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# **PROJECT 2 – TASK 3 SUSTAINABLE INDICATORS REPORT**

Prepared for the  
Clark County Department of Comprehensive Planning  
Nuclear Waste Division



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## 1.0 INTRODUCTION

This report is the second step toward preparing a Sustainability Impact Assessment and developing a monitoring program to assess and mitigate impacts resulting from the U.S. Department of Energy's (DOE) proposal to construct the Yucca Mountain Repository and transport High Level Nuclear Waste and Spent Nuclear Fuel (HLW) through Clark County. This report builds on an earlier report, *Project 1 – Task 1 Baseline Information and Community Perspective on Potential Repository Impacts on Clark County*. This earlier report summarized over a decade of work by Clark County's Nuclear Waste Division, the State of Nevada, and numerous contractors who have analyzed the vulnerabilities and adverse impacts faced by communities along the shipment corridor within Nevada. To date, the impacts have not been systematically prioritized, placed into a sustainability framework, evaluated in terms of indicators or measures that can be monitored. For Clark County it is critical to identify the set of impacts that are likely to significantly affect the county's economy, environment and community well-being because the Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DEIS) did not adequately address many of the issues that are most important to Clark County residents and that will require preventative and mitigative policies to be implemented.

The *Project 1 – Task 1 Baseline Information and Community Perspective on Potential Repository Impacts on Clark County* report indicated that “even without accidental radioactive events from transporting nuclear waste, Clark County would likely experience declines in residential and commercial property values along shipment routes; a decline in investments in such things as second home development; significant costs in governmental services to manage the program; potential losses in the visitor tourist sector; and perhaps significant declines in

many aspects of community well-being and satisfaction with living in the Las Vegas area and other municipalities.”

Since Clark County is charged with protecting the public health and safety of its citizens as acknowledged in Section 116C of the Nuclear Waste Policy Act (NWPA), the purpose of this report is to assist Clark County in developing a program to identify and monitor adverse impacts resulting from the DOE’s proposed shipment campaign. The program’s goal will be to monitor key impact indicators that can provide an early warning to decision makers if Clark County’s economy, environment, or community well-being is adversely affected so that appropriate mitigation can be implemented.

The monitoring program will be designed to be responsive not only to the full array of issues that have been identified by the residents of Clark County as important to their well-being, but also those identified in the *Project 1 - Task 1 Baseline Information and Community Perspective on Potential Repository Impacts on Clark County* report and summarized in Section 3.0 of this report. As a first step, this report summarizes the indicators that have been legally recognized (Section 2.0); identifies the key impact areas that have been identified by Clark County and the State of Nevada (Section 3.0); discusses the purposes for indicator programs (Section 4.0); summarizes a preliminary list of indicators that are either already monitored within Clark County or that have been identified by Clark County personnel as indicators that should be monitored if the U.S. DOE’s shipment campaign goes forward (Section 5.0); and prioritizes the indicators identified to date within a sustainability framework (Section 6.0).

Since Clark County recognizes that the DOE’s program is still evolving and that the environment in Clark County is dynamic, the selection of impact indicators will be an iterative process that will incorporate new information as it becomes available. The indicators that are

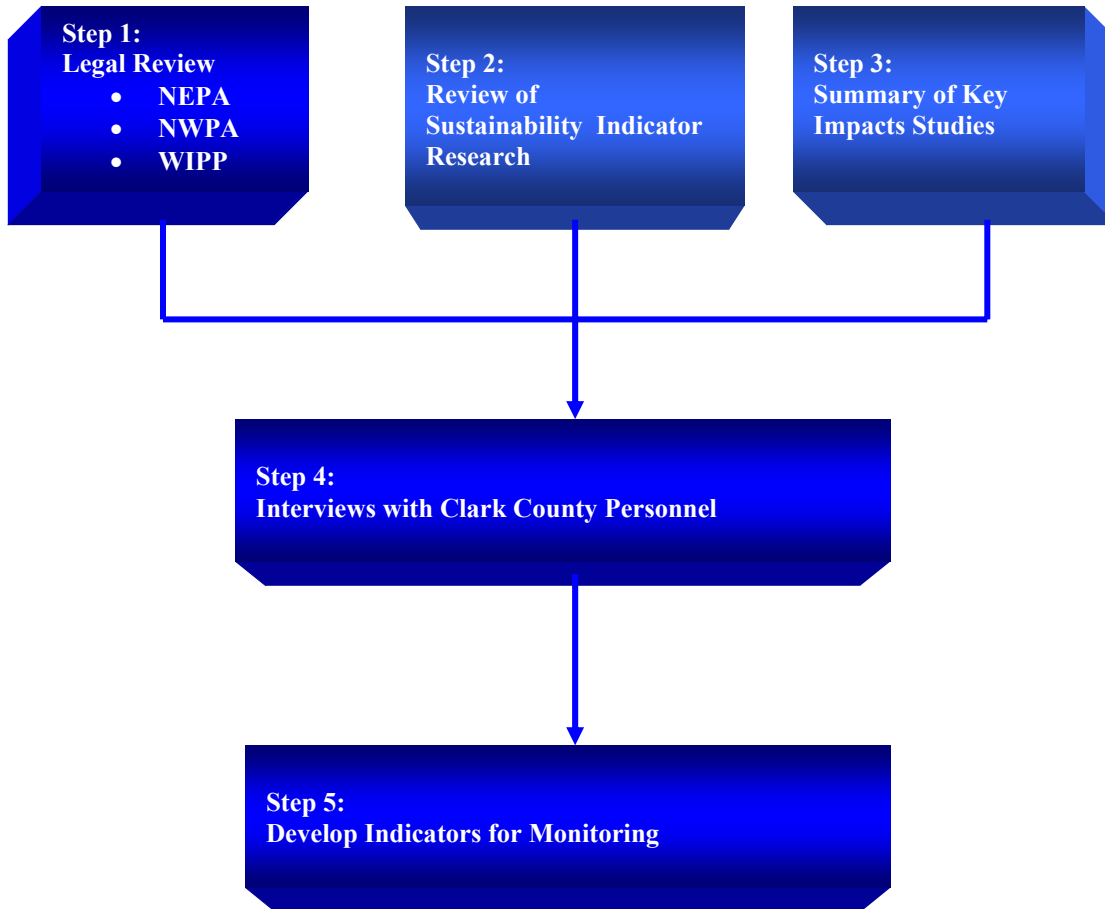
selected, however, will be drawn from those previously identified as meaningful for measuring community sustainability and that have been recognized as legally cognizable and/or have been recognized as important by Clark County personnel. For purposes of this report, legally cognizable indicators are those standards that have been codified in law, such as the National Ambient Air Quality Standards (NAAQS) of the Clean Air Act, and those standards that have been recognized by the courts in their interpretation of Federal and State law.

## **1.1 Approach**

In order to identify indicators that would be appropriate for Clark County's Nuclear Waste Division to monitor and evaluate the potential impacts of the DOE's proposal to transport HLW and SNF through Clark County, a Five-step research approach was implemented (Figure 1). These steps included the following components:

1. A review of the relevant legal framework that governs impact assessment and mitigation both for the proposed Yucca Mountain repository and for the Waste Isolation Pilot Project (WIPP). The legislation governing WIPP, the Waste Isolation Pilot Plant Land Withdrawal Act of 1992, was reviewed since it is the only one managed by the DOE that is receiving large shipments of radioactive waste. The National Environmental Policy Act of 1969 (NEPA) was selected because it establishes the nation's environmental compliance policy for all major Federal projects including the DOE's proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW. The NWPA and its amendments was analyzed because it details the specific standards that the U.S. Congress has determined governs the DOE's plans to construct a repository at Yucca Mountain and to ship HLW to that repository.

**Figure 1 Approach to Identification of Impact Areas and Indicators**



2. A review of the sustainability indicator research to identify the key indicators that have been used for early identification of adverse impacts from large-scale federal projects or to identify the direction and magnitude of changes in communities.
3. A summarization of the key impacts and issues identified by Clark County, the State of Nevada and local jurisdictions related to the DOE's plan to construct the Yucca Mountain Repository and to ship HLW through Clark County; and
4. Interviews with key Clark County governmental personnel to identify indicators that are currently measured as part of the County's activities to protect the public health and safety. (Figure 1).

### **1.1.1 Step 1: Legal Review**

Legislation that governs the DOE's responsibilities toward communities that are adversely impacted by shipment campaigns of radioactive wastes was studied to identify indicators that are legally cognizable. These include the National Environmental Policy Act of 1969, as amended; the Nuclear Waste Policy Act of 1982, as amended by the Nuclear Waste Policy Amendments Act (NWPAA) of 1987; and the Waste Isolation Pilot Plant Land Withdrawal Act of 1992.

NEPA was selected because it provides the framework for making all environmental decisions on major projects within the United States, including the DOE's proposal to construct the Yucca Mountain Repository and to transport HLW through Clark County. The NWPAA was selected because it identifies both exemptions to federal and State laws that Congress has authorized related to the construction of a permanent repository at Yucca Mountain, as well as specific requirements that the DOE must comply with if a decision to construct a permanent repository at Yucca Mountain is made. The NWPAA and the Energy Act of 1992 contain amendments to the NWPAA. The WIPP Land Withdrawal Act was selected because it provides a framework for how the DOE monitors and mitigates the impacts from the only existing nationwide program to transport transuranic radioactive wastes to the WIPP facility at Carlsbad, New Mexico. It provides an opportunity to evaluate the impacts that were recognized and mitigated by this legislation.

### **1.1.2 Step 2: Review of Sustainability Research**

A growing number of communities have established indicator programs to monitor whether they are growing their economies; managing their environmental resources; and contributing to the community's well-being in a sustainable manner. These indicator programs

have proven to be useful measures of overall community well being. These programs have been designed to provide policy makers and citizens with the information necessary to make informed decisions about the use and allocation of resources. For example, a community that relies heavily on tourism might use their hotel occupancy rate as a measure of economic well-being. If the hotel occupancy rate begins to decline then community leaders would be alerted to identify the causes and to the need to consider mitigation measures to boost the occupancy rate or make other adjustments to lessen the impact of declining tourism on the economy.

By reviewing successful indicator programs and their indicators, it allows Clark County to select the most appropriate indicators for monitoring the potential impacts from the DOE's proposed shipment campaign.

### **1.1.3 Step: 3 Summary of Key Impact Studies**

In response to the release of the Draft Environmental Impact Statement (DEIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada in August of 1999, Clark County and the State of Nevada prepared extensive comments documenting the areas that would be most impacted as a result of the DOE's plans. These summaries were reviewed in order to identify the effected areas and issues for which relevant indicators need to be constructed. In addition, a number of surveys have been conducted within Clark County that illustrates the community well-being factors considered most important by the residents of Clark County. These surveys were also reviewed in order to identify important community well-being factors for which indicators could be constructed.

#### **1.1.4 Step 4: Interviews**

A series of interviews were conducted with Clark County governmental personnel to identify the existing indicators used to monitor current conditions by their agencies (in many cases these consisted of regulatory standards for environmental factors). In addition, these personnel were asked to identify specific indicators that they believed would be important to monitor if the DOE proceeds with their proposal to construct the Yucca Mountain Repository and to transport HLW through Clark County. These indicators are discussed in Section 5.0 of this report.

