ENVIRONMENTAL ASSESSMENT REPORT
PREPARED FOR

APPLICATION FOR RENEWAL OF
RADIOACTIVE MATERIAL LICENSE R04971
WASTE CONTROL SPECIALISTS LLC
ANDREWS COUNTY, TEXSA

JULY 2008

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1.0 INTRODUCTION AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Since 1998, Waste Control Specialists LLC (WCS) has been operating a facility for storage and processing of radioactive waste. The facility was initially licensed by the Texas Department of Health (TDH) in 1997, and a renewal application was submitted, as required, in 2004. The renewal application was never acted upon by the agency, but the facility was allowed to continue operations. In 2007, the Texas Legislature moved the regulation of radioactive waste processing and storage facilities to the Texas Commission on Environmental Quality (TCEQ). Thus, this second application for renewal of the license is submitted to that agency.

The action requested is the continued operation of the WCS processing and storage facility in Andrews County, Texas. TCEQ rules require that an Environmental Report accompany an application for renewal of a license to operate such a facility. This document is that Report.

1.2 SUMMARY OF THE PROPOSED ACTION

The action proposed by this application is the renewal of an existing license authorizing the processing and storage of radioactive waste at a facility in Andrews County, Texas. The renewal will allow the facility to continue operating through 2013.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to renew the radioactive materials license for the facility so that it might continue operating.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the renewal of an existing license for a radioactive waste storage and disposal facility at the WCS site in Andrews County, Texas.

2.2 SITE AND PROJECT ALTERNATIVES

2.2.1 The Alternative of License Renewal

Renewal of the license will continue the operation of a facility that is important to the continued safe management of radioactive waste in the United States.

Renewal of the license will also result in continuation of the direct and indirect economic effects of storage and processing operations. As described further in Section 5.1 below, direct effects include the employment of approximately 71 of the total 105 workers at the WCS facility, annual wages of nearly $3.5 million, and output (sales) of nearly $3.0 million associated with storage and processing. License renewal for the storage and processing operation would continue at present levels the property and sales taxes paid to local jurisdictions, as well as WCS's financial and in-kind support to local organizations. The indirect effects of current WCS storage and processing operations (economic multiplier effects) are currently estimated to be an additional 58 workers in the four-county Region of Interest (ROI), $1.4 million in additional household income, and $1.8 million in additional business sales. These economic benefits would continue to occur with approval of the storage and processing license renewal.

2.2.2 The Alternative of No License Renewal

If the storage and processing license renewal application is not renewed, then WCS will begin decommissioning the facility. The closure of the facility would compromise the future of radioactive waste management in the United States in that a vital and necessary waste treatment facility would no longer be available to waste generators in the United States.

If the license is not approved, the direct, indirect, and cumulative economic impacts of the continued operation of the WCS storage and processing facility would not occur in the future. The effects to employment, direct, indirect and induced income, tax revenue to local jurisdictions, donations and participation in local charities and organizations, transportation effects, and the incremental contribution of WCS to the cumulative social and economic development in the area, would not continue.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 SITE DESCRIPTION

3.1.1 Description of Present Land Uses

The surrounding land is primarily used for stock grazing and supports an active oil and natural gas industry. There are four industrial facilities near the WCS complex: the Wallach gravel and crushing facility and Sundance Inc. (oil recovery and solids disposal), both located about one mile west of the WCS facility; DD Landfarm (oil production waste), located approximately 2.5 miles west of the facility; and the Lea County sanitary waste landfill located south of Highway 176 just inside the New Mexico border. In addition, the Louisiana Energy Services' (LES) National Enrichment Facility (NEF) is under construction west of WCS just inside the Texas-New Mexico border.

3.1.2 Population Adjacent to the Facility\

WCS holds title in fee simple to the surface estate of the approximately 14,900-acre site, including the 1,338-acre facilities area within which the existing storage and processing facility is located. There are no residences on property adjacent to the facility. The nearest residence in New Mexico is approximately 3.5 miles from the facility and in Texas, the nearest residence is approximately 8 miles from the facility.

3.1.3 Population Within One-mile Radius

WCS holds title in fee simple to the surface estate of the approximately 14,900-acre site, including the 1,338-acre facilities area within which the existing storage and processing facility is located. There are no residences within a one-mile radius of the facility.

3.1.4 Historic, Cultural, and Scenic Resources

3.1.4.1 Historic resources

Historic resources include buildings, structures, objects and non-archeological sites and districts that are important in the history of a community, a region, the state of Texas, or the nation. In association with the low-level disposal licensing process, investigations were conducted within 10 kilometers (km) of the WCS project site to determine whether historic resources that are listed in or eligible for listing in the National Register of Historic Places (NRHP) or that are designated

as New Mexico Registered Cultural Properties (NMRCP) or Registered Texas Historical Landmarks (RTHL) are present in the vicinity. Following field investigations, project architectural historians concluded that no significant historic resources are present in the 10 km study area.

