APPENDIX E

EXAMPLE DOCUMENT TEMPLATES

I) General

This Appendix (E) provides NMED's general expectations and guidance for reporting and document formats for corrective action documents under this Consent Order. The described formats include the general reporting recommendations and formats for site-specific RCRA Facility Investigation (RFI) work plans, RFI reports, periodic monitoring reports, risk assessment reports, corrective measures evaluations (CME), corrective measures implementation plans (CMIP), and corrective measures implementation reports (CMIR). This Appendix is not intended to provide recommended reporting formats for every potential corrective action document prepared under this Consent Order. Additionally, the recommendations for reporting and format of documents listed in this Appendix (E) may not include all sections that may be necessary to complete each type of document listed. Either Party may determine that additional sections are needed to address additional site-specific issues or information collected during corrective action or monitoring activities not listed below. Sections that do not apply to a particular plan or report may be omitted from that document.

II) RCRA Facility Investigation (RFI) Work Plan

DOE should prepare work plans for site investigations or corrective action activities using the general outline below. The data quality objectives (e.g., define nature and extent of contamination) should be clearly stated and the research, locations, depths and schedules of proposed sampling should be included in the work plan. General descriptions of proposed methods of exploration, field procedures and data collection methods should be included in each work plan. The general work plan outline is described below.

As appropriate, information described below related to previous investigations may be presented in a Historical Investigation Report prepared in conjunction with the RFI work plan.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

The executive summary or abstract should provide a brief summary of the purpose and scope of the investigation to be conducted at the subject site. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the work plan. The corresponding page numbers for the titles of each section of the work plan should be included in the table of contents.

e) Introduction

The introduction should include the Facility name, TA designation, unit location, and unit status. General information on the current site usage and status should also be included in this section. A brief description of the purpose of the investigation and the type of site investigation to be conducted should be provided in this section.

f) Background

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

This section should identify potential receptors, (e.g., groundwater), and include a brief summary of the type and characteristics of all waste and all Contaminants managed or released at the site, the known and possible sources of contamination, the history of releases or discharges of contamination, and the known extent of contamination. This section should include brief summaries of results of previous investigations including references to pertinent figures, data summary tables, and text in previous reports. At a minimum, detections of Contaminants encountered during previous investigations should be presented in table format, with an accompanying figure showing sample locations. If references to previous reports are presented, they should include page, table, and figure numbers for referenced information. Summary data tables and a site plan showing relevant investigation locations should be included in the Tables and Figures sections of the document, respectively.

For work plans addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs or AOCs), the information described in this section may be presented in TA-specific and/or site-specific background sections.

g) Site Description

i) Surface Conditions

A section on surface conditions should describe current and historical site topography, features and structures including topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a detailed description of current site uses and operations. In addition, descriptions of features located in surrounding sites that may have an

impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport should be included in this section.

ii) Subsurface Conditions

A section on subsurface conditions should the site conditions observed during previous subsurface investigations. It should include relevant soil horizons, stratigraphic information, groundwater conditions, and subsurface vapor information. A site plan showing the locations of all borings and excavations advanced during previous investigations should be included in the Figures section. A brief description of the anticipated stratigraphic units that may be encountered during the investigation may be included in this section if no previous investigations have been conducted at the site.

h) Proposed Investigation Activities

A section on proposed investigation activities should describe the data quality objectives of the proposed work scope as well as briefly describe a list of anticipated activities to be performed during the investigation to meet the data quality objectives. This could include background information research, health and safety requirements that may affect or limit the completion of tasks, drilling, test pit or other excavations, well construction, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot tests, and investigation-derived waste (IDW) storage and disposal. IDW includes general refuse, drill cuttings, excess sample material, water (decontamination, development and purge), and disposable equipment generated during the course of investigation, corrective action, or monitoring activities.

For work plans addressing multiple sites, the information described in this section may be presented in site-specific sections.

i) Investigation Methods

A section on investigation methods should provide a description of anticipated locations and methods for conducting the activities intended to achieve the data quality objectives. This section could include research methods, health and safety practices that may affect the completion of tasks, drilling methods, test pit or other excavation methods, sampling intervals and methods, well construction methods, field data collection methods, geophysical and land survey methods, field screening methods, chemical analytical testing, materials testing, aquifer testing, pilot tests, and other proposed investigation and testing methods. This information may also be summarized in table format, if appropriate.

j) Monitoring and Sampling Program

A section on monitoring and sampling should provide a description of the groundwater, ambient air, subsurface vapor, remediation system, engineering controls, and other monitoring and sampling programs currently being implemented at the site.

k) Schedule

A section should set forth the anticipated schedule for completion of field investigation, pilot testing, and monitoring and sampling activities. In addition, this section should set forth a schedule for submittal of reports and data to NMED.

l) References and Map Data Sources

A section should provide a reference list of all documents cited in the RFI work plan. The sources of geospatial data used to develop maps and figures presented in the RFI work plan should also be provided.

m) Tables

All tables should be provided in this section of the report. The following summary tables may be included in the investigation work plans, if applicable and if previous investigations have been conducted at the site. Data presented in the tables should include information on dates of data collection, analytical methods, detection limits, and significant data quality exceptions. The summary analytical data tables should include only detected analytes and data quality exceptions that could potentially mask detections.

1. Tables summarizing regulatory criteria, background, and applicable cleanup levels (may be included in the analytical data tables instead of as separate tables).
2. Tables summarizing historical field survey location data.
3. Tables summarizing historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
4. Tables summarizing historical soil, rock, and sediment laboratory analytical data should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
5. Tables summarizing historical groundwater elevation and depth to groundwater data. The table should include the monitoring well depths, the screened intervals in each well, and the dates and times measurements were taken.
6. Tables summarizing historical groundwater laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
7. Tables summarizing historical surface water laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
8. Tables summarizing historical air sample screening and laboratory analytical data. The data tables should include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
9. Tables summarizing historical pilot or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.

n) Figures

All figures should be provided in this section of the report. This section should include the following figures, including presentation of data where previous investigations have been conducted. All figures should include an accurate bar scale and a north arrow. An explanation should be included on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps should contain a date of preparation.

