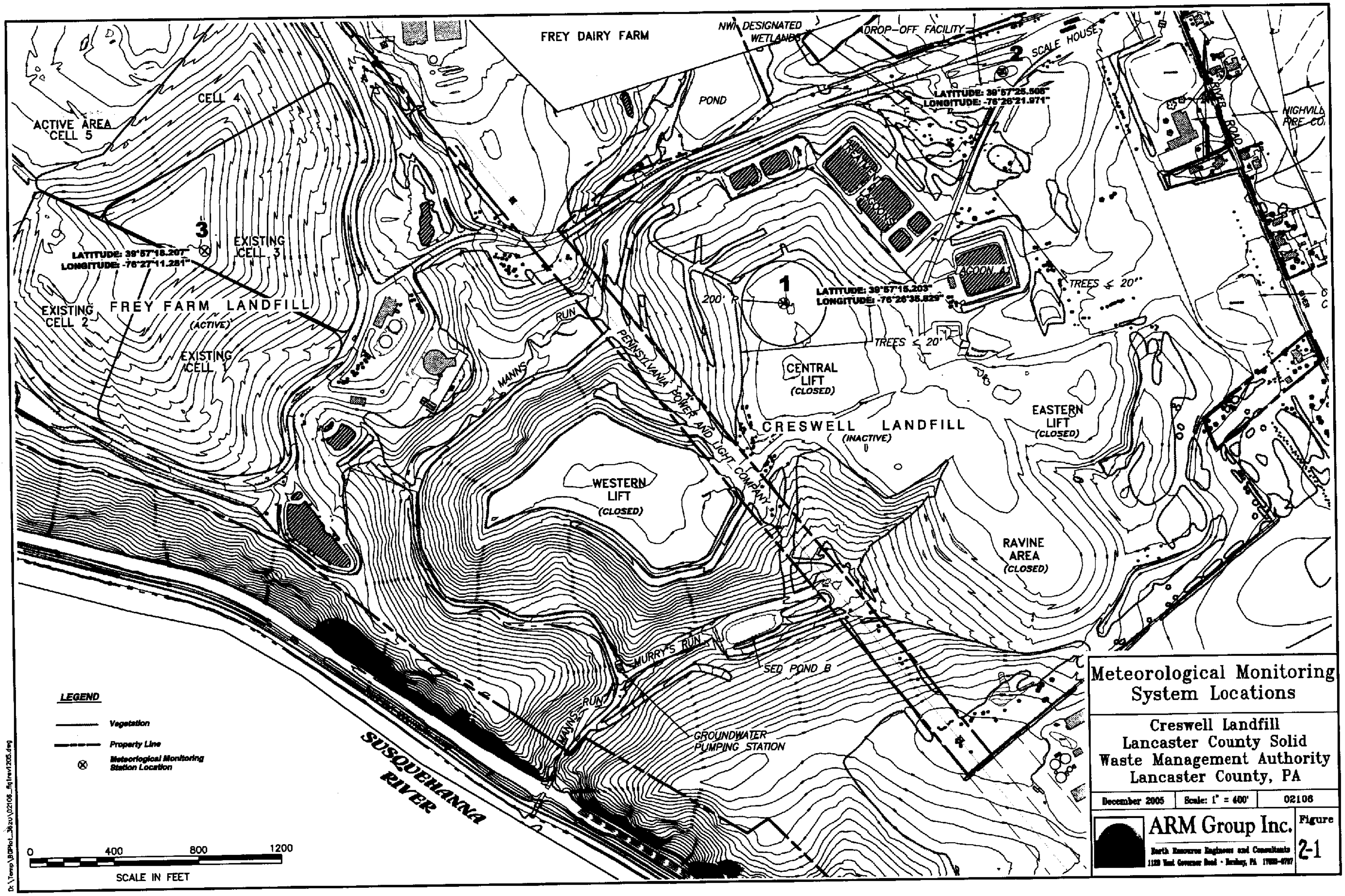
The meteorological sensors and gauges will be calibrated annually.

b. *Audits Could Detect Biases and Problems*

The meteorological data will be compared on a routine basis (i.e., monthly) and at other random dates and times with data from a nearby NOAA weather facility. Further processing of the meteorological data is currently not anticipated.

c. *Should Be Performed At Least Once A year*

The meteorological sensors and gauges will be calibrated annually.



Meteorological Monitoring System Locations

Creswell Landfill
Lancaster County Solid Waste Management Authority
Lancaster County, PA

December 2005	Scale: 1" = 400'	02106

ARM Group Inc.
Earth Resource Engineers and Consultants
1129 West Governor Road · Hershey, PA 17033-0797

Figure 2-1

3. Summary

The Lancaster County Solid Waste Management Authority (LCSWMA) is requesting that the Pennsylvania Department of Environmental Protection (DEP) approve a minor permit modification regarding the installation of meteorological monitoring equipment at the Frey Farm and Creswell Landfills and the addition of 1.4 acres to the FFLF property.

LCSWMA respectfully requests the DEP's timely consideration of this application and that LCSWMA be provided with the opportunity to clarify any questions that arise during the review process in order that the permit modification be issued in a timely manner.

Attachment A

Weather Station Component Specifications

WeatherLog®	Catalog No. S-10R

The RainWise System 10 Remote Weather Data Logger

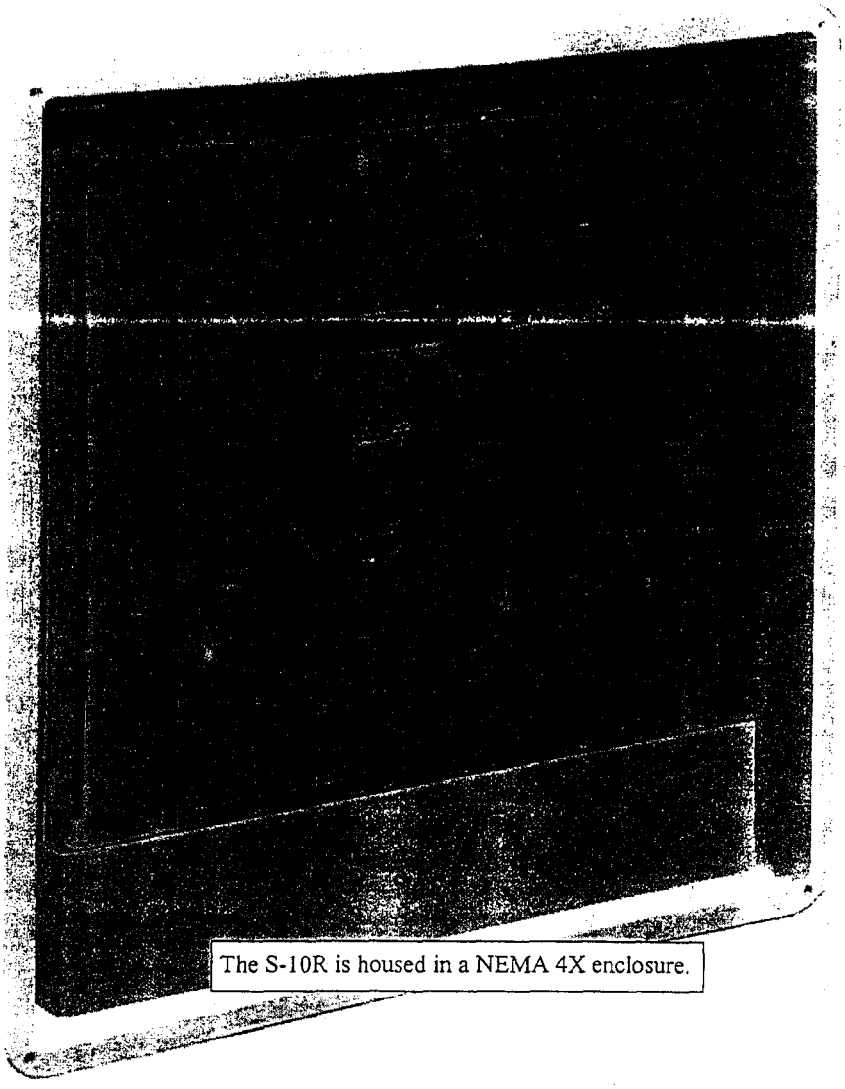
The System 10 Remote Weather Data Logger is the basic interface between the RainWise sensors and the desired output for a particular system.

The electronic module and associated power supply with any other auxiliary equipment is housed in a rugged, lockable NEMA 4X enclosure. This assembly can be mounted by itself and cable connected to the various sensors or combined with our Monopod in an integral sensor support system (S-10RM).

In addition to the standard RS-232 output, the S-10R can be supplied with RS-422, RS-485, 4-20ma and other analog outputs. An optional two line, sixteen character LCD display provides real time information.

The S-10R is guaranteed for five years.

- Storage up to 256K
- 8 analog inputs
- 6 digital inputs
- 2 timer/counter inputs
- RS-232 output standard
- User selectable sampling rate
- 300-9600 selectable Baud rate
- Main or solar powered



The S-10R is housed in a NEMA 4X enclosure.

RainWise® Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog® System 10 Remote Weather Logging System

General Description
System 10 Remote (S-10R) is the most versatile weather measuring and recording system in the WeatherLog® line. An adaptable data logger which, though designed primarily for remote sensing applications, can also be used for local applications where its enhanced capabilities are necessary. The system provides connections for any of the RainWise sensors.

Logging Capabilities
The S-10R's standard configuration includes 32K of non-volatile RAM. Typical data storage capability is 80 days when sampling 10 parameters hourly. Additional memory upgrades of 64K, 128K and 256K RAM are available. Logging rates from once a minute to once an hour are available.

Data Output
Standard output from the S-10R is RS-232. Other digital and analog outputs including 4-20ma. are available, as well as an LCD plug-in display.

Electronic Data Communications
The S-10R has several basic communications options. The system may be direct wired to a computer. Its control module will also support a built-in modem for telephone or radio communications. In addition to these alternatives, the S-10R offers its users the ability to use the RainWise Data Sponge to hand carry electronic data from the unit back to a PC.

Software
The S-10R is factory programmed and pre-wired to operate with the desired sensors. Other than setting the clock and record rate no field configuration is required. The system can be installed and operational in a very short time.

For data retrieval via the serial interface, user friendly PC software is included at no charge. The software will display the current conditions on screen, and upload the stored data from the S-10R. The S-10R weather data is output as comma delimited ASCII text, which may be easily imported into spreadsheet and database applications.

The S-10R uses a simple text command protocol, so it is straight forword to interface to other equipment.

Power Options
The S-10R may be line powered (115/250 VAC, 50/60 Hz) or battery powered with solar recharging capabilities.

Sensor Options for the S-10R
The S-10R will provide connections for:

WIND SPEED
WIND DIRECTION
TEMPERATURE
BAROMETRIC PRESSURE
HUMIDITY
SOLAR RADIATION
HOURS OF SUNLIGHT
RAINFALL /PRECIPITATION AMOUNT
PRECIPITATION SENSOR
LEAF WETNESS
EVAPORATION
SOIL MOISTURE
SOIL TEMPERATURE
SUBMERSIBLE TEMPERATURE
WATER LEVEL
SNOW DEPTH

and provide derived parameters for :

EVAPOTRANSPIRATION
DEW POINT
WIND CHILL
WIND SPEED AVERAGE
WIND DIRECTION AVERAGE
DEGREE DAYS
GROWING DAYS
RAINFALL RATE

Support Structure for the S-10R
The S-10R NEMA 4X enclosure is made from rugged weather-proof fiberglass. This enclosure is provided with four mounting holes for attachment to a frame or wall. The sensor and power connections are via cables to the S-10R, and terminate either through waterproof -thrus or connectors. The S-10R can also be supplied integrated into a Monopod sensor mount (S-10RM).

SPECIFICATIONS

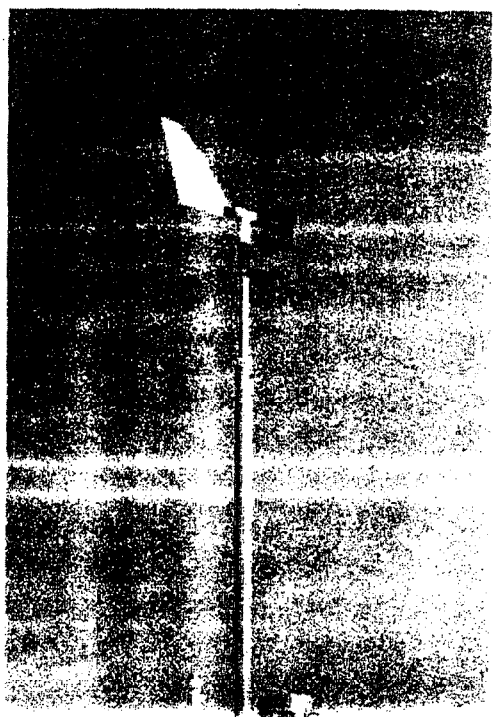
Guarantee:	5 years
Output:	Standard - RS-232 Optional - RS-422, 485, 4-20 ma, other analog outputs available.
Baud Rate:	User selectable from 300-9600 baud
Sampling Interval:	User selectable 1,2, 5, 10, 15, 30, 60 min.
RAM:	32K non-volatile. Additional RAM up to 256K available
Operating Temps:	-40°C to +85°C, -40°F to +185°F
Power Input:	115/250 VAC, 50/60Hz,12 VDC or solar panel/battery.
Optional Display:	Two line, 16 characters per line LCD

RainWise® Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog®

Catalog No.
MONO

The RainWise Monopod Sensor Support System



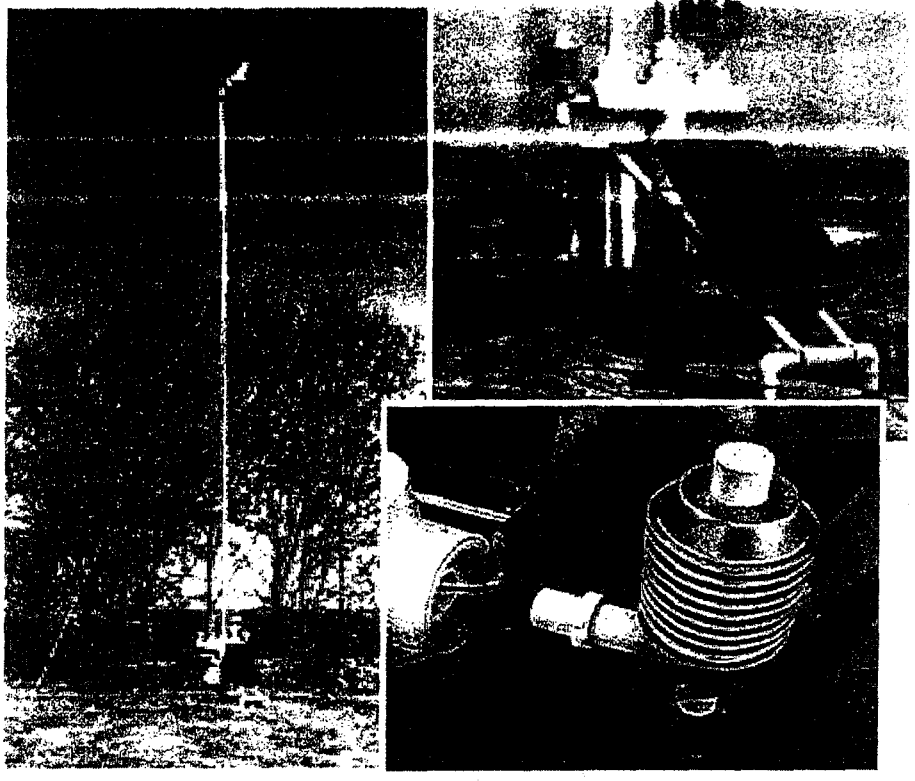
The Monopod sensor support system provides a sturdy pre-wired mounting for RainWise sensors that can be installed with a minimum of site preparation.

All of the sensors simply plug into their respective mounts. The lockable NEMA 4X electronic enclosure is large enough to accommodate the System 10 Remote electronics. Where a System 12 control/display console is utilized, the connection for power and sensor output is a single buriable cable. Where main power is not available, the Monopod is furnished with a solar panel mount which is adjustable for any site latitiude.

The Monopod will support up to six sensors and will also provide connections for Soil Moisture, Soil Temperature, and Evaporation.

The standard configuration includes an un-guyed three meter mast for wind speed and direction. The Monopod will also support a guyed ten meter mast.

The Monopod is constructed of weatherproof industrial PVC pipe. It is shipped completely assembled. The normal installation requires a concrete pad to support the flanged structure. For temporary installations, the Monopod can also be furnished with a three foot extension pipe which is supported by burying in the ground. The Monopod is guaranteed for five years.



RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog®

Catalog No.
AERVANE

The RainWise AerVane™ *for measuring* Wind Speed *and* Direction

The WeatherLog AerVane™ was designed to meet or exceed the EPA guidelines for regulatory modeling applications.

