[18]

KEY TECHNICAL ISSUE: IGNEOUS ACTIVITY

NRC/DOE TECHNICAL EXCHANGE ON KEY TECHNICAL ISSUES
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L/m - nv

GENERAL

SUBISSUES AND STATUS OF RESOLUTION

PROBABILITY OF IGNEOUS ACTIVITY - OPEN

CONSEQUENCE OF IGNEOUS ACTIVITY - OPEN

RELATIONSHIP OF SUBISSUES TO NRC ABSTRACTIONS

PROBABILITY SUBISSUE COVERED UNDER SCENARIO ANALYSIS

CONSEQUENCE SUBISSUE IN FOLLOWING INTEGRATED SUBISSUES

- -VOLCANIC DISRUPTION OF WASTE PACKAGE
- -AIRBORNE TRANSPORT OF RADIONUCLIDES
- -MECHANICAL DISRUPTION OF ENGINEERED BARRIERS
- -REDISTRIBUTION OF RADIONUCLIDES IN SOIL
- -LIFESTYLE OF THE CRITICAL GROUP

RELATIONSHIP OF ISSUE TO DOE RSS

AT PRESENT, NOT LISTED AS PRINCIPAL FACTOR

RSS STATES VOLCANISM TO BE CONSIDERED IN FACTORS FOR DISRUPTIVE EVENT SCENARIO

MAY MEETING PLANNED TO DISCUS ISSUE IN DETAIL

BASIS FOR SUBISSUE RESOLUTION AND PATH FORWARD:

PROBABILITY SUBISSUE: OPEN

PROVIDE INFORMATION ON RECURRENCE RATES WHICH CONSIDERS:(AA)[1]

- Definition of the Igneous System
- Known Events in the Area
- Inferred Events in the Area

PROVIDE AN ANALYSIS WHICH DEMONSTRATES THAT DOE MODELS ARE CONSISTENT (OR NOT INCONSISTENT) WITH ACCEPTABLE TECTONIC MODELS AND GEOPHYSICAL DATA (AA)

PROVIDE AN ANALYSIS ADDRESSING THE RELATIONSHIP OF STRAIN AND VOLCANISM WHICH COVERS RECENT STRAIN LITERATURE FOR YMR (E.G., WERNICKIE ET AL., 1998, SAVAGE ET AL., 1999, DIXON ET AL, 2000)(AA)

DEMONSTRATE THAT INFORMATION OBTAINED SINCE PVHA HAS NO SIGNIFICANT EFFECT ON RESULTS, INCLUDING VALIDITY OF BASIC MODELS (AA)

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[1]AA = Need for additional analysis, AD = Need for additional data and analysis, and NA = Aspect of subissue not addressed.

PROBABILITY SUBISSUE (cont):

PROVIDE AN EVALUATION THAT DEMONSTRATES THE ABILITY OF DOE MODELS TO REASONABLY FORECAST THE LOCATION OF NEW VOLCANOES(AA)

PROVIDE AN ANALYSIS WHICH EVALUATES IF MAGMA WOULD LOCALIZE RANDOMLY ALONG A DIKE OR WOULD FLOW INTO AN OPEN DRIFT(AA).

PROVIDE INFORMATION ON THE DIFFERENCES BETWEEN THE DOE PREFERRED PROBABILITY VALUE AND VALUES IN THE OPEN LITERATURE (I.E. RANGE FROM ABOUT 10^{-6} TO 10^{-8} PER YEAR) (AA)

CONSEQUENCE SUBISSUE: OPEN

PROVIDE AN EVALUATION OF THE RESPONSE OF MAGMA TO A DROP IN CONFINING PRESSURE WHEN ENCOUNTERING REPOSITORY DRIFTS (AA)

PROVIDE AN EVALUATION OF WASTE PACKAGE RESPONSE TO PHYSICAL, CHEMICAL AND THERMAL CONDITIONS REPRESENTATIVE OF YMR BASALTIC IGNEOUS ACTIVITY(AA)

PROVIDE AN EVALUATION OF WASTE FORM RESPONSE TO PHYSICAL, CHEMICAL AND THERMAL CONDITIONS REPRESENTATIVE OF YMR BASALTIC IGNEOUS ACTIVITY(AA)

PROVIDE A DEMONSTRATION OF THE UTILITY OF USING ASHPLUME IN PERFORMANCE ASSESSMENT WHICH INCLUDES:(ADA)

- -A Demonstration that the Model Can Reasonably Simulate Tephra-fall Characteristics of Representative Basaltic Volcanoes
- -Accounting For Potential Effects of HLW Entrainment on Dispersal Characteristics in Underlying Conceptual Model (Suzuki, 1983)
- -A Technical Basis to Constrain Past Characteristics of YMR Tephra Eruptions And Basis For Range in Future Eruptions.