1. A vicinity map showing topography and the general location of the site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting historical and proposed soil boring or excavation locations and sampling locations.
4. Figures presenting historical soil sample field screening and laboratory analytical data.
5. Figures presenting the locations of all existing and proposed vapor monitoring wells and borings.
6. Figures presenting all existing and proposed groundwater monitoring wells and piezometers, historical groundwater elevation data, and groundwater flow directions.
7. Figures presenting historical groundwater laboratory analytical data, if applicable. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
8. Figures presenting historical and proposed surface water sample locations and field measurement data, if applicable.
9. Figures presenting historical surface water laboratory analytical data, if applicable.
10. Figures presenting historical and proposed air sampling locations and presenting historical air quality data.
11. Figures presenting historical pilot and other testing locations and data, where applicable, including site plans and graphic data presentation.
12. Figures presenting geologic cross-sections, based on outcrop and borehole data acquired during previous investigations.

o) Appendices

A description of IDW management should be included as an appendix to the investigation work plan. Additional appendices may be necessary to present additional data or documentation not listed above.

III) RCRA Facility Investigation (RFI) Report

DOE should prepare investigation reports at the Facility using the general outline below. The RFI Report should be the reporting mechanism for presenting the results of completed RFI Work Plans. This section describes recommendations for reporting on SWMU and AOC investigations.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

The executive summary or abstract should provide a brief summary of the purpose, scope, and results of the investigation. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary. In addition, this section should include a brief summary of conclusions based on the investigation data collected and recommendations for future investigation, monitoring, remedial action or site closure.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the investigation, the type of site investigation conducted, and the type of results presented in the report also should be provided in this section.

f) Background

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

In addition, this section should include a brief summary of known and possible sources of contamination, the history of releases or discharges of contamination, the known extent of contamination, and the results of previous investigations including references to pertinent figures, data summary tables, and text in previous reports. The references to previous reports should include page, table, and figure numbers for referenced information. Summary data tables and a site plan showing relevant investigation locations should be included in the Tables and Figures sections of the document, respectively.

For investigation reports addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs/AOCs), the information described in this section may be presented in TA-specific or site-specific background sections.

g) Site Description

i) Surface Conditions

A section on surface conditions should describe current site topography, features, and structures including topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a description of current site uses and operations.. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport should be included in this section.

A section should describe surface water conditions and include a description of surface water runoff, drainage, surface water sediment transport, and contaminant transport in surface water as suspended load and as a dissolved phase in surface water via natural and man-made drainages, if applicable. A description of contaminant fate and transport should be included, if appropriate.

ii) Subsurface Conditions

A section on subsurface conditions should describe known subsurface lithology and structures, based on observations made during the current and previous subsurface investigations, including interpretation of geophysical logs and as-built drawings of man-made structures. A description of any known locations of pipelines and utility lines and observed geologic structures should also be included in this section. A site plan showing boring and excavation locations and the locations of the site's above- and below-ground structures should be included in the Figures section of the report. In addition, cross-sections should be constructed, if appropriate, to provide additional visual presentation of site or regional subsurface conditions.

A section should describe groundwater conditions observed beneath the subject site and relate local groundwater conditions to regional groundwater conditions. A description of the depths to water, aquifer thickness, and groundwater flow directions should be included in this section for alluvial groundwater, shallow perched groundwater, intermediate perched groundwater, and regional groundwater, as appropriate to the investigation. Figures showing well locations, surrounding area, and groundwater elevations and flow directions for each hydrologic zone should be included in the Figures section of the report.

h) Investigation Activities

A section on the investigation activities should briefly describe all activities performed during the investigation. This could include background information research, implemented health and safety measures that affected or limited the completion of tasks, drilling, test pit or other excavation methods, well construction methods, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot tests, and IDW storage and disposal. Any deviations from the approved RFI work plan should be identified.

i) Regulatory Criteria

A section should set forth the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium and exposure scenario at the subject site. The appropriate cleanup standards or screening levels for each site should be included if site-specific levels have been established at the subject site. A table summarizing the applicable cleanup standards or screening levels, or inclusion of applicable cleanup standards or screening levels in the data tables, should be included in the Tables section of the document. The risk assessment, if conducted, should be presented in a separate document or in an appendix to this report. If cleanup standards or screening levels calculated in an NMED-approved risk evaluation are employed, the risk evaluation document should be referenced including pertinent page numbers for referenced information.

j) Data Review Methodology

i) Identification of COPCs

A section should describe the process for evaluating investigation data to identify chemicals of potential concern (COPCs). The process should include, as appropriate, comparisons of site data to background values and background data, statistical tests using site data and background data, and evaluation of site history concerning use and release of chemicals at the site.

ii) Extent of Contamination

A section should describe the process for evaluating each COPC to determine whether extent of contamination has been defined. The process should consider the spatial distribution and trends of COPC concentrations. If extent is not defined, the process should determine whether additional sampling to determine extent is warranted based on comparisons to risk-based screening levels.

k) Field Investigation Results

A section should provide a summary of the procedures used and the results of all field investigation activities conducted at the site including the dates that investigation activities were conducted, the type and purpose of field investigation activities performed, field screening measurements, logging and sampling results, pilot test results, construction details, and conditions observed. Field observations or conditions that altered the planned work or may have influenced the results of sampling, testing, and logging should be reported in this section.

For investigation reports addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs/AOCs), the information described in this section may be presented in TA-specific or site-specific investigation result sections.

i) Site Contamination

A section should provide a description of sampling intervals and methods for detection of surface and subsurface contamination in soils, rock, sediments, groundwater, and surface water, and as vapor-phase contamination. Only factual information should be included in this section. Interpretation of the data should be reserved for the summary and conclusions sections of the report. Tables summarizing all sampling, testing, and screening results for detected Contaminants should be prepared in a format approved by NMED. The tables should be presented in the Tables section of the report.

(1) Soil, Rock, and Sediment Sampling

A section should describe the sampling of soil, rock, and sediment. It should include the dates, locations and methods of sample collection; sampling intervals; sample logging methods; screening sample selection methods; and laboratory sample selection methods including the collection depths for samples submitted for laboratory analyses. A site plan showing the sample locations should be included in the Figures section of the report.

(2) Soil, Rock, and Sediment Sample Field Screening Results

A section should describe the field screening methods used during the investigation and the field screening results. Field screening results also should be presented in summary tables in the Tables section of the document. The limitations of field screening instrumentation and any conditions that influenced the results of field screening should be discussed in this subsection.

(3) Soil, Rock, and Sediment Sampling Analytical Results

A section should summarize the results of laboratory analysis for soil, rock, and sediment samples. It should also describe the analytical methods used and provide a comparison of the analytical results to media-specific background values and screening levels for applicable exposure scenarios. The laboratory results also should be presented in summary tables in the Tables section of the document. Field conditions and sample collection methods that could potentially affect the analytical results should be described in this section. If appropriate, soil analytical data should be presented with sample locations on a site plan and included in the Figures section of the report.

