

Advanced Monitoring Technology Center

by

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Presentation Overview

- ✓ What we do and who we are
- ✓ Overview of the verification process
- ✓ Cost
- ✓ Testing completed



What We Do

Advanced Monitoring Technology Center

Our Technology Focus . . .



Verify the performance of technologies that can be used for generating real-time data or information to support monitoring of human and ecosystem health, assessing real or potential exposure to environmental contaminants and hazards, for monitoring environmental conditions, and characterizing (physically and chemically) contaminated sites

What does Verification Mean?

To establish or prove the truth of the performance of a technology under specific, predetermined criteria or protocols and adequate data quality assurance procedures.

Program Scope

- ✓ Application Areas
 - * Water and air quality monitoring
 - * Public/private contaminated site characterization and monitoring
 - * Brownfields investigations
 - * Industrial hygiene applications
 - * Emergency management/response
 - * Electric and gas utility monitoring
- ✓ Technology Areas
 - * Field sampling and analytical technologies for measuring contaminants in air, water, soil, sediments, and biological materials
 - * In-situ, remote sensing (i.e., geophysics) technologies



Center Goals

- ✓ Accelerate the use and acceptance of innovative environmental monitoring and characterization technologies
- ✓ Rigorous, statistically-defensible testing under actual field conditions
- ✓ Provide reliable, high-quality performance information

AMT Technology Areas

- ✓ Field analytical technologies
 - ★ Field portable X-Ray fluorescence spectrometers
 - ★ Field portable gas chromatograph/mass spectrometers
 - ★ Immunoassay kits
 - ★ Field portable gas chromatographs
 - ★ Fiber optic chemical sensors
 - ★ Continuous emission monitors (NO/NO_x, Mercury)
 - ★ Colorimetric test kits
 - ★ Optical open-path monitors
 - ★ Turbidimeters
 - ★ Ambient fine particle monitors

AMT Technology Areas cont'd

- ✓ Decision support software systems
- ✓ Physical characterization (e.g., geophysical methods, direct-push systems)
- ✓ Soil, soil gas, groundwater, surface water, and sediment sampling methods
- ✓ Multi-parameter water probes
- ✓ Monitoring bioremediation and natural attenuation
- ✓ Portable water quality analyzers



Who We Are

The AMT Center Team

- ✓ Center Management
 - * National Exposure Research Laboratory - Las Vegas
- ✓ ETV Program Management
 - * National Risk Management Research Laboratory - Technology Coordination Staff - Washington, DC
- ✓ Verification Organizations
 - * Sandia National Laboratories
 - * Oak Ridge National Laboratory
 - * Battelle Memorial Institute
- ✓ AMT Partners
 - * Technology Innovation Office
 - * Departments of Energy and Defense
- ✓ AMT Stakeholders
- ✓ Managers from the 5 other ETV Centers
- ✓ Lead in Dust Technical Panel



Verification Organization Responsibilities

- ✓ Stakeholder coordination
- ✓ Contacting vendors
- ✓ Building Verification Test Plans
- ✓ Arranging and conducting the test
- ✓ Data collection, validation, management, and reporting
- ✓ Report preparation and sign Verification Statements
- ✓ Outreach

EPA Responsibilities

- ✓ Stakeholder coordination
- ✓ Vendor contact
- ✓ Contribute to Verification Test Plan design
- ✓ Review data
- ✓ Review and clear reports; sign Verification Statements
- ✓ Outreach - putting the performance information in front of the people who can use it and who need it

Stakeholders' Input

- ✓ Technology needed by regulators and regulated-community
- ✓ Technology user/regulator information needs
- ✓ Verification test design
- ✓ Reporting mechanisms - outreach
- ✓ "Inreach" - sharing performance information with people in their organizations

Lead-in-Dust Technical Panel



- ✓ Distinguished group of 18 of the nation's experts in this field
 - ★ 6 EPA (OPPT, RTP, Region 1)
 - ★ 3 HUD
 - ★ 2 Massachusetts Dept of Public Health
 - ★ 2 NIST
 - ★ 2 Research Triangle Institute
 - ★ 1 NIOSH
 - ★ 1 QuanTech/American Industrial Hygiene Assoc
 - ★ 1 Battelle Memorial Institute



Technical Panel Responsibilities

- ✓ Ensure relevancy to high-priority needs
- ✓ Assist with technical aspects, such as identifying vendors and developing experimental design
- ✓ Review of test plan and verification reports
- ✓ Assist with logistics for the test (sites, samples, laboratories, etc.)