Personnel were selected to be interviewed because of their management responsibilities in areas that have previously been identified as potentially impacted by the proposed shipment campaign. Representatives from the following agencies were contacted (Appendix A):

- Department of Administrative Services
  - Emergency Management Division
- Clark County Assessors Office
- Department of Comprehensive Planning
  - Current Planning Division
  - Major Projects
  - Current Planning
- Environmental Planning Division
  - Air Division
  - Natural Resources
  - Advanced Planning Division
  - Community Planning

- Department of Finance
  - Community Resources Management

In addition key representatives of the Clark County School District were interviewed and their concerns were recorded and translated into indicators.

## 1.2 **Key Terms**

Four of the key terms used throughout this report, impacts, indicators, monitoring, and community well-being have been defined in various ways. For purposes of this report, impacts are any positive or adverse change to the environment, community well being, or economy resulting from any external change agent such as the DOE's proposed shipment campaign of HLW through Clark County. Indicators are those factors or conditions that will be routinely measured to determine whether positive or adverse changes are occurring to the environment, community well being, or economy, as a result of the shipment campaign. Measures or indicators will permit assessments of the direction and magnitude of change from baseline conditions or from articulated goals or standards. Monitoring is the formal measurement and evaluation of key indicators over time to determine if changes are occurring to the environment, community well being, or economy as a result of the shipment campaign. Community well being, also frequently referred to as quality of life alludes to the state of social well-being of an individual or group, either as perceived or as identified by observable indicators (Johnston et al 1994).

The monitoring of key indicators to identify any changes that occur to the environment, community well being, or economy of an area resulting from a major initiative is a well established practice used world-wide. The problem of selecting indicators to monitor and effectively measure change resulting from a shipment campaign is complicated because of the nature of the waste being shipped. In numerous studies, citizens have indicated that nuclear

wastes are among the most feared hazards or disamenities, and that people are reluctant to live or work near these wastes and routes used to transport these wastes. Repeated surveys in Clark County indicate that 75% are unwilling to purchase homes near the transportation corridor. In fact, almost 80% of residents surveyed believe that property values along the transportation corridor will decline if the DOE proceeds with its shipment campaign, even without incidents.

Further, several courts have legally recognized property value loss resulting from the stigma associated with the shipment of radioactive wastes. In a case brought in Santa Fe, New Mexico, the State of New Mexico was found liable for damages associated with the loss of property value for a property adjacent to a bypass that was constructed for the shipment of radioactive wastes to the WIPP facility in Carlsbad, New Mexico (ZIA Associates 1997). The court found that if a property's value declined as a result of the perceived risk associated with the transportation of radioactive wastes, even if the perception was unfounded, then the property value loss needed to be compensated.

The challenge for Clark County is to design a monitoring program of impacts that can proactively identify changes to the environment, community well-being, and economy that may be triggered not by population changes alone but by the stigma associated with the perceived risk of transporting radioactive waste. A survey of Clark County bankers and appraisers for the State of Nevada found that stigma-induced property value diminution can be anticipated from the DOE's shipment campaign even if no incident occurs (Conway et al 2000). Potential property value diminution was found to exist for all types of properties including residential, commercial, and industrial. The magnitude of property value losses was found to increase substantially if a transportation accident was to occur. The ambiguity and uncertainty associated with the DOE's proposal argues for a monitoring program that is comprehensive and dynamic. Accurate, readily

available information presented in a framework that can be easily understood and utilized to identify mitigative actions will be vital to maintain the communities' well-being.

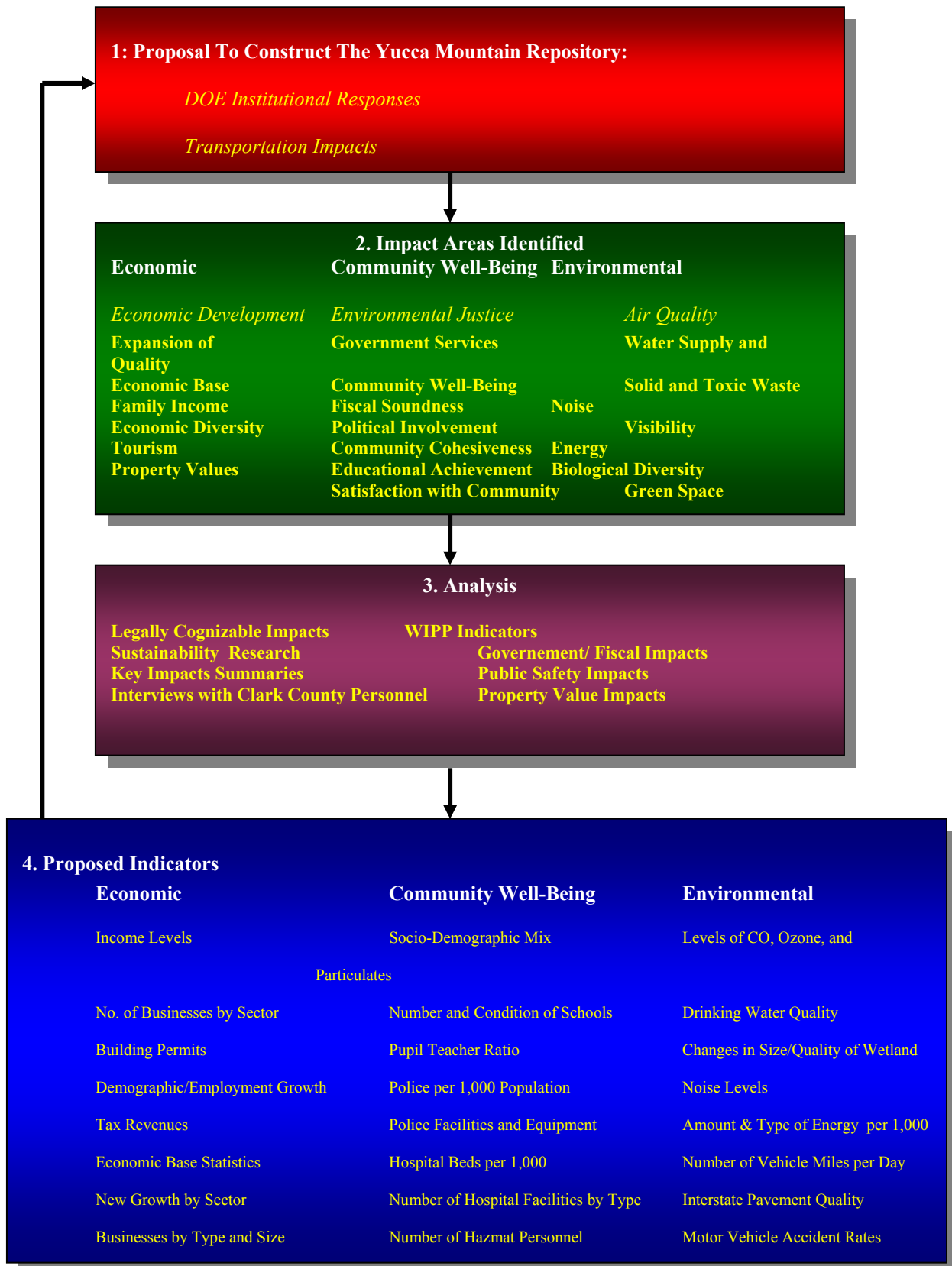
### **1.3 The Process for Identifying Impact Indicators**

As noted in Section 1.0, Clark County is responsible for protecting the public health and safety of its citizens. Toward this end the county provides governmental services and monitors a number of indicators to ensure the well being of its citizens. These indicators include standards promulgated by the federal government and monitored by the County. Air quality and water quality monitoring is an example of routine monitoring by the County to ensure that contaminant concentrations in air and water comply with federal environmental regulations. The County has also identified other indicators it deems important to monitor including school enrollments and measures of economic development.

DOE's proposal to develop a high-level nuclear waste repository and attendant transportation systems may adversely impact public health and safety, local economies, and quality of life. It is vital that Clark County be able to monitor a set of indicators that can provide an early warning to decisionmakers if DOE's proposed shipment campaign adversely impacts Clark County. The monitoring of these indicators will also provide information of the magnitude of the effects from established existing conditions or projected goals. The purpose of the report is to develop a list of priority indicators that can be monitored by Clark County and local jurisdictions as a basis of measuring changes that may result from the repository and its related transportation of high-level nuclear waste.

Figure 2 provides an illustration of the process of identifying impact indicators found in this analysis.

**Figure 1 Process of Identifying Impact Indicators for Monitoring**



Step 1 is not explicitly developed in this report because it is dealt with elsewhere in Clark County and the State of Nevada’s research on Yucca Mountain. Step 1 involves the characterization and understanding of the source of the potential changes to the proposed Yucca Mountain repository. The construction and operation of the repository and the shipment campaign can be viewed as the drivers of the impacts to the County. It will be important to know the exact routes over which the wastes will be transported, the number of shipments and mode, the inspection and safety systems that will have to be in place, the population at risk, among a larger set of data requirements that define and characterize the repository program. Any changes in the repository program including regulatory and institutional changes would obviously result in changes in the type and magnitude of impacts that may be experienced in Clark County. The identification of the impact areas to be evaluated by the County is directly linked to the repository and its associated transportation programs.

Step 2 in our analysis identifies and reviews the impact areas that have previously been recognized by Clark County’s Nuclear Waste Division and the State of Nevada as being potentially adverse to public health, well being and the economy of Clark County. Based on 15 years of impact assessment studies specific areas that are likely to be impacted were identified. These impact areas found in Step 2 provide a base framework from which specific indicators can be derived and monitored and that are directly linked to the repository program. Step 2 also categorizes the impact areas into three broad groupings—economic impacts, community well being impacts and environmental impacts. These broad categories provide a framework to examine the impacts of the repository from a “sustainability” perspective. This concept and how it is applicable to potential repository impacts is discussed in the report.

Step 3 describes the process and key components of the analysis that was taken in order to determine and identify the impact indicators. First, the key legislation that was designed to protect the environment from adverse impacts of major federal initiatives and the laws governing radioactive waste disposal facilities were analyzed to provide insights as to the types of indicators that have been legally recognized. Thus, federal laws and the federal agency guidance documents on the implementation of these laws was one approach for prioritizing the indicators to be monitored.

Secondly, we carefully reviewed the key impact assessments related to the proposed repository with the intent to discern from them precise measures characterizing the impacts. This was another approach to identify and prioritize impact indicators. The third analysis completed to meet our objectives in this study was to interview personnel from County departments that are mandated to monitor repository-related impacts. The interviews asked questions about departmental responsibilities, the legal basis for monitoring change and reporting requirements, as well as estimating expected impacts from the repository and related transportation programs. A set of indicators were therefore identified through these interviews either because these are mandated and could be associated with the transportation of high-level nuclear waste through Clark County or can be anticipated as a result of possible risk events. Lastly, indicators were also derived from current studies by Clark County's Nuclear Waste Division including studies examining fiscal impacts, public safety, and property value effects. In addition, a report examining lessons learned from the WIPP experience, also informed this study with respect to the indicators that were utilized for impact assessments, monitoring, and those that perhaps should have been utilized in New Mexico.

Step 4 provides a summary of the prioritized indicators or measures recommended to be utilized by Clark County in any impact monitoring program related to the transportation of nuclear waste through Clark County. These indicators result from examining the full array of indicators from the various analyses described above.

The resulting indicators were based on the data derived from the other steps and analyzed in order to establish an efficient monitoring program that maximizes the use of current and available data sources.