Analytical results should be evaluated using the process described in the Data Review Methodology section. Analytical results should be evaluated to identify COPCs. The lateral and vertical extent of contamination should be evaluated for each COPC to determine if extent is defined and, if not, whether additional sampling is warranted.

(4) Groundwater Sampling

A section on groundwater sampling should describe the dates, locations, depths, and methods of sample collection; methods for sample logging; and methods for screening and laboratory sample selection. A map showing all site and surrounding area well locations should be included in the Figures section of the report.

(5) Groundwater General Chemistry

A section on the general groundwater chemistry should describe the results of measurement of field purging parameters and field analytical measurements. Field parameter measurements and field analytical results also should be presented in summary tables in the Tables section of the document. The limitations of field measurement instrumentation and any conditions that may have influenced the results of field screening should be discussed in this section. As determined by DOE and NMED, relevant water chemistry concentrations should be presented as data tables or as isoconcentration contours on a map included in the Figures section of the report.

(6) Groundwater Chemical Analytical Results

A section should summarize the results of groundwater chemical analyses. It should describe the groundwater chemical analytical methods and analytical results. It should also provide a comparison of the data to cleanup standards or established cleanup levels for the site. The rationale or purpose for altering or modifying the groundwater sampling program outlined in the site RFI work plan should also be provided as appropriate in this section. Field conditions should be described in this section that may have affected the analytical results during sample collection. Tables summarizing the groundwater laboratory, field, and field sample QA/QC chemical analytical data; applicable cleanup levels; and modifications to the groundwater sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations, data tables, or as isoconcentration contours on a map included in the Figures section of the report.

(7) Surface Water Sampling

A section should describe the surface water sampling and should include the dates, times, locations, depths, and methods of sample collection. It should also describe methods for sample logging, sample-screening methods, and laboratory sample selection methods. A map showing all surface-water sampling locations should be included in the Figures section of the report.

(8) Surface Water General Chemistry

A section on the surface water general chemistry should describe the results of measurement of field parameters and field analytical measurements. Field parameter measurements and field analytical results also should be presented in summary tables in the Tables section of the document. The limitations of field measurement instrumentation and any conditions that influenced the results of field screening should be discussed in this section. Relevant water chemistry concentrations should be presented as data tables on a map included in the Figures section of the report.

(9) Surface Water Chemical Analytical Results

A section should summarize the results of surface water chemical analyses. It should describe the analytical methods and analytical results, and provide a comparison of the data to the cleanup standards or established background or cleanup levels for the site. The rationale or purpose for altering or modifying the surface-water sampling program outlined in the site RFI work plan also should be provided as appropriate in this section. Field conditions that may have affected the analytical results during sample collection should be described in this section. Tables summarizing the surface water laboratory, field, and analytical field sample QA/QC analytical data; applicable cleanup levels; and modifications to the surface-water sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations or as data tables on a map included in the Figures section of the report.

(10) Air and Subsurface Vapor Sampling

A section should describe the air and subsurface vapor sampling. It should describe the dates, locations, depths or elevations above ground surface, methods of sample collection, methods for sample logging, and methods for laboratory sample selection. A map showing all air sampling locations should be provided in the Figures section of the report.

(11) Air and Subsurface Vapor Field Screening Results

A section should describe the air and subsurface vapor field screening results. It should describe the field screening methods used for ambient air and subsurface vapors during the investigation and the field screening results. Field screening results should also be presented in summary tables in the Tables section of the report. The locations of ambient air and subsurface vapor screening sample collection should be presented on a site plan included in the Figures section of the report. The limitations of field screening instrumentation and any conditions that influenced the results of field screening should be discussed in this section.

(12) Air and Subsurface Vapor Laboratory Analytical Results

A section should describe the results of air and subsurface vapor laboratory analysis. It should describe the air sampling laboratory analytical methods and analytical results, and provide a comparison of the data to emissions standards or established cleanup or emissions levels for the site. The rationale or purpose for altering or modifying the air monitoring or sampling program outlined in the site investigation work plan also should be provided as appropriate in this section. Field conditions that may have affected the analytical results during sample collection should be described in this section. Tables summarizing the air sample laboratory, field, and analytical field sample QA/QC data; applicable cleanup levels or emissions standards; and modifications to the air sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations, data tables, or as isoconcentration contours on a map included in the Figures section of the report.

ii) Summary of Human Health Risk Screening

As applicable, a section should summarize the results of the human health risk screening presented in the Risk Assessments appendix.

iii) Summary of Ecological Risk Screening

As applicable, a section should summarize the results of the ecological risk screening presented in the Risk Assessments appendix.

l) Conclusions

A section should provide a brief summary of the investigation activities and results and a discussion of the conclusions of the investigation conducted at the site. The purpose of the conclusions is to support the recommendations for each site. The conclusions should address whether nature and extent of contamination are defined for each site and whether additional sampling for extent is warranted. The conclusions should also address whether each site poses an unacceptable risk to human health and ecological receptors for the exposure scenarios evaluated.

m) Recommendations

A section should discuss the need for further investigation, corrective measures, risk assessment and monitoring, or recommendations for corrective action completed, based on the conclusions provided in the Conclusions section. It should include explanations regarding additional sampling, monitoring, and site closure. A corresponding schedule for further action regarding the site should also be provided.

n) References and Map Data Sources

A section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

o) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the following tables. The summary analytical data tables should include only inorganic Contaminants detected above background values, detected without background values, or not detected with detection limits above background values and detected organic Contaminants.

1. Tables summarizing regulatory criteria, background levels, and applicable cleanup levels (this information may be included in the analytical data tables instead of as separate tables).
2. Tables summarizing field survey location data. Separate tables should be prepared for well locations and individual medium sampling locations except where the locations are the same for more than one medium.

3. Tables summarizing field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
4. Tables summarizing soil, rock, and/or sediment laboratory analytical data.
5. Tables summarizing the groundwater elevations and depths to groundwater. The table should include the monitoring well depths and the screened intervals in each well, and the dates and times measurements were taken.
6. Tables summarizing groundwater laboratory analytical data.
7. Tables summarizing surface water laboratory analytical data.
8. Tables summarizing the air sample screening and laboratory analytical data.
9. Tables summarizing the pilot test data, if applicable, including units of measurement and types of instruments used to obtain measurements.
10. Tables summarizing any materials test data.

p) Figures

All figures should be provided in this section of the report. This section should provide the following figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps should contain a date of preparation.