CONSEQUENCE SUBISSUE (cont):

PROVIDE AN ANALYSIS RECONCILING HLW ENTRAINMENT MODEL WITH WALL-ROCK ENTRAINMENT STUDIES AT BASALTIC VOLCANOES(NA)

OBTAIN DATA ON WIND SPEED AND DIRECTION AT ALTITUDES OF CONCERN FOR VOLCANIC TEPHRA DISPERSION (GENERAL RANGE OF 2-6 KM),

OR

PROVIDE A REASONABLY CONSERVATIVE METHODOLOGY TO EVALUATE DISPERSAL PATTERNS IN THE ABSENCE OF SUCH DATA. (ADA)

DEMONSTRATE THAT AIRBORNE PARTICLE CONCENTRATIONS ARE REPRESENTATIVE OF TEPHRA-FALL DEPOSITS (NA)

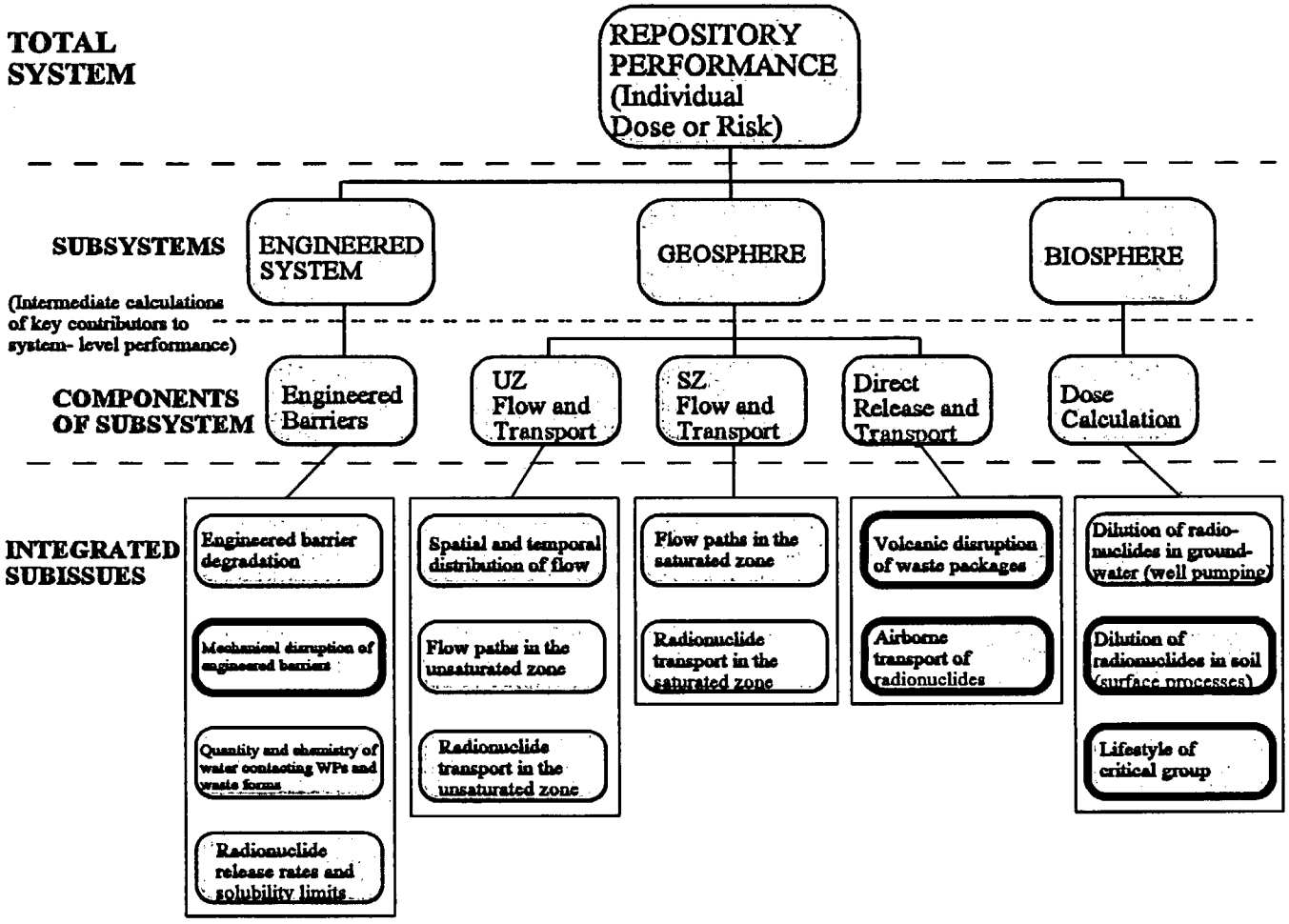
DEMONSTRATE THAT MASS-LOADING PARAMETERS ARE APPROPRIATE FOR LIFESTYLE, LOCATION AND HABITS OF CRITICAL GROUP (DYNAMIC VS STATIC VALUES)(NA)