## **2.0 LEGALLY COGNIZABLE IMPACTS**

### **2.1 The National Environmental Policy Act of 1969 (NEPA, 42 USC 4321)**

In 1969, the United States Congress (Congress) adopted the NEPA with an implementation date of January 1, 1970. The purpose of the act was to “declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality” (NEPA, 42 USC ‘ 4321).

The language of the statute is brief and general. It was originally comprised of a declaration of Congressional purpose and two subchapters. The first subchapter described the policies and goals of NEPA, while the second established the Council on Environmental Quality (CEQ) and delineated its responsibilities.

When NEPA was initially authorized, the Congress did not empower CEQ to promulgate regulations resulting in inconsistent responses from the various federal agencies. To address the inconsistencies, President Carter approved Executive Order No. 11991, which directed CEQ to

disseminate mandatory regulations. These regulations were codified in 40 C.F.R. (Part 1500, et Seq.) and compel federal agencies to abide by the purpose, policy, and mandates of NEPA in their planning processes. Included is a requirement to prepare an Environmental Impact Statements for all major decisions that utilize federal funds.

The *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 C.F.R. Parts 1500, et Seq.) briefly references methodology in Section 1502.24, which states:

*“Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of the methodology in the appendix.”*

Guidance detailing the methods and standards to be considered within an EIS can be found in the various memoranda, checklists, and guidance documents that have been developed by the federal agencies in response to NEPA. This guidance establishes the factors that have been legally recognized as appropriate for mitigation. Relative to the DOE’s proposal to construct the Yucca Mountain Repository and to ship HLW through Clark County, these memoranda, checklists, and guidance documents are particularly informative for identifying the range of issues that Clark County can appropriately seek mitigative relief from the DOE, if they proceed with the shipment campaign.

One of the initial guidance documents prepared by CEQ was *Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations*. Like NEPA, this document does not specifically address the methods or standards to be used in preparing and evaluating an

EIS. Instead, this guidance primarily addresses procedural issues related to the implementation of NEPA. Two of the questions addressed in this document however are relevant to the issue of standards. Question 19 addresses the scope of mitigation measures that must be addressed. It states:

*“The mitigation measures discussed in an EIS must cover the range of impacts of the proposal. The measures must include such things as design alternatives that would decrease pollution emissions, construction impacts, aesthetic intrusion, as well as, relocation assistance, possible land use controls that could be enacted, and other possible efforts. Mitigation measures must be considered even for impacts that by themselves would not be considered ‘significant’.” Once the proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not ‘significant’) must be considered, and mitigation measures must be developed where it is feasible to do so.”*

This discussion implies that the proposed action within the EIS will adversely affect some environmental standard. Question 23, specifically references an obligation to acknowledge “conflicts with land use plans, policies, or controls.” And further details that these include those policies promulgated by local, regional, and State executive and/or legislative bodies.

In 1983, CEQ linked the NEPA process with the obligation of federal agencies to comply with other federal laws and Executive Orders (CEQ 1983). The *Memorandum Guidance Regarding NEPA Regulation* states that an EIS should include “issues which originate from separate legislation, regulation, or Executive Order (e.g., historic preservation or endangered species concerns); and identify State and local agency requirements which must be addressed.”

(Reinke and Swartz 1999, pg. G 66) This memorandum goes on to state that an EIS should encompass “to the maximum extent possible all of the environmental and public involvement requirements of State and Federal laws, Executive Orders, and administrative policies of the involved agencies. Examples of these requirements include the Fish and Wildlife Coordination Act, the Clean Air Act, the Endangered Species Act, the National Historic Preservation Act, the Wild and Scenic Rivers Act, the Farmland Protection Policy Act, Executive Order 11990 (Protection of Wetlands), and Executive Order 11998 (Floodplain Management)”(Reinke and Swartz 1999, pg. G 67).

The linkages between NEPA and existing federal law, regulation, and Executive Order has subsequently been broadened to incorporate pollution prevention, transboundary impacts, and Executive Order 12898 on Environmental Justice Consideration (Reinke and Swartz 1999, pgs. P-89, T-95, and J-99). Taken as a whole, NEPA, the *Memorandum Guidance Regarding NEPA Regulation* and the subsequent Executive Orders promulgated by CEQ establish Federal and State law and regulatory requirements as the *recognized standards* for measuring impacts under NEPA.

More recently, CEQ developed guidance addressing methodological approaches that are acceptable for measuring cumulative impacts in their 1997-guidance document, *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997). This document lays out a series of methodological approaches that can be combined to evaluate cumulative effects. NEPA defines cumulative effects as “*the impacts on the environment, which results from the incremental impact of the action when added to other past, present, and future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions*” (40 CFR 1508.7). The guidance specifically argues that “analyzing cumulative effects ultimately

depends on the careful application of individual methods, techniques, and tools to the environmental impact assessment at hand.” Specifically, the guidance encourages the use of a suite of primary methods that includes:

- Questionnaires, interviews and panels;
- Checklists;
- Matrices;
- Networks and system diagrams;
- Modeling;
- Trend analysis; and
- Overlay mapping and GIS (CEQ 1997, pg vi).

This guidance document also encourages the use of special methods to identify cumulative impacts such as carrying capacity analysis, ecosystem analysis, economic impact analysis, and social impact analysis. (CEQ 1997, pg vi). Further, this document argues that the purpose for using any of these analytical techniques should be the design of mitigation strategies (CEQ 1997, pg vii).

In addition to CEQ another key player in the review of EISs under the NEPA is the U.S. Environmental Protection Agency (USEPA). Since 1970, the USEPA has reviewed virtually all of the roughly 25,000 EISs that have been prepared (USEPA 1999). This is the result of a Congressional effort to address an ambiguity in NEPA, through an amendment to the Clean Air Act of 1997 that delegates the requirement to review EISs prepared in response to NEPA to USEPA. Section 309 of the Clean Air Act of 1997 states that NEPA does not assure that Federal environmental agencies will effectively participate in the decision-making process. It is essential that mission-oriented Federal agencies have access to environmental expertise in order

to give adequate consideration to environmental factors@ (Senate Report No. 91-1196, 91st Congress, 2nd Session 43, 1970; 40 CFR Part 6; Subpart A).

The USEPA guidance document, *Cross-Cutting Environmental Laws: A Guide for Federal/State Project Officers*, parallels the CEQ's *Memorandum Guidance Regarding NEPA Regulation* in stressing the integration of Federal environmental laws into the NEPA process (USEPA 1991). Similarly, another USEPA guidance document, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, references the CEQ's handbook, *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997), as the "most comprehensive and useful information to date on practical methods for addressing cumulative effects in NEPA" (USEPA 1999).

The DOE after much resistance adopted NEPA Implementing Procedures in code 10 C.F.R. Part 1021. These Implementing Procedures adopt by reference the CEQ regulations. The DOE has developed an EIS checklist as part of their NEPA implementation guidance (DOE 1997). This DOE NEPA guidance document also emphasizes the use of federal standards, as well as, state, and local government regulations as appropriate guideposts for measuring impacts.

## **2.2 Draft Environmental Impact Statement (DEIS)**

As required by NEPA, the DOE released the Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DEIS) in July of 1999. The Proposed Action in the DEIS includes the shipment of spent nuclear fuel and other high-level radioactive waste that is currently stored at 72 civilian and commercial facilities and 5 DOE facilities to a permanent storage repository at Yucca Mountain, Nye County, Nevada approximately 90 miles northwest of Clark County, Nevada.

The DEIS identified the following as “statutes and regulations establishing or affecting authority to propose, license, and develop a monitored geologic repository” (DEIS 1999; pgs. 11-1 to 11-5):

- Nuclear Waste Policy Act of 1982, as amended (42 USC ‘ 10101-10270)
- Energy Policy Act of 1992 (42 USC ‘ 10101 et seq.)
- National Environmental Policy Act of 1969, as amended (42 USC ‘ 4321 et seq.)
- Atomic Energy Act of 1954, as amended (42 USC ‘ 2011 et seq.)
- Federal Land Policy and Management Act of 1976 (43 USC ‘ 1701 et seq.)
- Executive Order 11514, National Environmental Policy Act, Protection and Enhancement of Environmental Quality.

The DEIS also describes over forty statutes, regulations, and orders regarding environmental protection requirements that are also applicable to the Yucca Mountain project [Appendix B (DEIS 1999; pgs. 11-5 to 11-17)]. Compliance with these statutes and regulations provide the basis for many of the indicators that are suggested for monitoring in Section 6.0.

These Federal laws and Executive Orders govern primarily environmental factors that the DOE said were considered in the DEIS. To describe the affected environment relative to socio-economic factors, the DOE used the Regional Economic Models, Inc. (REMI) to estimate baseline socio-economic conditions. The DEIS compared Nevada’s 1990 B to 1997 growth rate with the national average. Similarly, the DOE used national averages to compare the employment rate, pupil B teacher ratios, officer to B population ratios, and firefighters per 1,000 population within Clark County. The DOE forecast the number of households based on the assumption that the persons per household and occupancy rates remain static. Recent data indicate that the rate of persons per household and occupancy rates are decreasing. This means

that the method used by the DOE in the DEIS may undercount the impact of the shipment campaign on the housing stock in Clark County. The DOE also measured the number of beds per 1,000 and patient days by holding the usage rate constant with those identified in 1996 (Roderfer et al. 1996, pgs 214 - 216).

### **2.3 Nuclear Waste Policy Act**

In 1982, the United States Congress passed the NWPA, which was amended in 1987. The NWPA and its amendments established the process that is to be used by the DOE in the site selection, site characterization, EIS preparation, and decision to recommend to the President the development of a geologic repository for the disposal of spent nuclear fuel and other high-level radioactive waste at Yucca Mountain, Nevada.

The NWPA states that *“any recommendation made by the Secretary under this section shall be considered a major Federal action significantly affecting quality of the human environment for purposes of the National Environmental Policy Act of 1962 [42 U.S.C. 4321 et seq.]. A final environmental impact statement prepared by the Secretary under such Act shall accompany any recommendations to the President to approve a site for a repository.”*

Section 113d of the NWPA specifically groups all activities during the site characterization phase into what is designated as a “preliminary activity” that is to be addressed in only one EIS.

The NWPA also limits the alternative sites to be considered under NEPA to the Yucca Mountain site (section 114F) and instructs the Nuclear Regulatory commission that *“to the extent such statement is adopted by the Commission, such adoption shall be deemed to also satisfy the responsibilities of the Commission under the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] and no further consideration shall be required, except that nothing*

*in this subsection shall affect any independent responsibilities of the Commission to protect the public health and safety under the Atomic Energy Act of 1954” [42 USC 2011 et seq.].*

The NWPA also lays out the process for States and Indian tribes to indicate their disapproval of a Presidential recommendation to Congress of the Yucca Mountain site. Within 60 days of a Presidential recommendation, either the Governor, legislature, or governing body of a tribe on whose reservation the site is located, may submit a notice of disapproval to Congress under section 116 or 118 [U.S.C. 10136 and 10138]. Upon submittal of a notice of disapproval, Congress must respond with a passage of a resolution of site approval within the first 90 calendar days of continuous session or the site is disapproved (Section 115C).