1. A vicinity map showing topography and the general location of the site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be required to present the locations of relevant off-site well locations, structures and features.
3. Figures presenting boring or excavation locations and sampling locations.
4. Figures presenting soil sample field screening (if applicable) and laboratory analytical data.
5. Figures presenting the locations of all newly installed and existing vapor monitoring wells and borings.
6. Figures presenting groundwater monitoring well and piezometer locations, groundwater elevation data, and groundwater flow directions.
7. Figures presenting groundwater laboratory analytical data. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
8. Figures presenting surface water sample locations and field measurement data.

9. Figures presenting surface water laboratory analytical data. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure.
10. Figures presenting air sampling locations and presenting air quality. The field screening or laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
11. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.
12. Figures presenting pilot test locations and data, if applicable, including site plans and graphic data presentation.

q) Appendices

Each investigation report should include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

i) Field Methods

An appendix should provide detailed descriptions of the methods used to acquire field measurements of each medium that was surveyed or tested during the investigation. This appendix should include exploratory drilling or excavation methods, the methods and types of instruments used to obtain field screening, field analytical or field parameter measurements, instrument calibration procedures, sampling methods for each medium investigated, decontamination procedures, sample handling procedures, documentation procedures, abandonment procedures for wells/boreholes and excavations, and a description of field conditions that affected procedural or sample testing results. Methods of measuring and sampling during pilot tests should be reported in this appendix, if applicable. Geophysical logging methods should be discussed in a separate appendix. IDW storage and disposal methods and documentation should be discussed in a separate appendix. Any deviations from the approved RFI work plan should be identified and discussed.

i) Exploratory Drilling or Excavation Investigations

A section should describe the locations, methods, and depths of subsurface explorations. The description should include the types of equipment used, the logging procedures, the soil or rock classification system used to describe the observed materials, exploration equipment decontamination procedures, and conditions encountered that may have affected or limited the investigation.

A description of the site conditions observed during subsurface investigation activities should be included in this section, including soil horizon and stratigraphic information. Site plans showing the locations of all borings and excavations should be included in the Figures section of the report. Boring and test pit logs for all exploratory borings and test pits should be presented in an appendix or attachment to the report.

ii) Exploratory and Monitoring Well Boring Geophysical Logging

A section should describe the methods, dates of measurement, depth intervals measured, and the results of geophysical logging. The relative merits and limitations of each geophysical logging method employed should be discussed, along with any field conditions or instrument malfunctions that occurred that may have affected the results of the geophysical logging.

iii) Monitoring Well Construction and Boring or Excavation Abandonment

A section should describe the methods and details of monitoring well construction and the methods used to abandon or backfill exploratory borings and excavations. The description should include the dates of well construction, boring abandonment, or excavation backfilling. In addition, well construction diagrams should be included in an appendix or attachment with the associated boring logs for monitoring well borings. The Respondents may submit well abandonment reports as an appendix to the investigation report.

iv) Surface Air and Subsurface Vapor Conditions

A section should describe surface air and subsurface vapor monitoring and sampling methods used during the site investigation. It should also describe observations made during the site investigation regarding subsurface flow pathways and the subsurface air-flow regime.

v) Materials Testing Results

A section should discuss the materials testing results, such as core permeability testing, grain size analysis, or other materials testing results. Sample collection methods, locations, and depths should also be included. Corresponding summary tables should be included in the Tables section of the report.

vi) Pilot Testing Results

A section should discuss the results of any pilot tests. Pilot tests are typically conducted after initial subsurface investigations are completed and the need for additional investigation or remediation has been evaluated. Pilot tests, including aquifer tests and remediation system pilot tests, should be addressed through separate work plans and pilot test reports. The format for pilot test work plans and reports should be approved by the Department prior to submittal.

vii) Boring/Test Pit Logs and Well Construction Diagrams

An appendix should provide boring logs, test pit logs, or other excavation logs, and well construction details. In addition, a key to symbols and a soil or rock classification system should be included in this appendix. Geophysical logs should be provided in a separate section of this appendix.

viii) Analytical Program

An appendix should discuss the analytical methods, a summary of data quality objectives, and the data quality review procedures. A summary of data quality exceptions and their effect on the

acceptability of the field and laboratory analytical data with regard to the investigation and the site status should be included in this appendix.

ix) Analytical Reports

An appendix should provide the contract laboratory final analytical data reports generated for the investigation. The reports should include all chain-of-custody records and Level II QA/QC results provided by the laboratory. The final laboratory reports and data tables should be provided electronically in a format. Paper copies (or electronically scanned in PDF format) of all chain-of-custody records should be provided with the reports. Electronic spreadsheets containing all analytical data, including dates of sampling and analysis, analytical methods, and detection limits should also be provided in this appendix, along with summary pivot tables containing all inorganic and organic results for each sample.

x) Investigation-Derived Waste Management

An appendix should provide a description of each IDW stream generated during the investigation; the methods used for characterization, storage, and disposal; and available records documenting disposal.

xi) Box Plots and Statistical Results

If statistical tests were performed as part of COPC identification, an appendix should provide the results of the statistical tests as well as box plots comparing site investigation data to background data.

xii) Risk Assessments

A risk assessment may be included as an appendix to the investigation report; however, the risk assessment should be presented in the Risk Assessment format described in Section V of this Appendix (E).

xiii) Other Appendices

Other appendices containing additional information should be included as deemed necessary by NMED or as otherwise appropriate.

IV) Periodic Monitoring Report

DOE should use the following guidance for preparing periodic monitoring reports. The reports should present the reporting of periodic groundwater, surface water, vapor, and remediation system monitoring at the Facility. The following sections provide a general outline for monitoring reports, and also provide the minimum requirements for reporting for specific Facility sites, watersheds, and regional monitoring. All data collected during each monitoring and sampling event in the reporting period should be included in the reports.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, watershed, and any other unit name; the monitoring event or reporting period; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

The executive summary or abstract should provide a brief summary of the purpose, scope, and results of the monitoring conducted at the subject site during the reporting period. The Facility, SWMU or AOC name, site name, location, and TA designation, watershed, and monitoring event or reporting period should be included in the executive summary. In addition, this section should include a brief summary of conclusions based on the monitoring data collected.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the monitoring, type of monitoring conducted, the monitoring event or reporting period, and the type of results presented in the report should also be provided in this section.

f) Scope of Activities

A section on the scope of activities should briefly describe all activities performed during the monitoring event or reporting period including field data collection, analytical testing, remediation system monitoring, if applicable, and purge/decontamination water storage and disposal. Methods used should be identified or a reference provided to an approved work plan describing methods. Any deviations from approved work plans should be identified.