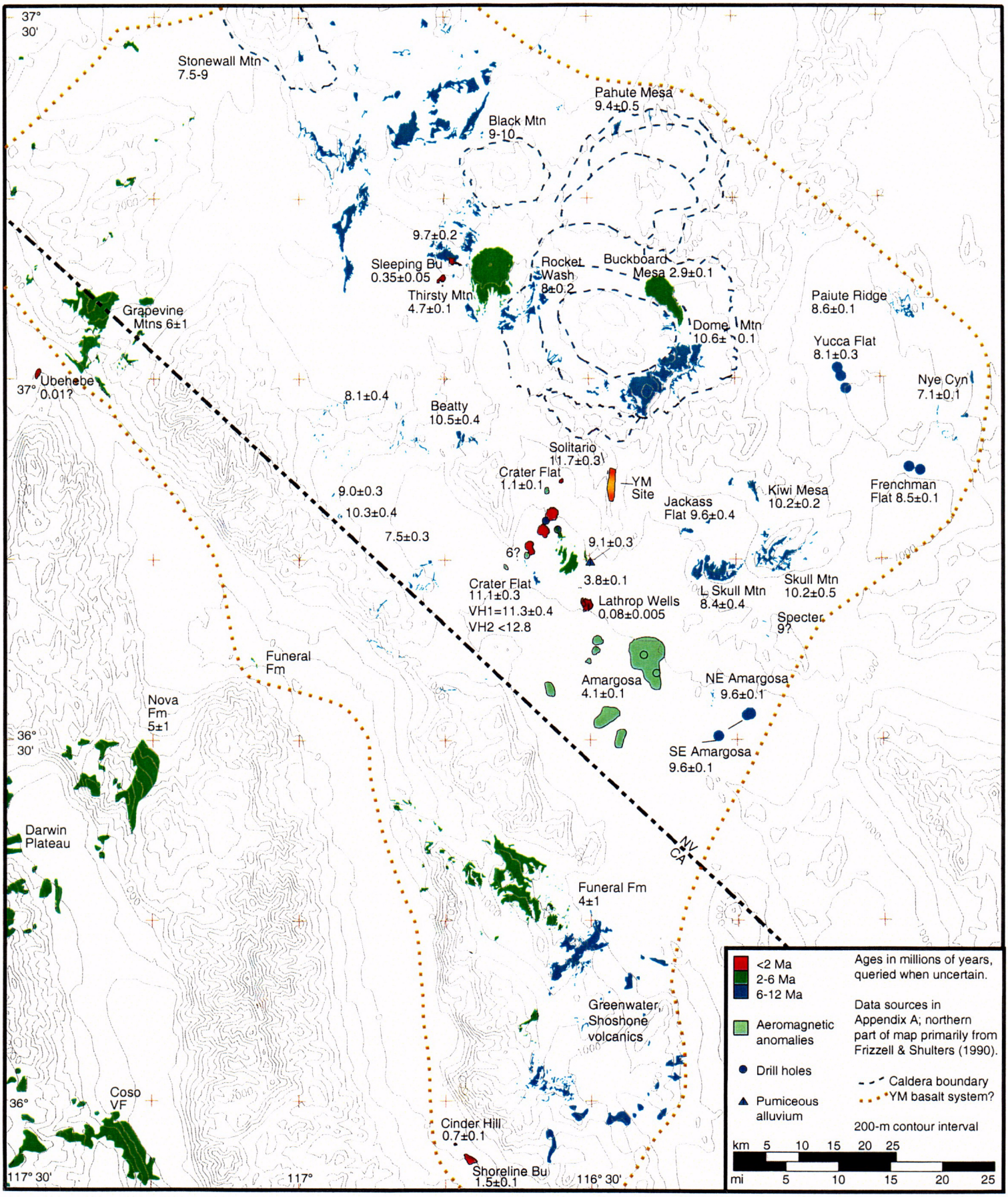
CONSEQUENCE SUBISSUE (cont):

