



**U.S. Department of Energy  
Oak Ridge Operations**

**NESHAP Environmental  
Monitoring for On-Site  
Receptors**

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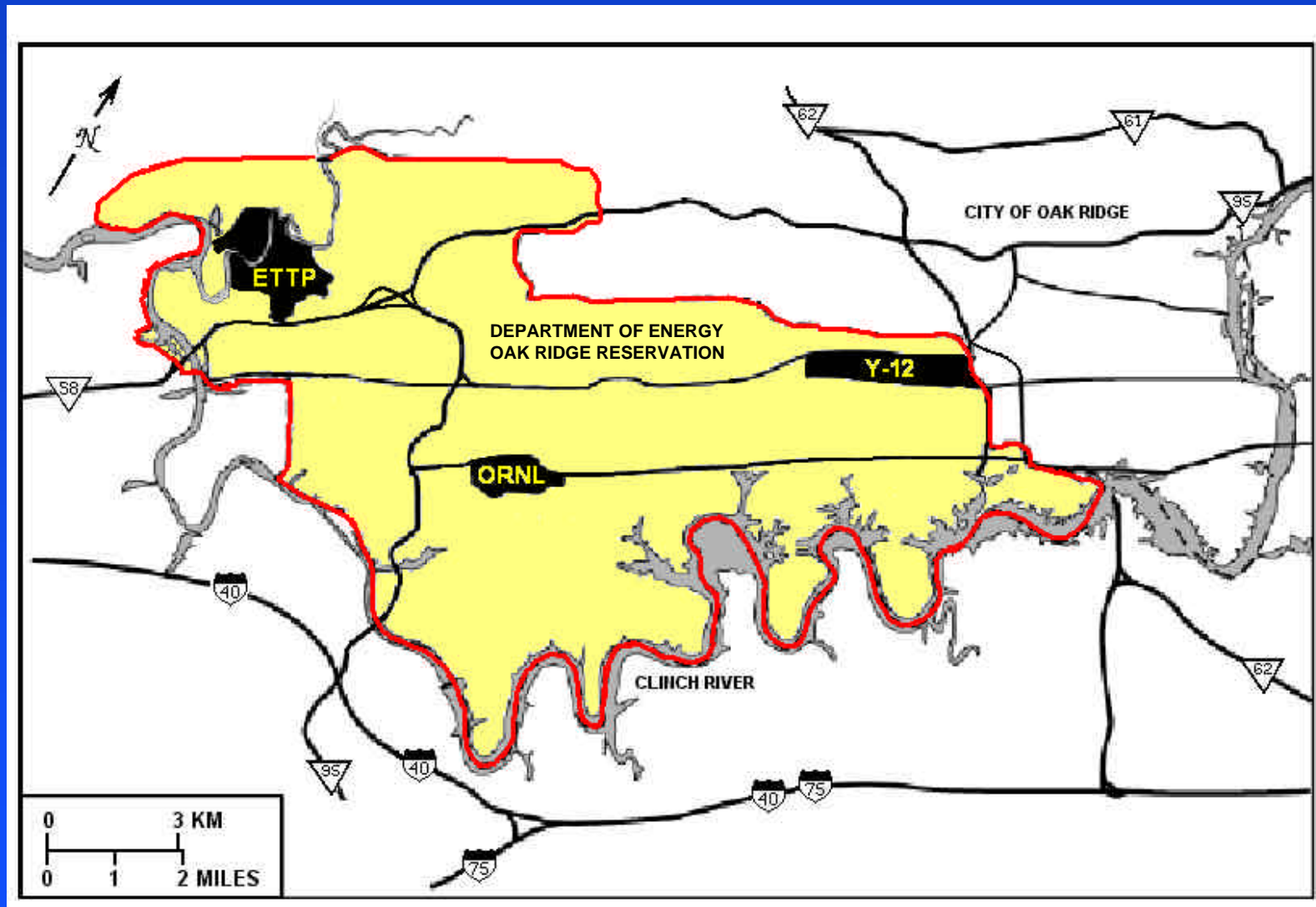
**April 9, 2003**

*\* CDM Federal Services subcontractor to Bechtel Jacobs Company LLC, managing contractor for the U. S. Department of Energy under Contract DE-AC05-98OR22700.*

# Oak Ridge Reservation (ORR)

- 34,424 acres
- Department of Energy (DOE) Facilities
  - East Tennessee Technology Park
  - Y-12 National Security Complex
  - Oak Ridge National Laboratory
- Number of (Major) Prime Contractors: 10 (est.)

