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ENV-ES-TPP-003

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Los Alamos National Laboratory

Environment, Safety, Health Directorate

ENV-ES

Technical Project Plan

for the

Neighborhood Environmental Watch Network (NEWNET)

Signatures

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REVISION HISTORY

Document Number and Revision <i>[Include revision number, beginning with Revision 0]</i>	Effective Date <i>[Document Control Coordinator inserts effective date]</i>	Description of Changes <i>[List specific changes made since the previous revision]</i>
0	5/25/01	New document, issued as ESH-17-NEWNET.
1	11/3/04	Purpose revised to reflect educational driver.
0	5/2/07	Prioritize work and stations, issued as EP ERSS-QAPP-003, R0
ENV-ES-TPP-003, R0	10/22/2015	Minor Revision, updated Group, Document Type, and Attachment 1 – NEWNET Station Location This supersedes EP ERSS-QAPP-003.

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1.0 QUALITY PROGRAM

1.1 Organization

1.1.1 What is NEWNET

The Neighborhood Environmental Watch Network (NEWNET) is a network of ambient monitoring stations equipped with gamma-radiation measurement and meteorological sensors. Each station is connected to a database. Data are available via an Internet Web site (<http://newnet.lanl.gov>).

1.1.2 What is Monitored?

The NEWNET system provides real-time data on radiation levels at selected locations near Los Alamos National Laboratory (LANL). NEWNET stations also monitor relevant environmental conditions such as the ambient temperature

1.1.3 Purpose

This quality assurance (QA) project plan describes the policies and requirements that ensure NEWNET data are collected, analyzed, and reported in a consistent, agreed-upon manner.

The NEWNET project serves three functions.

1. It provides outreach to provide gamma-radiation measurements, meteorological data, and tutorial information to the environment departments of interested Pueblos near LANL. It is operated to monitor selected locations near LANL and provides training in the tools and techniques used to fulfill the requirements for environmental monitoring in U.S. Department of Energy (DOE) Order 458.1 and the guidance of DOE-HDBK-1216-2015.
2. It provides independent monitoring of radioactive gases released from Los Alamos Neutron Science Center (LANSCE), at the request of the radioactive air emissions monitoring program.
3. It supplements the LANL meteorology system by providing additional wind-direction data in selected canyons.

The priority for maintaining or discontinuing each station is listed in Appendix A, *NEWNET Station Locations*. Note that many stations will be discontinued because of their low priority according to station location criteria (see section on *Station Design*) or they do not support the project purposes above.

1.1.4 Project Organization

The NEWNET project is managed within the Environmental Protection Division (ENV) of the Environment, Safety, and Health Directorate (ADESH) by a task leader who reports to the ENV-ES (Environmental Services) group leader. An instrument technician and a database support person are occasionally requested to provide support as needed.

2.0 PERSONAL DEVELOPMENT

2.1 Personnel Training and Qualification

2.1.1 Required Personnel Education

Documentation of education qualification is maintained by the LANL personnel division. The NEWNET project requires part-time personnel with the following skills:

- an electronics or instrumentation technician to perform maintenance
- a health physicist to evaluate measurements and instrumentation
- a database programmer to maintain the database and the website

2.1.2 Training of Personnel

All personnel performing NEWNET-related work are required to train to this plan and any applicable procedures governing this work before performing work for the project. Training will be documented in accordance with applicable ADESH quality program training requirements.

3.0 QUALITY IMPROVEMENT

3.1 Improving Quality

3.1.1 Performance Reports

The task leader provides periodic updates, either verbal or written, to management. These updates are used to keep group management apprised of the focus of the NEWNET activities and to identify any shortcomings that may be identified.

3.1.2 Deficiencies and Corrective Action

Corrective actions for the project will be initiated, tracked, corrected, and documented according to LANL requirements.

4.0 DOCUMENTS AND RECORDS

4.1 Project Records

4.1.1 Records Resulting from the NEWNET Project

The number, type, and detail of all records to be kept will provide sufficient information to allow an individual with equivalent education and training to verify or reconstruct the methods used to collect and verify the data collected.

4.1.2 Electronic Records

The project maintains electronic databases of the data collected at each NEWNET station.

5.0 WORK PROCESSES

5.1 Planning and Performing Work

5.1.1 Policy

Work that contributes to achieving the quality specifications of NEWNET project deliverables will be planned and documented in this plan and appropriate implementing procedures.

5.2 Quality Objectives and Criteria for Measurement Data

5.2.1 What are Data Quality Objectives?

Data-quality objectives (DQOs) are statements of the uncertainty level a decision-maker is willing to accept in results derived from environmental data. DQOs must strike a balance between time, money, and data quality.