ACCOUNT FOR REMOVAL AND DEPOSITION OF CONTAMINATED TEPHRA ASH AND CHANGE IN PARTICLE CHARACTERISTICS THROUGH TIME BY FLUVIAL AND AEOLIAN PROCESS OCCURRING BETWEEN AREA OF VENT AND LOCATION OF THE CRITICAL GROUP(NA)

ACCOUNT FOR INHALATION DOSE CONTRIBUTIONS FOR PARTICLES UP TO 100 MICRONS IN DIAMETER (AA)

PROVIDE A TECHNICAL BASIS FOR ASSUMPTION THAT THE CRITICAL GROUP WILL SELF-EVACUATE IN RESPONSE TO A YMR TYPE BASALTIC ERUPTION 20 KM AWAY (NA)


TOTAL SYSTEM
REPOSITORY PERFORMANCE (Individual Dose or Risk)
SUBSYSTEMS
(Intermediate calculations of key contributors to system- level performance)
ENGINEERED SYSTEM
GEOSPHERE
BIOSPHERE
COMPONENTS OF SUBSYSTEM
Engineered Barriers
UZ Flow and Transport
SZ Flow and Transport
Direct Release and Transport
Dose Calculation
INTEGRATED SUBISSUES
Engineered barrier degradation
Mechanical disruption of engineered barriers
Quantity and chemistry of water contacting WPs and waste forms
Radionuclide release rates and solubility limits
Spatial and temporal distribution of flow
Flow paths in the unsaturated zone
Radionuclide transport in the unsaturated zone
Flow paths in the saturated zone
Radionuclide transport in the saturated zone
Volcanic disruption of waste packages
Airborne transport of radionuclides
Dilution of radio-nuclides in ground-water (well pumping)
Dilution of radionuclides in soil (surface processes)
Lifestyle of critical group


37° 30'
Stonewall Mtn 7.5-9
Black Mtn 9-10
Pahute Mesa 9.4±0.5
9.7±0.2
Sleeping Bu 0.35±0.05
Thirsty Mtn 4.7±0.1
Rocket Wash 8±0.2
Buckboard Mesa 2.9±0.1
Grapevine Mtns 6±1
Dome Mtn 10.6± 0.1
Paiute Ridge 8.6±0.1
Yucca Flat 8.1±0.3
Nye Cyn 7.1±0.1
37° Ubehebe 0.01?
8.1±0.4
Beatty 10.5±0.4
Solitario 11.7±0.3
Crater Flat 1.1±0.1
YM Site
9.0±0.3
10.3±0.4
7.5±0.3
Jackass Flat 9.6±0.4
Kiwi Mesa 10.2±0.2
Frenchman Flat 8.5±0.1
6?
9.1±0.3
3.8±0.1
Crater Flat 11.1±0.3
VH1=11.3±0.4
VH2 <12.8
Lathrop Wells 0.08±0.005
L Skull Mtn 8.4±0.4
Skull Mtn 10.2±0.5
Specter 9?
Funeral Fm
Amargosa 4.1±0.1
NE Amargosa 9.6±0.1
Nova Fm 5±1
36° 30'
SE Amargosa 9.6±0.1
Darwin Plateau
NV
CA
Funeral Fm 4±1
Greenwater, Shoshone volcanics
36°
Coso VF
Cinder Hill 0.7±0.1
Shoreline Bu 1.5±0.1
117° 30'
117°
116° 30'
<2 Ma
2-6 Ma
6-12 Ma
Aeromagnetic anomalies
Drill holes
Pumiceous alluvium
Ages in millions of years, queried when uncertain.
Data sources in Appendix A; northern part of map primarily from Frizzell & Shulters (1990).
Caldera boundary
YM basalt system?
200-m contour interval
km 5 10 15 20 25
mi 5 10 15 20 25