# Oak Ridge Reservation



# Re-Use/Reindustrialization

- Industrial Parks
- Facility Leasing
- Commercialization
- Number of On-Site Leased Properties: 60 (est.)



# NESHAP

## National Emission Standards for Hazardous Air Pollutants

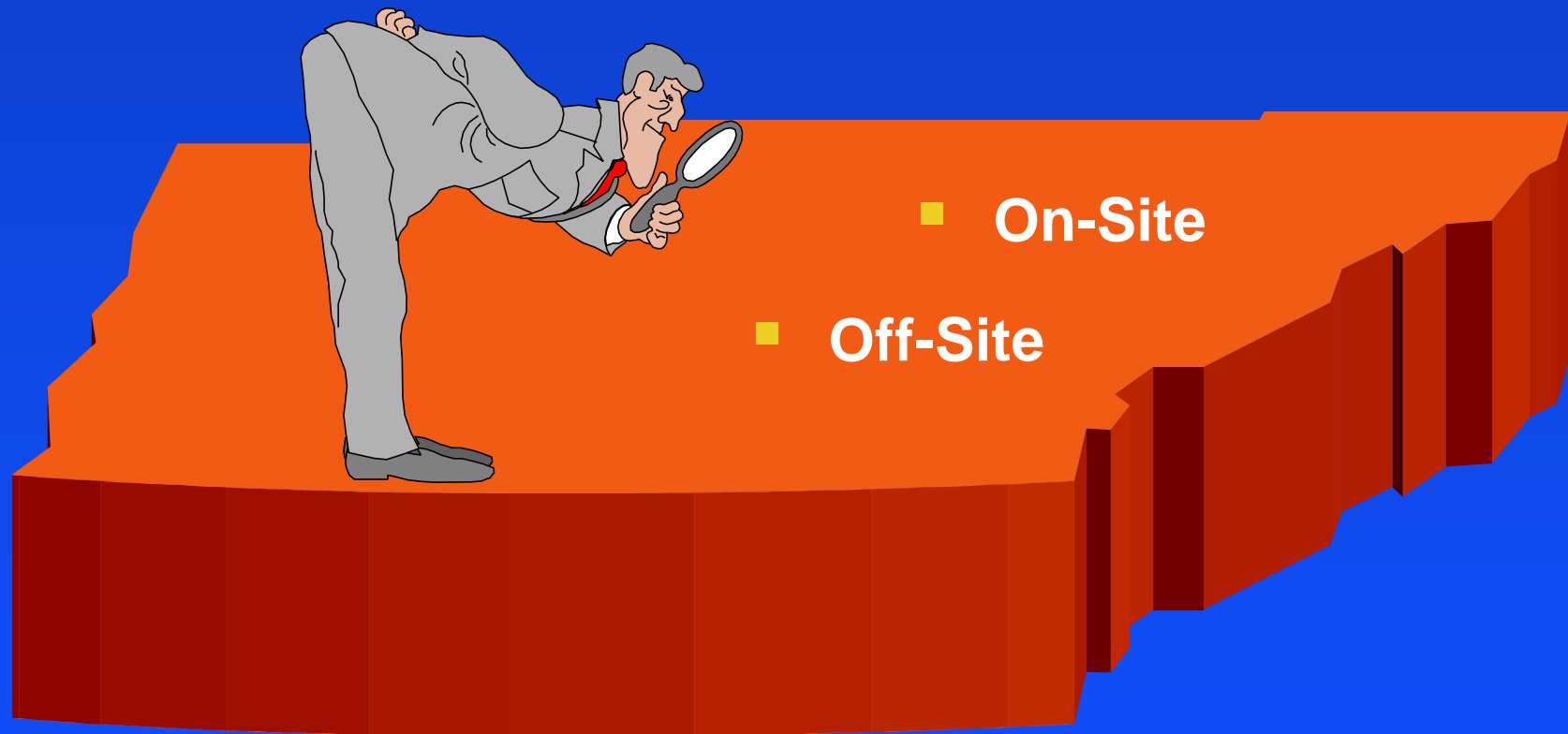
- DOE facilities subject to airborne radionuclide emission regulations specified under NESHAP
- Demonstration of compliance is exclusive of emissions from lessee sources operating under NRC or State radiological license and located on DOE reservations
- DOE facilities must comply with a 10 mrem/year air emission standard