g) Regulatory Criteria

A section should provide information regarding applicable cleanup standards, risk-based screening levels and risk-based cleanup goals for each pertinent medium at the subject site consistent with Section IX (Cleanup Objectives and Cleanup Levels) of the Consent Order. A table summarizing the applicable cleanup standards or screening levels, or inclusion of the applicable cleanup standards or screening levels in the data tables should be included in the

Tables section of the document. The appropriate cleanup or screening levels for each site should be included, if site-specific levels have been established at separate sites. Risk-based evaluation procedures, if used to calculate cleanup or screening levels, should either be included as an appendix or attachment or referenced. The specific document and page numbers should be included for all referenced materials.

h) Monitoring Results

A section should provide a summary of the results of monitoring conducted at the site. This section should include the dates and times that monitoring was conducted, the measured depths to groundwater, directions of groundwater flow, field air and water quality measurements, contaminant surveys, static pressures, field measurements, and a comparison to previous monitoring results. Field observations or conditions that may influence the results of monitoring should be reported in this section. Tables summarizing vapor-monitoring parameters, groundwater elevations, depths to groundwater measurements, and other field measurements could be substituted for this section. The tables should include all information required in Section m) below.

i) Analytical Data Results

This section should discuss the results of the chemical analyses. It should provide the dates of sampling, the analytical methods, and the analytical results. It should also provide a comparison of the data to previous results and to applicable background values and/or screening levels. The rationale or purpose for altering or modifying the monitoring and sampling program should be provided in this section. The tables should include all information required in Section m) below.

j) Remediation System Monitoring

This section should discuss the remediation system monitoring. It should summarize the remediation system's capabilities and performance. It should also provide monitoring data, treatment system discharge sampling requirements, and system influent and effluent sample analytical results. The dates of operation, system failures, and modifications made to the remediation system during the reporting period should also be included in this section. A summary table may be substituted for this section. The tables should include all information required in Section m) below.

k) Summary and Interpretations

A summary section should provide a discussion and conclusions of the monitoring conducted at the site. In addition, this section should provide a comparison of the results to applicable screening levels, and to relevant historical monitoring and laboratory analytical data. The consistency of current monitoring results with previous results should be summarized. An explanation should be provided with regard to data gaps. A discussion of remediation system performance, monitoring results, modifications, if applicable, and compliance with discharge requirements should be provided in this section. Recommendations and explanations regarding future monitoring, remedial actions, or site closure, if applicable, should also be included in this section.

l) References

A section should provide a reference list of all documents cited in the report.

m) Tables

All tables should be provided in this section of the report. A section should provide the following summary tables for the media sampled. As appropriate, DOE may combine one or more of the tables. Data presented in the tables should include the current sampling and monitoring data plus data from the three previous monitoring events or, if data from less than three monitoring events is available, data acquired during previous investigations. Remediation system monitoring data also should be presented. The dates of data collection should be included in the tables. Summary tables may be substituted for portions of the text. As appropriate, the tables identified below may be provided as appendixes.

1. Tables summarizing the regulatory criteria, background levels, and applicable cleanup levels may be included in the analytical data tables instead of as separate table.
2. Tables summarizing groundwater elevations and/or depths to groundwater data. The table should include the monitoring well depths, the screened intervals in each well, and the dates and times of measurements.
3. Tables summarizing field measurements of surface water quality data.
4. Tables summarizing field measurements of vapor monitoring data (should include historical vapor monitoring data as described above).
5. Tables summarizing field measurements of groundwater quality data (should include historical water quality data as described above).
6. Tables summarizing vapor sample laboratory analytical data (should include historical vapor sample analytical data as described above).
7. Tables summarizing surface water laboratory analytical data (should include historical surface water analytical data as described above).
8. Tables summarizing groundwater laboratory analytical data (should include historical groundwater analytical data as described above).
9. Tables summarizing remediation system monitoring data, if applicable (should include historical remediation system monitoring data as described above).
10. Tables summarizing analytical results exceeding screening levels or regulatory criteria.
11. Tables summarizing deviations from approved work plans.

n) Figures

All figures should be provided in this section of the report. This section should include the following figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures should contain a date of preparation. As appropriate, figures identified below may be provided as appendices.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features or properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well and piezometer locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be required to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting, as applicable, the locations of piezometer, monitoring and other well locations, groundwater elevation data, and groundwater flow directions.
4. Figures presenting groundwater laboratory analytical data for the current monitoring event and historical monitoring events. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map.
5. Figures presenting surface water sampling locations and laboratory analytical data for the current monitoring period. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels.
6. Figures presenting vapor sampling locations and laboratory analytical data for the current monitoring event. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. The analytical data corresponding to each sampling location exceeding screening levels should also be presented as vertical profiles. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map.
7. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.

o) Appendices

Each monitoring report should include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

i) Field Methods

If field methods are not described in an approved work plan, an appendix should be provided that includes the methods used to acquire field measurements of groundwater elevations, vapor and water quality data, and vapor, surface water and groundwater samples. It should include the methods and types of instruments used to measure depths to water, air or headspace parameters, flow measurements, and water quality parameters. In addition, decontamination, well purging

techniques, well sampling techniques, and sample handling procedures should be provided in this appendix. Methods of measuring and sampling remediation systems should be reported in this section, if applicable.

ii) Analytical Reports

An appendix should provide the analytical reports and include the contract laboratory final chemical analytical data reports generated during this reporting period. The reports should include all chain-of-custody records and Level II QA/QC results provided by the laboratory. The laboratory final reports and data tables should be provided electronically in a format approved by the NMED. Paper copies (or electronically scanned in PDF format) of all chain-of-custody records should be provided with the reports.

V) Risk Assessment Report

This section provides a general outline for risk assessments and also lists the minimum requirements for describing risk assessment elements.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

The executive summary or abstract section should provide a brief summary of the purpose and scope of the risk assessment of the subject site. The Executive Summary should also briefly summarize the conclusions of the risk assessment. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the risk assessment. The corresponding page numbers for the titles of each unit of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site usage and status should also be included in this section. A brief description of the purpose of the report should be provided in this section.

f) Background

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. If a risk assessment report is provided separately from a RFI report, the separate risk assessment report should include a labeled figure in the document showing the locations of current and former site structures and features.

i) Site Description

A section should describe current site topography, features and structures including topographic drainages, man-made drainages, erosional features, current site uses and operations, and other data relevant to assessing risk at the site. Depth to groundwater and direction of groundwater flow should be included in this section. The presence and location of surface water bodies such as springs or wetlands should be noted in this section. Photographs of the site may be incorporated into this section. Ecological features of the site should be described here, including type and amount of vegetative cover, observed and expected wildlife receptors, and level of disturbance of the site. The LANL ecological checklist for the site may be included as an appendix or attachment to the document and its inclusion may meet the requirement to describe the ecological features of the site. A topographical map of the site and vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features should be included in the Figures section of the document.