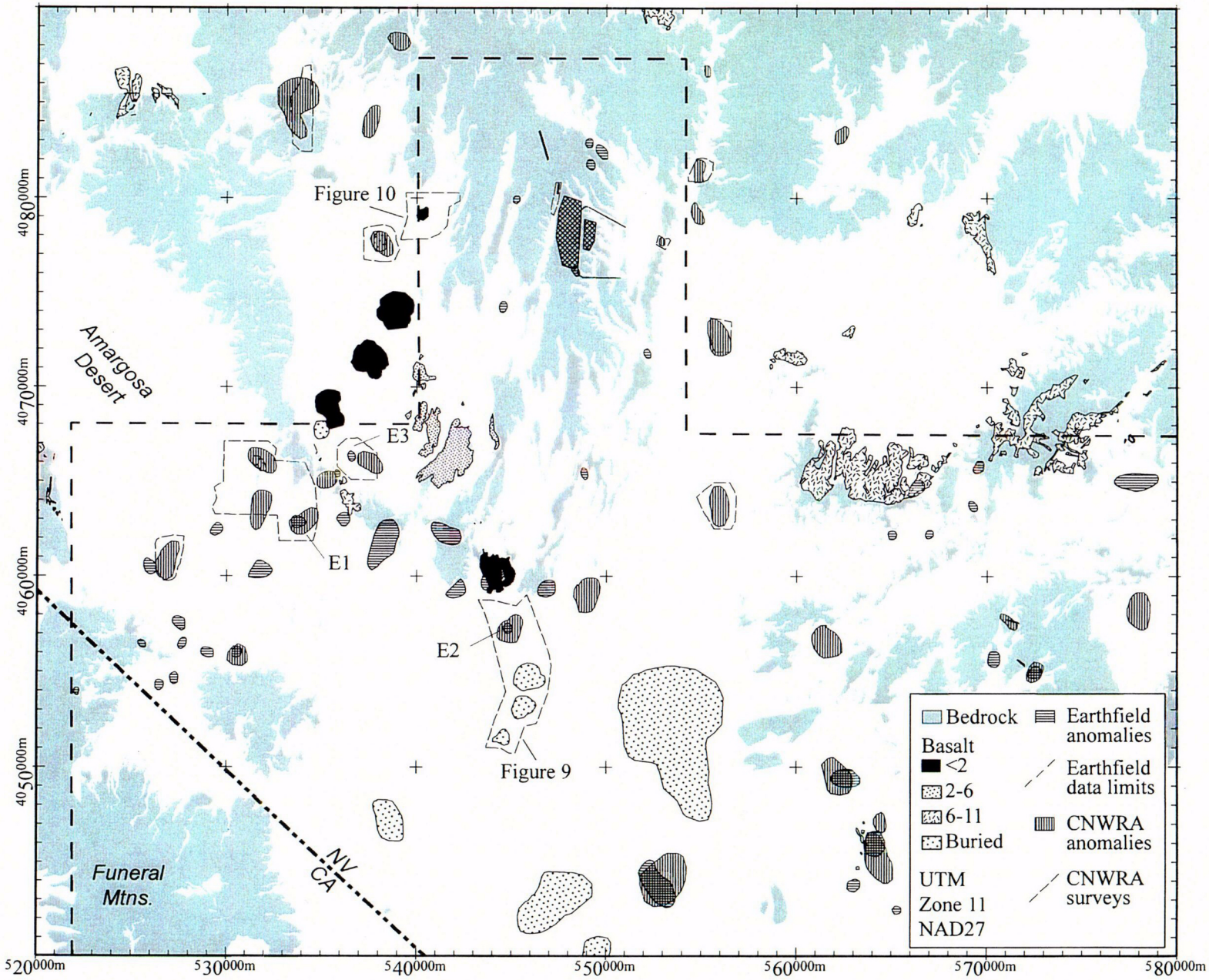