The NWPA also provides for consultation with the State (Section 117C) particularly as it relates to off site concerns *“including but not limited to, questions of State liability arising from accidents, necessary road upgrading and access to the site, ongoing emergency preparedness and emergency response, monitoring of transportation of high-level radioactive waste and spent nuclear fuel through such State, conduct of baseline health studies of inhabitants in neighboring communities near the repository site and reasonable periodic monitoring thereafter, and monitoring of the repository site upon any decommissioning and decontamination.”*

Consultation and financial assistance to Indian Tribes is provided for in Section 118.

The NWPA also provides for the development of “standards for the protection of the general environment from radioactive material in repositories,” and by the EPA and excludes this activity from the NEPA requirement to prepare an EIS [Section 121 A and C].

Subtitle G specifies which impact areas are to be considered for mitigation (Section 175). These include:

- (1) education, including facilities and personnel for elementary and secondary schools, community colleges, vocational and technical schools and universities;*
- (2) public health, including the facilities and personnel for treatment and distribution of water, the treatment of sewage, the control of pests and the disposal of solid waste;*
- (3) law enforcement, including facilities and personnel for the courts, police and sheriff's departments, district attorneys and public defenders and prisons;*
- (4) fire protection, including personnel, the construction of fire stations, and the acquisition of equipment;*
- (5) medical care, including emergency services and hospitals;*
- (6) cultural and recreational needs, including facilities and personnel for libraries and museums and the acquisition and expansion of parks;*
- (7) distribution of public lands to allow for the timely expansion of existing, or creation of new, communities and the construction of necessary residential and commercial facilities;*
- (8) vocational training and employment services;*
- (9) social services, including public assistance programs, vocational and physical rehabilitation programs, mental health services, and programs relating to the abuse of alcohol and controlled substances;*
- (10) transportation, including any roads, terminals, airports, bridges, or railways associated with the facility and the repair and maintenance of roads, terminals, airports, bridges, or railways damaged as a result of the construction, operation, and closure of the facility;*

- (11) *equipment training for State and local personnel in the management of accidents involving high-level radioactive waste;*
- (12) *availability of energy;*
- (13) *tourism and economic development, including the potential loss of revenue and future economic growth; and*
- (14) *other needs of the State and local governments that would not have arisen but for the characterization of the site and the construction, operation, and eventual closure of the facility. [42 USC 10174(a)]*

Subtitle H Section 180C also requires the DOE to “*provide technical assistance and funds to States for training for public safety officials of appropriate units of government and Indian tribes through whose jurisdiction the Secretary plans to transport spent nuclear fuel or high-level radioactive waste under subtitle A or under subtitle C. Training shall cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. The Waste Fund shall be the source of funds for work carried out under this subsection.*” [42 USC 10175]

#### **2.4 Waste Isolation Pilot Plant Land Withdrawal Act of 1992**

The Waste Isolation Pilot Plant Land Withdrawal Act provides the regulatory framework for the operations and decommissioning activities to be conducted at the WIPP facility in Carlsbad, New Mexico. The WIPP facility is designed to receive approximately 38,000 shipments of transuranic radioactive waste over 35 years. The WIPP Land Withdrawal Act states that the facility and shipment campaign must comply with all provisions of the Clean Air Act (42 USC 7401 et Seq.) and the Solid Waste disposal Act (42 USC 6901 et Seq.) with the exception of the land disposal restrictions described in section 9(a)(1), as well as, “any other applicable

clean air or hazardous waste law” (Section 14). The WIPP bill also provides economic assistance of \$20,000,000 per year for the fourteen-year period of waste transport and a commitment that the DOE will provide assistance to the State of New Mexico to support the acquisition of public safety equipment and training. The WIPP Land Withdrawal Act indicates that the \$20,000,000 of economic assistance “shall be made available to units of local government in Lea and Eddy counties in the State; and may also be provided for independent environmental assessment and economic studies associated with WIPP.” These funds are currently being used to improve road quality along the transport corridor. Beyond a general statement that the Congress will appropriate funds for public safety training and equipment, the WIPP Land Withdrawal Act does not identify how much funding will be made available or any criteria for determining what equipment and activities are appropriate for mitigation assistance.

### **3.0 REVIEW OF SUSTAINABILITY INDICATOR PROGRAMS**

In order to improve the community well being, cities, and counties around the country are starting to define a vision for their future that balances economic, environment and social well-being of their communities. These "sustainable" cities have developed specific goals and strategies to guide programs and governmental services to achieve this balance and quality of life for the long-term. The goals and visions of these local areas are based on the *values* and *priorities* of residents who live there.

The 1999 report by the White House on *Building Livable Communities* argues that the real challenge that the nation faces in the 21st Century is to build "livable cities" and involves enhancing economic growth, public safety, environmental quality, well being of families, and sense of community. As part of a national initiative, 70 percent of over 200 communities in the U.S. adopted policies to pursue “livable cities.” Building on the work of the Community

Empowerment Board and the President's Council on Sustainable Development, the Livable Communities Initiative mobilized 12 federal agencies to provide information, tools and monitoring support for community targeted assistance.

From the Federal perspective, the initiative is to broaden choices available to communities in order to:

- Sustain prosperity and expand economic opportunity;
- Ensure equal access and participation by all stakeholders to community resources,
- Manage environmental resources in a manner that is sustainable,
- Enhance community well-being, and;
- Build a strong sense of community.

These initiatives base their efforts on earlier goals of sustainable development: environmental protection (reduce environmental threats); economic security (build on past investment in communities and broaden the economic base); and community well-being (encourage opportunities for all segments of society). The report on *Building Livable Communities* found commonalties in diverse local initiatives for developing livable communities. These common characteristics for developing livable communities are important because the development of Clark County and its municipalities as "Livable Communities" may be incongruent or incompatible with the process, approaches, and impacts of DOE's proposed repository program of transporting, managing and disposing of nuclear waste through and near Clark County.

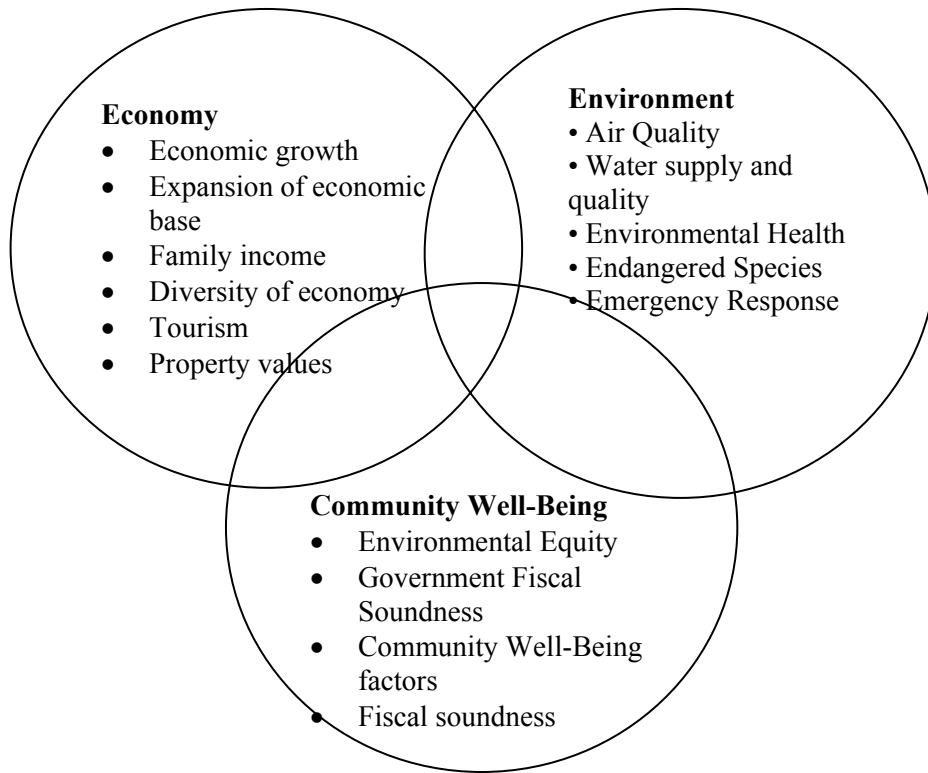
The commonalties in the local initiatives for Livable Communities are as follows:

- Locally Driven—the efforts/initiatives are by local people, a bottom up approach that is not federal directed.

- Inclusive Partnership—opportunities for collaborative public input and goal setting that is open to all stakeholders.
- Broad Scope—successful efforts to create or maintain livable communities and achieve lasting solutions occur when economic, social and environmental challenges are pursued simultaneously.
- Resilient Local Economies—growing interest in economic development strategies that maintain local assets as a source of competitive advantage in the regional, national, and global economy.
- Smart Growth—supports the kind of growth that builds on existing investments and quality of life and redresses environmental damages associated with current patterns of development.

Ideally, there are three elements inherent in developing livable communities (Building Livable Communities 1999) (Figure 3). First a consensus on a vision of what the community strives to be. Some of the elements of the vision are found in comprehensive plans and quality of life reports. Second, it is important that visioning and goal setting in the three linked areas—economy, environment, and community well-being be developed. Third, establish a set of indicators to measure to ensure that the strategies/programs are moving toward the goals. Figure 3 illustrates the range of indicators that can be developed for each of the three key elements of sustainability.

**Figure 3 Community Livability Indicators**



### **3.1 Level of Community Livability**

Community livability indicators are generally developed as outcomes or output measures that can describe whether a community is utilizing its resources in a manner that is sustainable. These indicators can be monitored over time. The outcomes or outputs from these monitoring efforts can be discussed at meetings between the public and government. If there is slippage in one or more indicators, then the program or strategy can be altered to mitigate the problem. For example, if an indicator program is established in Clark County and as a result of the DOE's nuclear waste program, and there is an adverse impact that causes one of the indicators to drop, Clark County would have an early warning and may be able to develop appropriate mitigation. Given the fact that previous research has indicated that the construction of the Yucca Mountain Repository and the shipment of HLW will adversely impact elements of a livable community, the development of a monitoring program plan that will measure an array of economic,

environmental, and community well-being indicators over time is a prudent approach to protect the public health, safety, and quality of life of Clark County residents.

#### **4.0 SUMMARY OF IMPACTS RESULTING FROM NUCLEAR WASTE TRANSPORTATION THROUGH CLARK COUNTY**

##### **4.1 Introduction**

Over the last decade, several efforts have been undertaken by both Clark County and the State of Nevada to identify and examine impacts that may result from the activities surrounding the siting of a high-level nuclear waste repository at Yucca Mountain. In addition to repository-specific effects, studies have also addressed the impacts of transporting nuclear waste through Clark County. Among the impact areas identified by these studies are: environmental quality and health, socioeconomic effects to various business sectors including tourism, the convention industry and visitation patterns, property value losses, behavioral effects in home and business investments, social well-being, political activism, and public perceptions and concerns.

In addition to these effects, the establishment of a nuclear waste disposal program will likely result in significant fiscal costs to state and local governments. These costs have and will continue to accrue as a result of their efforts to manage and mitigate repository-related effects, and to build state and local capacity in planning and in providing for public safety. Both the State of Nevada and Clark County continue to examine the nature and magnitude of governmental fiscal costs that will result from the DOE's repository program. A number of impact reports have been compiled by the County (Yucca Mountain Nuclear Waste Repository Program B Baseline Information and Community Perspective on Potential Repository Impacts on Clark County, December 13, 1999) and the State of Nevada (State of Nevada Comments on the U.S. Department of Energy's Draft Environmental Impact Report for a Geological repository for the

Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, Volume 1 and 2, February 28, 2000) in response to the DOE's DEIS.