If the risk assessment is presented as an appendix to an investigation report, the site description section may reference information presented in the main investigation report.

ii) Investigation Sampling Results

A section should discuss the results of the sampling at the site. It should include a description of the history of releases of Contaminants, the known and possible sources of contamination, and the vertical and lateral extent of contamination present in each medium. This section should include summaries of sampling results of all investigations including site plans (included in the Figures section of the report) showing locations of detected Contaminants. This section should reference pertinent figures, data summary tables, and references in previous reports. References to previous reports should include page, table, and figure numbers for referenced information. Summaries of sampling data should include for each constituent: the maximum value detected, the detection limit, the 95 percent upper confidence level (UCL) of the mean value detected (if applicable to the data set), and whether the 95 percent UCL of the mean was calculated based on a normal or lognormal distribution. Background values used for comparison to inorganic constituents at the site should be presented here. The table of background values should appear in the Tables section of the document and include actual values used as well as the origin of the values (e.g., Facility-wide, UCL, and upper tolerance level (UTL)). This section should also include a discussion of how “non-detect” sample results were handled in the averaging of data.

If the risk assessment is presented as an appendix to an investigation report, the investigation sampling section may reference information presented in the main investigation report.

iii) Determination of COPCs

A section should describe the process used to identify the COPCs evaluated in the risk assessment. If the risk assessment is presented as an appendix to an investigation report, the Determination of COPCs section may reference information presented in the main investigation report.

g) Conceptual Site Model

A section should present the conceptual site model. It should include information on the expected fate and transport of Contaminants detected at the site. This section should provide a list of all sources of contamination at the site. Sources that are no longer considered to be ongoing but represent the point of origination for Contaminants transported to other locations should be included. The discussion of fate and transport should address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site model should appear in the Figures section of the document.

For human health risk assessments, the conceptual site model should include the current and reasonably foreseeable land use and residential land use for all risk assessments. All values for exposure parameters and the source of those values should be included in table format and presented in the Tables section of the document.

Conceptual site models presented for ecological risk assessments should identify assessment endpoints and measurement receptors for the site. The discussion of the model should explain how the measurement receptors for the site are protective of the wildlife receptors identified by DOE in the Site Description section.

Exposure point concentrations (EPCs) may be calculated for each COPC for each applicable human health exposure scenario and for ecological receptors.

h) Human Health Risk-Screening Evaluations

i) Risk Screening Levels

A section should present the actual screening values used for each COPC for comparison to all human health and ecological risk screening levels and be consistent with Section IX (Cleanup Objectives and Cleanup Levels) of the Consent Order.

ii) Risk Assessment Results

A section should present all risk values, hazard quotients (HQs), and hazard indices (HIs) for human health based on current and reasonably foreseeable future land use. For risk assessments addressing multiple sites, results should be presented separately for each site.

iii) Vapor Intrusion Pathway

If one or more sites has volatile organic chemicals (VOCs) as COPCs, a section should present an evaluation of the vapor intrusion pathway. If the vapor intrusion pathway is not potentially complete because of land use, topography, or other factors, a qualitative evaluation may be used. If the vapor intrusion pathway is potentially complete, a quantitative evaluation should be used.

iv) Essential Nutrients

If essential nutrients are present as COPCs, a section should present a comparison of detected concentrations of essential nutrients to essential nutrient screening levels for appropriate exposure scenarios.

v) Uncertainty Analysis

A section should include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties, including data evaluation and COPC identification, exposure, exposure evaluation, toxicity evaluation, and the additive approach.

vi) Interpretation of Human Health Risk-Screening Results

A section should present all risk values, HQs, and HIs for human health based on current and reasonably foreseeable future land use, as adjusted based on the results of the uncertainty analysis.

i) Ecological Risk-Screening Evaluations

i) Scoping Evaluation

A section should present an evaluation of the breadth and focus of the ecological risk-screening evaluation. The scoping evaluation should be based on an ecological scoping checklist which should be included as an appendix.

ii) Assessment Endpoints

A section should describe the ecological risk screening assessment endpoints evaluated in the screening assessment.

iii) Ecological Risk Screening Evaluation

A section should present ecological risk-screening evaluations including comparisons of EPCs to ecological screening levels and calculations of HQs for each receptor for each COPC and HIs for each receptor.

iv) Uncertainty Analysis

A section should include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties, including

chemical form, exposure assumptions, toxicity values, area use factors, population area use factors, and lowest observable adverse effects levels (LOAELs). A qualitative evaluation of potential risks associated with COPCs not having ecological screening levels should also be provided.

v) Interpretation of Ecological Risk Screening Results

A section should include an evaluation of the potential ecological risk for each receptor considering the multiple lines of evidence presented in the assessment. A summary of the potential risk to ecological receptors should be presented.

j) Conclusions

A section should present the conclusions regarding potential human-health and ecological risk. As applicable, sites posing a potentially unacceptable risk to human health should be identified for each exposure scenario evaluated. As applicable, sites posing a potentially unacceptable ecological risk should be identified for each receptor.

k) References

A section should provide a reference list of all documents cited in the report.

l) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the tables. If the risk assessment is a separate report rather than an appendix to an investigation report, the analytical data tables described in Section III of this Appendix (E) should also be presented.

1. Tables presenting the EPC for each site for each applicable human health exposure scenario and for ecological receptors. The tables should include all applicable COPCs and include the number of analyses, number of detections, minimum concentration, maximum concentration, statistical distribution, EPC, and method used to calculate the EPC.
2. Tables presenting applicable physical and chemical properties for each COPC evaluated in the human health screening assessment.
3. A table presenting exposure parameters for each scenario evaluated in the human health screening assessment and the sources of the parameters.
4. Tables of all human-health screening levels used and the sources of those values. Screening levels may be included in the individual risk screening tables.
5. Tables presenting all risk values, HQs, and HIs under current and reasonably foreseeable future land use for human health for each applicable scenario.
6. Tables presenting risk values, HQs, and HIs for vapor intrusion for each site having a potentially complete vapor intrusion pathway.
7. Tables presenting essential nutrient screening results.