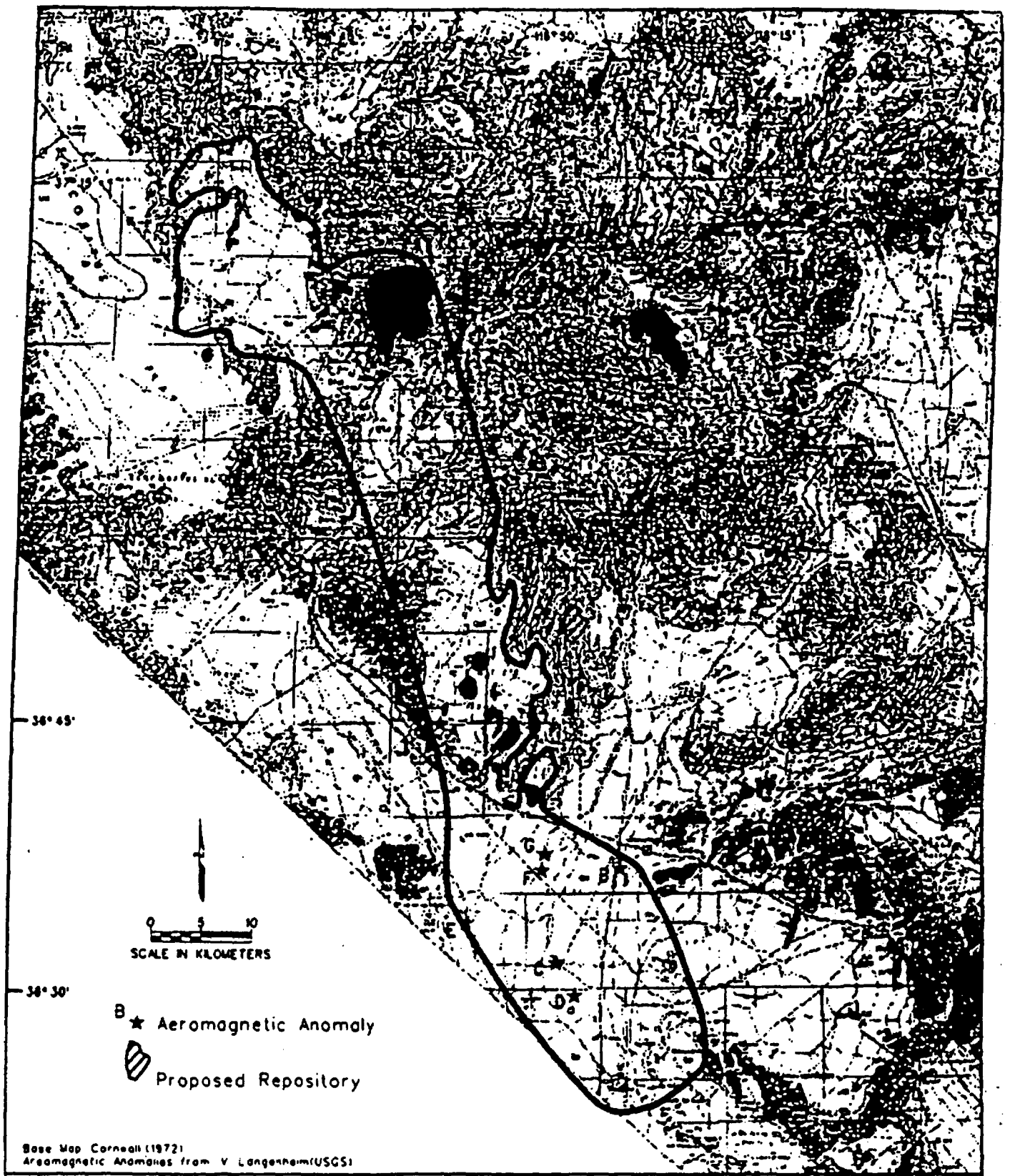