From these local and state studies it is clear that adverse impacts to the well-being of Clark County and other communities in Nevada will result from the shipment of nuclear waste in the state. These quality of life effects can result from possible increased costs for governmental services, declines in property values, decreasing desire to live in communities near nuclear waste transportation routes, heightened concerns over public safety, and other problems emanating from the repository program.

In response to the DOE's DEIS both Clark County and the State of Nevada identified potential vulnerabilities and impacts with respect to their direction, likelihood, and magnitude. In this section of this report these areas of vulnerability and potential negative impacts are identified and summarized.

It is important to note that both Clark County and the State of Nevada have indicated that DOE's DEIS is inadequate. In many cases, specific impacts are not discussed in the DEIS despite the fact that they are mandated by NEPA and the NWPA. Many of the impacts viewed as significant by the County and the State to the well being of the economy and state are not adequately considered. The following represents impacts considered to be significant that have not been fully addressed in the DEIS.

#### **4.2 Property Value Impacts**

Numerous studies at the national level, as well as those focusing on Clark County, have documented very high levels of public concern over the risks of transporting nuclear waste; the potential for decline in investments in areas near shipment routes, and the subsequent potential for diminution in property values near such routes. Even without accidents, stigma-type effects

are now acknowledged to adversely affect property values. Property value declines can result from several factors including buyer reluctance to purchase homes in these areas, or from the increased desire of residents to sell and leave areas near shipment routes. Moreover, at least one study has shown the influence of lenders' preferences to deny loans on a property contiguous to a parcel that is environmentally contaminated. In their 1991 study Hanford/Healy report that 66% of the banks would require additional indemnification, 44% would consider adjusting the loan-to-value ratio, and 60% would require personal liability, with the overwhelming majority indicating higher interest for loans on property contiguous to environmentally contaminated parcels.

In an important state judicial case, *Santa Fe versus Komis*, compensation to owners of property was deemed necessary to counteract property value losses resulting from negative public perceptions of shipping nuclear waste along a constructed bypass in Santa Fe County, New Mexico. The results of a recent public survey of Clark County residents show very similar public beliefs in property value declines when compared to the results of the Santa Fe survey used in the Komis case. For example, the survey found that fifty-nine percent of Santa Fe residents would "under no condition" purchase residential property near nuclear waste shipment routes. In the case of Clark County, that figure was 75%. Moreover, while 71% of Santa Fe residents believe that residential property would sell for less near shipment routes, compared to similar properties not located near the routes, 82% of Clark County residents indicated similar beliefs.

When interviewed bankers and appraisers in Clark County indicated, that based on their experience, residential properties along nuclear waste routes would decline by an average of 5% in value without any transportation incidents, and over 20% under a severe accident event. The

same study of lenders and appraisers discovered that both commercial and industrial properties also were projected to decline in value but not to the degree expected in the residential sector.

The above studies are based on responses to future hypothetical scenarios, but there also is confirmation of property value effects from *actual* shipments of nuclear waste. In examining property value effects of transporting nuclear waste by rail in South Carolina, Gawande and Jenkins-Smith (1999) found the value of homes diminished by \$840 for every mile closer to the rail line transporting the waste. Property value diminution as a result of shipping waste through Clark County is a compelling and serious impact area. The economy of the Las Vegas Valley under the severe accident scenario should anticipate serious negative consequences. The case for property value diminution is built on four research pillars: (1) analogous case experience shows diminution effects in home and land values as a result of risk perceptions of hazardous facilities; (2) case law demonstrating compensation of damages resulting from stigma; (3) surveys of residents demonstrating expectations of property value losses, and an unwillingness to purchase properties near routes used for shipping nuclear wastes; and (4) the losses in a case of actual shipments. In summary, serious property value effects near nuclear waste shipment routes in Clark County can be expected and may occur for a distance of up to 3 miles from routes used to transport nuclear waste.

#### **4.3 Impacts on the Tourism Sector**

While the tourism industry is the dominant economic sector in Clark County, and the State fueling economic development, it is also a very vulnerable sector. Tourism is most vulnerable to adverse impacts resulting from the high-level nuclear waste program in general, and in specific the transportation of nuclear waste through the County and State. In order to understand the ways tourism can be impacted, and the magnitude of these impacts on the County

and State economies, a number of studies have been undertaken by the State of Nevada and Clark County.

These studies have demonstrated the sensitivity of the tourism industry to changes in image, and that nuclear waste and its transportation evoke very strong negative images tied to health and safety risks. These images are known to influence tourist behavior, especially if alternative resort and convention destinations are available. Adverse publicity resulting from stigma-type events has had serious impacts on tourism in several places. Several events/mishaps involving nuclear facilities or accidental radioactive materials have had adverse effects on the local tourism industry.

In the late 1980s, two surveys discovered that the repository would have an adverse impact on the attraction of Nevada as a place to retire, raise a family, or vacation. Close to 50% of those surveyed in one study indicated that the location of the repository would affect their decisions to attend a convention in Nevada. A 1988 survey targeted convention planners concluded that even without an incident for ten years, 30% of convention planners would lower their ranking of Nevada as a place to hold conventions.

A 1993 survey of previous convention attendees indicated that the location of a nuclear waste repository within 100 miles would negatively affect decisions to attend a convention by 25% of the respondents. Studies also suggest that if Las Vegas becomes associated in the public's mind with a repository and the associated transportation of nuclear waste, that any negative incident could adversely influence tourism rates. Based on "no incident" scenarios, two studies concluded that the impacts to Las Vegas tourism still would be moderately to significantly adverse.

To date, none of the studies firmly establishes the specific magnitude of the adverse impacts that are likely to occur. However, the combination of studies using different methodologies, all indicate that adverse impacts to the tourism sector of the economy should be anticipated. This tourism sector is the dominant economic driver in Clark County. Hence, any repository-related impacts to this sector must be carefully considered when making decisions concerning whether to construct the repository, and/or the designation of transportation routes for the shipment of nuclear waste.

#### **4.4 Impacts on Public Safety**

One potential area of impact for Clark County from the proposed repository is in public safety (police, fire, and emergency medical services) and emergency management including planning and response. Studies in these areas have estimated resources needed for emergency management and public safety needs for state and local agencies. Some of these studies have provided cost estimates for needed training, planning, equipment, and other resources necessary to carry out public safety functions in the event the repository is sited at Yucca Mountain. DOE's DEIS explicitly identified one emergency management function (training) that needed to be strengthened. Preliminary data from an on-going assessment of public safety needs resulting from the siting of a repository and subsequent transportation of nuclear waste through Clark County indicates that serious capacity shortfalls exist in this area for most communities in Clark County.

One of the key areas in the public safety area that needs to be assessed, especially in the case of serious transportation incident involving nuclear waste, is the multi-jurisdictional and multilevel response capability. The demands on coordination and inter-jurisdictional response following any event is critical because an incident involving the release of radioactive material

will quickly overwhelm local jurisdictional resources. Research efforts to date, both at the State level and Clark County, demonstrate that neither is currently prepared for a serious high-level nuclear waste incident. In addition, the fiscal costs necessary to be able to adequately have confidence in the agencies providing public safety is very large.

The 1995 Public Safety Advisory Group study found that Clark County public safety personnel were not adequately trained for responding to transportation accidents involving nuclear materials. According to the 1995 study, training is needed in the following areas: response procedures, incident command, radiological monitoring, emergency medical procedures, use of communication systems, transportation safety, and practice, as well as evacuation, coordination and communication planning.

In addition to training needs, several other areas of public safety needs must be considered. These include emergency planning, response (including requisite equipment and facilities), impacts of re-routing and evacuation, communications, emergency medical services and decontamination facilities, and information management needs. Current studies sponsored by Clark County are in the process of estimating the cost of the necessary training, additional personnel, plans, and equipment and coordination exercises.

Several studies at the state level have identified public safety and emergency management needs. These are referenced in the Clark County (Yucca Mountain Nuclear Waste Repository Program B Baseline Information and Community Perspective on Potential Repository Impacts on Clark County, December 13, 1999) summary of impacts related to the Yucca Mountain program. In addition to the costs of emergency response planning, equipment/facilities requirements, and training, the area of information management has been found to be very important. Emergency management information systems at different levels of

government, and among local entities need to be compatible and comprehensive. Information management needs fall into the following areas: databases; geographical information systems (GIS); response tools (plume modeling capabilities, hazard zones, and evacuation information), training aids, planning and analysis tools and monitoring capabilities, coordination of data, exercising and information sharing.

#### **4.5 Impacts on County and Local Fiscal Resources**

Based on several State of Nevada studies and the on-going research on communities in Clark County, it is apparent that additional fiscal costs to government will result from the shipment of nuclear waste through Clark County and several of the local jurisdictions. Additional fiscal expenses to municipalities and Clark County governmental agencies will result from mandate-driven requirements for personnel, planning, monitoring, regulatory responses, and citizen participation and communications. These do not include the costs needed in the public safety areas identified above.

Fiscal costs fall into two categories, programmatic and procedural. Procedural requirements for many local governmental agencies will result from added reporting, monitoring of environmental and socioeconomic conditions, planning/evaluation, record-keeping, specialized services due to the nuclear waste disposal program, and public communications. The sources of such requirements will be local, county, and regional policy organizations, state advisory boards, local and state governmental/legislative entities, federal regulatory agencies, and congressional oversight activities among others. In 1995, one study concluded that 38 state government departments had already incurred fiscal costs associated with the repository. Programmatic costs can accrue to an agency as a result of a mandate or the mission of an agency and entail answers to the question of what should be done? For example, various air, water and

other permits may be necessary during the repository siting and operation that require local agency time and effort. Additionally, the County is a major actor in the planning and operation of the inner and outer beltways that may be deeply impacted by DOE's transportation plans.

#### **4.6 Environmental Justice Impacts**

Environmental justice concerns have been identified in the DOE's DEIS. However, a systematic analysis of environmental and socioeconomic impacts on lower income, minority, and Native American populations has not been undertaken. In Clark County, the health, environmental, socioeconomic, quality of life consequences and barriers to economic opportunities may *disproportionately affect* lower income areas and communities of color.

Such differential effects need to be examined and identified by group and or geographic area, and the nature of the impact measured. *All* potential impacts need to be addressed on the basis of inequitable distribution spatially, demographically, and by magnitude of risk. Previous studies have identified environmental justice issues that need to be addressed along the following factors in order to determine what impacts may exist:

- Are there existing areas, populations, cultures, currently experiencing disproportionately greater environmental and health risks, economic hardships, and other problems?
- To what extent are the current planning/program activities by DOE amplifying and exacerbating these problems?
- To what extent will the transportation of nuclear waste further deteriorate the quality of life and economic opportunities of already overburdened and vulnerable populations?

- What is the level of added/cumulative effects of vulnerable populations resulting from the nuclear waste program, and what are the consequences in terms of health impacts, loss of cultural resources, and economic hardships?
- What will be the short and long-term impacts of a nuclear waste transportation accident on an area, community, or population already experiencing inequities or vulnerabilities?
- What will be the costs of *preventing* further vulnerability and/or mitigating future adverse impacts?
- How can the nuclear waste program be utilized to redress existing and potential future problems of vulnerable communities in Clark County?