The balanced propeller is supported in stainless steel instrument ball bearings. The propeller drives a serrated disc which generates pulses in an optical switch.

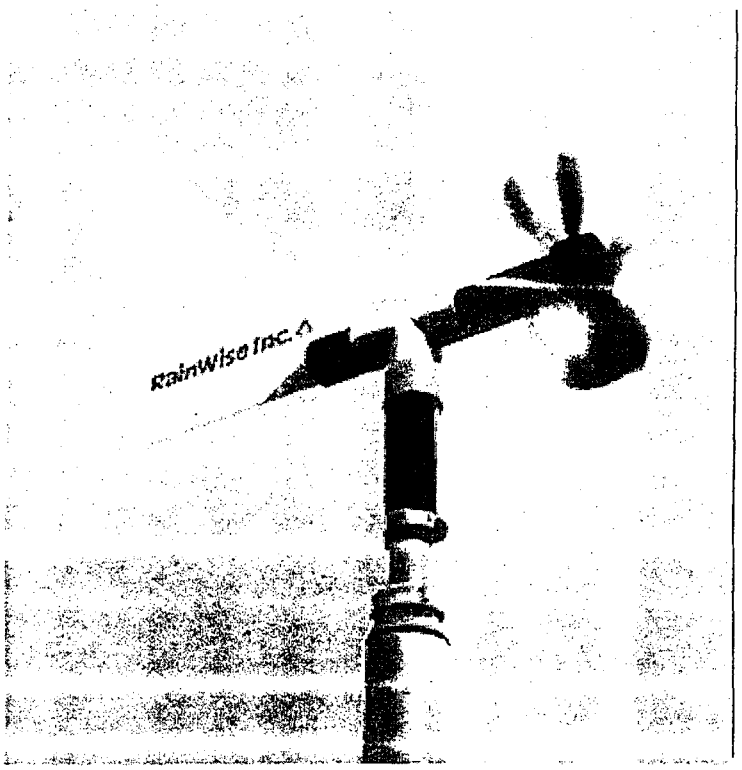
The direction is obtained through an optical resolver. There is no "dead band" and the resolution and accuracy are ±1.0 degrees.

There are no contacts or brushes in the assembly. The AerVane™ is made from anodized aluminum, stainless steel, ultraviolet inhibited PVC and Lexan® plastic.

A RainWise interface can provide an RS-232 output or any desired analog output including 4-20 milliamps, 0-1 VDC, etc.

The RainWise AerVane™ is guaranteed for five years.

- Meets or exceeds EPA monitoring guidelines
- Accuracy traceable to NIST
- No direction dead band
- Five year guarantee
- Plug-in installation



WIND SPEED SPECIFICATIONS:

Range:	0-60 m/s (120 mph) Gust to 75 m/s (150 mph)
Accuracy:	±1.0%
Sensor:	Five blade propeller - Lexan® - uv inhibited
Distance constant:	≤ 3.0 meters (10 feet)
Threshold:	0.36 m/s (0.8 mph)
Transducer:	Optical switch.
Frequency:	10 cycles per revolution.

WIND DIRECTION SPECIFICATIONS:

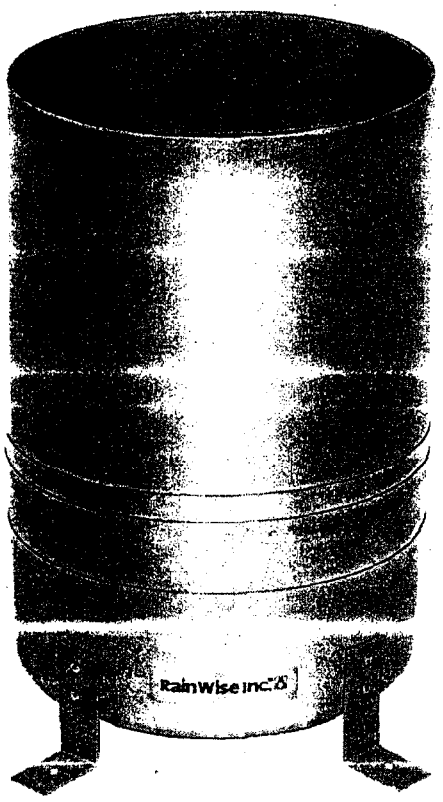
Range:	360 degrees - no dead band.
Resolution:	1.0 degree.
Accuracy:	± 1.0 degrees.
Sensor:	Balanced Vane with a 33 cm. (13.0 inch) radius.
Delay distance:	≤ 5.0 meters.
Threshold:	≤ .5 m/s (1.0 mph) at 10 degree deflection.
Damping ratio:	>.53 software corrected

RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog®

Catalog No.
PG/H

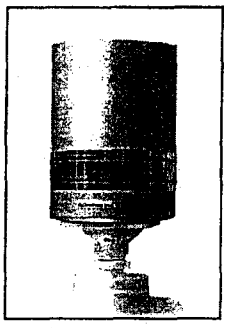
The RainWise Industrial Tipping Bucket Precipitation Gauge



The RainWise model PG/H industrial tipping bucket precipitation gauge is constructed from anodized aluminum and stainless steel to provide years of precision recording of any type of precipitation.

The tipping bucket is molded from a specially-formulated plastic that has a very low surface tension coefficient. The weight of the water required to make the bucket tip produces a momentary switch closure that is equal to 0.01 inch/0.25mm of rainfall. This momentary pulse may be used in a system to determine either rainfall amount and/or rate. The same tip that produces the pulse also dumps the bucket so that the gauge never requires emptying.

The tipping bucket sensor is mounted on stainless steel instrument bearings and housed in an anodized aluminum case. The unit has a built in bubble level to facilitate installation. An insect/ debris screen is also provided.



The gauge is heated with two molded rubber electric heaters which are controlled by a built-in thermostat. These heaters are factory set to operate at 35° F. (1° C..).

Mounting options include flange feet for mounting on a flat surface or the RainWise Monopod adapter which allows for easy installation and removal.

The PG/H is guaranteed for five years.

SPECIFICATIONS

Transducer:	Tipping bucket of specially formulated plastic for low surface tension - mounted on stainless steel instrument bearings.
Switch:	Dry reed switch.
Output:	Less than 0.1 second per switch closure.
Resolution:	0.01" / 0.25 mm per bucket tip.
Accuracy:	0.5% at 0.5 inch per hour.
Overall size:	8.75" x 12.5" (31.75 cm)
Collector diameter:	8.625" (21.9 cm)
Heaters:	120/250 VAC – 525 watts
Thermostat:	Factory set at 35° F. (1° C.).

RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

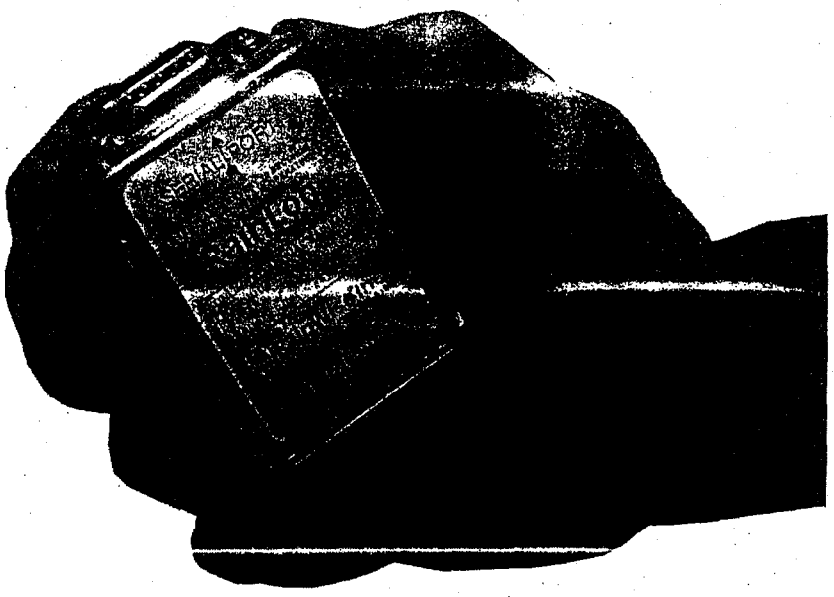
WeatherLog®

Catalog No.
RainLog

The RainWise RainLog™

The RainWise rain logger provides an economical method of logging rainfall at a remote location where power is not available.

This logger fits inside any of our rain gauges and will log total rainfall at a one minute resolution anywhere in the world for one year. It can easily be unplugged and connected to the serial port of a computer. It comes complete with Windows® software and serial port connecting cable.



Actual size

- Five year warranty.
- One year capacity – both logger and battery supply.
- One minute time/date stamp resolution.
- Will fit inside any RainWise gauge.
- Nonvolatile memory.
- Powered by two AAA alkaline batteries.
- May also be used as an event recorder.
- LED flashes when properly connected.
- Windows® software included.

RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog®

Catalog No.
BARO
BARO-P

The RainWise®
Digital Barometers

The RainWise barometers contain a silicon chip with an integral sensing diaphragm and four piezo-resistors. The standard RainWise barometer is located within the control/display module of whichever WeatherLog system you purchase. Optionally, barometers may be remotely mounted in a separate NEMA 4X enclosure. The remote mount barometer comes with a standard cable length of 25'.

RainWise barometers are covered by the RainWise five year warranty.

SPECIFICATIONS

Model BARO (standard):

Range:	10.2 to 37.4 inches of mercury - 300 to 1100 millibars.
Output:	Digital.
Resolution:	.01 inch of mercury - 0.1 millibar.
Accuracy:	± 0.01 inches of Mercury - ± 0.5 millibar @ 25°C.*
Temperature Compensation:	-40° C. to +60° C.

* after local offset adjustment

Model BARO-P (precision):

ANALOG OUTPUT:	
Voltage range:	0 - 5 VDC -(4-20 milliamp available as factory configured).
Output current:	0.5 milliamp maximum.
Load resistance:	10K ohm minimum.
Resolution:	1.22 mV/bit (12 bit DAC output)
Accuracy:	0.06% FS, typical), 0.12% FS maximum
DIGITAL OUTPUT:	
Baud rates:	1200 to 28800.
Data framing:	1 start bit, 8 data bits, 1 stop bit.
Parity:	Even, odd or no parity.
Resolution:	0.10 millibar.
Accuracy-digital:	0.05% FS, typical, 0.10% FS maximum
Addressing:	89 individual (user assigned), 9 group addresses (multicast), 1 global address (broadcast), 1 null address (address not assigned)
GENERAL:	
Range:	500 -1100 millibars.
Housing:	Anodized aluminum.
Temperature compensation:	-40°C. to + 85°C.
Long term stability:	0.025% per year or better, including all sources.
Power requirement:	5.5 - 30 VDC

RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

WeatherLog®	Catalog No. RH/T

The RainWise Relative Humidity *and* Temperature Sensor

The RainWise RH/T sensor combines our temperature sensor with our relative humidity sensor. The sensors are mounted within a passive multi-plate solar shield. This dual design results in a compact unit which provides accurate, responsive measurements with a minimum of hysteresis.

The temperature sensor is available in several configurations, including RTD's, thermistors and thermocouples depending upon the user requirements. The standard sensor is a solid state integrated circuit with a built-in operational amplifier. This amplifier provides consistency against cable length variation and resistance to electrical noise problems. The relative humidity sensor is a thin film polymer capacitor. This is mounted within a porous plastic filter. Certification traceable to NIST is available for these sensors.

The RH/T is available with several mounting configurations. These include our standard Monopod plug-in mount, building side mounts and bracketed tower mounts. With the proper RainWise interface, the RH/T can be furnished with either an RS-232 digital or analog output. The RainWise RH/T sensor has a five year warranty.

SPECIFICATIONS

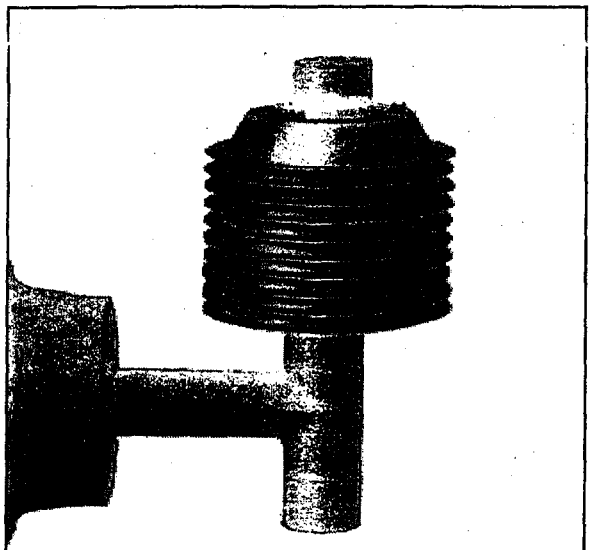
Relative Humidity

Range:	0 - 100 % RH.
Total Accuracy:	± 2.0 % RH @ 25° C. and 5VDC.
Operating Temperature:	-40°C to + 85 ° C. - see note.
Hysteresis:	± 0.8% of span maximum.
Linearity:	± 0.5% RH typical.
Repeatability:	± 0.5% RH.
Factory Calibration:	Supplied at 0% RH and 75.3% RH.

NOTE:
The accuracy of the humidity sensor is specified at 25° C. In order to achieve ± 2% accuracy over the operating temperature range, the temperature effects are compensated in the RainWise logger. The range for the system with this compensation is -40° C to + 85 ° C.

Temperature:

	Standard
Range:	-40 °C to +65°C.
Accuracy:	± 0.3 °C.
Resolution:	0.1 °F or 0.1°C.
	Precision
Range:	-50 °C to +50°C.
Accuracy:	± 0.1°C.
Resolution:	0.1 °F or 0.1°C.



Monopod Plug-in Mount

RainWise Inc.
25 Federal Street Bar Harbor, Maine 04609
Phone: 207-288-5169 Fax:207-288-3477

Contact: David Katz (215) 579-4212

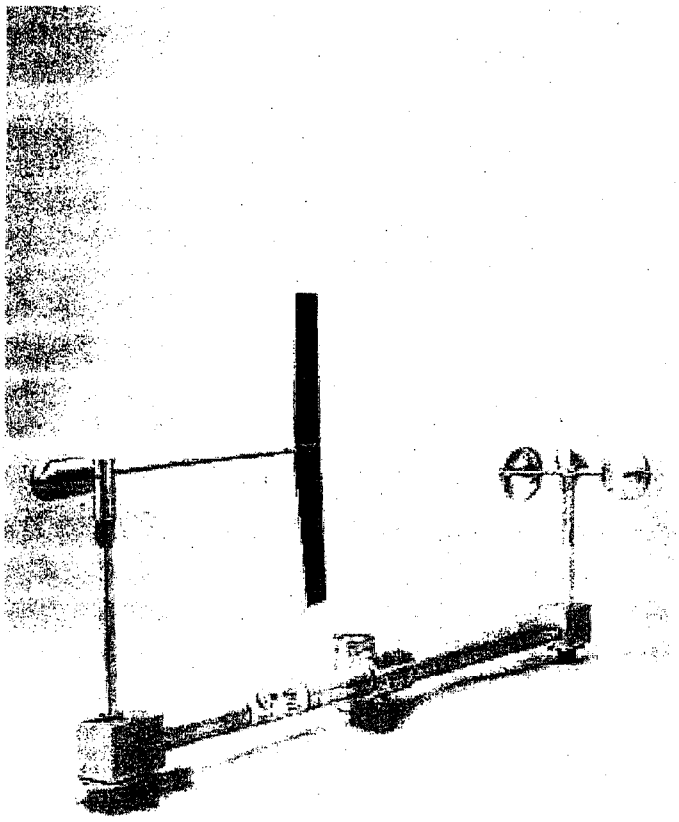
CLIMATRONICS CORPORATION

WIND MARK III WIND SENSOR

FEATURES

- Low Threshold
- Low Cost
- Low Power
- Lightweight
- Optional External Heaters

Climatronics' Wind Mark III (WM-III) Wind Sensors combine accuracy and reliability with low cost. They also meet the Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) requirements and are well suited for general wind monitoring applications.



The WM-III sensor is also available as a wind speed only (P/N 100108-1) or wind direction only (P/N 100108-2) instrument.

Wind speed is sensed by a three-cup anemometer and converted to an electrical signal by a solid-state photo chopper. A counter balanced wind vane coupled to a precision, low torque potentiometer senses wind direction. The sensors use stainless steel precision ball bearings for maximum life and low threshold. Traceability to NIST is available as an option for each anemometer cup assembly by comparison testing against an NIST transfer standard in our wind tunnel test facility. The sensors and their crossarm are an integral unit. The crossarm mounts on a 3/4-inch IPS vertical pipe stub (1.05 inch O.D.). Orientation of the crossarm is along an East-West plane.