Figure 10
Amargosa Desert
E3
E1
E2
Figure 9
Funeral Mtns.
NV.
CA
Bedrock
Basalt
<2
2-6
6-11
Buried
UTM Zone 11 NAD27
Earthfield anomalies
Earthfield data limits
CNWRA anomalies
CNWRA surveys
4080000m
4070000m
4060000m
4050000m
520000m
530000m
540000m
550000m
560000m
570000m
580000m

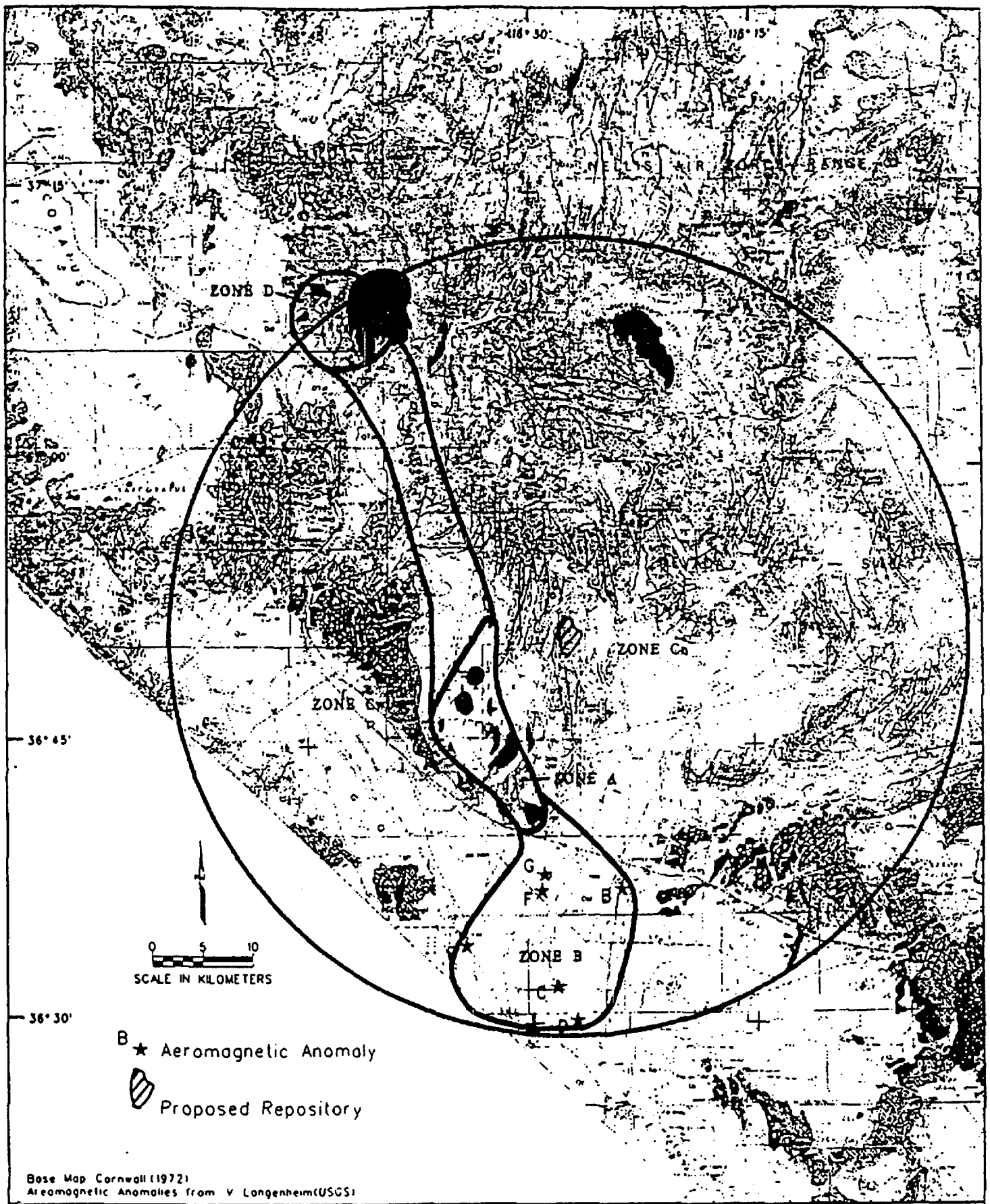