#### **4.7 4.7 Business and Economic Development Impacts**

On-going studies of municipalities in Clark County have encountered serious concerns regarding the potential impacts that nuclear waste transportation may have on economic development. The DOE's DEIS is inadequate in its treatment of this important impact area. Several studies point out the likely impact of transporting nuclear waste will have on the imagery of Las Vegas as a place to visit and recreate. In addition, the potentially negative impacts on the convention visitor economy resulting from these shipments have already been discussed above.

The impacts on business investment in Clark County resulting from the repository program are unclear because of the lack of systematic forecasts and studies of this sector to date. Several scenario-based studies targeting Clark County residents have found that a diminution of investments near transportation routes is likely. These scenario-based studies also suggest that out-migration rates from Southern Nevada may increase as a result of potential transportation mishaps. Another study focusing on possible property value changes, suggests financial

institutions will make likely adjustments to loan terms for firms wanting to locate in shipment corridors when the DOE program is under way. Hence, the presence of shipments may impact investment decisions in the commercial office distribution sectors along transportation corridors.

Concerns about development along or near potential shipment routes have been raised in terms of possible disruption of on-going development plans. The stigma associated these transportation corridors may result in property value losses and/or increased reluctance to invest or purchase homes near them (see above). Three factors require investigation: how the repository program will effect economic development decisions; the nature of any lost opportunity costs due to the repository (for example in diversification of the local economic base), and the likely economic consequences of a “reasonably foreseeable” transportation accident involving nuclear waste. To date, the DOE has refused to address this impact area.

One recent survey of Las Vegas businesses provides information on the perceived impacts that transportation of nuclear waste will have. Almost 54% of the businesses surveyed indicated that either moderate or significant adverse impacts on their business (or the economy in general) would result from even a non-incident transportation program involving nuclear waste. In this survey, the tourism and professional services industries responding expressed the highest levels of concern about adverse impacts on business. The concerns expressed by the business community in this survey are:

- Loss in business activity
- Stigma effects
- Negative publicity
- Decreased property values
- Decreased quality of life

- Health and safety concerns
- Increased out migration rate
- Group and individual discomfort

#### **4.8 Cumulative Impacts from Transportation**

Under NEPA (42 U.S.C. 4321, et. Seq.), cumulative impacts are identified as: the impact on the environment that results from the impact of the action when added to the other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The DEIS inadequately approaches cumulative impacts of transporting nuclear waste because it has not delineated transportation routes. Without designated routes, it is impossible to determine the full range of impacts on transportation, transportation development, and air quality. Moreover, the “reasonably foreseeable future” criteria to measure cumulative impacts is not detailed in the DEIS. The impacts to Nevada from currently transporting hazardous materials, low-level radioactive waste, mixed wastes, requires attention to the risks of cumulative impacts. Moreover, possible cumulative impacts for unforeseen accident events on the local economy are an impact area that must be addressed in terms of cumulative impacts. Baseline equity considerations, accident rates on various routes, and economic plans along existing routes need to be evaluated from a cumulative impact perspective, in addition to individual approaches. Such analysis and discussion was absent from the DEIS, although it is warranted under the NEPA guidelines.

#### **4.9 Quality of Life Impacts**

Quality of life measures are important in evaluating impacts to a community in order to determine the direction, magnitude, and significance of community changes resulting from a program. The strength of a quality of life impact assessment is in part a result of the community

identifying those factors it considers vital for its well-being. Measures of these factors (indicators) can then be developed and monitored in terms of degree of change from a baseline condition or an established norm. Technically, these quality of life indicators can be either objective or subjective, and include, for example, the level of community satisfaction.

Lessening perceptions of their current and future quality of life by county residents due to the repository can result in behaviors that would be detrimental to the overall well being of the County. For example, if well-being declines it may result in reduced in-migration, increase out migration rates, declines in personal investments, and increased stress and worry over repository related risks by residents.

There is support from several studies that show that the transportation of nuclear waste through Clark County will diminish several quality of life measures including “satisfaction with life”; satisfaction with the community as a “place to live”; economic opportunities, and environmental quality. Although quality of life impacts are difficult to forecast, it will be necessary to identify the key measures that constitute quality of life; determine those that may be impacted by the repository program; monitor these measures; and quantify these changes resulting from the repository. At some point the County may develop mitigation programs to prevent quality of life deterioration and/or mitigate their impacts. It is vital to determine the specific areas of quality of life that are important to Clark County residents, as well as those that the repository program is especially capable of harming. Quality of life is an area of vulnerability that needs to be carefully and fully addressed in the impact assessment.

## **5.0 CLARK COUNTY PERSONNEL INTERVIEWS**

On November 26 and 27, 2000, interviews were conducted with key Clark County personnel identified by the Nuclear Waste Division as having responsibilities for programs

within Clark County (Appendix B). As noted in Section 1.1.4, interviewees were asked to describe the mission of their departments; the types of data that they currently maintain to accomplish their normal responsibilities; the key standards or measures their department monitors; issues that they may confront as a result of the nuclear waste shipment program; and indicators that they consider important to monitor as a result of the DOE's proposal to construct the Yucca Mountain Repository and to ship HLW through Clark County. The interviewees were also asked to describe the type of data their departments would need to be able to attribute any impacts resulting from the DOE's proposed plans.

In general, the interviewees indicated that current data collection efforts focus on maintaining data that measures compliance with a broad array of existing federal environmental regulations. The interviewees also observed that for the most part, they believed that any special or new indicators that they would need to measure impacts from the DOE's proposed shipment campaign would be linked to an incident event rather than from routine shipments. This suggests that it is feasible to design a monitoring program that can efficiently build off of the existing data that is collected by Clark County personnel. This should facilitate the rapid development and deployment of a monitoring system. A summary of the interviews follows.

## **5.1 Current Planning**

Major projects is responsible for facilitating the review of major development projects throughout Clark County from the beginning planning stages, through the zoning process and up through the permitting phase. Major projects are defined as those that are at least 700 acres. Currently, Major Projects is working on developments in Apex (21,000 acres), Summerlin Park (22,000 acres), South Highlands, Pinnacle Peak, and Rhodes Ranch. On average, 4 or 5 major development projects have been ongoing at all times over the last five years. Additionally, there

are generally 5 to 10 midsize projects (100 to 650 acres) ongoing at any one time. Staff from Major Projects indicated that they are aware of at least six major developments that are scheduled for the next decade. These include a 7,500-acre development in North Las Vegas; another development project in Summerlin; two others in the Valley; and two in the Prim/Jean area. They also noted that the Coyote Springs project on the Clark County/Lincoln County line near Alamo is designed to be a 22,000-acre self-contained community. These projects are viewed as critical due to the rapid growth of population in the Las Vegas area and the demand for housing; the fact that land for larger master planned communities is in short supply; and that some projects (North Las Vegas) are considered vital for the economic development of the community.

The staff indicated that the Las Vegas Chamber of Commerce produces the *Las Vegas Perspective* on an annual basis and that this document provides a good review of current and future development trends. The staff also noted that currently Clark County does not provide economic development incentives. They noted that if the DOE moved forward with the proposed shipment campaign that there might be a need for economic development incentives to stimulate the market in Clark County in the future. The projected need for incentives would be a consequence of buyer reluctance; issues of liability; and possible changes in loan adjustments.

Currently, the key indicator for development is the rate at which people move into the metropolitan area. For example, in 1989 the growth rate was 2,000 – 3,000 persons per month. By 1999, the rate increased to 4,000 persons per month. Other indicators of development trends are housing units built and occupied; housing mix by area; and housing starts.

Specific indicators that were suggested to monitor impacts from the DOE's proposed shipment campaign included:

- Monitoring the build out rates. Developers currently provide a schedule for build out during the planning process. If build out rates slow from those projected by the developer, it may be an indication that the DOE's shipment campaign is negatively effecting the market.
- Number of building permits as a measure of housing starts
- Number of home sales

They noted that during the last downturn in Clark County's economy that home sales dropped from 4,000 per month to 2,000 – 3,000 per month. Thus, the number of home sales provides a good barometer of the economic health of the building sector.

## **5.2 Community Planning**

Community Planning is responsible for updating and maintaining Clark County's Land Use Plan. The staff interviewed indicated that Clark County would be completely built out over the next 20 years. Currently, development continues to focus on the fringe areas of the valley, for example, Blue Mountain. Infill development within the urban area is still limited but as the valley becomes built out, there will inevitably be changes in the type of land use in the urban area as residential areas transition to commercial and retail development.

Those interviewed indicated that to date they have not incorporated the DOE's proposed shipment campaign into their planning activities since no routes have been officially designated. However, all agreed that if there were an accident it would have a significant adverse impact on development activities. They also suggested that changes in the current land use resulting from the DOE's proposed shipment campaign could best be measured by tracking the following indicators:

- Number of land use applications;

- Zoning change requests; special use permits;
- Plan amendments;
- Building permits; and
- Variance requests.

While changes in the indicators suggested are expected to occur as the valley is built out, any dramatic shift, particularly, along the shipment corridors could be linked to the shipment campaign and should be monitored and evaluated.

### **5.3 Community Resources Management**

The representative from Community Resources Management stated that adverse changes to a community as a result of a major project usually result from increases in population requiring additional homes, schools, and other community services. While there may be some additional demand for services resulting from the DOE's shipment campaign, Community Resource Management staff thought that any additional demand would be minimal given the rapid growth already occurring in the Valley. Instead, personnel indicated that the transportation of nuclear waste through Clark County is primarily a psychological issue and that if there was an accident during the shipment campaign that it would hurt tourism. This would have a devastating effect since in the 1980's the state increased taxes on gaming to offset a reduction in the property tax. From the perspective of Community Resources Management the key indicators to monitor in order to determine whether Clark County's economy is being damaged by the DOE's shipment of HLW through the area are the number of visitor days and building permits.

### **5.4 Finance**

Clark County operating funds for governmental agencies (such as public works) are generated from two primary sources: intergovernmental revenues and property taxes.

Approximately 25% of the total tax revenue comes from property tax. The intergovernmental revenue flows from sales tax, motor vehicle privilege tax, cigarette tax, and other supplemental taxes. In 1997, these taxes were aggregated from five dedicated sources into a consolidated tax distribution formula.

According to personnel in the Finance Department, the DOE's proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW could result in adverse impacts on Clark County revenues. These adverse impacts would emanate from: losses in property values; declines in sales tax revenues from decreased spending rates and visitation days by tourists; declines in sales tax revenues from a slow down in building activity; and declines in intergovernmental revenue allocations due to economic changes.

#### **5.5 County Assessors Office**

A senior appraiser from the County Assessor's Office revealed that Clark County has already experienced property value diminution in the northern part of the valley for a one to two year period following the construction of a gas pipeline, as well as, in the area near the Pepcon explosion in Henderson. The appraiser acknowledged that these areas have rebounded, but the rate at which an area rebounds is dependent on a number of factors making it difficult to predict what will happen if the DOE proceeds with its plans to ship HLW through Clark County. Initially, there is likely to be some downturn, but if there are no incidents, then property values may rebound overtime. If there is an accident, however, the downturn in property values could be significant and long lasting, according to the interviewee.

The appraiser noted that a reduction in property values would adversely affect assessed valuation since the land component of the assessed value of a property is linked to market value. An earlier survey of Clark County lenders and appraisers indicates that a reduction in property

values in Clark County is likely even under a no incident scenario, if the DOE proceeds with the HLW shipment campaign (Conway et al 2000). He also noted that for the last several years that the assessed valuation has been going up but that when there is a downturn in the economy assessed value does decrease although there is a lag in time from when the property value declines to the time the Board of Equalization adjusts the assessed value. If there were a significant drop resulting from an accident event associated with the DOE's shipment campaign of SNF and HLNW then the Board of Equalization could reduce this lag time. Normally, however, the Board of Equalization tries to minimize fluctuations in assessed valuation. The link between property value diminution and assessed value is an indirect link. If there is a downturn in property values over time then assessed values will also decline most negatively affecting revenues for costs such as fire and police services, and schools.