The LEXAN cup (P/N 102138) and magnesium vane (P/N 101944) combination are standard. The Heavy-duty aluminum cups (P/N 101286), and heavy-duty magnesium vane (P/N 101292) are optional. A sensor transit case (P/N 100255) is available. Climatronics Universal Interface Module (UIM), IMP-800 series of digital data acquisition units, or almost any data loggers / data acquisition system currently available on the market are easily interfaced with the Wind Mark III sensor.

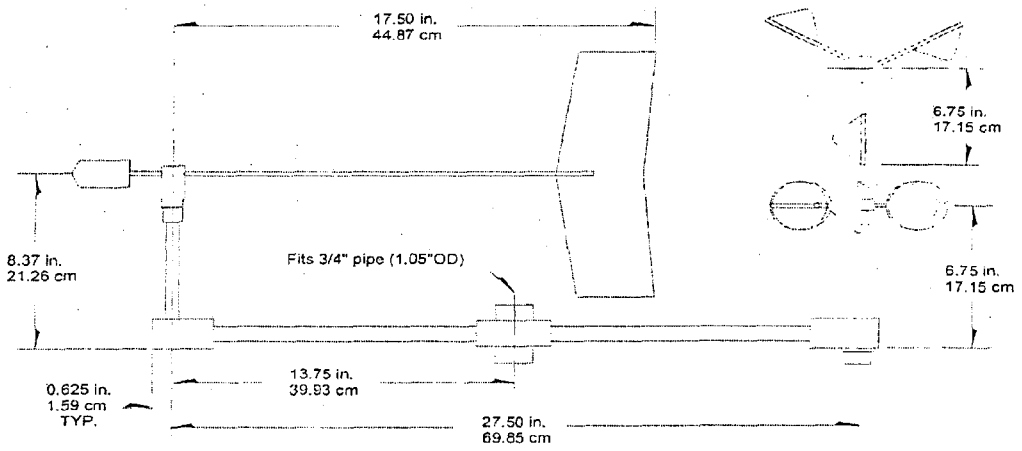
The Wind Mark III sensor can be provided with a 4 - 20 mA current loop output. In this configuration, the part number is 101908. Please consult the Current Loop Wind Sensor data sheet for additional details.

SPECIFICATIONS

PERFORMANCE	WM-III Wind Speed	WM-III Wind Direction
Accuracy	0.25 mph (± 0.11 m/s) or ± 1.5% of true air speed (whichever is greater)	± 3 degrees
Threshold	<1.00 mph (0.45 m/s)	< 1.0 mph (0.45 m/s)
Distance Constant	102138 LEXAN <2.4 m (8.0 ft) 101286 HD Aluminum <4.6 m (<15.0 ft)	101944 Standard <2.4 m (8.0 ft) 101292 Heavy Duty <4.5 m (<15.0 ft)
Damping Ratio	N/A	>0.4 to 0.6 at 10° initial angle of attack
Operating Range	0 to 125 mph (0 to 55 m/s)	0 to 360 degrees - mechanical
ELECTRICAL		
Signal Output	Nominal 2.0 Vpp into 4.7 Kohm, frequency proportional to wind speed, amplitude dependant on supply voltage	Variable DC voltage, magnitude proportional to wind direction
Power Requirements	5 to 15 Vdc @ 1 mA nominal	Max. 5 mA through 2 Kohms
PHYSICAL		
Weight	Less than 2 lbs (0.9 kg)	
Turning Radius	3.75 in (9.5 cm)	17.5 in (44.4 cm)
Operating Temperature	-40° to 140°F (-40° to 60°C)	

SENSOR HEATER SPECIFICATIONS

External — 20 Watts per sensor thermostatically controlled
110/60 VAC/Hz, P/N 101234-G0 or 220/50 VAC/Hz, P/N 101234-G1



Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716-2404

TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales@climatronics.com

Rev. 24 Jan 2002

TEMPERATURE SENSORS

FEATURES

- Maintenance Free
- Versatile
- Highly Accurate
- Durable

Capable of meeting virtually any ambient measurement need, Climatronics' temperature sensors are accurate durable, and linear over a wide range, can be provided with NIST traceable calibration, and are well matched for high accuracy delta temperature applications.

The Air, Water/Soil, and Expanded Range Sensors encase a thermistor bead in a stainless steel or vinyl sheath. This casing, combined with Climatronics' temperature shield, gives the thermistor bead protection from solar radiation, precipitation, and corrosive, airborne particles. Such configurations transfer heat as rapidly as possible, yielding a typical time constant of 3.6 seconds. When direct exposure of the thermistor to the media being measured is permissible, our Fast Response Sensor reduces the time constant to a minimal 0.6 seconds.

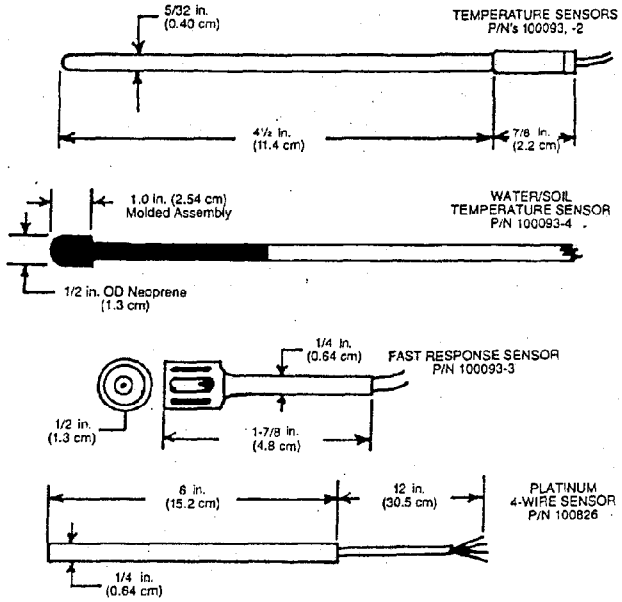
A second type of sensor, Platinum 4-Wire, operates on the principle that electrical resistance of a pure metal increases with temperature. Platinum's superior linearity, stability, sensitivity and resistance to corrosion, make it an ideal practical choice. The unit's four-wire design automatically compensates for possible lead resistance errors, and it is supplied with certified NIST traceability.

Sensors install easily in Climatronics' temperature shields. The TS-10 Motor Aspirated Shield, P/N 100325, provides a constant airflow past the sensor (as discussed in the TS-10 data sheet), while the Naturally Aspirated Shields (P/N 100552 or P/N 102080), rely on ambient air flow or convection for sensor aspiration.

Please consult Climatronics for assistance with the proper combination of sensor, shield, cable, and data acquisition electronics to meet your specific monitoring requirements.

SPECIFICATIONS

	Air, Water/Soil P/N's 100093 (102090*) 100093-4	Expanded Range P/N 100093-2 (102096*)	Fast Response P/N 100093-3	Platinum 4-Wire P/N100826 (102092*)
Accuracy	±0.27°F (±0.15°C) over full range	±0.18°F** (±0.10°C) over full range	±0.27°F (±0.15°C) over full range	±0.18°F (±0.1°C)
Range	-22.0° to 122.0°F (-30.0° to 50.0°C)	-58.0 to 122°F (-50.0° to 50.0°C)	-22.0° to 122.0°F (-30.0° to 50.0°C)	-58.0° to 122.0°F (-50.0 to 50.0°C)
Time Constant	3.6s	3.6s	0.6s	5.5s
Interchangeability	±0.27°F (±0.15°C)	±0.18°F (±0.10°C)	±0.27°F (±0.15°C)	±0.45°F(±.25°C) can be compensated
Linearity	±0.29°F (±0.16°C)	±0.25°F (±0.16°C)	±0.29°F (±0.16°C)	±0.09°F (±0.05°C) included in accuracy
Leads	3	4	3	4
Dimensions				
Diameter	5/32 in (0.40 cm) 0.5 in (1.3 cm)	5/32 in (0.40 cm)	½ in (0.64 cm)	¼ in (0.64 cm)
Length	4.5 in (11.4 cm) 1.0 in (2.54 cm)	4.5 in. (11.4 cm)	1-7/8 in (4.8 cm)	6.0 in (15.2 cm)



** Can be improved to ± 0.08°C with 0.02% accuracy composite resistors.
* Includes MS Connectors

Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716 USA

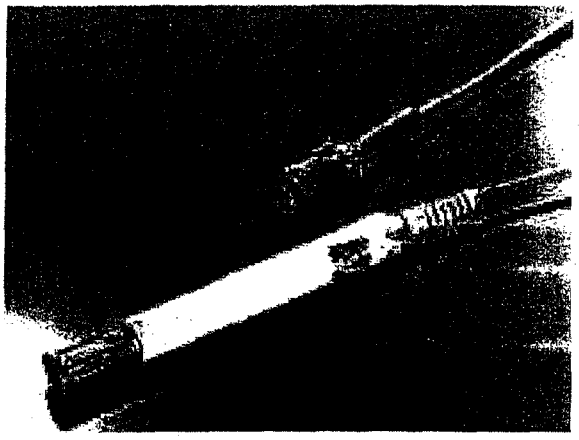
TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales@climatronics.com

Rev. 8 Jan 2002

RELATIVE HUMIDITY/TEMPERATURE SENSOR P/N 101812-G0, G1 & G2

FEATURES:

- Moderate Cost
- Excellent Long-Term Stability
- Wide Operating Temperature Range
- Contamination Resistant
- Linear Voltage Output
- Compact Size



Climatronics' capacitive relative humidity sensor (P/N 101812) is specifically designed for meteorological monitoring systems. Very low power consumption makes this capacitive relative humidity sensor ideal for integration with data acquisition systems operating in remote locations. The sensor provides a linear 0 - 1 VDC output signal corresponding to 0 - 100% relative humidity. Energizing the sensor is only required for 0.25 seconds during each measurement cycle.

The sensor can be used over long periods of time without maintenance or calibration, and features exceptional resistance to contaminants. Repeatability is also excellent, even after complete sensor saturation. The sensor maintains its accuracy over the full range of humidity, even at conditions close to condensation. This is accomplished by electronic temperature compensation of the humidity element. Separate power and signal grounds permit the use of long cable runs without loss of signal accuracy.

The dual-measurement probe includes a temperature sensor with electrical and performance characteristics matching those of a 100 Ohm platinum resistance thermometer, conforming to British Standard Institution BS 1904:1984, tolerance Class A.

SPECIFICATIONS

PERFORMANCE

Relative Humidity

Accuracy:	±1% RH, from 0 - 100%
Repeatability:	±0.3% RH
Operating Range:	0 - 100%
Operating Temperature Range:	-40°C to +70°C
Long-Term Stability:	±1% over 12 months
Response Time (without filter):	10 seconds

Temperature

Type:	100 Ohm platinum resistance thermometer
Range:	G0 = -30°C to +70°C G1 = -50°C to +150°C G2 = -40°C to +70°C
Accuracy:	±0.3°C
Repeatability:	±0.1°C
Resolution:	0.1°C
Standard Conformance:	British Standard Institution No. BS 1904:1984, tolerance class A

ELECTRICAL

Relative Humidity

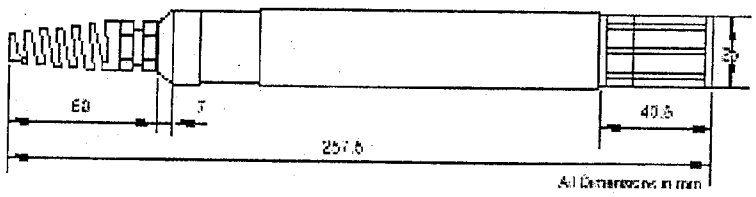
Excitation Power:	4.8 to 26.5 VDC; max current consumption 10 mA @ 12 VDC
Signal Output:	0 - 1 VDC = 0 - 100%
Output Impedance:	1000 Ohms

Temperature

Excitation Power:	Supplied by the Central Control Unit, signal conditioner, or data logger
Signal Output:	G0 = -0.3 to 0.7 Vdc, G1 = -0.5 to 1.5 Vdc, G2 = 0 to 1.0 Vdc

PHYSICAL

Length:	10.12" (257mm)
Diameter:	0.98" (25 mm)
Weight:	0.16 lb (0.16 kg)



Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716-2404

TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales @climatronics.com

Rev. 21 Mar 2003

PRECIPITATION GAUGES

FEATURES

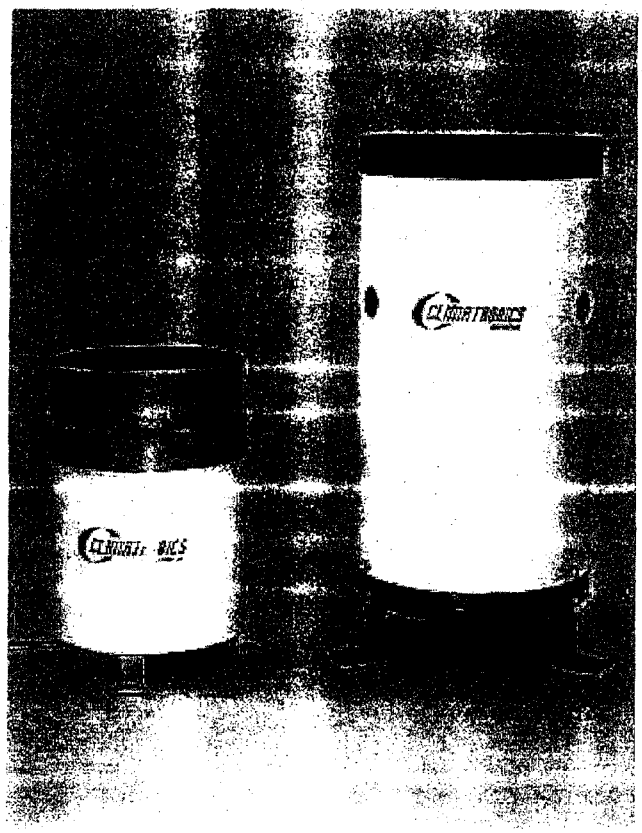
- Reliable and Accurate
- Tipping or Weighing Buckets
- English or Metric Measurements
- Optional Electric Heat

Climatronics offers a variety of accurate and durable precipitation gauges. Models are available for both AC and DC powered systems, with or without heaters.

Tipping bucket gauges are available with screened funnels of 6 or 8-inch* diameter. Precipitation is channeled to a triangular bucket, which tips for every 0.01-inch or 0.1 mm of water collected. When the bucket empties it momentarily activates a sealed reed switch,** which sends an event message to the signal conditioner or data acquisition system. Upon tipping, the accumulated water is drained.

Both of Climatronics' tipping bucket gauges can be provided with optional electric heaters for AC powered systems. The heaters prevent data loss during freezing conditions and melt snow so the tipping bucket may measure the water equivalent. Either type of gauge is easy to install, requiring a level piece of ground that is free from obstruction or the use of Climatronics P/N 102271 Rain Gauge Mounting Bracket. Signal conditioners are available in modular form with an input range of 0-1 inch (0-2.5 cm) or 0-10 inches (0-25 cm), and corresponding standard output ranges of 0-1 or 0-5 VDC. A wind shield (P/N 100097WS) is available to prevent uplift near the sensor funnel, insuring a representative data capture. A precipitation calibrator (P/N 260-2595) for field calibration of the tipping bucket mechanism is also available.

Weighing bucket, optical, all-season, present weather and other specialty precipitation gauges can also be provided on special order.



* Optional metric sizes available
** Optional mercury switch available

SPECIFICATIONS

	6-Inch Tipping Bucket* (P/N 100508)	8-Inch Tipping Bucket* (P/N 100097)
PERFORMANCE		
Accuracy	±1% for rain rates of up to 2 in/hr (5.1 cm/hr) ±5% for rain rates of up to 10 in/hr (25 cm/hr)	±1% for rain rates of 1 to 3 in/hr (2.54 to 7.6 cm/hr) ±3% for rain rates of 0 to 6 in/hr (0 to 15.24 cm/hr)
Resolution/Sensitivity	0.01 in (0.25 mm) 0.004 in (0.1 mm)	0.01 in *(0.24 mm) 0.004 in (0.1 mm)
ELECTRICAL		
Power Requirements (without heat)	None†	None†
Output	Switch Closure	Switch Closure
Contact Rating	2A at 12 VDC	3A at 12 VDC
PHYSICAL		
Size	10.25 in H x 6.25 in diameter (26.0 cm H x 15.9 cm diameter)	18.25 in H x 8 in diameter (46.3 cm H x 20.3 cm diameter)
Weight	2.5 lbs (1.1 kg)	2.5 lbs (1.1 kg)
Operating Temperature (heated)	-40 to 140° F (-40 to 60° C)	-40 to 140° F (-40 to 60° C)

† *Excitation provided by signal conditioner or data acquisition system*
* *Electric heat available, 200 watts*

Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716-2404

TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales@climatronics.com

Rev. Jan 10, 2002

ANALOG BAROMETRIC PRESSURE SENSOR

FEATURES

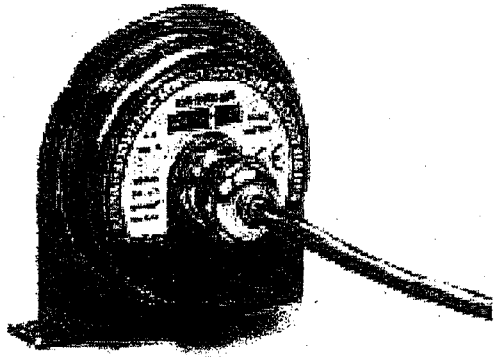
- Inexpensive
- Excellent Long-Term Stability
- Wide Operating Temperature
- Analog Voltage Output
- Compact Size

Climatronics' analog barometric pressure sensor, P/N 102270 is designed for applications, which require accurate pressure measurements at a modest cost. It is a stable transducer based upon a proven design, yielding a linear and repeatable sensor with low hysteresis. The high level output signal is directly useable without additional signal conditioning.