# NESHAP Standard

- “Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any *member of the public* to receive in any year an EDE\* of 10 mrem/year.” [40CFR61.92]
- “Compliance with this standard shall be determined by calculating the highest EDE to any member of the public at any *off-site* point where there is a residence, school, business or office.” [40CFR61.94(a)]

\* *Effective Dose Equivalent*

# Who is a Member of the Public?



# Member of the Public

## (Original understanding)

- A 'member of the public' had been understood to be an individual at any *off-site* point (i.e., outside the ORR boundary) where there was a residence, school, business, or office.  
[Preamble]



# **Member of the Public**

## **(Amended Definition\*)**

- **If a Leased Facility is**
  - **On DOE property**
  - **Lessee employees do not wear DOE security access badges**
  - **There are no DOE security controls, then**
- **Employees of the Lessee Must Be Considered Members of the Public Subject to NESHAP**

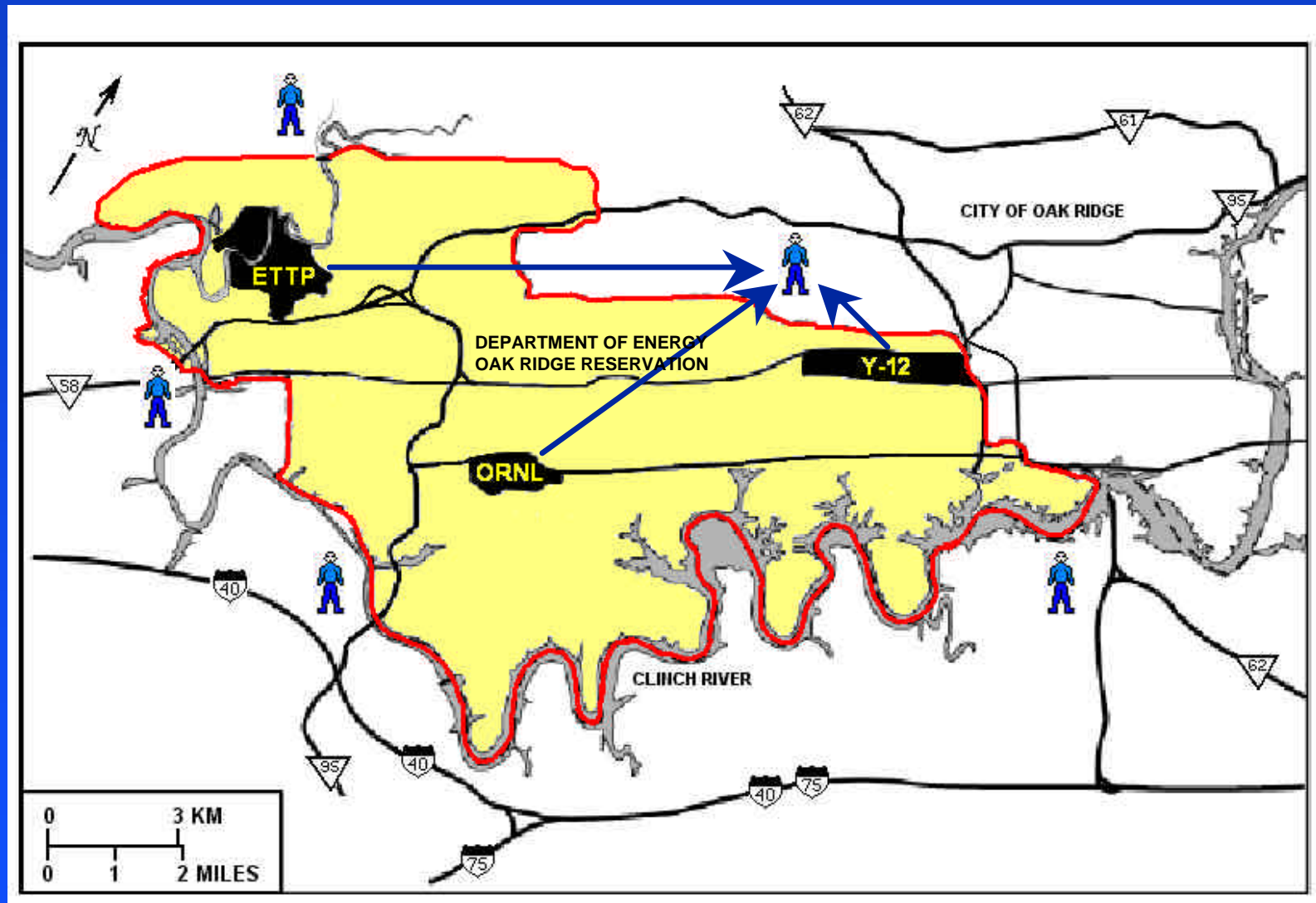
*\* February 2001: Memorandum from EPA HQ to EPA Regional Offices*