GEOMATRIX

BRUCE M. CROWE
WALKER LANE STRUCTURAL ZONE

Figure BC-11

FVHA Project

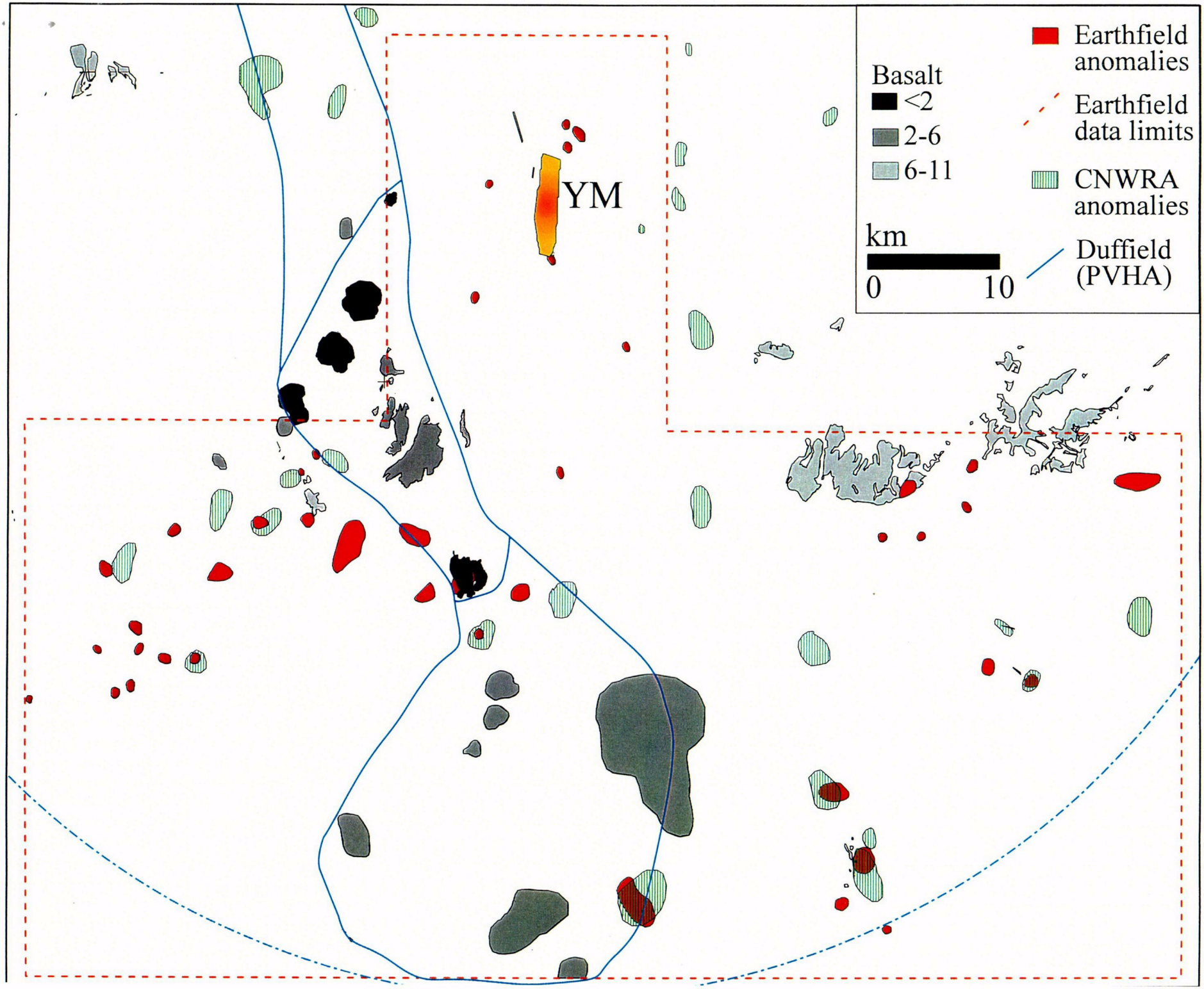


GEOMATRIX

WENDELL A. DUFFIELD
REGIONAL BACKGROUND AND
LOCAL ZONES

Figure
WD-2

PVHA
Project


YM
Basalt
<2
2-6
6-11
km
0
10
Earthfield anomalies
Earthfield data limits
CNWRA anomalies
Duffield (PVHA)