This sensor features the use of a built-in Application Specific Integrated Circuit (ASIC), which works hand-in-hand with a capacitive transducer to achieve long-term stability and high accuracy. The analog pressure sensor's small size and wide operating temperature range further enhance its compatibility with all of Climatronics' signal conditioning and data acquisition products.

Two measurement ranges (600 - 1100 hPa and 800 - 1100 hPa) and two accuracy specifications (0.1% and 0.25%) are available.

All versions of the P/N 102270 sensor are also available mounted in a small, vented environmental enclosure (NEMA-4X) for applications where another suitable shelter is not available. This assembly is provided under P/N 102272. Specifications for P/N 102270 and P/N 102272 are the same. The companion cable assembly for P/N 102272 is P/N 101797-XX.



SPECIFICATIONS

PERFORMANCE

Accuracy:	-G1 & -G3 =	<±0.1% FS RSS of non-linearity, hysteresis and non-repeatability
	-G0 & -G2 =	<±0.25% FS RSS of non-linearity, hysteresis and non-repeatability
Resolution:		Infinite, limited only by output noise level (0.0005% FS)
Operating Range:	-G0 & -G1 =	600 to 1,100hPa (17.72 to 32.48" of Hg)
	-G2 & -G3 =	800 to 1,100hPa (23.62 to 32.48" of Hg)
Storage Temperature Range:		-65° to 250°F (-55° to 120°C)
Over Pressure:		30psia
Operating Temperature Range:		0° to +175°F (-20° to +80°C)
Time Constant:		Less than 10 milliseconds to reach 90% final output with step function pressure input
Long Term Stability:		±0.25% FS over 6 months @ 70°F

ELECTRICAL

Excitation Power:	12V dc standard, 20 to 32V dc or 5V dc optional <0.2 watts
Signal Output:	0.1 to 5.1V dc (0.5V to 4.5V dc with 5V dc power)
Output Impedance:	<5 Ohms
Output Noise:	<200 microvolts RMS (0 to 100Hz)

PHYSICAL SPECIFICATIONS	P/N 102270	P/N 102272
Height:	2.250" (57mm)	4" (101.6mm)
Length:	2.295" (59mm)	6" (152.4mm)
Width:	0.97" (26mm)	6" (152.4mm)
Weight:	6 ounces (0.17Kg)	4 lbs (1.82 kg)
Mounting:	Panel mount (bracket supplied)	Vented enclosure

CLIMATRONICS CORPORATION

Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716-2404

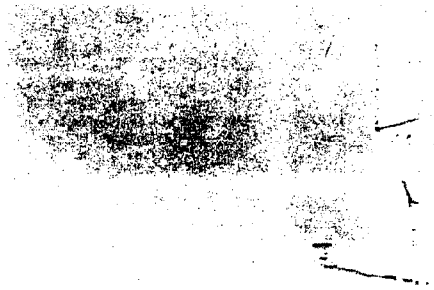
TEL: 631-567-7300
FAX: 631-567-7585
E-Mail: sales @climatronics.com

Rev. 2/13/01

FREESTANDING ALUMINUM TOWERS

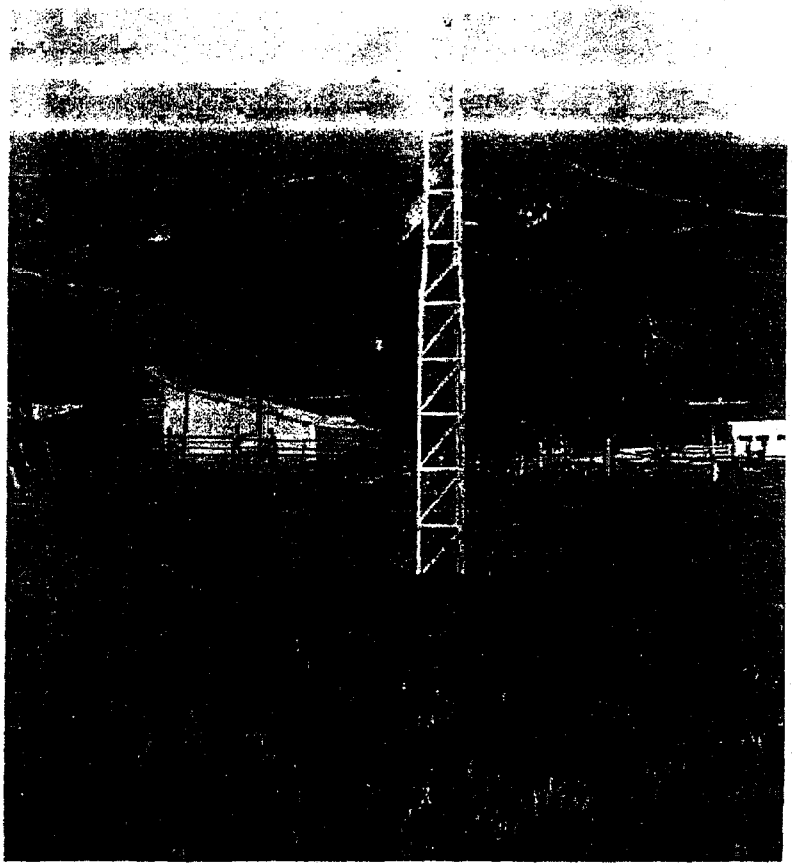
FEATURES

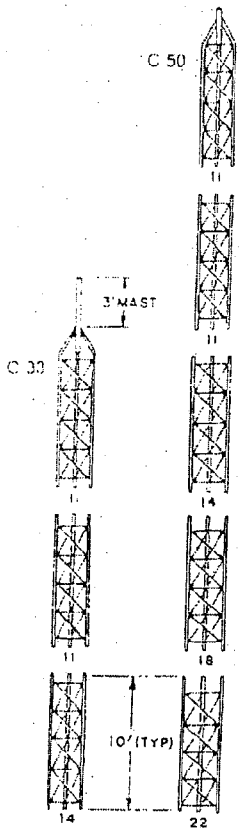
- Triangular Design
- Lightweight/Transportable
- Tilt Down, Hinged Base
- Roof and Ground Mounting
- Optional Guying and Grounding Kits



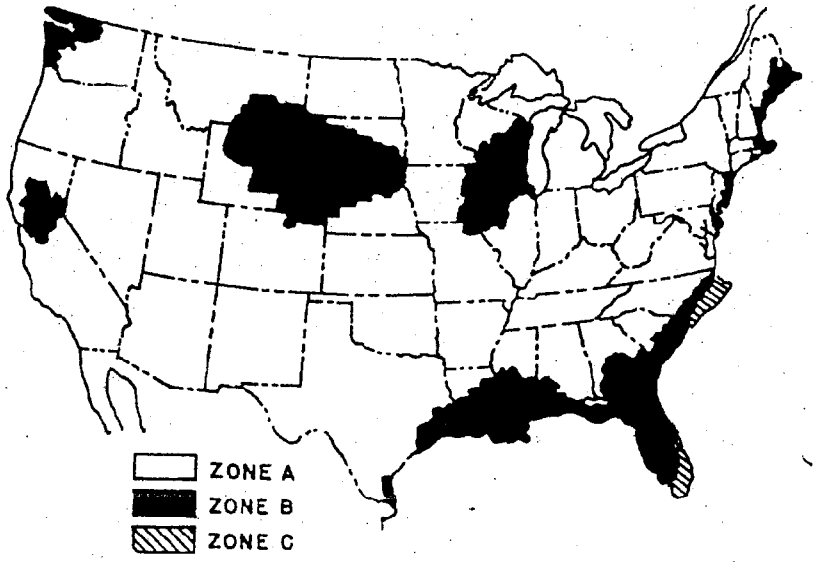
Climatronics has available a wide variety of freestanding, aluminum towers. These portable, lightweight towers are of a triangular design and are easily erected. Capable of meeting virtually all of your tower needs, these towers are constructed from 10-foot sections and include a tilt down base. For roof mounting or in areas of high wind conditions, our Guy Kit (P/N 101004) provides further tower stability. For mounting to the side of a small building or a penthouse, a special penthouse mount is available to provide the proper support. A Full Height Grounding Kit (P/N 100924) for lightning protection is also available.

For heavy-duty towers, towers in excess of 100 feet, instrument booms, instrument elevator systems, and other tower-related items, please contact our Sales Department with your specific requirements.



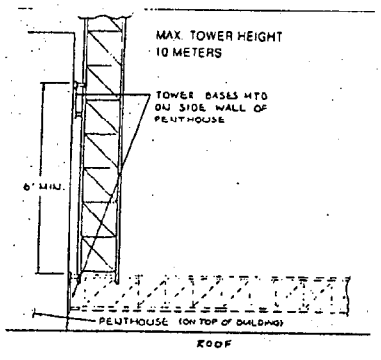


Model Number	Height (feet)	Weight (pounds)	Section Width (inches) Bottom	Top	Wind Load (square feet) 87 mph Zone A	100 mph Zone B	110 mph Zone C
C-10	10	13	14	14	9.0	5.0	3.0
C-20	20	26	14	11	6.0	3.5	2.0
C-30	30	38	14	11	4.5	2.5	1.5
C-33	33 (10m)	38	14	11	4.5	2.5	1.5
C-33HD	33(10 m)	55	18	11	9.0	6.5	5.0
C-40	40	68	18	11	4.5	2.5	1.5
C-50	50	101	22	11	4.5	2.5	1.5
C-60	60	153	22	14	6.0	2.5	0.5
C-70	70	212	26	11	7.0	3.5	1.0
C-80	80	247	26	14	4.0	0.5	---



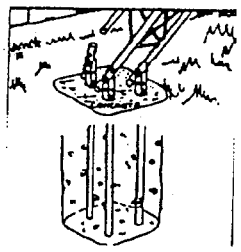
HEAVY DUTY TOWERS

Model	Height (feet)	WGT (lbs)	Section Width Inches Bottom	Top	Wind Load Sq. Ft Zone A
C40HD	40	178	30	18	35.0
C50HD	50	190	30	14	21.0
C60HD	60	256	30	14	21.0
C70HD	70	322	30	14	21.0
C80HD	80	369	30	14	16.0



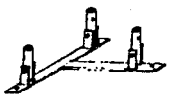
CONCRETE BASES

Part Number	Concrete Volume (yd^3)	Hole Dimensions (feet)
B-14	0.6	2' x 2' x 4'
B-18	1.5	3' x 3' x 4'
B-22	2.0	4' x 4' x 4'
B-26	4.0	4½' x 4½' x5'
B-30	6.0	5' x 5' x 6'

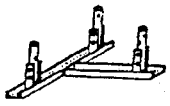


FLAT ROOF MOUNTS

RFM-14



RFM-18



Climatronics Corporation
140 Wilbur Place
Bohemia, NY 11716 USA

Phone: (631) 567-7300
Fax: (631) 567-7585
E-Mail: sales@climatronics.com

Rev. 10 Jan 2002

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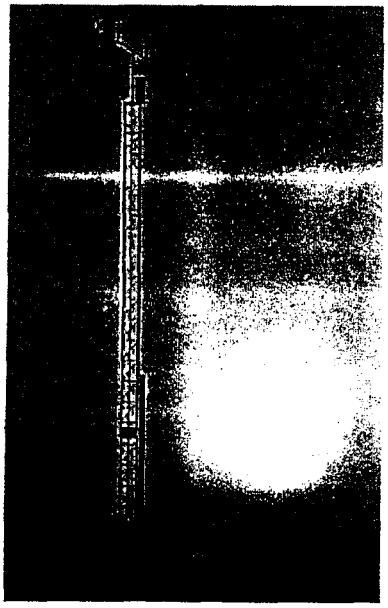
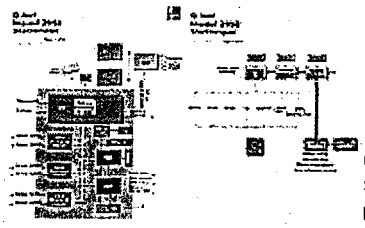
When every decision counts

Industrial & Military Systems

Q-Net Integrated Weather Monitoring System



Description



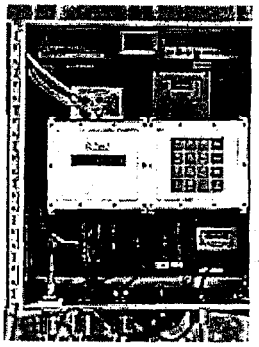
CONCEPTUAL DRAWING Q-NET SYSTEM
CLICK HERE

Q-Net Integrated Systems are a straight-forward solution to the integration problems faced when building an environmental monitoring system for a specific application. The network design of Q-Net provides a flexible framework for assembling any size system from a single sensor system to a complex multi-parameter array.

The building blocks of Q-Net are plug-in modules that work together in whatever combination is required, making Q-Net remarkably adaptable.

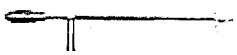
The heart of Q-Net is its RS-485 network, which allows additional components eve full sensor stations to be added on at any stage along the network. The character of the RS-485 interface makes expansion of a system effortless, and simplifies the dissemination of collected data.

Q-Net System Features



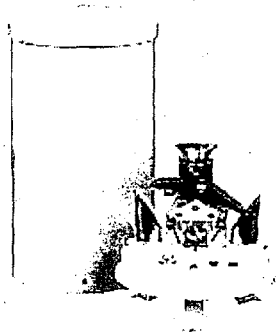
- Rugged, powerful, flexible, simple to use
- Multiple sensor choices
- Full lightning protection
- Dual sealed enclosure
- Variety of telemetry options
- Radio (UHF, VHF, spread spectrum)
- Satellite (GOES, METEOSAT, LEOS, ARGOS)
- Telephone, cellular telephone, GSM
- Multiple outputs
- RS485, RS232, FSK, 4-20 mA, 0-10 Vdc
- Solar power option
- Removable memory card option
- Keypad and display for local programming and data display

Q-Net System Sensors



- Wind Speed
  Wind Direction

- Wind Direction
- Temperature
- Relative Humidity
- Barometric Pressure
- Solar Radiation (Global, Net, Long Wave, UVB, etc.)
- Rain Fall
- Evaporation
- Water Level
- Water Current
- Soil Moisture
- Soil Temperature
- Grass Minimum
- Gas Monitors (NOx, SOx, O2, CO, CO2, etc.)



Q-Net Modules

Each Q-Net station includes a NEMA 4X enclosure called a StationPac, which houses the Q-Net modules and auxiliary equipment. For added protection, the Q-N modules are housed within a second sealed enclosure within the StationPac. Ther are **five Q-Net modules** in all, which together control the operation of a Q-Net system.

- The **Sensor Interface (QSI)** obtains data from either analog or digital sensors.
- The **Network Controller (QNC)** controls overall operation of the system and provides a data interface to host systems. For on-site data logging, an optional removable AWI Data Archive Card is available.
- The **Relay/Telemetry (QRT)** modules allow data to be transmitted to a remote location o the Q-Net via any of the telemetry devices.
- The **Analog Readout (QAR)** provides analog outputs of sensor data to allow the use of analog recorders and displays with a system.
- The **Power Supply (QPS)** regulates dc power to the system components.

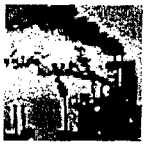
Power input can be 12 Vdc, battery and/or solar panels, 110 or 230 Vac, 50/60 Hz

These five modules provide the flexibility that is the basis of the Q-Net concept. In practice, not every system requires all of them. A basic Q-Net system may require no more than a sensor station (or stations), one QSI, one QNC, and a QPS.