8. Tables presenting ecological screening levels (ESLs) for each receptor evaluated.
9. Tables presenting HQs for each COPC based on the receptor having the minimum ESL.
10. Tables presenting the HI for each ecological receptor.
11. Tables presenting area use factors for each site.
12. Tables presenting the population area use factors for each applicable receptor at each site.
13. Tables presenting adjusted HIs for each applicable receptor at each site.
14. Tables presenting LOAEL-based ESLs for each applicable COPC and receptor.
15. Tables presenting HIs based on LOAEL-based ESLs.
16. Tables presenting adjusted HIs based on LOAEL-based ESLs.

i) Figures

All figures should be provided in this section of the report. As appropriate, DOE may combine one or more of the figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. If the risk assessment is an appendix to an investigation report, only the conceptual site model diagram is recommended.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features or properties.
2. For human health risk assessments, a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. For ecological risk assessments, a topographical map of the site and vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features.
4. Conceptual site model diagrams for both human health and ecological risk assessments.

m) Appendices/Attachments

Each risk assessment report should include appendices containing supporting data. Appendices may include the results of statistical analyses of data sets and comparisons of data, LANL ecological checklists for the site, full sets of results of all sampling investigations at the site, or other data as appropriate. Risk assessments consisting of an appendix to an investigation report should include attachments containing supporting data not included in other appendixes to the investigation report (e.g., ecological checklists, results of statistical analyses of data sets).

VI) Corrective Measures Evaluation Report

DOE should prepare corrective measures evaluations for sites requiring corrective measures using the format listed below.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures evaluation to be conducted at the subject site. The executive summary or abstract should also briefly summarize the conclusions of the evaluation. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures evaluation and the corrective action objectives for the project should also be provided in this section.

f) Background

The background section should describe the relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

This section should include a brief summary of known and possible sources of contamination, the history of releases or discharges of contamination, and the vertical and lateral extent of contamination present in each medium. This section should include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. If references to previous reports are presented, they should include page, table, and figure numbers for referenced information. Summary tables and a site plan showing

relevant investigation locations should be referenced and included in the Tables and Figures sections of the document, respectively.

g) Site Description

i) Surface Conditions

A section on surface conditions should describe current and historical site topography, features, and structures, including a description of topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a description of current site uses and operations. This section should also include a description of those features that could potentially influence corrective action option selection or implementation such as archeological sites, wetlands, or other features that may affect remedial activities. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff or contaminant fate and transport should be included in this section. A site plan displaying the locations of all pertinent surface features and structures should be included in the Figures section of the corrective measures evaluation.

ii) Subsurface Conditions

A section on subsurface conditions should describe the site conditions observed during previous subsurface investigations. It should include relevant soil horizon and stratigraphic information, groundwater conditions, fracture data, and subsurface vapor information. A site plan showing the locations of all borings and excavations advanced during previous investigations should be included in the Figures section. A brief description of the stratigraphic units anticipated to be present beneath the site may be included in this section if stratigraphic information is not available from previous investigations conducted at the site.

h) Conceptual Site Model

i) Sources and Release Mechanisms

A section should provide a list of all sources of contamination at the subject site where corrective measures are to be considered or required. Sources that are no longer considered to be releasing Contaminants at the site, but may be the point of origination for Contaminants transported to other locations, should be included in this section. Descriptions of the mechanisms for releasing Contaminants from the sources should also be included in this section.

ii) Pathways

A section should describe potential migration pathways that could result in either acute or chronic exposures to Contaminants released from the site. It should include such pathways as utility trenches, paleochannels, surface exposures, surface drainages, stratigraphic units, fractures, structures, and other features. The migration pathways for each contaminant and each relevant medium should be tied to the potential receptors for each pathway. A discussion of contaminant characteristics relating to fate and transport of Contaminants through each pathway should also be included in this section.

iii) Receptors and Risks

A section should provide a listing and description of all anticipated potential receptors that could possibly be affected by the contamination present at the site. Potential receptors should include, but are not limited to human and ecological receptors. Descriptions of the potential risks to receptors should also be included in this section. A summary should be provided of complete or potentially complete exposure pathways under current conditions and under reasonably foreseeable future conditions.

i) Regulatory Criteria

A section should set forth the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site. The appropriate cleanup levels for each site should be included, if site-specific levels have been established at separate sites. A table summarizing the applicable cleanup standards or screening levels, or inclusion of applicable cleanup standards or screening levels in the summary data tables should be included in the Tables section of the document. The risk assessment should be presented in a separate document or in an appendix to this report. If cleanup or screening levels calculated in a risk evaluation are employed, the risk evaluation document should be referenced including pertinent page numbers for referenced information. Other regulatory requirements (e.g. endangered species) applicable to corrective actions should be identified and described.

j) Identification of Treatment Technologies

A section should identify the treatment technologies potentially applicable for the waste and/or Contaminants at the site. General classes of technologies considered should include containment, in-situ treatment, excavation/removal, and ex-situ treatment. Candidate technologies should be screened to identify those that are potentially applicable and those that are not applicable.

k) Identification and Screening of Corrective Measures Alternatives

A section should identify and describe potential corrective measures for source, pathway, and receptor controls. Corrective measures alternatives should be comprised of applicable or potentially applicable technologies identified in the Identification of Treatment Technologies section. Corrective measures alternatives should include the range of available options including, as applicable, institutional controls, engineering controls, in-situ and on-site remediation alternatives, complete removal, and any combination of alternatives that would potentially achieve cleanup goals. The no action alternative should also be considered as a baseline for comparison to other alternatives.

l) Evaluation of Corrective Measures Alternatives

A section should provide an evaluation of the corrective measures options identified in Section k above. The evaluation should be based on the threshold criteria and the balancing criteria identified in Section XVI (Corrective Measures Evaluation). A table summarizing the corrective measures alternatives and the criteria listed in Section XVI should be included in the Tables section of this document. The general basis for evaluation of corrective measures options is defined below.

m) Selection of Recommended Corrective Measures Alternative

DOE should propose the recommended corrective measure(s) at the site and provide a justification for the selection in this section. The justification should include the supporting rationale for the remedy recommendation.

n) Design Criteria To Meet Cleanup Objectives

DOE should present general descriptions of the preliminary design for the recommended corrective measures in this section. The description should include appropriate preliminary plans and specifications to effectively illustrate the technology and the anticipated implementation of the remedial option at the subject area. The preliminary design should include a discussion of the design life of the alternative and provide preliminary engineering calculations for proposed remediation systems.

o) Schedule

A section should set forth a proposed schedule for completion of remedy-related activities such as bench tests, pilot tests, construction, installation, remedial excavation, cap construction, installation of monitoring points, and other remedial actions. The anticipated duration of corrective action operations and the schedule for conducting monitoring and sampling activities should also be presented. In addition, this section should provide a schedule for submittal of reports and data to NMED, including a schedule for submitting all status reports and preliminary data.

p) References and Map Data Sources

A section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

q) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the tables. Tables presenting the results of previous investigations and analytical data may also be presented in an appendix.