Who Are Our Customers?

- ✓ Regulators
- ✓ Technology users
- ✓ Technology vendors



Regulators Need...

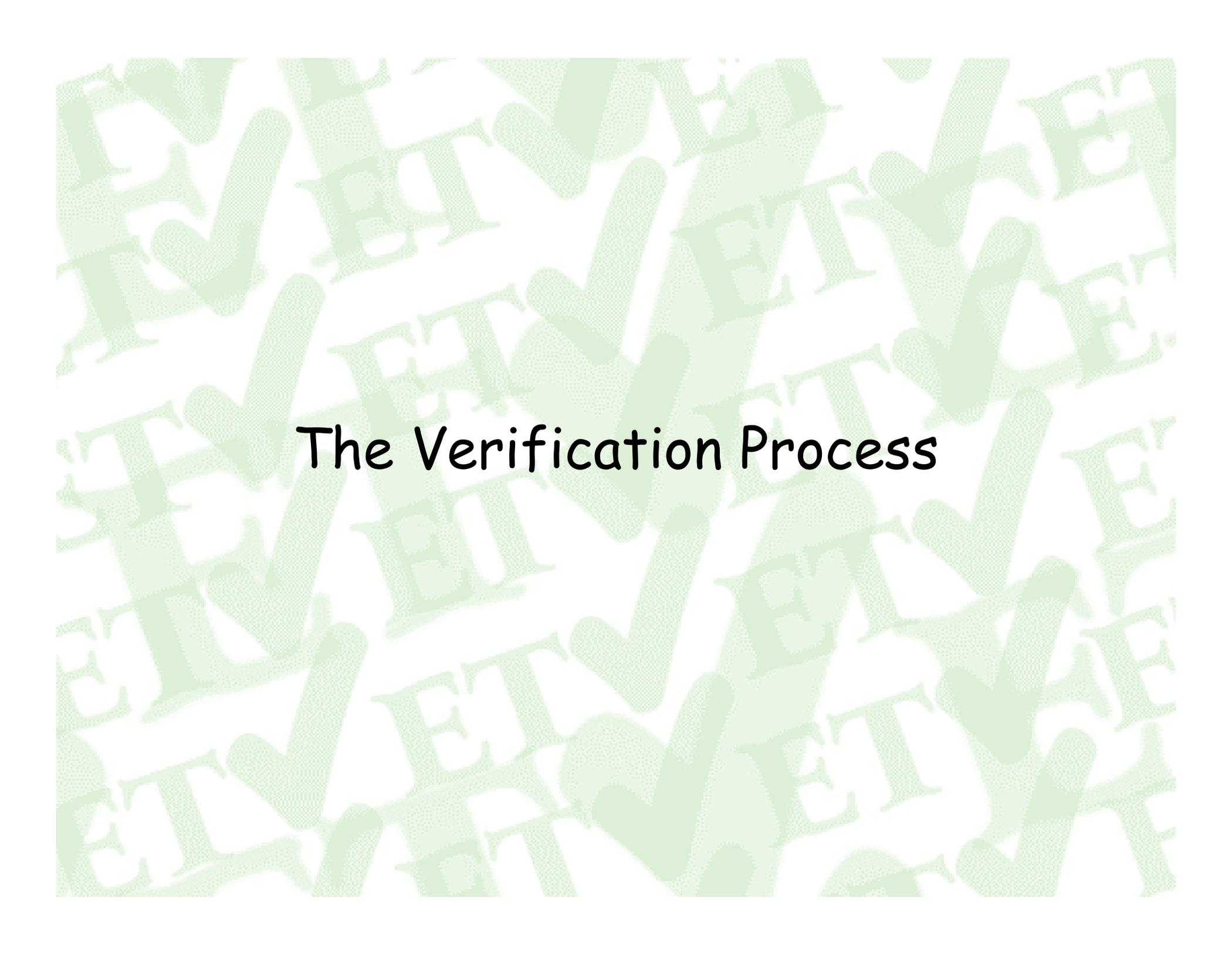
- ✓ Performance information on technologies
- ✓ Somebody they trust telling them that it's okay to try it
- ✓ Some assurance or proof that the technology works as advertised
- ✓ Minimize the risk in trying something "unconventional"

Technology Users Need...