The Q-Net Can Be Used in a Variety of Applications:

- Pollution Monitoring
- Plume Dispersal Monitoring (using Safer Real Time, CAMEO/ALOHA, etc)
- Oil & Gas Plants
- Chemical Plants (Perimeter Fence Monitoring)
- Water Treatment Plants
- Synoptic Stations
- Climate Monitoring
- Flood Warning & Monitoring
- Hydro-meteorological Stations
- Port & Harbors
- Agriculture

Industrial and Environmental Application



For many industries, monitoring of certain environmental parameters is either required or recommended by the EPA. AWI designs and builds a variety of system that meet EPA requirements, and can be tailored to the specific needs of any site.

Plume modeling and perimeter monitoring are two important applications to which AWI systems are specifically suited. The outputs of AWI EPA systems are compatible with the most prevalent plume modeling software packages, and their sensor interfaces accept the outpu of many gas detection sensors (NOX, SOX, CO, CO2, Ammonia, Chlorine, and others).

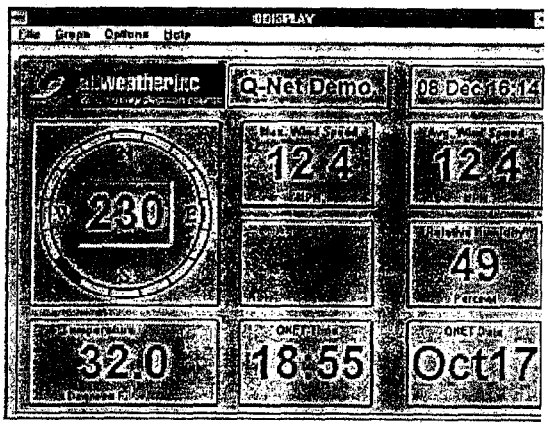
Alarm functions are built into AWI EPA systems, with program-mable alarm levels that automatically open or close a relay, or send an alarm signal to a host compute via data line or a choice of telemetry links.Q-Net has been used in many countries for Synoptic and Climate monitoring, transmitting its data via satellite or intelligent radio networks. Its flexibility and power, make it an ideal solution for this type of requirement.

Q-Soft PC Software

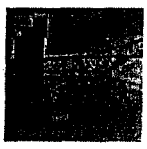
- Powerful, flexible and simple to use
- Programmable display options
- Data base archive
- Report generator
- Programmable channel table
- Programmable storage and transmit times
- Differential temperatures
- Wind gust, standard deviation
- Averages, maximums, minimums

Software Description

Data collected by a Q-Net system can be output directly to an external computer, via the various telemetry devices. Using Q-Soft, a software interface designed and developed by AWI, the data can be displayed graphically in multiple formats on any PC.

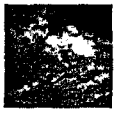


Q-Soft is a set of Microsoft® Windows® programs and libraries used to provide an interface between the Q-Net and the user. This software provides options for direct connection or telemetry connection to the Q-Net, and interfaces to the optional Memory Card Reader for accessing and retrieving stored data.



There are two possible user interfaces for a Q-Net system: AWI Q-Soft PC softwar and an optional keypad and display. Most Q-Net systems will benefit from the ease of use and versatility of Q-Soft, with its graphical interface and powerful data manipulation capabilities. Some systems, however, are better suited to the keypad and display option remote systems, (for instance, those not connected to a host computer).

Q-Soft Allows Users To:



- Collect data from the Q-Net through the COM port, either via direct connect,

telemetry, or direct connect to the optional Memory Card Reader.

- Perform real-time or batch statistical processing on the data as it is collected. Examples of the most common statistical parameters produced are: averages, running averages, circular averages (wind direction), minimum and maximum, standard deviation, and histograms.
- Generate reports based on these statistical parameters. Reports can be in the form of file or printer output.
- Generate real-time graphic windowdisplays of these parameters. Wind direction can be displayed on a circular wind dial as well as numerically.
- View trends and relationships between parameters on graphs that can be displayed on the screen or printed on the appropriate printer.
- Configure the system, which is done either through a menu system or by means of editing a textual configuration file.

Q-Net Specifications

Input Voltage:	80-135/160-270 Vac, 50/60 Hz 9-30 Vdc
Serial Output:	RS232, RS485, FSK
Analog Output:	0-1, 0-5, 0-10 Vdc, 4-20 mA
Sample Interval:	1 second
Output/Storage Interval:	Programmable from 1 second to 24 hours
Transient Protection:	MOV on power lines, Spark Gap and Transorbs on all sign and data lines
Input Channels:	12 Standard, expandable to 48
Input Types:	
Analog:	Voltage, Current, Resistance, Pulse, Frequency
Digital:	RS232, RS485, FSK
Resolution Analog:	16 bit
Data Storage Memory:	
Internal:	64Kb
Memory Card:	1Mb
Keypad/Display:	Hex keypad, 2 line x 20 character LCD display
Housing:	NEMA 4X
Operating Ambient Conditions	
Temperature:	-40° to +65° C, -40° to +150° F
Humidity:	0 to 100% condensing
Battery Back Up (Optional):	5 amp/hour Sealed Gel Cell
Solar Power Kit:	10 or 20 Watts

Typical Sensor Compliment
(Other options available, consult factory for details)

Wind Speed, Model 2030	
Range:	0-160 mph (0-72m/s)
Accuracy:	+/-0.15 mph or +/-1%
Threshold:	0.5 mph (0.22 m/s)
Wind Direction, Model 2020	
Range:	0 to 360°
Accuracy:	+/-2°
Threshold:	0.5 mph (0.22 m/s)
Temperature, Model 5190	
Range:	-40° to +60° C, -40° F to 135° F
Accuracy:	/-0.2° C
Sensing Element:	Pt100 RTD
Humidity, Model 5190	
Range:	0 to 100%
Accuracy:	+/-2% (10 to 100%), +/-3% (0 to 10%)

Sensing Element:	Thin Film Capacitor
Barometric Pressure, Model 7120	
Range:	600 to 1100 hPa
Accuracy:	0.88 hPa
Resolution:	0.1 hPa
Rain Fall, Model 6011	
Sensitivity:	0.01" or 0,1 mm per tip
Accuracy:	+/-0.5% @ 0.5" per hour
Resolution:	0.01"/0.1mm
Solar Radiation, Model 3120	
Spectral Response:	0.35 to 1.15 microns
Sensitivity:	70µV/W/m2
Accuracy:	+/-5%

For specifics on any instrument, call 1-800-824-5873,
email us at marketing@allweatherinc.com
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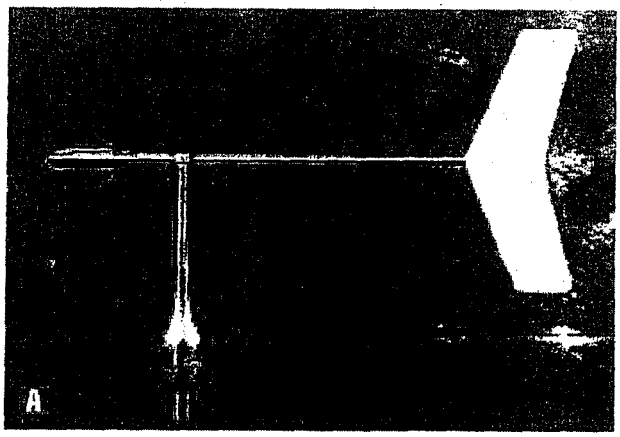
Micro Response Anemometer/Vane

- Very sensitive to low wind speeds
- Threshholds as low as .5 mph
- Weatherproof



A. Model 2020 Micro Response Vane

Description

This is a highly reliable, low threshold wind direction sensor. It responds to winds as low as 0.5 MPH. The machined aluminum body is aerodynamically shaped to combat sensor-induced turbulence. A labyrinth beneath the vane assembly prevents water and dust particles from reaching the sealed bearings at the top of the shaft. The reinforced, lightweight foam tail has a butyrate skin and a stainless steel counterweight.

Features

As the vane turns, it rotates a stainless steel shaft held in place with instrument-grade bearings. A waterproof conductive plastic potentiometer is coupled to the base of the shaft. This potentiometer has excellent linearity. Very low torque 0.15 inch ounces) is required to move the wiper. The use of a single wiper doubles the life expectancy of the potentiometer compared to the dual-wiper potentiometers. Electronic switching inside the signal conditioning module provides an output range of 0° to 540°.

B. Model 2030 Micro Response Anemometer

Description

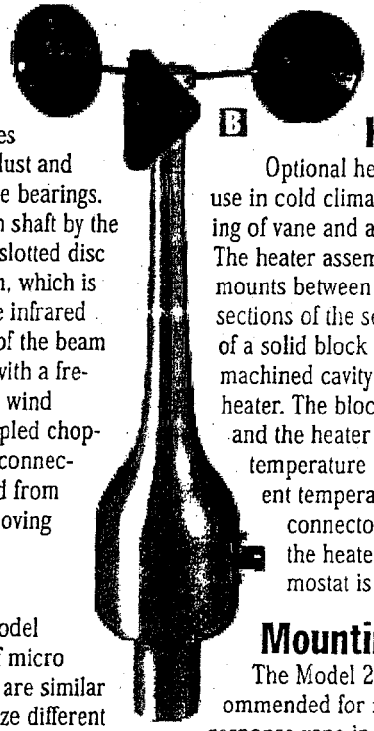
This is a highly responsive and rugged 3-cup anemometer designed to measure very low wind speeds (0.5 mph threshold). It is constructed entirely of stainless steel and anodized aluminum to resist corrosive environments. Like its wind vane counterpart, the micro response anemometer has an aerodynamically shaped body and utilizes a labyrinth to prevent dust and water from reaching the bearings.

Rotation of the main shaft by the cup assembly moves a slotted disc through a photon beam, which is generated by a long-life infrared LED. The interruption of the beam causes a pulse output with a frequency proportional to wind speed. The photon-coupled chopper is mounted on the connector and can be removed from the body simply by removing the connector.

Three Models:

In addition to the Model 2030 two other types of micro response anemometers are similar in construction but utilize different transducers. The Model 2031 utilizes a DC generator to produce a DC voltage proportional to wind speed. The main shaft couples the cup assembly directly to the generator. Output is approximately 5.5 mV/mph.

The Model 2032 employs a normally open reed switch. A bar magnet attached to the main shaft causes two closures of a reed switch per revolution. The frequency of closures is thus proportional to wind speed.



Heaters

Optional heaters are available for use in cold climates to minimize freezing of vane and anemometer shafts. The heater assembly, Model 20201, mounts between the top and bottom sections of the sensor body. It consists of a solid block of aluminum with a machined cavity containing a 20-watt heater. The block acts as a heat sink, and the heater raises the block's temperature 20°C above the ambient temperature. Environmental connectors are supplied with the heater. An optional thermostat is available.

Mounting

The Model 2023 crossarm is recommended for mounting the micro response vane in conjunction with the micro response anemometer. A mast adapter is available for mounting either sensor alone on a 1-inch 25mm O.D. mast. Fixed keying of the sensor bodies makes orientation necessary one time only.

Specifications

Micro Response Vane

Sensor:	Counter balanced tail
Transducer:	5K-ohm potentiometer, single wiper
Excitation:	5VDC, 1 mA
Range:	0-360°or 0-540°
Accuracy:	±2°, 5° deadband at North
Resolution:	<1°
Potentiometer Linearity:	0.5%
Threshold:	0.5 mph (0.22 m/s)
Damping Ratio:	0.4
Delay Distance:	3.5' (1.1m)
Operating Temperature:	-40° to +60°C
Materials:	Aluminum body with foam tail
Size:	
Body:	12" H x 2.75" dia (305 x 70 mm)
Turning radius:	18" (457 mm)
Mounting:	Direct to 2023 crossarm or with adapter to 1" (25 mm) O.D. mast
Weight/shipping:	2.5 lbs/7 lbs (1.1 kg/3.2 kg)

Micro Response Anemometer

Sensor:	3-cup assembly, carbon graphite composite, 2" diameter cups
Transducer:	
Model 2030:	light chopper
Model 2031:	DC generator
Model 2032:	reed switch
Excitation:	
Model 2030:	25 mA, + 12 VDC
Light source:	
Model 2030:	LED
Output	
Model 2030:	30 pulses/revolution, 900 Hz at 88.8 mph
Model 2031:	approx. 5.5 mV/mph
Model 2032:	2 contacts/revolution, 60Hz at 88.8 mph
Range:	0-160mph (0-75m/s)
Accuracy:	±0.15 mph or ±1%
Threshold:	
Models 2030, 2032:	.5 mph (0.44 m/s)
Model 2031:	.5 mph (0.45 m/s)
Distance Constant:	5' (1.5m)
Operating Temperature:	-40° to +60°C
Materials:	Stainless steel and anodized aluminum
Size:	
Body:	12" H x 2.75" dia (305 x 70mm)
Turning radius:	3.8" (97mm)
Mounting:	direct to 2023 crossarm or with adapter to 1" (25mm) O.D. mast
Weight/shipping:	2.5 lbs/7 lbs (1.1 kg/3.2 kg)

Heater

Heating Capability:	To approx 20°C above ambient temperature at 0 wind speed
Control:	Optional Model 10681 thermostat
Input Voltage:	
Model 20201:	115 Vac, 50/60 Hz
Model 20201-A:	230 Vac, 50/60 Hz
Size:	2.64" dia. x 1.5" H (67 x 38 mm)
Weight/shipping:	1 lb/2 lbs (0.4 kg/0.9 kg)

Crossarm

Size:	48" W x 6" H x 1" square (1219 x 152 x 25 mm)
Mounting:	1" (25mm) O.D. mast
Weight/Shipping:	3.5 lbs/5 lbs (1.6 kg/2.3 kg)

Ordering Information

Micro Response Vane

2020	Micro Response Vane
20201	Sensor Heater Assembly, 115 Vac
20201-A	Sensor Heater Assembly, 230 Vac
10681	Thermostat Control for Sensor Heater, one thermostat required for any number of heaters, requires junction box
T600503	Cable, 3 Conductor, 20 AWG shielded for 2020

Micro Response Anemometer

2030	Micro Response Anemometer, light chopper
2031	Micro Response Anemometer, dc generator
2032	Micro Response Anemometer, reed switch
T600502	Cable, 2-conductor, 20 AWG shielded for 2031 or 2032
T600504	Cable, 4-conductor, 20 AWG shielded for 2030

Heater

20201	Sensor Heater Assembly, 115 Vac
20201-A	Sensor Heater Assembly, 230 Vac
10681	Thermostat Control for sensor heater; one thermostat required for any number of heaters; requires junction box
T600503	Cable for heater

Crossarm

2023	Crossarm for mounting two micro response wind sensors to 1" (25 mm) O.D. mast
20231	Mast Adapter to mount one micro response wind sensor to 1" (25 mm) O.D. mast

Spare Parts Kits

M488140	Spare Parts Kit for 2020, 2021
M488141	Spare Parts Kit for 2030, 2031, 2032, 2033

allweatherinc
All Weather Inc.
1165 National Drive
Sacramento, CA 95834
Phone: 916 928-1000
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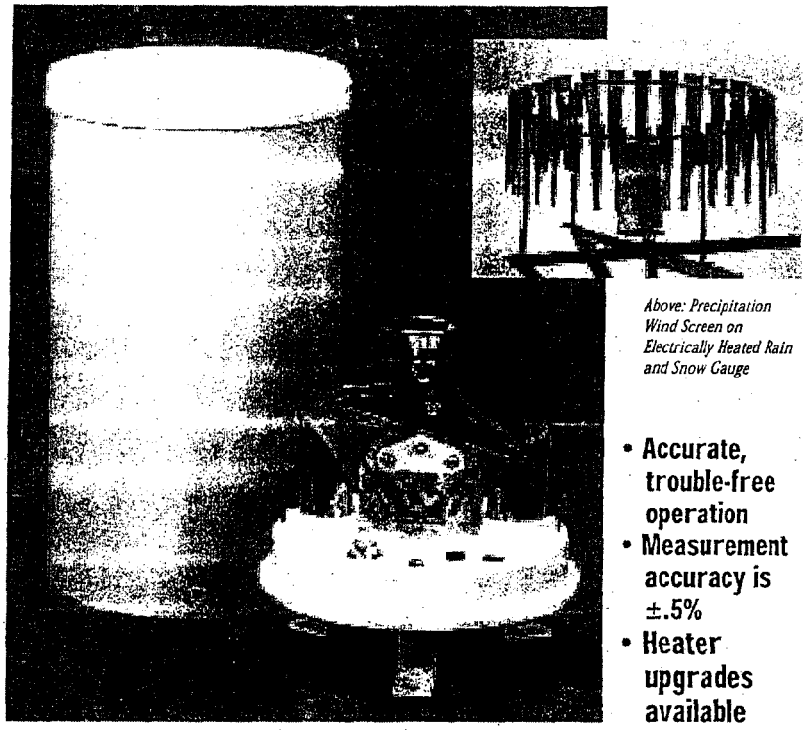
Tipping Bucket Rain Gauge, Electrically Heated Rain and Snow Gauge, and Wind Screen



Above: Precipitation Wind Screen on Electrically Heated Rain and Snow Gauge

- **Accurate, trouble-free operation**
- **Measurement accuracy is ±.5%**
- **Heater upgrades available**

Tipping Bucket Rain Gauge

Tipping Bucket Rain Gauges, 6011-A and 6018-A series, are standard, precision instruments for measuring rainfall volume and/or rate. Rain enters the gauge through a large funnel, the rim of which is protected by a metal ring to prevent distortion. Collected water passes through a debris-filtering screen and is funneled into one of two tipping buckets inside the gauge. The bucket tips when a given amount of water has been collected; the amount is determined by gauge calibration. As the bucket tips, it causes a 0.1-second switch closure. The tip also brings a second bucket into position under the funnel, ready to fill and repeat the cycle. After the rain water is measured, it drains out through tubes in the base of the gauge. The drain holes are covered by screens to prevent insect entry.