# Demonstrating Compliance With Annual Standard

## Original Dose Assessment Methodology

- ORR modeled annual dose to the *off-site* most exposed individual (MEI) that is a member of the public and is based on the summation of airborne radionuclide emissions from all DOE activities.

# Off-Site MEI

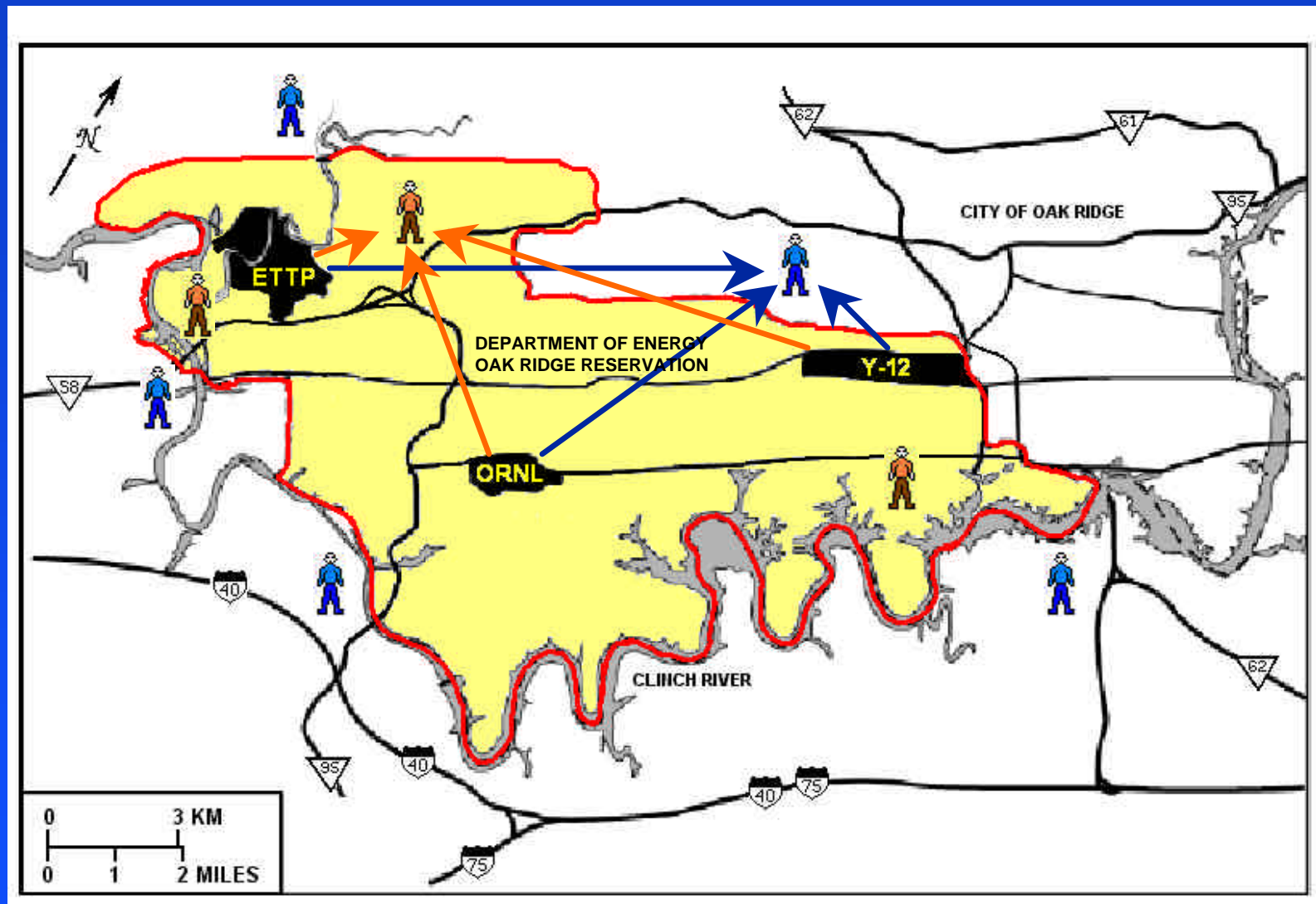


# Demonstrating Compliance With Annual Standard

## Updated Dose Assessment Methodology

- ORR modeled annual dose to the MEI whether located *on-site* or *off-site* that is a member of the public and is based on the summation of airborne radionuclide emissions from all DOE activities.

# On-Site MEI



# NESHAP Compliance Impact of On-Site MEI

- Potential restrictions on DOE operations to assure compliance with dose standard
- Greater DOE construction and operating costs due to potential requirements for continuous in-stack emission sampling and pollution control enhancements
- Additional administrative costs and time delay for obtaining any required air emission source construction or operating permits

# Approval of Alternative Method

## Goals

- Protection of the public *on-site* and *off-site*
- Continued DOE operations that include site remediation
- Reduce unnecessary cost and complexity of compliance
- Assuring a conservative estimate of exposure to the public