- ✓ Acceptance/recognition by regulators
- ✓ Confidence that the technology really works
- ✓ Low(er) cost solution to solving environmental problems

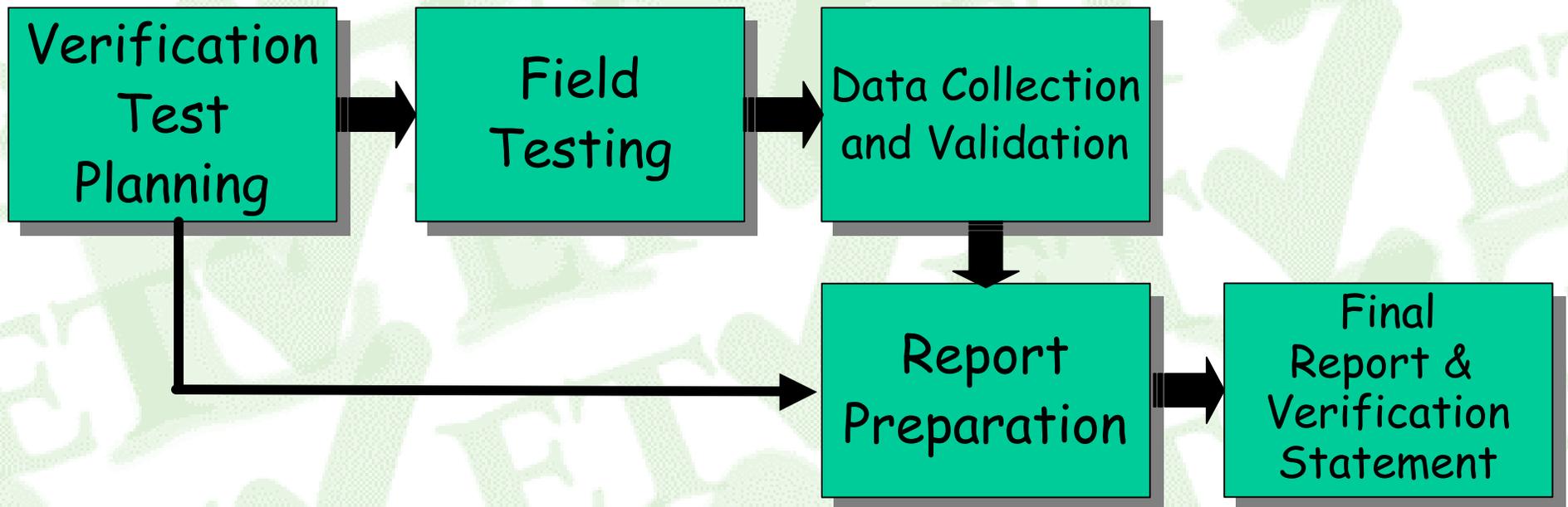
Technology Vendors Need...

- ✓ Acceptance/recognition by regulators
- ✓ Timely information dissemination
- ✓ Low-cost testing/verification
- ✓ Return on investment/value-added



The Verification Process

Technology Verification Process



Verification Test Plan Development

Verification Test Plan

Vendors



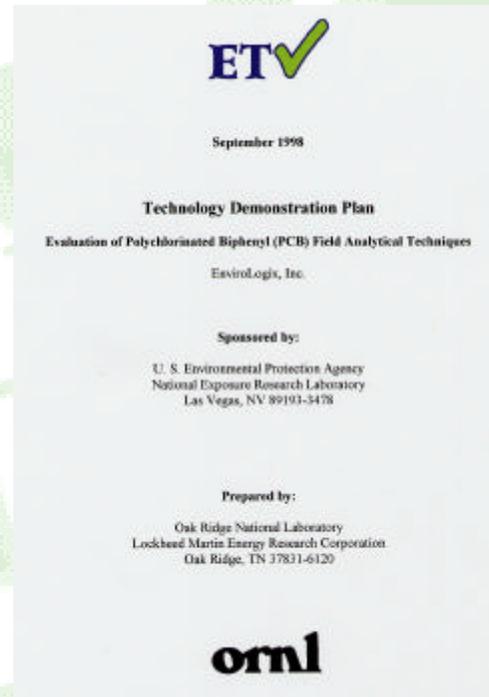
QA Team



Peer Reviewers



Center Team



Stakeholders





Field testing
under real-world
conditions



Validation of Reference Laboratory Data
Specialized Assays Inc.
ETV Explosives Demonstration