Electrically Heated Rain and Snow Gauge

For areas where snow or freezing rain may occur, Electrically Heated Rain and Snow Gauges, 6021-A and 6028-A series, are available. Each gauge includes 4 separate heaters. A NiChrome wire heater wraps around the collection funnel to melt the precipitation. A second NiChrome wire heater warms the internal components and the gauge base to prevent refreezing of the water inside the gauge. In addition, a cartridge heater is installed into each of the two gauge drain tubes so that the measured precipitation passes out of the gauge freely without freezing on contact with the cold outside air. The funnel and the base heaters are controlled by thermostats; the drain tube heaters are continuous duty. Rain gauge models may operate on either 115 VAC or 230 VAC power.

Four Available Models

The 6011-A, 6021-A Series gauges have an orifice diameter of approximately 8 inches and a resolution of either 0.01 inch or 0.1 mm.

The 6018-A, 6028-A Series gauges feature a collection funnel 12 inches in diameter. This size provides the maximum sampling area, resulting in improved catch. These gauges can be calibrated to a resolution of 0.01 inch, 0.25mm, or 1 mm.

All gauge types utilize a mercury-wetted reed switch. The mercury wetting prevents the arcing that is common with reed switches and provides a better electrical contact.

Features

All Weather Inc. rain gauges are designed for many years of accurate, trouble-free operation. They utilize all metal construction, including aluminum, nickel-plated brass, and stainless steel. The built-in level and predrilled feet aid in proper installation. Measurement accuracy is ±0.5% at a precipitation rate of 0.5 inch per hour.

Wind Screen

This Alter-Type Wind Screen minimizes the formation of strong updrafts which can distort the trajectories of precipitation particles falling toward a gauge. The screen also generates turbulent air motions over the gauge orifice to break up streamlines and thus improve the catch. Use of a wind screen is recommended with all precipitation gauges located in windy areas. The screen consists of 32 free-swinging galvanized metal leaves, evenly spaced around a 4-foot diameter ring. Each leaf is fabricated from 22-gauge sheet metal, 16" long, 3" wide at the top and 2" wide at the bottom. One of the quadrants is hinged and swings out to permit easy access to the gauge. Two lengths of legs (two feet and three feet) are available due to variations in gauge height. A mounting kit is available.

Specifications

Tipping Bucket Rain Gauge

Sensor Type:	Tipping bucket
Output:	0.1-second switch closure
Switch:	Form A reed, mercury-wetted
Sensitivity:	
Model 6011-A:	1 tip per 0.01"
Model 6011-B:	1 tip per 0.1 mm
Accuracy:	±0.5% at 0.5"/hr
Collector Orifice:	8.214" diameter (208 mm)
Size:	8.25" dia x 17.5" H (210 x 445 mm)
Weight/Shipping:	8 lbs/15 lbs (3.6 kg/6.8 kg)

Electrically Heated Rain and Snow Gauge

Sensor Type:	Tipping bucket
Output:	0.1-second switch closure
Switch:	Form A reed, mercury-wetted
Sensitivity:	
Model 6021-A:	1 tip per 0.01"
Models 6021-B, 6021-D:	1 tip per 0.1 mm
Accuracy:	±0.5% at 0.5"/hr
Collector orifice:	8.214: diameter (208 mm)
Heaters:	
Funnel:	NiChrome wire in foil, 125 W, thermostatically controlled
Base:	NiChrome wire in foil, 150 W, thermostatically controlled
Drain Tubes:	2, cartridge, 20 W each, continuous duty
Thermostat Set Point:	Funnel heater: approx 11°C (52°F) Base heater: approx 6°C (43°F)
Operating Temperature:	-25° to + 40°C
Input Voltage:	
Model 6021-A, 6021-B:	115 Vac, 60 Hz
Model 6021-D:	230 Vac, 50 Hz
Size:	8.25" dia x 17.5" H (210 x 445 mm)
Weight/Shipping:	8 lbs/15 lbs (3.6 kg/6.8 kg)

Precipitation Gauge Wind Screen

Material:	22-gauge sheet metal, galvanized
Size:	
Model 6410:	48" dia x 24" H (1219 x 610 mm)
Model 6411:	48" dia x 36" H (1219 x 914 mm)
Weight/shipping:	45 lbs/50 lbs.

Ordering Information

Tipping Bucket Rain Gauge

6011-A	Tipping Bucket Rain Gauge, 0.01"/tip
6011-B	Tipping Bucket Rain Gauge, same as 6011-A except 0.1 mm/tip
6018-A	12" Tipping Bucket Rain Gauge, 0.01"/tip
6018-B	12" Tipping Bucket Rain Gauge, same as 6018-A except 0.25mm/tip
6018-C	12" Tipping Bucket Rain Gauge, same as 6018-A except 1mm/tip

Electrically Heated Rain and Snow Gauge

6021-A	Electrically Heated Rain and Snow Gauge, 0.01"/tip, 115 Vac, less power cable
6021-B	Electrically Heated Rain and Snow Gauge, same as 6021-A except 0.1 mm/tip, 115 Vac
6021-D	Electrically Heated Rain and Snow Gauge, same as 6021-A except 0.1 mm/tip, 230 Vac
6028-A	Electrically Heated 12"Rain and Snow Gauge, same as 6021-A except 0.1 mm tip, 230 Vac
6028-B	Electrically Heated 12"Rain and Snow Gauge, same as 6021-A except 0.25 mm tip, 115 Vac
6028-D	Electrically Heated 12"Rain and Snow Gauge, same as 6021-A except 0.25 mm tip, 230 Vac
60211	Heater Kit Option to convert 6011 Series gauge to 6021 Series, 115 Vac input; less power cable
60212	Heater Kit Option, same as 60211 except 230 Vac input
M488063	Spare parts kit for 6021-A

Cables

T600502	Cable to connect rain gauge to output device, 2-conductor, 20 AWG shielded
T600723	Power Cable, 3-conductor, 16 AWG/heated rain gauges

Precipitation Gauge Wind Screen

6410	Precipitation Gauge Wind Screen, 24" legs
6411	Precipitation Gauge Wind Screen, 36" legs
64101	Leg Extender Kit, converts 6410 to 6411
64102	Wind Screen Mounting Kit

allweatherinc
All Weather Inc.
1165 National Drive
Sacramento, CA 95834
Phone: 916 928-1000
USA Toll Free: 800 824-5873
Fax: 916 928-1165

QUALIMETRICS

Q-Net Barometric Pressure Sensor

SYSTEMS

Product Overview

The Model 7120 is designed to mount inside the standard Q-Net enclosure on one of the slide-in accessory equipment bays.

The 7120 is packaged in a black thermoplastic enclosure. All electrical and plumbing connections exit through the cover of the enclosure without external connectors. The electrical and plumbing leads are three feet long and are of adequate length for termination with the standard Q-Net enclosure. There is one cable for the BP sensor power and signals and a separate cable for the optional heater power. When the heater option is not installed, a black plastic plug covers the unused cable hole in the enclosure cover.

Pressure Transducer

The pressure transducer uses a laser-trimmed piezoresistive sensing element to convert a change in atmospheric pressure to an analog voltage. Atmospheric pressures from 600 mb to 1100 mb (17.72-32.43 in. Hg) are detected and amplified by the sensor and its associated circuitry. The wide response of the sensor allows operation at elevations ranging from sea level to 14,000 feet without adjustments to the sensor.

The sensor operates from a DC power source of 10.5-24.0 Vdc, 15ma maximum. The output voltage range is from 2.9008 Vdc to 5.3167 Vdc, corresponding to a pressure range from 600 to 1100 mb. Input power and output signals are provided through a four conductor shielded cable.

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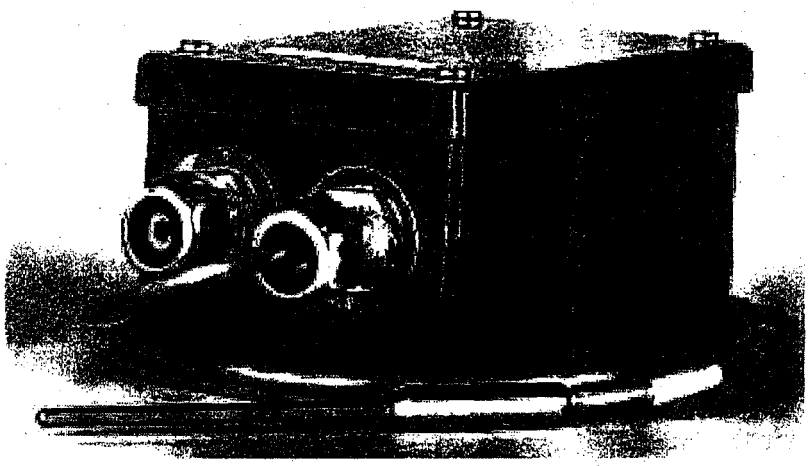
Remote Temperature Measuring System, Temperature Probes

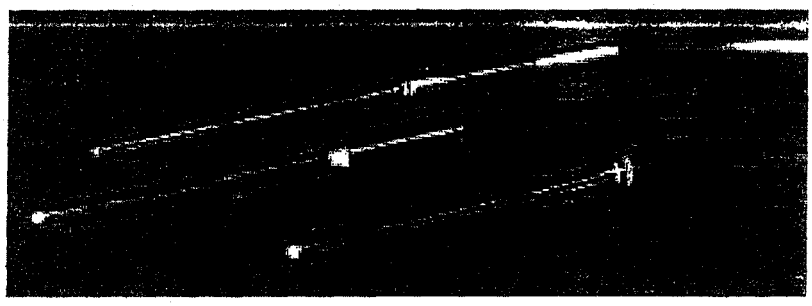
- **Weatherproof steel closure**
- **Output compatible with many telemetry systems**



Remote Temperature Measuring System

Description

The Model 4350-A is a low power, temperature measuring system designed for use in remote areas. It is composed of a Model 4480-B thermistor temperature probe and a translator housed in a weatherproof steel enclosure. The enclosure has waterproof cable glands for signal and power cables and is easily mounted on a mast or wall. Power is provided by an external 12 VDC source. The translator converts the output of the probe to a 0 to 5 VDC output proportional to temperature. Precision resistors are used to maintain system accuracy and define the sensor range. The output is compatible with many types of telemetry systems.



Probes

Several different types of Temperature Probes are available for air, water, and soil temperature measurements.

Model 4480-A

Model 4480-A, the most commonly used probe, incorporates a precision composite thermistor that produces a linear output voltage which is proportional to the range of temperature.

The Model 4480-A features a 3 element composite, with a measuring range of -50° to +50°C.

Model 4470-A

The Model 4470-A probe utilizes a platinum element. It has an accuracy of ±0.1°C and a measuring range of -50° to +100°C. Other probes are available for special measurements.

Model 4485

Includes waterproofing features for underwater and soil temperature use.

Model 4482

Incorporates the same probe, but it also includes hardware to mount it in a Model 6821 evaporation pan.

Specifications

Remote Temperature Measuring System

Sensor:	Thermistor probe, Model 4480-B
Translator:	DC amplifier with resistive bridge input
Power source:	+12 VDC at 5 mA max
Translator temperature:	-50° to 50°C (-58 to 122°F)
Signal range:	0 to 5 VDC
Sensor accuracy:	±0.1°C (±0.22°F)
Translator accuracy:	±.23°C (±0.5°F)
Translator size:	6" L x 4" W x 3" H (152 x 102 x 76 mm)
Translator weight/ shipping:	3 lbs/5 lbs (1.4 kg/2.3 kg)

Probes

Sensor Element:	
Model 4470-A:	100-ohm platinum wire, (American curve, α=0.00392)
Models 4480, 4482, 4485:	3-element composite thermistor
Range:	
Model 4470-A:	-50° to +100°C
Models 4480, 4482, 4485:	-50° to +50°C
Accuracy:	
Model 4470-A:	±0.1°C
Models 4480, 4482, 4485:	±0.2°C
Time Constant:	
Model 4470-A:	15 seconds
Models 4480, 4482, 4485	15 seconds
Size:	
Model 4470-A:	0.4" dia x 6" L (10 x 152 mm)
Models 4480:	0.43" dia x 5.25" L (11 x 133 mm)
Model 4482:	2" W x 8.5" L (51 x 216 mm)
Model 4485:	0.5" dia x 3.2" L (13 x 80 mm)

** Maximum sensor error at any temperature is the sum of the thermistor accuracy and interchangeability, the linearity deviation, and the uncertainty due to fixed resistor tolerance.*

Ordering Information

Remote Temperature Measuring System

Model 4350-A	Remote Temperature Measuring System, including Model 4480-B thermistor temperature probe with 20 feet of cable and weather-proof translator
T600504	4-conductor, 20 AWG shielded cable to connect translator to battery and output device, or for additional distance between probe and translator
8141-B	Self-Aspirated Radiation Shield, for 4470 and 4480 series temperature probes
11510	Battery, 12 VDC

Probes

4470-A	Air Temperature Probe, platinum resistance element includes 5' cable
4480-A	Air Temperature Probe, 3-element thermistor, includes 5' cable
4480-B	Air Temperature Probe, same as 4480-A except includes 20' cable
4480-C	Air Temperature Probe, same as 4480-B except includes 30' cable
4482	Underwater Temperature Probe; includes mounting hardware for evaporation pan and 50' cable
4485	Soil/Water Temperature Probe, includes 50' cable
T600504	Cable for Model 4480, as well as Model 4470-A when connected to a signal conditioning module, 4-conductor, 20 AWG shielded
T600704	Cable for Models 4482 and 4485, 4-conductor, 18 AWG neoprene

allweatherinc
All Weather Inc.
1165 National Drive
Sacramento, CA 95834
Phone: 916 928-1000
USA Toll Free: 800 824-5873
Fax: 916 928-1165

Attachment B

DEP Application Forms

FORM

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION
GENERAL INFORMATION FORM – AUTHORIZATION APPLICATION

Before completing this General Information Form (GIF), read the step-by-step instructions provided in this application package. This version of the General Information Form (GIF) must be completed and returned with any program-specific application being submitted to the Department.

Related ID#s (If Known)			
Client ID#	4660	**APS ID#**	
Site ID#	450744	**Auth ID#**	
Facility ID#	477357		

DEP USE ONLY
Date Received & General Notes

CLIENT INFORMATION

DEP Client ID#	**Client Type / Code**
4660	Authority/AUTH

Organization Name or Registered Fictitious Name	**Employer ID#** (EIN)	**Dun & Bradstreet ID#**
Lancaster County Solid Waste Mgm't Auth. (LCSWMA)	23-6006036	06-709-5828

Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**

Additional Individual Last Name	**First Name**	**MI**	**Suffix**	**SSN**

Mailing Address Line 1	**Mailing Address Line 2**
1299 Harrisburg Pike	P.O. Box 4425

Address Last Line – City	**State**	**ZIP+4**	**Country**
Lancaster	PA	17604-4425	USA

Client Contact Last Name	**First Name**	**MI**	**Suffix**
Norris	Brooks	K.	