The appraiser suggested that changes in property values over time, particularly, significant losses in property values is an indicator that assessed valuations will eventually be affected and in turn could adversely impact the level of fire and police services, and school funding. Additionally, the appraiser suggested that changes in the migration patterns within the Valley would be another excellent indicator that the transportation of HLW is adversely affecting the area.

## **5.6 Administrative Services: Emergency Management**

The representative from Emergency Management noted that his agency is already being impacted by the DOE's proposed shipment campaign of HLW. In order to protect the public health and safety, training exercises have already begun to prepare for a potential incident event if the DOE proceeds with its proposed shipment campaign of HLW through Clark County. In order to prepare for any incident event, Emergency Management will need to add equipment,

personnel, and training to respond to all four stages of an event; mitigation, preparedness, response, and recovery planning. This will have significant a budgetary impact on the department.

Preparing for an incident event requires coordination between the Highway Patrol, Public Works, Department of Transportation, Police, Fire, and Finance as well as others. The Emergency Management representative stated that since preparedness planning already has begun that it is important to begin to establish a baseline measurement of current service levels and to begin monitoring the number of personnel; additional training (needs); and equipment that will be required to adequately protect the public health and safety.

#### **5.7 Environmental Planning Division**

The Environmental Planning Division is primarily responsible for Clean Air Act Planning and the development of the State Implementation Plan (SIP). The representative from the Environmental Planning Division noted that Clark County has a non-attainment status for CO, ozone, and particulates < 10 microns. Significant efforts have been made to improve air quality but that growth in the Valley and the proposed stricter standards for particulates continues to be a challenge for the County. Based on the number of truck shipments proposed in the DEIS, the representative interviewed did not expect that the DOE's proposed shipment campaign of HLW would have a significant impact on air quality relative to CO, ozone, and particulates. Because of the rapid growth in the Valley, however, there is increasing congestion problem that raises the potential for excessive exposure to radiation for those who might be caught in traffic next to a truck carrying HLW.

The representative suggested that adherence with the Clean Air Act (CAA) and its amendments would be appropriate indicators to monitor to ensure that the DOE's proposed

shipment campaign do not adversely affect air quality along the transportation routes. In addition, a program to inspect the trucks for radiation levels would be important to protect the public's health and safety, as well as, monitoring for compliance with the USEPA's radiation standards.

## **5.8 Natural Resources**

Two representatives from Natural Resource Planning discussed potential impacts in the areas of water quality, solid waste, conservation, and endangered species. One of the representatives indicated that there would likely be minimal impact from the DOE's proposal to ship HLW through Clark County on the areas water quality short of a major accident event resulting in a cask being dropped directly into the water supply. This representative considered that outcome unlikely and indicated that the primary issue is "*public perception.*" This person noted that the transportation of HLW would require changes in the County's Contingency Plan. Appropriate indicators that currently are measured and should continue to be measured to ensure that there are no adverse effects to water quality are compliance with regulatory standards, especially the Clean Water Act (CWA).

The other Natural Resource representative indicated that the transportation routes might adversely affect the habitat for the 80 species that are now monitored under the Endangered Species Act (ESA) within Clark County. Continued compliance with the ESA would be a good indicator that the shipment campaign is not negatively impacting the habitat for endangered species.

Table 1 provides a summary of the indicators recommended by Clark County personnel during the interviews.

**TABLE 1**  
**SUMMARY OF INDICATORS FOR MONITORING FROM INTERVIEWS WITH**  
**CLARK COUNTY PERSONNEL**

<b>Division</b>	<b>Recommended Impact Indicators for Monitoring</b>
<b>Major Projects</b>	Number of building permits Occupancy rates Number of home sales
<b>Community Planning</b>	Build-out rates for development projects Number of land development applications Zoning change requests Special use permits Plan amendments Building permits
<b>Community Resources Management</b>	Corridor versus general valley statistics Tourist visitor days Convention trade attendees
<b>County Assessors Office</b>	Building permits Property value changes over time Changes in migration patterns
<b>Emergency Management</b>	Absorption rates of planned communities Capacity evaluations for the four areas in emergency management - Mitigation - Preparedness - Response - Recovery
<b>Environmental Planning Division</b>	Continued monitoring of Clean Air Act pollutants NPDES and SWDA compliance for water quality Endangered Species Act continued monitoring Inspection of trucks for radiation levels

## **6.0 PRELIMINARY INDICATORS IDENTIFIED FOR MONITORING**

The preliminary set of indicators suggested for monitoring are primarily derived from existing federal legislation and are in response to the impacts that have been previously identified by Clark County residents, Clark County public officials, and the State of Nevada in studies and comments to the DEIS, as well as, those suggested during interviews with key Clark County personnel. These include an array of impacts that can be grouped into three categories; economic concerns, environmental protection, and community well-being. For purposes of this report, the discussion of suggested indicators will be grouped according to these impact areas. These impact areas also fall within the framework that has been recognized as appropriate for mitigation under the NEPA and Section 175 of the NWPA as discussed above.

**6.1 Economic Impacts and Indicators**

Economic impacts can be aggregated into four general areas: economic development; economic diversification; tourism and convention trade; and property values (Table 2). Continued economic growth and increasing expansion of Clark County’s economic base is one of the primary impact concerns that have been identified repeatedly by the public and government officials. The concern for the economic well being of Clark County residents needs also be monitored at the level of the family. This will require monitoring demographic growth and rate of change in income levels among the various demographic groups within Clark County to ensure that the proposed shipment campaign does not unduly burden one or more groups within the community.

<b>TABLE 2 SUMMARY OF ECONOMIC INDICATORS RECOMMENDED FOR MONITORING</b>	
<b>Impact Areas</b>	<b>Recommended Impact Indicators for Monitoring</b>
Economic Development	Income Levels Number of Business by Sector Building Permits Demographic and Employment Growth Tax Revenues
Economic Diversification	Economic Base Statistics New Growth by Sector Business by Type and Size Corridor Land Use Changes
Tourism and Convention Trade	Visitor Days Occupancy Rates Gaming Revenues Average Daily Visitor Expenditure
Property Values	Corridor Land Use Changes Average Home Prices Assessed Valuation Property sales/rental rates per square foot

Indicators that can monitor *economic development* include: income levels; number of business by sector; number of building permits; demographics and employment growth; and tax revenues by type.

As communities grow, *economic diversification* is also an important consideration since it contributes to economic stability. Indicators that have been identified for measuring economic diversification include: economic base statistics; new growth by sector; business by types and size; and land use changes along the transportation routes.

Of particular concern has been protection of the *tourism industry*, which is the primary economic engine for Clark County, as well as, the State of Nevada. Previous studies have indicated that this sector of the economy may be particularly vulnerable as a result of the DOE's proposed shipment campaign of radioactive wastes through Clark County. These studies indicate that tourists may decide to spend their discretionary vacation dollars elsewhere, particularly, if an incident was to occur with the shipment of radioactive waste. Indicators to measure potential impacts to this vital part of Clark County's economy include: average visitor days; occupancy rates; number of convention visitors; average daily visitor expenditures; and gaming revenues.

*Property values* are another area of significant concern. A study in South Carolina found that the transportation of spent nuclear fuel in an urban area could result in property value diminutia (Gawande and Jenkins-Smith 1999). Additionally, there are numerous court cases that have found that when the perception of risk from a disamenity results in stigma induced property value diminution, that parties can be found responsible for this loss. In fact, in New Mexico, the State was found liable for the loss of value of a property that was adjacent to land used for the shipment of radioactive waste, even though it was the DOE who was responsible for the shipment of the waste. Given these facts, it is critical that at a minimum the following indicators be monitored: land use changes along the proposed transportation routes; average home price; assessed valuation; and rental rates or sales costs per square foot for commercial and industrial property.

## 6.2 Environmental Impact Areas and Indicators

Many of the environmental indicators that are being suggested to monitor impacts from the DOE’s proposal to construct the Yucca Mountain Repository and to ship HLW through Clark County are based on standards codified within Federal and State law (Table 3 ). For example, *air quality* and *visibility* is currently monitored under the CAA and CAAA (42 USC ‘ 7401 et seq.) for compliance with *National Ambient Air Quality Standards* (NAAQS) and under *Nevada Revised Statutes: Air Emissions Controls, Chapter 445B*. Currently, Nevada is in a non-attainment status with NAAQS requirements. Under existing NAAQS requirements, any additional decrease in air quality resulting from the proposed shipment campaign could limit economic development projects including the construction of new highways and the expansion of existing transportation corridors. Thus, monitoring for compliance with NAAQSs is a critical indicator.

<b>TABLE 3 SUMMARY OF ENVIRONMENTAL INDICATORS RECOMMENDED FOR MONITORING</b>	
<b>Impact Areas</b>	<b>Recommended Impact Indicators for Monitoring</b>
<b>Air Quality</b>	CO, Ozone, Pariculates
<b>Water Quality</b>	Drinking Water Quality
<b>Wetlands</b>	Changes in Size/Quality of Wetlands
<b>Noise</b>	Noise Levels
<b>Energy</b>	Amount and Type of Energy Use per 1,000
<b>Transportation</b>	Vehicle Miles Traveled per Day Interstate Pavement Quality Motor Vehicle Accident Rates
<b>Environmental Quality</b>	Perception of Environmentl Quality
<b>Waste</b>	Radiation Levels Number of HLW Trucks Number of LLW Trucks Number of Toxic Waste Trucks Number of Hazmat Incidents
<b>Biodiversity</b>	Size and Quality of Habitat Species Mix and Population

Similarly, monitoring of the *water supply and water quality* for compliance with the *Safe Drinking Water Act* (SDWA) (42 USC ‘ 300 (f) et seq.); the *Clean Water Act of 1977*, as

amended (CWA)(33 USC ‘ 1251 et Seq.); *Nevada Revised Statutes: Water Controls 445A* and *Underground Water and Wells, Chapter 534*; as well as, *Executive Order 11990, Protection of Wetlands* and *Executive Order 11988 Floodplain Management* and compliance with *Floodplains/Wetlands Environmental Review Requirements* (10 CFR Part 1022) are valuable environmental indicators.

Indicators that can be used to measure changes in *noise* levels as the result of the truck shipments of SNF and HLNW through Clark County can be monitored through compliance with standards in the *Noise Control Act of 1972*, as amended (42 USC ‘ 4901 et seq.). Measuring the amounts and types of *energy* used per 1,000 population can monitor energy use. Additionally, monitoring the number of *vehicles miles traveled* per day can be used as an indicator to measure whether energy use, air quality, and congestion levels. Motor vehicle *accident rates* and *Interstate pavement quality* in selected areas where waste is transported are also measures of whether the transportation of radioactive waste through Clark County is being adversely impacted as a result of the DOE’s shipment campaign.