Soil Sample Analyses

Criteria	1001-1020	1021-1040	1041-1060	1061-1080	1081-1100	1101-1108
Date received	10/7/99	10/7/99	10/13/99	10/13/99	10/20/99	10/20/99
Date validated	10/20/99	10/20, 21/99	10/21/99	10/21/99	10/21/99	10/21/99
Completeness	✓	✓	✓	✓	✓	✓
COCs	✓	✓	✓	✓	✓	✓
Form1's	✓	✓	✓	✓	✓	✓
Blank	✓	✓	✓	✓	✓	✓
MS/MSD / LCB	TNT out (high) ✓	✓	✓	✓	✓	✓
surrogates	✓	✓	✓	✓	✓	✓
raw data	✓	✓	✓	✓	✓	✓
ICAL/CCAL	✓	✓	✓	✓	✓	✓
prep sheets	✓	✓	✓	✓	✓	✓
Holding Times ^(see 8125) 7 days to extract 40 days to analyze	8/28/99 9/2, 3, 21, 22/99	8/30/99 9/5, 21, 22/99	8/28/99 9/4, 28, 29/99	8/28/99 9/4, 5, 29/99	8/28/99 9/4, 5, 24, 25/99	8/26/99 9/5, 30/99
Correctness of data	calc error recs att	1030 locks ok ✓	1058 mechanics 1060 calc ok ✓	1064, 1064 mechanics ✓	1080 mechanics ✓	1088 prep error
Evaluation of reps	att	att	att	att	att	att
Evaluation of QC	TNT high on msmsd ✓	high bgnd levels in MS 105 ✓	HMX out ✓	HMX out ok ✓	HMX/MSD out ok ✓	msmsd out ok ✓
Evaluation of PE	1004 1005 ✓	1021 ok	1043 1045, 100 1040 ✓	1061 ✓	1082 ✓	1101 ✓

Completed
 att = see attached sheet

ABD 10/20/99 ABD 10/21/99 ABD 10/21/99 ABD 10/21/99 ABD 10/21/99 ABD 10/21/99

2 corrections to data: 1060 RDX → 51 mg/kg
 1064 HMX → 25.6 mg/kg

Validation of raw laboratory data

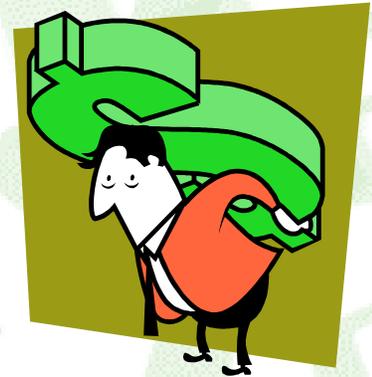
Technology Verification Report Contents

- ✓ **Verification Statement**
- ✓ Technology Description
- ✓ Site and Design Description
- ✓ Reference Laboratory Data Validation
- ✓ Verification Test Results
- ✓ Field Observations and Cost Summary
- ✓ Technology Update



What is the Money Spent on?

- ✓ Initial vendor meeting
- ✓ Selecting a reference laboratory
- ✓ Identifying and qualifying sites
- ✓ **Developing the verification test plan**
- ✓ Pre-verification testing
- ✓ **Field testing - sample preparation**
- ✓ **Data collection, reduction, evaluation, and management**
- ✓ **Report preparation**





Testing Completed

Technology Categories Tested

- ✓ Field analytical technologies
 - * Field portable X-Ray fluorescence analyzers (7)
 - * Field portable gas chromatograph/mass spectrometers (3)
 - * Photoacoustic infrared monitor (1)
 - * Immunoassay kits/Immunosensors (8)
 - * Field portable gas chromatographs (5)
 - * Fiber optic chemical sensors (2)
 - * Ion mobility spectrometer (1)
 - * Ion specific electrode (2)
- ✓ Decision support software systems (6)
- ✓ Soil (4), soil gas (2), groundwater (6), and sediment sampling (2) technologies

Battelle

- ✓ NO/Nox Emission Monitors (6)
- ✓ Turbidimeters (8)
- ✓ Optical Open-Path Monitors (5)
- ✓ Mercury continuous emission monitors (4)
- ✓ Ambient fine particulate monitors (13)
- ✓ On-board vehicle emission monitor (1)