# Alternative Methodology

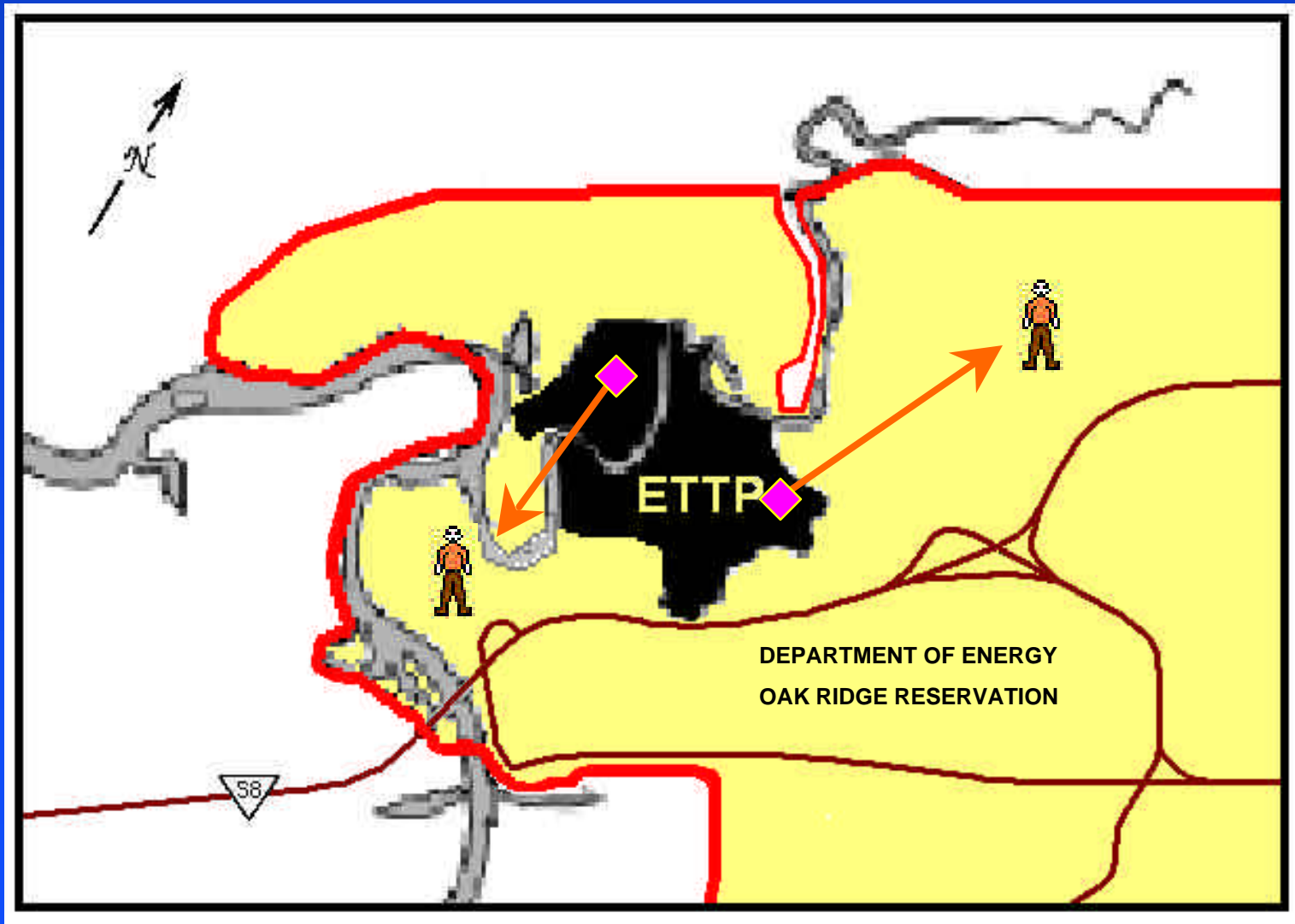
## Environmental Measurements

- For DOE-ORR point sources with a PEDE\* **<0.1 mrem off-site** but **≥0.1 mrem on-site**, ambient air sampling for assessing the actual dose contribution in lieu of continuous stack monitoring was approved by EPA as an alternative method