1. Tables summarizing regulatory criteria, background levels, and the applicable cleanup standards (may be included in the analytical data tables instead of separate tables).
2. Tables summarizing the inventories of wastes disposed of or Contaminants released at the site.
3. Tables summarizing historical field survey location data.
4. Tables summarizing historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
5. Tables summarizing historical soil, rock, and sediment laboratory analytical data. The summary tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.

6. Tables summarizing historical groundwater elevation and depth to groundwater data. The table should include the monitoring well depths and the screened intervals in each well, and the dates and times measurements were taken.
7. Tables summarizing historical groundwater laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
8. Tables summarizing historical surface water laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
9. Tables summarizing historical air sample screening and laboratory analytical data. The data tables should include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
10. Tables summarizing historical pilot or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.
11. Tables summarizing the corrective measures alternatives and evaluation criteria.
12. Tables identifying potential remedial action technologies and summarizing their potential applicability.
13. Tables summarizing the screening of corrective measures alternatives against screening criteria.
14. Tables presenting the schedule for installation, construction, implementation, and reporting of selected corrective measures.

r) Figures

All figures should be provided in this section of the report. This section should include the following figures for each site, as appropriate. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures should contain a date of preparation. Figures presenting sampling locations and results of previous investigations may also be presented in an appendix.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting historical soil boring or excavation locations and sampling locations.
4. Figures presenting historical soil sample field screening and laboratory analytical data, if appropriate.

5. Figures presenting all existing wells including vapor monitoring wells and piezometers.
6. Figures presenting historical groundwater elevation data and indicating groundwater flow directions.
7. Figures presenting historical groundwater laboratory analytical data including past data, if applicable. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map.
8. Figures presenting historical surface water sample locations and laboratory analytical data including past data, if applicable. The analytical data corresponding to each sampling location may be presented as individual concentrations or in table form on the figure.
9. Figures presenting historical air sampling locations and presenting air quality data. The field screening or laboratory analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map.
10. Figures presenting historical pilot and other test locations and data, if applicable, including site plans or graphic data presentation.
11. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.
12. Figures depicting the baseline conceptual site model.
13. Figures presenting the locations of existing and proposed remediation systems.
14. Figures presenting existing remedial system design and construction details.
15. Figures presenting preliminary design and construction details for recommended corrective measures.
16. Figures depicting the conceptual site model following implementation of the recommended corrective measures.

s) Appendices

Each corrective measures evaluation should include, as appropriate, appendices presenting conceptual designs of corrective measures alternatives and relevant additional data, such as historical investigation results, pilot or other test or investigation data, remediation system design specifications, system performance data, or cost analyses as necessary.

VII) Corrective Measures Implementation Plan

DOE should prepare corrective measures implementation plans for sites requiring corrective measures using the format listed below.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures to be implemented at the subject site. The executive summary or abstract should also briefly summarize the approach to the corrective measures to be implemented. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures implementation plan. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures to be implemented and the corrective action objectives for the project should also be provided in this section.

f) Background

The background section should describe the relevant background information at a summary level including:

- historical site uses by the U.S. Government and any other entity since 1940;
- the locations of current and former site structures and features (a labeled figure should be included in the document showing the locations of current and former site structures and features;
- the locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures; and
- the vertical and lateral extent of contamination present in each medium.

g) Site Description

This section should describe the site at which the corrective measures will be implemented, providing for the locations of structures, utilities, surface grades and conditions.

h) Regulatory Criteria

This section should describe how the corrective measure will meet the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site after implementation of the remedy.

i) Description of Corrective Measures to be Implemented

The Corrective Measures Implementation Plan should provide a description of the following elements:

- The selected final remedy,
- The cleanup goals and remediation system objectives, and
- The identification and qualifications of all persons, consultants, and contractors that will be implementing the remedy.

j) Figures, Tables, and Appendices

The plan should include the following items:

- Detailed engineering design drawings and systems specifications for all elements of the remedy;
- A construction work plan;
- An operation and maintenance plan;
- The results of any remedy pilot tests;
- A plan for monitoring the performance of the remedy, including sampling and laboratory analysis of all affected media;
- A waste management plan;

k) Schedule

This section should set forth a proposed schedule for submittal to NMED of periodic progress reports and for implementation of the remedy.

VIII) Corrective Measures Implementation Report

DOE should prepare corrective measures implementation reports for sites requiring corrective measures using the format listed below.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures that were implemented at the subject site. The executive summary or abstract should also briefly summarize the final configuration and justification for acceptability of the corrective measures implemented. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures that were implemented and how the corrective action objectives for the project were met.

f) Background

The background section should describe the relevant background information at a summary level including:

- historical site uses by the U.S. Government and any other entity since 1940;
- the locations of current and former site structures and features (a labeled figure should be included in the document showing the locations of current and former site structures and features;
- the locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures; and
- the vertical and lateral extent of contamination present in each medium before the corrective measures implementation.

g) Description of Corrective Measures that were Implemented

This section should described or summarize the corrective measures implemented at the site. A statement that the remedy has been completed in accordance with the NMED-approved corrective measures implementation plan for the remedy. Any differences from the Corrective Measures Implementation Plan should be identified with an explanation of the rationale for deviations from the original plan.

h) Site Description

This section should describe the site following implementation of the corrective measures. Photographs and figures may be used.

i) Conceptual Site Model

This section should be provided to update the conceptual site model (as presented in the CME Report) for the as-built configurations at the completion of the corrective measures implementation. Any differences from the Corrective Measures Implementation Plan should be identified with an explanation of the expected effect on the conceptual site model of anticipated performance. The final conceptual site model should address changes in the sources of Contaminants and release mechanisms, pathways, and receptors and risks.

j) Regulatory Criteria

This section should describe how the corrective measure meets the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site after implementation of the remedy.

k) References and Map Data Sources

This section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

l) Figures, Tables, and Appendices

The report should include: as-built drawings and specifications signed and stamped by a registered professional engineer, if applicable; copies of the results of all monitoring, including sampling and analysis, and other data generated during the remedy implementation; and copies of all waste disposal records.