The DQOs are then used to develop a scientific and resource-effective data collection design. NEWNET system operations presented in this document reflect these requirements.

Spatial Boundary of the Study

The spatial boundaries of interest for the NEWNET system include the region surrounding LANL and the adjacent communities.

Practical Constraints on Data Collection

- Funding levels
- Equipment capabilities
- Damage to stations by animals, people, or weather

5.2.2 Measurements to Be Made

Measurements are provided at some stations of the following parameters:

- Gamma-radiation levels
- temperature
- barometric pressure
- relative humidity
- wind speed and direction

5.2.3 Comparability

Comparability is a measure of the confidence with which one data set can be compared with another. Comparability of the NEWNET data is ensured because the same equipment, processes, and analytical methods are used consistently at several station locations.

5.2.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount expected to be obtained under correct, normal conditions. Data may be lost because of equipment malfunction, power failure, station destruction, human error, or unacceptable data uncertainty.

5.2.5 Precision and Accuracy

The NEWNET system is operated so that the measurements have the following precision and accuracy:

- Gamma radiation: $\pm 5\%$ precision, $\pm 60\%$ accuracy from 0.06 to 0.3 MeV and $\pm 20\%$ from 0.3 to 8 MeV.
- Temperature: ± 5 degrees Celsius
- Atmospheric Pressure: 1%
- Wind Speed: ± 1.0 mph
- Wind direction: ± 10 degrees
- Relative Humidity: $\pm 10\%$ at 25 degrees Celsius

5.3 Station Design

5.3.1 Sampling System Design

The primary design objective for the radiation monitoring system is to provide measurements of gamma-radiation levels. To achieve the objective, the system design is based on standard instrumentation for real-time gamma radiation.

All NEWNET stations are operated continuously. The stations contain a high-pressure ion chamber (HPIC) to measure gamma radiation and meteorology instruments to measure selected meteorological parameters.

5.3.2 Station Location

Locations for the NEWNET stations are listed in Attachment 1, *NEWNET Station Locations*. Locations are evaluated according to the following criteria:

- importance to the communities adjacent to LANL;
- ability to measure LANSCE emissions; and
- ability to measure canyon winds.

5.3.3 Sampling Frequencies

Data loggers accumulate data at 1-min intervals that are then averaged for 15 min.

5.3.4 Measurement Parameters

The following parameters may be measured, all averaged every 15 min:

- gamma radiation
- temperature
- pressure
- humidity
- wind speed and direction

5.3.4 Station Siting Evaluation Criteria

The specific location of the station should be selected after considering the following criteria.

1. **Distance to obstructions greater than two times the height of the obstruction:** If possible, the distance between the station and the obstruction should be at least two times the height of the obstruction. This criterion contributes to unrestricted air flow for meteorological measurements. Stations that do not meet this criterion do not measure wind speed and direction.
2. **Good topographic location:** The area site should be as level and flat as possible. This will provide a stable foundation for the station.
3. **Obstructions:** Obstructions between the source and the station are minimized.
4. **Sources of radiation:** The station is isolated from anomalous sources of radiation.
5. **Grounding:** Consider electrical grounding and lightning protection, especially if the station includes a 10-m-high pole; stations that do not include a 10-m-high pole and that are only powered by solar collectors and 12-V batteries do not have to be grounded.

These criteria are important to ensure consistency and adequacy among station locations. Good scientific judgment will be used to select the optimal location based on site-specific criteria and on specific measurement needs. However, not all sites can meet all these criteria. In some cases, a station may be sited close to a building. In this case, it may not be appropriate to include meteorological instrumentation on the station.

5.3.5 NEWNET Station Equipment

A NEWNET station typically consists of an HPIC, temperature sensor, pressure sensor, and humidity sensor and may include wind speed and direction sensors. Equipment have the following specifications:

Parameter	Instrumentation	Specifications
Gamma Radiation	Gamma radiation is measured by a Reuter-Stokes High Pressure Ionization Chamber, model RSS-100 (RSS-1013 system includes the electronics, display and Model 100 PIC); Model 120 on portables. This instrument has an ionization chamber filled with argon to a pressure of 25 atmospheres (about 450 psi). Reuter-Stokes is a subsidiary of General Electric.	<p>Range: 0–00 mR</p> <p>Precision: $\pm 5\%$</p> <p>Accuracy: $\pm 60\%$ at 0.06 to 0.3 MeV, $\pm 20\%$ at 0.3 to 8 MeV</p> <p>Ionization chamber volume: 7.9 L</p> <p>Energy response: 0.07 to 8 MeV</p>
Temperature	Temperature may be measured by a Met One model 064-2, or equivalent, temperature sensor mounted in a Model 075 or 5980 or similar solar shield to reflect solar radiation.	Range: -50 to $+50^\circ$ C
Humidity	Humidity is measured with Rotronic Hygromer™, model 200 series, or an equivalent sensor.	<p>Humidity Range: 0–100% RH</p> <p>Precision at 68–77° F: $\pm 10\%$</p> <p>Temperature limits at sensor: -5 to 212° F (-20 to 100° C)</p>
Barometric Pressure	<p>Barometric pressure is measured by a Met One Barometric Pressure Sensor Model 090D. This is available in a number of calibration ranges, determined by the elevation of the station.</p> <p>Barometric pressure decreases by about 1-in.Hg per 1000 ft of elevation. The value is converted to millibars of barometric pressure, and is reported unadjusted for elevation. (Values normally reported in weather reports have been adjusted to pressure at sea level.)</p>	<p>Calibration Range (standard model): 26–32 in. Hg at 0–1500 ft (elevation)</p> <p>Accuracy: $\pm 1\%$</p> <p>Operating temperature range: -22 to 50° C</p>

Parameter	Instrumentation	Specifications
Wind	Wind data is measured by Met One Model 6266/037, or equivalent, System, consisting of a wind speed sensor (anemometer cup) and wind direction sensor (vane).	Range:0–100 mph; 0–360 degrees Threshold: 1.0 mph, speed and direction indicators Accuracy:±1.0 mph; ±10 degrees Distance Constant: <5 ft (speed);1.5 ft (direction) Damping Ratio: 0.25 (direction) Temperature Range: –50 to +85° (speed); –50 to 70° C (direction)
HPIC battery	300-V lithium pack	55-mAH lithium
Data logger	Campbell Scientific CR10X	

5.4 Instrument Calibration

5.4.1 Meteorology Instrument Calibration

The instruments for measuring atmospheric relative humidity, barometric pressure, wind speed and direction, and temperature are calibrated by their manufacturer.

5.4.2 Data Management

5.4.1 Data Transfer

The data taken by the NEWNET stations are currently stored in a database on the newnet.lanl.gov computer.

5.4.2 Data Review

No regular data review is performed. Data may be reviewed and comments added only as extra time is available by the task leader.

5.4.3 Security

The NEWNET computers are on the LANL “green” (unclassified) network and, therefore, must be protected from unauthorized access or “hacking.” All NEWNET computers on the green network will be protected by a security program to prevent unauthorized access.

5.4.4 Handling of Outliers

Outliers remain in the database; they are not removed from the database or web presentation.

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6.0 DESIGN

6.1 Identify Design Requirements

The NEWNET project requires no hardware design activity. Because data are not used for compliance or for regulatory purposes, no software quality or configuration requirements are necessary, although these requirements will be followed as practicable.

7.0 PROCUREMENT

7.1 Procurement of Items and Services

Procurement of items and services used in the NEWNET project will follow the LANL procurement process. Items and services required for the project are commercial-grade in nature, and no special procurement requirements or needs are necessary.

8.0 INSPECTION AND ACCEPTANCE TESTING

8.1 Policy

Any materials or services will be inspected and/or tested they are accepted for use in the NEWNET Project. Most supplies used during performance of NEWNET activities are commercial-grade in nature and require no special acceptance practices or procedures.

9.0 REFERENCES

- DOE Order 458.1, "Radiation Protection of the Public and the Environment," changed February 11, 2011
- DOE-HDBK-1216-2015, "Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance," March 2015

10.0 ATTACHMENTS OR APPENDICES

Attachment 1: *NEWNET Station Locations*

ATTACHMENT 1 – NEWNET STATION LOCATIONS
Page 1 of 2

The following stations are in place on the date of this plan. Each is discussed in more detail below the table.

Name	Location	Priority ¹
Santa Clara	West Puye Cliffs Road, Arts and Crafts area, ~200 m N of roadway	C
San Ildefonso	San Ildefonso back entrance, 100 m south of transfer station	C
East Gate	~500 ft ESE of East Gate guard tower, in hut on canyon rim	A
Mortandad Canyon	Next to meteorological station south of LANSCE	C
Buey East	~1 mi west up Cañada del Buey from Met Tower	B
KAPPA site	TA-18, east ridge	C
TA-73-12	675 ft W of East Gate Guard Tower, in hut near canyon rim	A
LA High School	Front lawn, near Diamond Drive	B
TA-54	Near the White Rock Met Tower	B
Espanola	NNMC, 100 m west of gymnasium.	C
S-Site	TA-16 entrance	B

¹ Priority A: Top priority; keep these stations running if possible.
Priority B: Allow these stations to run but shut them down if they become unreliable.
Priority C: Currently not operational; do not revive. Remove these stations.