Of primary concern to Clark County is the protection of the *public’s health and safety*. A number of federal and State laws provide standards that can be effectively used as indicators for protecting the public’s health and safety. These include the *Hazardous Materials Transportation Act* (49 USC ‘ 1801); *Emergency Planning and Community Right to Know Act of 1986* (42 USC ‘ 1001 et seq.); *Nevada Revised Statutes: Hazardous Materials, Chapter 459*; *Nuclear Regulatory Commission Radioactive Materials Packaging and Transportation Regulations* (10 CFR Parts 71 and 73); Department of Transportation *Hazardous Materials Packaging and Transportation Regulations* (49 CFR Subchapter C B Hazardous Materials Regulations, Parts 171 through 180); *Pollution Prevention Act of 1990* (42 USC ‘ 13101 et seq.); *Comprehensive,*

*Environmental Response, Compensation, and Liability Act*, as amended (42 USC ‘ 9601 et seq.); *Standards for Protection Against Radiation* (10 CFR Part 20); *Resource Conservation and Recovery Act*, as amended (42 USC ‘ 6901 et seq.); *Executive Order 12088, Federal Compliance with Pollution Control Standards*; *Executive Order 12856, Right to Know Laws and Pollution Prevention Requirements* and the *Nevada Revised Statutes: Sanitation, Chapter 444*. Additionally, the number of trucks transporting SNF, HLNW, LLRW, and other hazardous waste through Clark County should be monitored to assess cumulative impacts.

Biological diversity can also be monitored through measuring the *species mix, population levels, and changes in habitat acreage*, as well as, by using the standards in Federal and State law as indicators. The Federal and State laws that probed standards that can be used as indicators of biological diversity include the *Endangered Species Act*, as amended (16 USC ‘ 1531 et seq.); *Fish and Wildlife Coordination Act*, as amended (16 USC ‘ 661, 48 Stat. 401); *Nevada Revised Statutes: Protection and Preservation of Timbered lands, Trees, and Flora, Chapter 527*; *Nevada Revised Statutes: Hunting, Fishing, and Trapping: Miscellaneous Protective Measures, Chapter 503*; and *Executive Order 13112, Invasive Species*.

### **6.3 Community Well-Being Impacts and Indicators**

Indicators measuring community well-being can include both “objective” indicators about community conditions such as pupil-teacher ratios and “subjective” indicators, such as “satisfaction with the quality of life.” Both types of community well-being indicators are important measures and are included as suggested indicators (Table 4).

<b>TABLE 4 SUMMARY OF COMMUNITY WELL-BEING INDICATORS RECOMMENDED FOR MONITORING</b>	
<b>Impact Area</b>	<b>Suggested Indicator</b>
<b>Environmental Equity</b>	Socio-demographic distribution of population Income distribution Spatial population distribution Distribution of costs and benefits by group
<b>Governmental Fiscal</b>	Tax revenues to Local jurisdictions Number and conditions of schools Pupil teacher ratio
<b>Public Safety</b>	Police per 1,000 population Police facilities and equipment Hospital beds per 1,000 Number of hospital facilities by type Number of hazmat personnel Level of hazmat training by type Hazmat facilities and equipment Number and type of radiation detection equipment Number and type of decontamination equipment Firefighters per 1,000 population Fire facilities and equipment.
<b>Quality of Life</b>	Family income levels Employment rates Satisfaction with quality of life Satisfaction with level of governmental services Level of Concern over public health and safety

*Environmental equity* refers to evaluating whether the DOE’s proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW results in an unfair distribution of impacts on communities of color, the low income, the elderly, and children. This can be monitored through tracking changes in the *demographic mix* along the transportation corridor to assess for compliance with *Executive Order 12898, Environmental Justice*. One population within Clark County that may be particularly impacted is Native Americans. Several pieces of Federal legislation provide effective standards that can be used as indicators to measure potential impacts on Clark County’s Native American population. These include the standards within the following legislation: *Archeological Resources Protection Act*, as amended (16 USC 470aa et seq.); *American Indian Religious Freedom Act of 1978* (42 USC 1996); *Native American Graves Protection and Repatriation Act of 1990* (25 USC 3001); *Antiquities Act* (16

USC 431 et seq.); *Executive Order 13007, Indian Sacred Sites*; and *Executive Order 13094, Consultation and Coordination with Indian Tribal Governments*.

The **fiscal soundness of government services** is another area that could be affected, particularly, in the case of an accident event that results in property value diminution and subsequent loss of tax revenues. Public services that may be impacted if tax revenues decline as a result of stigma-induced property value diminution include the quality of Clark County schools. Indicators that can be monitored to provide an early warning of such impacts include:

- Change in tax revenues
- Pupil teacher ratio
- Number and conditions of schools

In addition, service levels for a variety of government services designed to protect the **public health and safety** should be monitored as indicators of community well-being. Among the levels of government services that can be used as indicators are:

- Police per 1,000 population
- Police facilities and equipment
- Hospital beds per 1,000
- Number of hospital facilities by type
- Number of hazmat personnel
- Level of hazmat training by type
- Hazmat facilities and equipment
- Number and type of radiation detection equipment
- Number and type of decontamination equipment
- Firefighters per 1,000 population, and

- Fire facilities and equipment.

Additionally, changes in income levels and employment rates can be used as indicators of how the DOE's proposed shipment campaign is impacting the *quality of life* of Clark County residents. Satisfaction with the quality of life in the area and the level of concern about the health and safety risks associated with the DOE's proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW are other measures that can be evaluated.

While changes in the indicators suggested may not be attributable to the DOE's proposal to construct the Yucca Mountain Repository and the related shipment of HLW, they can be effective as an early warning that changes are occurring that require additional investigation. In the next section of this report, the next steps that should be considered to build a monitoring program, including the design of a model to differentiate changes in indicators that are attributable to the DOE's shipment campaign from those that may occur because of organic growth within Clark County will be discussed.

## **7.0 DISCUSSION**

Our preliminary analysis indicates that the range of potential impacts to Clark County resulting from the DOE's proposal to construct the Yucca Mountain Repository and to ship HLW to Yucca Mountain is broad and the possible magnitude is substantial. Adding to the complexity posed by the broad range and substantial magnitude of impacts that may be experienced, is the uncertainty and unpredictability associated with the DOE's plans. For example, to date neither the routes nor the mode of transportation has been specified. Further, the DOE has provided only cursory information about how it intends to manage the full array of impacts that are likely to be experienced by Clark County and its residents because of the DOE's shipment campaign.

It is within this uncertain and unpredictable environment that Clark County is challenged to design and build a monitoring program that can effectively and efficiently measure any adverse impacts resulting from the DOE's activities. Thus, it is vital that the monitoring program design be flexible, dynamic, and responsive to accommodate new information as it is ascertained. Toward this end, the preliminary indicators that have been identified within this report are based largely on impact indicators that have been legally recognized for mitigation purposes; through the extensive literature on sustainable indicators that have developed over the last decade; by earlier studies that have identified potential impact areas; and through preliminary interviews with Clark County governmental personnel. It is expected that these indicators will be refined in an iterative fashion over time as additional studies such as the recently begun Governmental Fiscal Impact Study and Public Safety Impact Study are completed as well as any additional studies and as the new information from the DOE evolves.

Our initial efforts indicate that Clark County governmental personnel in the normal administration of their duties already gather much valuable data but that their data collection activities are very fragmented and uneven. Further, some of the data that will be vital to an ongoing monitoring effort is either not collected or it is maintained by non-governmental entities. The current data collection efforts cannot meet the critical challenge faced by Clark County to provide an ongoing monitoring program that can provide an early warning system for decisionmakers to alert them to any adverse impacts to the economy, environment, or community well-being resulting from the DOE's proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW.

Thus, the next step in the development of a monitoring program is to: refine the indicators in consultation with Clark County's Nuclear Waste Division; inventory, define, and

characterize the sources, reliability, and frequency of currently available data; evaluate all data sources and identify gaps; and then design a centralized system for collating, analyzing, and maintaining the data, as well as, for reporting the data to Clark County decisionmakers and residents. Subsequent phases will include working with Clark County decision makers to establish a process for assessing which impacts are attributable to the DOE's proposal to construct the Yucca Mountain Repository and the related shipment campaign of HLW.

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## **APPENDIX A**

### **Clark County Personnel Interviewed**

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**Department of Comprehensive Planning - Environmental Planning Division**  
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## **APPENDIX B**

### **Laws, Regulations, Statutes, and Orders Governing the Proposed Yucca Mountain Repository**

- Clean Air Act, as amended (42 USC 7401 et seq.)
- Nevada Revised Statutes: Air Emission Controls, Chapter 445B
- Safe Drinking Water Act, as amended (42 USC 300(f) et seq.)
- Clean Water Act of 1977, as amended (33 USC 1251 et seq.)
- Nevada Revised Statutes: Water Controls, Chapter 445A
- Nevada Revised Statutes: Underground Water and Wells, Chapter 534
- Executive Order 11988 Floodplain Management
- Compliance with Floodplains/Wetlands Environmental Review Requirements (10 CFR Part 1022).
- Hazardous Materials Transportation Act (49 USC 1801)
- Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 1001 et seq.)
- Nevada Revised Statutes: Hazardous Materials, Chapter 459
- Nuclear Regulatory Commission Radioactive Materials Packaging and Transportation Regulations (10 CFR Parts 71 and 73) Department of Transportation hazardous Materials Packaging and Transportation Regulations 49 CFR Subchapter C B Hazardous Materials Regulations, Parts 171 through 180)
- Pollution Prevention Act of 1990 (42 USC 13101 et seq.)
- Comprehensive, Environmental Response, Compensation, and Liability Act, as amended (42 USC 9601 et seq.)
- Standards for Protection Against Radiation (10 CFR Part 20)
- Resource Conservation and Recovery Act, as amended (42 USC 6901 et seq.)
- Noise Control Act of 1972, as amended (42 USC 4901 et seq.)
- Nevada Revised Statutes: Sanitation, Chapter 444
- Executive Order 12088, Federal Compliance with Pollution Control Standards
- Executive Order 12856, Right to Know Laws and Pollution Prevention Requirements
- National Historic Preservation Act, as amended (16 USC 470 et seq.)
- Archeological Resources Protection Act, as amended (16 USC 470aa et seq.)
- American Indian Religious Freedom Act of 1978 (42 USC 1996)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001)
- Antiquities Act (16 USC 431 et seq.)
- Executive Order 11593, National Historic Preservation
- Executive Order 13007, Indian Sacred Sites
- Executive Order 13094, Consultation and Coordination with Indian Tribal Governments
- Executive Order 12898, Environmental Justice
- Endangered Species Act, as amended (16 USC 1531 et seq.)
- Fish and Wildlife Coordination Act, as amended (16 USC 661, 48 Stat. 401)
- Migratory Bird Treaty Act, as amended (16 USC 703 et seq.)
- Bald and Golden Eagle Protection Act, as amended (16 USC 668-668d)
- Nevada Revised Statutes: Protection and Preservation of Timbered lands, Trees, and Flora, Chapter 527
- Nevada Revised Statutes: Hunting, Fishing, and Trapping: Miscellaneous Protective Measures, Chapter 503; Nevada Administrative Code: Sections 010 B 1-4
- Executive Order 11990, Protection of Wetlands
- Executive Order 13112, Invasive Species
- Rivers and Harbors Act (33 USC 301 et seq.)
- National Forest Organic Administrative Act (16 USC 521)

- Materials Act of 1947 (30 USC 601 B 603)
- Taylor Grazing Act (43 USC 315 B 316)
- Farmland Protection Policy Act (7 USC 4201 et seq.)