\* *Potential Effective Dose Equivalent*



# Alternative Methodology



# Alternative Methodology

## Ambient Air Sampling Location

- At or near each *on-site* MEI with a modeled PEDE  $\geq 0.1$  mrem

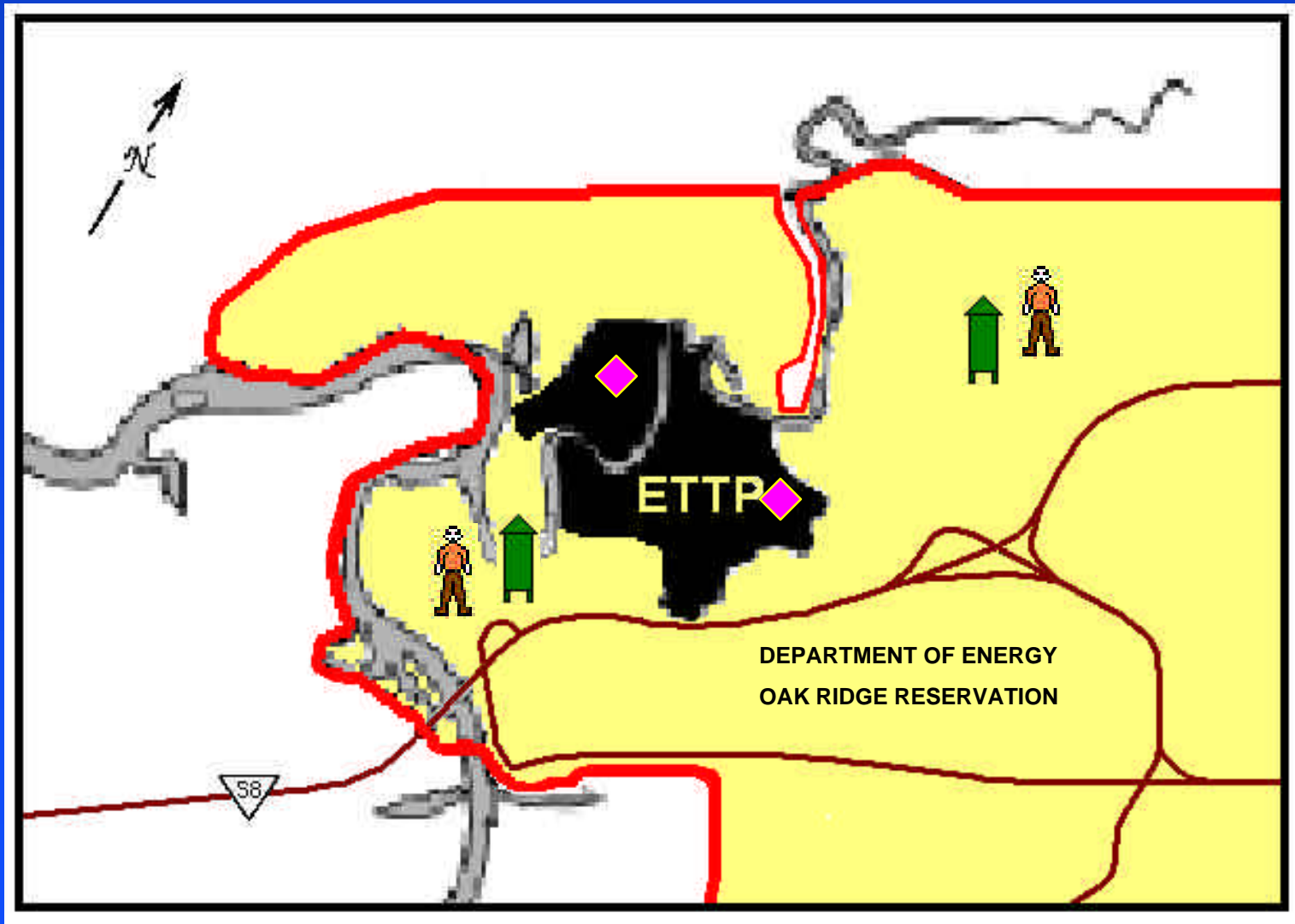
OR

- At the *on-site* location of maximum modeled PEDE  $\geq 0.1$  mrem

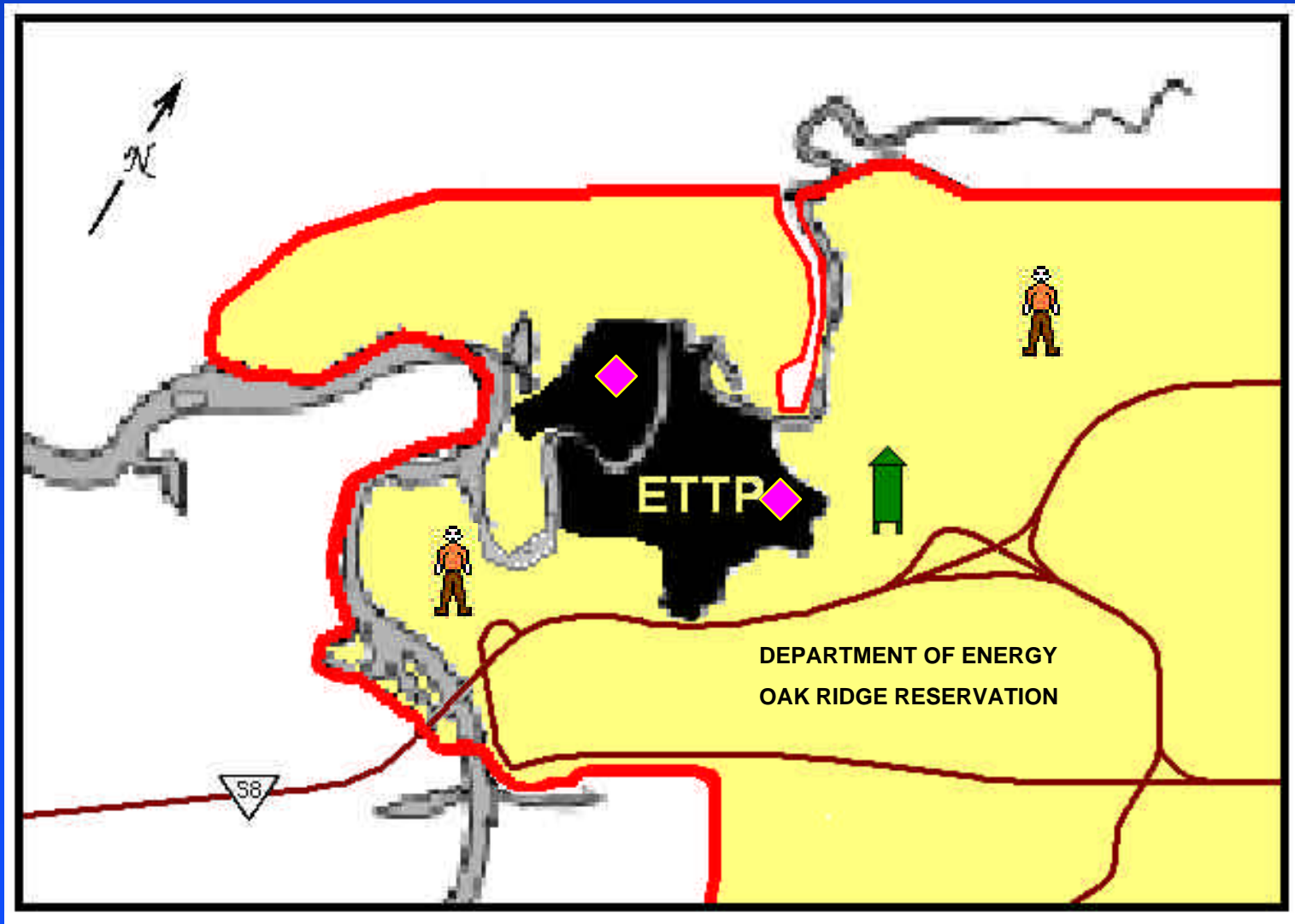
AND

- Each applicable emission point is subject to permitting

# Sampler Location At Each MEI



# Sampler Location At Maximum PEDE



# Alternative Methodology

## Annual EDE Determination

- Model\* an EDE to all receptors both *on-site* and *off-site* for all DOE NESHAP sources
- Model an EDE based on the airborne radionuclide concentration measured at each *on-site* ambient air sampling location
- The location with the maximum modeled EDE is reported as the annual MEI with associated dose

\* *Using an EPA approved dose assessment model*

# Advantages

- **Cost avoidance with using ambient air vs in-stack continuous sampling**
- **Pre-approval for using environmental measurements to demonstrate NESHAP compliance that expedites project schedules**
- **Clarifies definitions of terms used in NESHAP regulations**
- **Assures a conservative determination of the impact of DOE operations on the most exposed member of the public**

# Disadvantages

- Lessee (member of the public) locations must be tracked to assess any potential changes with respect to the EDE from applicable DOE emission sources
- Ambient air sampler locations can change depending lessee locations
- Additional complexity to determine the annual dose to the most exposed member of the public

# Approval of Alternative Methods\*

October 19, 2001

- EPA approves the use of ambient air monitoring for compliance assurance in lieu of continuous stack sampling for minor sources that become major as a result of the presence of on-site receptors
- EPA approves the use of ambient air monitoring to verify compliance with 40 CFR Part 61, Subpart H for fugitive and diffuse emission sources

*\* EPA approvals were incorporated as addendum to the DOE Oak Ridge Reservation Rad NESHAP Compliance Plan*