Client Contact Title	**Phone**	**Ext**
Senior Manager, Technical Services	(717) 397-9968	163

Email Address	**FAX**
bnorris@lcswma.org	(717) 397-9973

SITE INFORMATION

DEP Site ID#	**Site Name**
450744	LCSWMA Frey Farm Landfill

EPA ID# **Estimated Number of Employees to be Present at Site** 10

Description of Site
Solid Waste Landfill

County Name	**Municipality**	**City**	**Boro**	**Twp**	**State**
Lancaster	Manor	☐	☐	☒	
County Name	**Municipality**	**City**	**Boro**	**Twp**	**State**
		☐	☐	☐	

Site Location Line 1	**Site Location Line 2**
3049 River Road	

Site Location Last Line – City	**State**	**ZIP+4**
Conestoga	PA	17516

Detailed Written Directions to Site
Route 441 South (of Columbia, PA) 8.5 miles to landfill entrance on right

Site Contact Last Name	**First Name**	**MI**	**Suffix**
Eshbach	Robert		

Site Contact Title	**Site Contact Firm**
Landfill Manager	LCSWMA

Mailing Address Line 1	**Mailing Address Line 2**
3049 River Road	

Mailing Address Last Line – City	**State**	**ZIP+4**
Conestoga	PA	17604

Phone	**Ext**	**FAX**	**Email Address**
(717) 871-6420		(717) 871-6425	beshbach@lcswma.org

NAICS Codes (Two- & Three-Digit Codes – List All That Apply)
56; 561/562

6-Digit Code (Optional)
562212

Client to Site Relationship
OWNOP

FACILITY INFORMATION

Modification of Existing Facility

		Yes	No
1.	**Will this project modify an existing facility, system, or activity?**	☐	☒
2.	**Will this project involve an addition to an existing facility, system, or activity?**	☒	☐

If "Yes", check all relevant facility types and provide DEP facility identification numbers below.

	Facility Type	DEP Fac ID#		Facility Type	DEP Fac ID#
☐	Air Emission Plant		☐	Industrial Minerals Mining Operation	
☐	Beneficial Use (water)		☐	Laboratory Location	
☐	Blasting Operation		☐	Land Recycling Cleanup Location	
☐	Captive Hazardous Waste Operation		☐	MineDrainageTrmt/LandRecyProjLocation	
☐	Coal Ash Beneficial Use Operation		☒	Municipal Waste Operation	101389
☐	Coal Mining Operation		☐	Oil & Gas Encroachment Location	
☐	Coal Pillar Location		☐	Oil & Gas Location	
☐	Commercial Hazardous Waste Operation		☐	Oil & Gas Water Poll Control Facility	
☐	Dam Location		☐	Public Water Supply System	
☐	Deep Mine Safety Operation -Anthracite		☐	Radiation Facility	
☐	Deep Mine Safety Operation -Bituminous		☐	Residual Waste Operation	
☐	Deep Mine Safety Operation -Ind Minerals		☐	Storage Tank Location	
☐	Encroachment Location (water, wetland)		☐	Water Pollution Control Facility	
☐	Erosion & Sediment Control Facility		☐	Water Resource	
☐	Explosive Storage Location		☐	Other:	

Latitude/Longitude Point of Origin	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
	39	57	19	76	26	48

Horizontal Accuracy Measure: Feet --or-- Meters

Horizontal Reference Datum Code
☐ North American Datum of 1927
☐ North American Datum of 1983
☐ World Geodetic System of 1984

Horizontal Collection Method Code

Reference Point Code

Altitude: Feet --or-- Meters

Altitude Datum Name
☐ The National Geodetic Vertical Datum of 1929
☐ The North American Vertical Datum of 1988 (NAVD88)

Altitude (Vertical) Location Datum Collection Method Code

Geometric Type Code

Data Collection Date

Source Map Scale Number: Inch(es) = Feet
--or-- Centimeter(s) = Meters

PROJECT INFORMATION

Project Name
Form 54 - Meteorological Monitoring

Project Description
Installation of meteorological equipment

Project Consultant Last Name	First Name	MI	Suffix
Tafuto	William	S.	

Project Consultant Title: Vice President-Senior Engineer

Consulting Firm: ARM Group Inc.

Mailing Address Line 1: 1129 West Governor Road

Mailing Address Line 2:

Address Last Line – City	State	ZIP+4
Hershey	PA	17033-0797

Phone	Ext	FAX	Email Address
(717) 533-8600		(717) 533-8605	wtafuto@armgroup.net

Time Schedules	Project Milestone (Optional)
12/05	Submit permit modification application
3/06	Receive DEP approval
4/06	Begin Procurement process
8/06	Install equipment

1. **Is this application for an authorization type on the list of authorizations affected by the land use policy?** ☐ Yes ☒ No
   Note: If "Yes", you must complete the following Land Use Information section, unless exempted by Questions 2 or 3 below.
   If "No", skip Questions 2 & 3 below as well as the following Land Use Information section.
   For referenced list, see Appendix A attached to the GIF Instructions.

2. **For an Air program authorization only. All other authorizations continue with Question 3 below. Will the permit authorize the construction of facilities outside an existing permitted area?** ☐ Yes ☐ No
   Note: If "Yes", you must complete the following Land Use Information section unless exempted by Question 3 below.
   If "No", skip Question 3 below as well as the following Land Use Information section.

3. **Have you attached or submitted municipal and county 'Early Opt Out' approval letters for the project?** ☐ Yes ☐ No
   Note: If "Yes" to Question 3, skip the following Land Use Information section. This should only be checked "Yes" if applicant is choosing the early opt-out option. Required approval letters described in the GIF Checklist and Instructions should be attached.
   If "No" to Question 3, continue with the following Land Use Information section.

LAND USE INFORMATION

Note: Applicants are encouraged to submit copies of local land use approvals or other evidence of compliance with local comprehensive plans and zoning ordinances.

1.	**Is there a municipal comprehensive plan(s)?**	☐ Yes	☐ No
2.	**Is there a county comprehensive plan(s)?**	☐ Yes	☐ No
3.	**Is there a multi-municipal or multi-county comprehensive plan?**	☐ Yes	☐ No
4.	**Is the proposed project consistent with these plans?** If no plan(s) exists, answer "Yes".	☐ Yes	☐ No
5.	**Is there a municipal zoning ordinance(s)?**	☐ Yes	☐ No
6.	**Is there a joint municipal zoning ordinance(s)?**	☐ Yes	☐ No
7.	**Will the proposed project require a zoning approval (e.g., special exception, conditional approval, re-zoning, variance)?** If zoning approval has already been received, attach documentation.	☐ Yes	☐ No
8.	**Are any zoning ordinances that are applicable to this project currently the subject of any type of legal proceeding?**	☐ Yes	☐ No
9.	**Will the project be located on a site that has been or is being remediated under DEP's Land Recycling Program?**	☐ Yes	☐ No
10.	**Will the project result in reclamation of abandoned mine lands through re-mining or as part of DEP's Reclaim PA Program?**	☐ Yes	☐ No
11.	**Will the project be located in an agricultural security area or an area protected under an agricultural conservation easement?**	☐ Yes	☐ No
12.	**Will the project be located in a Keystone Opportunity Zone or Enterprise Development Area?**	☐ Yes	☐ No
13.	**Will the project be located in a Designated Growth Area as defined by the Municipalities Planning Code?**	☐ Yes	☐ No

COORDINATION INFORMATION

Note: The PA Historical and Museum Commission must be notified of proposed projects in accordance with DEP Technical Guidance Document 012-0700-001 and the accompanying Cultural Resource Notice Form.

If the activity will be a mining project (i.e., mining of coal or industrial minerals, coal refuse disposal and/or the operation of a coal or industrial minerals preparation/processing facility), respond to questions 1.0 through 2.5 below.

If the activity will not be a mining project, skip questions 1.0 through 2.5 and begin with question 3.0.

1.0	**Is this a coal mining project?** If "Yes", respond to 1.1-1.6. If "No", skip to Question 2.0. (DEP Use/48y1)	☐	Yes	☒	No
1.1	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be equal to or greater than 200 tons/day?** (DEP Use/4x70)	☐	Yes	☐	No
1.2	**Will this coal mining project involve coal preparation/ processing activities in which the total amount of coal prepared/processed will be greater than 50,000 tons/year?** (DEP Use/4x70)	☐	Yes	☐	No
1.3	**Will this coal mining project involve coal preparation/ processing activities in which thermal coal dryers or pneumatic coal cleaners will be used?** (DEP Use/4x70)	☐	Yes	☐	No
1.4	**For this coal mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?** (DEP Use/4x62)	☐	Yes	☐	No
1.5	**Will this coal mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?** (DEP Use/3140)	☐	Yes	☐	No
1.6	**Will this coal mining project involve underground coal mining to be conducted within 500 feet of an oil or gas well?** (DEP Use/4z41)	☐	Yes	☐	No
2.0	**Is this a non-coal (industrial minerals) mining project?** If "Yes", respond to 2.1-2.6. If "No", skip to Question 3.0. (DEP Use/48y1)	☐	Yes	☒	No
2.1	**Will this non-coal (industrial minerals) mining project involve the crushing and screening of non-coal minerals other than sand and gravel?** (DEP Use/4x70)	☐	Yes	☐	No
2.2	**Will this non-coal (industrial minerals) mining project involve the crushing and/or screening of sand and gravel with the exception of wet sand and gravel operations (screening only) and dry sand and gravel operations with a capacity of less than 150 tons/hour of unconsolidated materials?** (DEP Use/4x70)	☐	Yes	☐	No
2.3	**Will this non-coal (industrial minerals) mining project involve the construction, operation and/or modification of a portable non-metallic (i.e., non-coal) minerals processing plant under the authority of the General Permit for Portable Non-metallic Mineral Processing Plants (i.e., BAQ-PGPA/GP-3)?** (DEP Use/4x70)	☐	Yes	☐	No
2.4	**For this non-coal (industrial minerals) mining project, will sewage treatment facilities be constructed and treated waste water discharged to surface waters?** (DEP Use/4x62)	☐	Yes	☐	No
2.5	**Will this non-coal (industrial minerals) mining project involve the construction of a permanent impoundment meeting one or more of the following criteria: (1) a contributory drainage area exceeding 100 acres; (2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 feet; (3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet?** (DEP Use/3140)	☐	Yes	☐	No

3.0	**Will your project, activity, or authorization have anything to do with a well related to oil or gas production, site development for such activity, or the waste from such a well?** If "Yes", respond to 3.1-3.3. If "No", skip to Question 4.0. (DEP Use/4z41)	☐	Yes	☒	No
3.1	**Does the oil- or gas-related project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?** (DEP Use/4z41)	☐	Yes	☐	No
3.2	**Will the oil- or gas-related project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or storm water system?** If "Yes", discuss in *Project Description*. (DEP Use/4z41)	☐	Yes	☐	No
3.3	**Will the oil- or gas-related project involve the construction and operation of industrial waste treatment facilities?** (DEP Use/4z41)	☐	Yes	☐	No
4.0	**Will the project involve a construction activity that results in earth disturbance?** If "Yes", specify the total disturbed acreage. (DEP Use/4x66) **4.0.1 Total Disturbed Acreage**	☐	Yes	☒	No
5.0	**Does the project involve any of the following: placement of fill, excavation within or placement of a structure, located in, along, across or projecting into a watercourse, floodway or body of water (including wetlands)?** (DEP Use/4x66)	☐	Yes	☒	No
6.0	**Will the project involve discharge of industrial wastewater or stormwater to a dry swale, surface water, ground water or an existing sanitary sewer system or separate storm water system?** If "Yes", discuss in *Project Description*. (DEP Use/4x62)	☐	Yes	☒	No
7.0	**Will the project involve the construction and operation of industrial waste treatment facilities?** (DEP Use/4x62)	☐	Yes	☒	No
8.0	**Will the project involve construction of sewage treatment facilities, sanitary sewers, or sewage pumping stations?** If "Yes", indicate estimated proposed flow (gal/day). Also, discuss the sanitary sewer pipe sizes and the number of pumping stations/treatment facilities/name of downstream sewage facilities in the *Project Description*, where applicable. (DEP Use/4x62) **8.0.1 Estimated Proposed Flow (gal/day)**	☐	Yes	☒	No
9.0	**Was sewage planning submitted and approved?** If "Yes", attach the Act 537 approval letter unless the submitted application is actually requesting Act 537 approval (Approval required prior to 105/NPDES approval). (DEP Use/4x61) **9.0.1 Is Act 537 Approval Letter attached?**	☐	Yes	☒	No
10.0	**Is this project for the beneficial use of biosolids for land application within Pennsylvania?** If "Yes" indicate how much (i.e. gallons or dry tons per year). (DEP Use/4X62) **10.0.1 Gallons Per Year (residential septage)** _____ **10.0.2 Dry Tons Per Year (biosolids)**	☐	Yes	☒	No
11.0	**Does the project involve construction, modification or removal of a dam?** If "Yes", identify the dam. (DEP Use/3140) **11.0.1 Dam Name**	☐	Yes	☒	No
12.0	**Will the project interfere with the flow from, or otherwise impact, a dam?** If "Yes", identify the dam. (DEP Use/3140) **12.0.1 Dam Name**	☐	Yes	☒	No
13.0	**Will the project involve operations (excluding during the construction period) that produce air emissions (i.e., NOX, VOC, etc.)?** If "Yes", identify each type of emission followed by the amount of that emission. (DEP Use/4x70) **13.0.1 Enter all types & amounts of emissions; separate each set with semicolons.**	☐	Yes	☒	No

14.0	**Is an on-site drinking water supply (well), other than individual house wells, proposed for your project?** If "Yes", indicate total number of people served and/or the total number of connections served, if applicable. Also, check all proposed sub-facilities. (DEP Use/4x81)	☐	Yes	☒	No
	14.0.1 Number of Persons Served				
	14.0.2 Number of Employee/Guests				
	14.0.3 Number of Connections				
	14.0.4 Sub-Fac: Distribution System	☐	Yes	☐	No
	14.0.5 Sub-Fac: Water Treatment Plant	☐	Yes	☐	No
	14.0.6 Sub-Fac: Source	☐	Yes	☐	No
	14.0.7 Sub-Fac: Pump Station	☐	Yes	☐	No
	14.0.8 Sub-Fac: Entry Point	☐	Yes	☐	No
	14.0.9 Sub-Fac: Transmission Main	☐	Yes	☐	No
	14.0.10 Sub-Fac: Storage Facility	☐	Yes	☐	No
15.0	**Will your project involve purchasing water in bulk, excluding during the construction period?** If "Yes, name the provider. Also, indicate the daily number of employees or guests served. (DEP Use/4x81)	☐	Yes	☒	No
	15.0.1 Provider's Name				
	15.0.2 Number of Employees/Guests				
16.0	**Is your project to be served by public water supply?** If "Yes", indicate name of supplier and attach letter from supplier stating that it will serve the project. (DEP Use/4x81)	☐	Yes	☒	No
	16.0.1 Supplier's Name				
	16.0.2 Letter of Approval from Supplier is Attached	☐	Yes	☐	No
17.0	**Will this project involve a new or increased drinking water withdrawal from a stream or other water body?** If "Yes", provide name of stream. (DEP Use/4x81)	☐	Yes	☒	No
	17.0.1 Stream Name				
18.0	**Will the construction or operation of this project involve treatment, storage, reuse, or disposal of waste?** If "Yes", indicate what type (i.e., hazardous, municipal (including infectious & chemotherapeutic), residual) and the amount to be treated, stored, re-used or disposed. (DEP/Use4x32)	☐	Yes	☒	No
	18.0.1 Type & Amount				
19.0	**Will your project involve the removal of coal, minerals, etc. as part of any earth disturbance activities?** (DEP Use/48y1)	☐	Yes	☒	No
20.0	**Does your project involve installation of a field constructed underground storage tank?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	20.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
21.0	**Does your project involve installation of an aboveground storage tank greater than 21,000 gallons capacity at an existing facility?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	21.0.1 Enter all substances & capacity of each; separate each set with semicolons.				
22.0	**Does your project involve installation of a tank greater than 1,100 gallons which will contain a highly hazardous substance as defined in DEP's Regulated Substances List, 2570-BK-DEP2724?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	22.0.1 Enter all substances & capacity of each; separate each set with semicolons.				

23.0	**Does your project involve installation of a storage tank at a new facility with a total AST capacity greater than 21,000 gallons?** If "Yes", list each Substance & its Capacity. **Note:** Applicant may need a Storage Tank Site Specific Installation Permit. (DEP Use/2570)	☐	Yes	☒	No
	23.0.1 Enter all substances & capacity of each; separate each set with semicolons.				