Discussion of NEWNET Stations

Santa Clara Pueblo

The Santa Clara Pueblo NEWNET station is in Santa Clara Canyon, with a view of Los Alamos. LANSCE is 12 km to the southwest.

San Ildefonso Pueblo

The San Ildefonso Pueblo station is about 1 km southwest of the Pueblo’s main plaza. LANSCE is about 10 km west-southwest of the NEWNET station.

East Gate

The East Gate station is 0.8 km north of LANSCE and is important for monitoring LANSCE emissions, which are easily detected and quantified at this location. The NEWNET measurements are especially important in understanding unexpected emissions (e.g., in 2005).

Mortandad Canyon

The Mortandad Canyon station is 1 km southeast of LANSCE and is shut down.

Buey East

The Cañada del Buey station is 200 m north of Material Disposal Area (MDA) G and 20 m south of the San Ildefonso Sacred Area. It is important to San Ildefonso Pueblo because it measures direct-penetrating radiation (DPR) from MDA G. It is also important to provide canyon wind data in Cañada del Buey because canyon winds can channel airborne contamination from MDA G toward White Rock.

Kappa Site

For many years, the Kappa Site station monitored Technical Area 18 (TA-18). It is now shut down.

TA-73-12

The TA-73-12 station is 0.8 km north of LANSCE and is important for monitoring LANSCE emissions.

Los Alamos High School

The high school site is 6 km west-northwest of LANSCE.

TA-54

The TA-54 station is about 1 km ESE of MDA G, 5 km southeast of LANSCE, and lies between these LANL sites and White Rock. Thus, it provides assurance that the LANSCE emissions do not reach White Rock.

Española

The Española station is at the Northern New Mexico College, which hosts the Certificate in Environmental Monitoring, and from time to time faculty members or administrators express some interest in the station. It is now shut down.

S-Site

On one occasion, the S-Site station detected a radioactive sealed source being used nearby. However, there is no good scientific reason for a station at this location and no effort should be put into maintaining the station. When convenient, it may be shut down and its parts may be used as spares.



Environment, Safety and Health

Electronic Public Reading Room - Posting of Controlled Procedures

Operations Integration Office Management Approval:

Print Name	Signature	Date
Ellena Martinez	<i>Ellena Martinez</i>	3/4/16

Derivative Classifier:

OUO
 UCNI
 Unclassified
 Classified

Print Name	Signature	Date
Larry W. Maassen	<i>Larry Maassen</i>	3/4/16

List of Controlled Documents:

Procedure No.	Title/Description
Air Monitoring (ENV)	
ENV-ES-TPP-003	Technical Project Plan for the Neighborhood Environmental Watch Network (NEWNET)
ENV-ES-TPP-007	Technical Project Plan for the Direct Penetrating Radiation Monitoring Network (DPRNET)
Data Validation (ADESH)	
OIO-TP-5161	Routine Validation of Volatile Organic Compound Analytical Data
OIO-TP-5162	Routine Validation of Semivolatile Organic Compound Analytical Data
OIO-TP-5163	Routine Validation of Organochlorine Pesticide and Polychlorinated Biphenyl Analytical Data
OIO-TP-5165	Routine Validation of Metals Analytical Data
General Field Work	
OIO-TP-222	Shipping/Receiving of Environmental Samples by the Sample Management Office (SMO)
OIO-QP-219	Sample Control and Field Documentation
Soil, Foodstuffs, and Biota Sampling (ENV)	
ENV-ES-TPP-002	Technical Project Plan for Biota Dose Assessment
ENV-ES-TP-003	Collection of Soil and Vegetation Samples for the Environmental Surveillance Program
ENV-ES-TP-004	Produce Sampling
ENV-ES-TP-007	Game Animal Sampling
ENV-ES-TP-006	Sampling Soil and Vegetation at Facility Sites
SOP-5247	Collection of Benthic Macroinvertebrates in the Rio Grande
ENV-ES-TP-008	Collection of Crawfish in the Rio Grande
Well Drilling, Construction, Development, Maintenance, and Abandonment	
ENV-RCRA-QP-010	Land Application of Groundwater