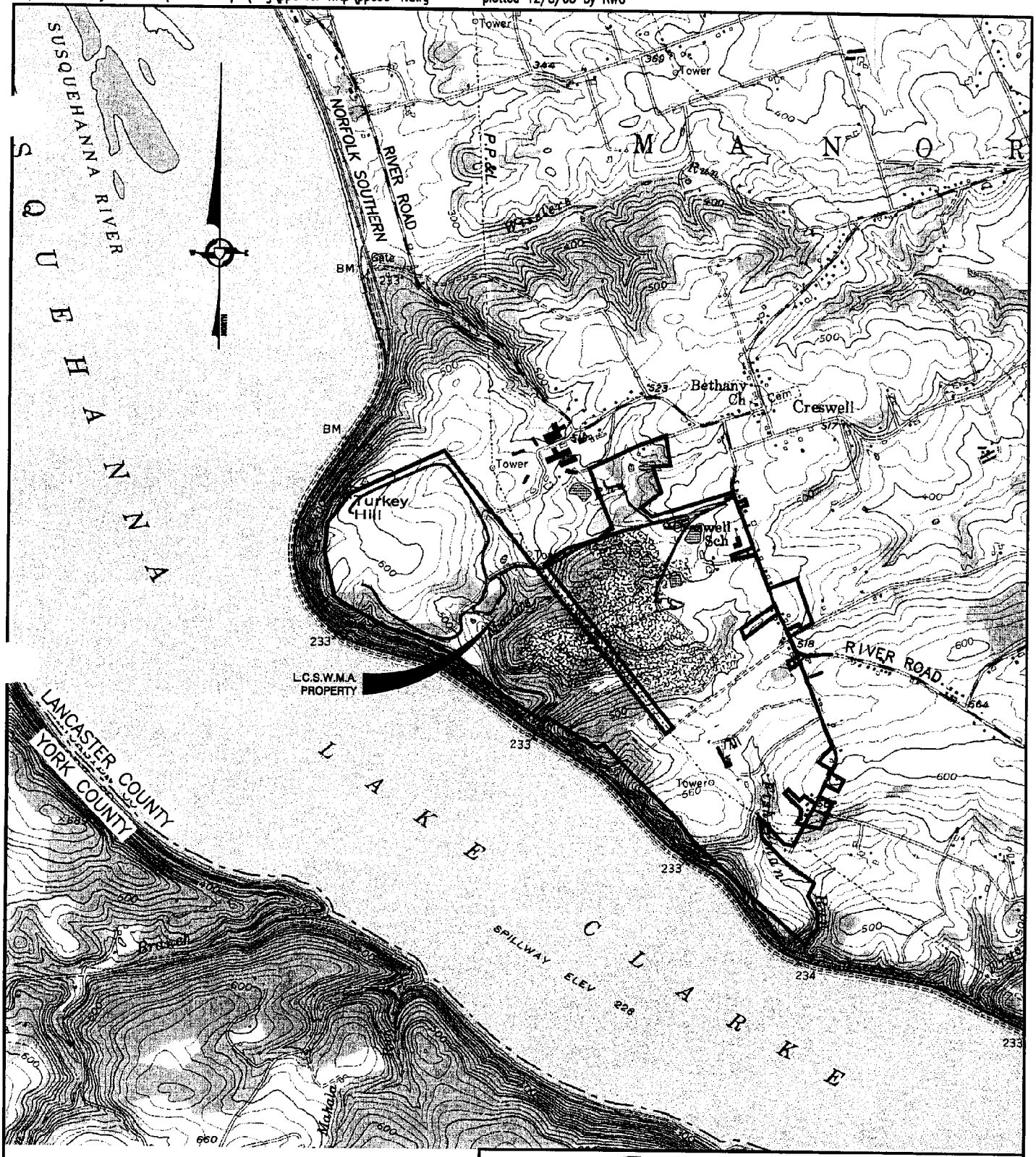
CERTIFICATION

I certify that I have the authority to submit this application on behalf of the applicant named herein and that the information provided in this application is true and correct to the best of my knowledge and information.

Type or Print Name Brooks K. Norris

Signature	Title	Date
Brooks K Norris	Senior Manager, Technical Services	12/23/2005

L:\Autocad Projects 2005\LF site maps\dwg\ppc for ffltp\ppc96-1.dwg plotted 12/8/05 by RWG



LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY

1299 Harrisburg Pike
PO Box 4425
Lancaster, PA 17604
717-397-9968
Fax 717-397-9973
www.lcswma.org

U.S.G.S. SITE LOCATION

Drawn By: RWG	Scale: 1"= 2000'	Date: 3/12/04	Drawing No: 010920-04A

2540-PM-LRWM0357 Rev. 3/2001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

Coordination #

FORM A
APPLICATION FOR MUNICIPAL OR RESIDUAL WASTE PERMIT

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided herein. Replacement/substitution of or attachment to this form is prohibited. Improperly completed forms may be rejected by the Department, may be considered to be violations of the Department's Rules and Regulations, and may result in assessment of fines and penalties.

SECTION A. APPLICANT IDENTIFIER (Check one of the boxes and identify both)

☒ Owner	Name: Lancaster County Solid Waste Management Authority	Phone #: (717) 397-9968
	Address: 1299 Harrisburg Pike;P.O. Box 4425; Lancaster, PA 17604	Email: www.lcswma.org
☒ Operator	Name: Lancaster County Solid Waste Management Authority	Phone #: (717) 397-9968
	Address: 1299 Harrisburg Pike;P.O. Box 4425; Lancaster, PA 17604	Email: www.lcswma.org

SECTION B. TYPE OF FACILITY

Municipal Waste Landfill	☒	Residual Waste Landfill	☐
Construction/Demolition Waste Landfill	☐	Class I	☐
Municipal Waste Composting Facility	☐	Class II	☐
Municipal Waste Incinerator or Resource Recovery Facility	☐	Class III	☐
Municipal Waste Demonstration Facility	☐	Residual Waste Disposal Impoundment	
Municipal Waste Transfer Facility	☐	Class I	☐
Municipal Waste Processing Facility	☐	Class II	☐
Other, Specify	☐	Residual Waste Composting Facility	☐
		Residual Waste Demonstration Facility	☐
		Residual Waste Transfer Facility	☐
		Residual Waste Incinerator or Other Processing Facility	☐
		Residual Waste Agricultural Utilization	☐
		Residual Waste Land Reclamation	☐
		Other, Specify	☐

SECTION C. MAP LOCATION

U.S.G.S. Map Location of Facility (attach the map and identify location on the USGS map)

7.5" Map Name Safe Harbor

Center of Facility:

Latitude 39 ° 57 ' 19 " Longitude 76 ° 26 ' 48 "

SECTION D. GENERAL INFORMATION

Number of New Acres Proposed for Permit (Issued)
NOT APPLICABLE •

Number of Acres Proposed for Permit (New)
153 • 2

Total Acres of the Property
175 • 6

Number of Previously Permitted Acres
153 • 2

Current Permit ID Number(s) 101389

SECTION E. AFFIDAVIT

COMMONWEALTH/STATE OF Pennsylvania

SS:

COUNTY OF Lancaster

Sworn and subscribed to before me this 23rd day of December 19 2005

Catherine A. Dougherty
NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Catherine A. Dougherty, Notary Public
Manheim Twp., Lancaster County
My Commission Expires June 8, 2008
Member, Pennsylvania Association Of Notaries

My Commission Expires
June 8, 2008

Print or type name to be Signed: James D. Warner, Executive Director Date 12-23-05

Date: 12-23-05

I, _____ do hereby certify pursuant to the penalties of 18 Pa. C.S.A.
(Signature of Applicant)

Section 4904 to the best of my knowledge, information, and belief that the information contained in this application is true and correct and is in conformance with 25 PA. Code Chapters 271 or 287, whichever is applicable, of the rules and regulations of the Department of Environmental Protection.

SECTION F. APPLICATION FEE

A. Municipal Facilities

i. Application for new permit, or repermitting. (ref. 271.128)

☐	$18,500	–	Municipal Waste Landfill
☐	$19,250	–	Construction/Demolition Waste Landfill
☐	$4,400	–	Transfer Facility
☐	$1,900	–	Incinerator or Resource Recovery Facility
☐	$4,000	–	Other Municipal Waste Processing Facility, including Composting Facility
☐	$17,300	–	Demonstration Facility

ii. Application for a major permit modification.

☐	$300	–	Addition of types of waste not approved in the permit
☐	$7,800	–	Municipal Waste Landfill and Construction/Demolition Waste Landfill
☐	$700	–	Transfer Facility
☐	$1,500	–	Incinerator or Resource Recovery Facility
☐	$700	–	Other Municipal Waste Processing Facility, including Composting Facility
☐	$6,700	–	Demonstration Facility

iii.	☐	$300	–	Permit Reissuance
iv.	☐	$300	–	Permit Renewal
v.	☒	$300	–	Minor Permit Modification

SECTION F. APPLICATION FEE (Continued)

A. Residual Facilities

i. Application for new permit, or repermitting. (ref. 287.141)

- ☐ $25,900 – Residual Waste Landfill
- ☐ $8,500 – Residual Waste Disposal Impoundment
- ☐ $5,200 – Residual Waste Transfer Facility
- ☐ $8,300 – Residual Waste Noncaptive Incinerator
- ☐ $2,200 – Residual Waste Captive Incinerator
- ☐ $5,200 – Other Waste Processing Facility, including Composting Facility
- ☐ $8,500 – Residual Waste Demonstration Facility
- ☐ $5,100 – Residual Waste Land Reclamation
- ☐ $5,100 – Residual Waste Agricultural Utilization

ii. Application for a major permit modification.

- ☐ $600 – Addition of types of waste not approved in the permit
- ☐ $7,800 – Residual Waste Landfill
- ☐ $600 – Residual Waste Agricultural Utilization
- ☐ $1,900 – Residual Waste Land Reclamation
- ☐ $1,500 – Residual Waste Incinerator Facility
- ☐ $700 – Residual Waste Transfer or Other Processing Facility, including Composting Facility
- ☐ $5,800 – Residual Waste Demonstration Facility
- ☐ $4,600 – Residual Waste Disposal Impoundment

iii. ☐ $400 – Residual Waste Permit Reissuance

iv. ☐ $300 – Residual Waste Permit Renewal

v. ☐ $300 – Residual Waste Minor Permit Modification

SECTION G. PUBLIC NOTICE - SECTION 271.141 (MUNICIPAL), 287.151 (RESIDUAL)

For a new permit, major permit modification, permit renewal, permit reissuance, and submission of a closure plan, attach the proof of public notice for each of the following:

1. Newspaper - Attach the name of the newspaper, circulation location, copies of the notice, and dates of publication.
2. Municipality - Attach copies of the written notices sent to the host township and host county, and copies of the returned certified mail signature cards.
3. Contiguous Landowners - Attach copies of the written notice(s) sent to each landowner and copies of the returned certified mail signature cards.

SECTION H. MUNICIPAL WASTE MANAGEMENT PLANS AND PERMITS

For a new permit, major permit modification, permit renewal, or permit reissuance of a municipal waste landfill or resource recovery facility permit, is the proposed facility located in a county that has an approved municipal waste management plan that complies with Section 513 of Act 101? Yes ☐ No ☐

If the above answer is "yes", the applicant must complete form 46 - Relationship between Municipal Waste Management Plans and Permits.

NOTE: For each permit application, please submit the original (mark as such) and additional copies as requested by the Department's regional office.

2540-PM-LRWM0358 Rev. 5/2001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

Date Prepared/Revised December 8, 2005
DEP USE ONLY
Date Received

FORM B
PROFESSIONAL CERTIFICATION

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form B, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 271.122, 287.122

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Soild Waste Management Authority (LCSWMA)

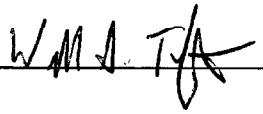
Site Name: LCSWMA Frey Farm Landfill

Facility ID (as issued by DEP): Permit 101389; DEP Site ID 450744 DEP Facility ID 477357

SECTION B. REGISTERED PROFESSIONAL ENGINEER

I, William S. Tafuto
(Engineer's Name – Print or Type)

being a Registered Professional Engineer in accordance with the Pennsylvania Professional Engineer's Registration Law, do hereby certify to the best of my knowledge, information, and belief that the information contained in the accompanying application, plans, specifications, and reports has been prepared in accordance with accepted practice of engineering, are true and correct, and are in accordance with the Rules and Regulations of the Department of Environmental Protection. I also certify that those individuals indicated in the following paragraphs prepared this application under my supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature  Date December 8, 2005

License Number 043878-E Expiration Date September 30, 2007

Address ARM Group Inc.
1129 West Governor Road
Hershey, PA 17033-0797

Telephone No. (717) 533-8600

SECTION C. SOIL SCIENTIST PROVIDING SOILS INFORMATION

I, NOT APPLICABLE do hereby certify
(Soil Scientists Name – Print or Type)

to the best of my knowledge, information, and belief that the soils information contained in this application has been prepared in accordance with accepted practices of soil science and in accordance with the Rules and Regulations of the Department of Environmental Protection. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature _____ Date _____

Address _____

_____

_____

Telephone No. (___) _____

SECTION D. REGISTERED PROFESSIONAL GEOLOGIST

I, NOT APPLICABLE being a
(Hydrogeologist's Name – Print or Type)

Registered Professional Geologist in accordance with the Pennsylvania Professional Geologists Registration Law, do hereby certify to the best of my knowledge, information, and belief that the hydrogeology information contained in this application has been prepared in accordance with the accepted practices of hydrogeology and in accordance with the Rules and Regulations of the Department of Environmental Protection. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Signature _____ Date _____

License Number _____ Expiration Date _____

Address _____ Professional Seal

_____

_____

Telephone No. (___) _____

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

Date Prepared/Revised December 8, 2005
DEP USE ONLY
Date Received

FORM B1
APPLICATION FORM CERTIFICATION

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form B1, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Soild Waste Management Authority (LCSWMA)

Site Name: LCSWMA Frey Farm Landfill

Facility ID (as issued by DEP): Permit 101389; DEP Site ID 450744 DEP Facility ID 477357

SECTION B. CERTIFICATION

Professional Engineer

I, William S. Tafuto
(Engineer's Name -Print or Type)

being a Registered Professional Engineer in accordance with the Pennsylvania Professional Engineer's Registration Law, do hereby certify that the forms used in the accompanying application have been reproduced under my supervision and have the same exact content and the same format as the forms prepared by the Department. I am aware that there are significant penalties for altering the content of the Department's forms, including the possibility of fines and imprisonment.

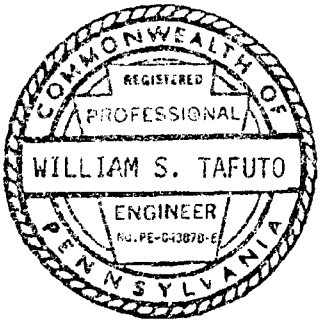
Signature _____ Date December 8, 2005

License Number 043878-E Expiration Date September 30, 2007

Address ARM Group Inc.
1129 West Governor Road
Hershey, PA 17033-0797

Professional Seal

Telephone No. (717) 533-8600



2540-PM-LRWM0351 Rev. 4/2000

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF LAND RECYCLING AND WASTE MANAGEMENT

DEP USE ONLY
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FORM C1
COMPLIANCE HISTORY CERTIFICATION

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided herein. Improperly completed forms may be rejected by the Department, may be considered to be violations of the Department's Rules and Regulations, and may result in assessment of fines and penalties.

Instructions:

If your last Form HW-C does not require to be amended, execute the certification Form C1 Compliance History Certification (2540-PM-LRWM0351 Rev. 8/99) indicating that the Form HW-C, on file is complete and current. Be sure the form is properly signed, sealed, and notarized. Please note that the date on the certification Form C1 must be the date the HW-C, on file, was notarized.

If the applicant, permittee, or licensee ("application") is a corporation, this form must be signed by two corporate officers (a president or vice-president and a secretary or treasurer) authorized to execute the form or by one corporate officer and one corporate employee in Pennsylvania with sufficient authority over the solid waste management activity being licensed or permitted to execute this form on behalf of the corporation. **ATTACH A COPY OF THE ARTICLES OF INCORPORATION OF THE APPLICANT.**

SECTION A. APPLICANT IDENTIFIER

Facility Name: LCSWMA Frey Farm Landfill

SECTION B. CERTIFICATION

This is to certify that no changes, additions, or other supplemental data are required to amend the most recent form HW-C, Compliance History dated June 21, 2005 and submitted to the Pennsylvania Department of Environmental Protection by June 29, 2005, which amendments would update and make current and complete all the information provided therein. The Compliance History now in the Department's possession reflects the Company's current status of officers, corporate structure as applicable, and compliance with environmental laws and regulations, and there are no instances of unlawful conduct as defined by the Pennsylvania Solid Waste Management Act of July 7, 1980 (35 P.S. §6018.610) that have not been corrected to the satisfaction of the Department.

(Signature)

Name: James D. Warner
(Print or Type Name)

Title: Executive Director
(Print or Type Title)

Social Security No.: ***-**-6521

Sworn to and subscribed before me this
23rd day of December
2005.

Catherine A. Dougherty
Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Catherine A. Dougherty, Notary Public
Manheim Twp., Lancaster County
My Commission Expires June 8, 2008
Member, Pennsylvania Association Of Notaries

SECTION B. (Continued)

Brooks K Norris
(Signature)

Name: Brooks K. Norris
(Print or Type Name)

Title: Senior Manager, Technical Services
(Print or Type Title)

Social Security No.: ***-**-6316

Sworn to and subscribed before me this 23rd day of December 2005.

Catherine A. Dougherty
Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Catherine A. Dougherty, Notary Public
Manheim Twp., Lancaster County
My Commission Expires June 8, 2008
Member, Pennsylvania Association Of Notaries

Attach copy of Articles of Incorporation