3.1.4.2 Archeological Resources

In March 2006, archeological research conducted in connection with the low-level disposal licensing process consisted of a review of the site records and previous projects conducted within a 314.16 square kilometer (km^2) area (10 km radius of the project center) encompassing parts of Texas and New Mexico. Research was conducted at the Archaeological Records Management Section of the New Mexico Historic Preservation Division (NMHPD), the Texas Historical Commission (THC), and the Texas Archeological Research Laboratory. A total of 18 archeological sites were identified within the study area, 14 in New Mexico and four in Texas. Of these 18 sites, seven sites have been determined eligible for the National Register of Historic Places (NRHP) and two sites have been determined not eligible for the NRHP. The NRHP eligibility of the remaining nine sites is undetermined. The closest archeological site to the project area is in New Mexico and is approximately 3.4 km from the center of the study area.

A survey was conducted in 1994 that covered the proposed low-level radioactive waste landfill sites north of the existing WCS storage and processing facilities. This survey documented cultural resources, and in fact determined that the area is not well suited for the presence and preservation of archeological sites.

3.1.4.3 Scenic Resources

According to the U.S. Department of Interior (DOI) Bureau of Land Management (BLM), visual resources consist of landscape or visual character, and visual sensitivity and exposure. A study area's landscape features include landform, vegetation, water resource features, color, adjacent scenery, scarcity, and cultural modifications that either add to or detract from visual quality. The overall impression of an area, composed of the elements above, is referred to as the "visual character." For this analysis, the visual character of the area is focused on the perspective of residents living in close proximity to the facility who would be affected by the continued operations, and the perspective of the driving public (along roads within 10 km of the site). However, since the closest residence is approximately 3.5miles away from the facility, the majority of the analysis is geared toward the driving public.

In accordance with the DOI and BLM guidance, a photo inventory of the scenic qualities of the area that includes the WCS facility was conducted during the week of May 9-13, 2005. This photo inventory is included in the complete Socioeconomic Report that is included in the Storage and Processing License Renewal Application. The study area included views from as much as 15 miles from the WCS project. Views were captured to illustrate three zones: foreground-middle ground, background, and seldom-seen. It was determined that the visual resources study area does not contain notable representations of landforms (elevated views, hilltops), vegetation (woodlands), water (stream crossings, bridges, wetlands, water bodies), color (notable changes in color of the landscape), adjacent scenery (pastoral scenes, wildlife viewing potential), scarcity (known scarcity of wildlife habitat, vegetation, or cultural resource), or cultural modifications (urbanized areas, historic structures, visual detractors). The relative lack of visual obstructions to a vast view of this section of the West Texas/East New Mexico landscape could be considered an important element of the "visual character" of the area. Overall, the entire study area can be considered to have modest scenic quality that is pleasant to regard for its rural, undeveloped nature, rather than dramatic, unique or rare qualities.

3.1.5 Flood Plains, Streams and Marshes

There is a 100-year floodplain in the southern part of the facility, created by State Line Road which is the main access into the facility from Highway 176. The storage and processing facility area is not in the 100-year floodplain and the floodplain does not extend into the 30 meter buffer zone around the facility. There are no streams or marshes on the facility property.

3.2 AREA AND SITE SUITABILITY

3.2.1 Geology – Physiography, Geography, Foundation Geology

The site is underlain primarily by the Late Tertiary/Quaternary-aged pedogenic caprock caliche that developed on pre-Quaternary strata on the High Plains. Quaternary Blackwater Draw eolian sands and younger windblown sands overlie the caprock caliche in the northern and southern parts of the site. Below the caprock caliche are sands, gravels, and sandstones that have been variously ascribed to the Tertiary Ogallala Formation, the Tertiary-aged and younger sections of the Gatuna Formation, and the Cretaceous Antlers Formation. From a hydrogeologic perspective, these sands, gravels and sandstones represent a single hydrostratigraphic unit overlying the Triassic red beds, the distinctive red and purple claystones, siltstones and sandstones of the Triassic Dockum Group. The undifferentiated sands, gravels, and sandstones of the Ogallala/Antlers/Gatuna Formations are referred to as the OAG unit in this application. For practical purposes the caprock caliche is also considered part of the OAG unit.

The Triassic Dockum Group red beds are present beneath the entire WCS property. The Cooper Canyon Formation, with characteristically red and purple claystones, siltstones, and sandstones, comprises the upper 600 feet of the Dockum Group immediately beneath the site. To the north of the main area of the storage and processing facility lies a geologic feature referred to as the red bed ridge, which is a prominent buried ridge developed on the upper surface of the Triassic Dockum Group. The ridge may have developed as a local topographic high from erosion, minor compression faulting and folding during Jurassic time, or a combination of these processes.

The OAG unit is present beneath the facility at depths ranging from about 10 feet in the area of the main processing and storage facility area, to about 60 to 70 feet on the northern and southern boundaries of the facility. With the exception of some areas on the top of the red bed ridge, where the caprock extends to the top of the red beds, the sand and gravel deposits of the OAG unit are present across the site. The local thickness of the OAG unit is partially related to the structure of the underlying red beds. The thickness of the OAG unit generally increases off the northeastern and southwestern flanks of the underlying red bed ridge. In addition, small-scale structural lows in the surface of the red beds generally contain an increased thickness of OAG unit and an increase in gravel and sandy gravel near the contact with the underlying Dockum red beds.

The upper portion of the Cooper Canyon Formation, encountered below the contact with the OAG unit, is primarily red to purple, dry, very firm to consolidated clay or claystone. The claystone occurs from a depth of about 10 feet to a depth of about 1100 to 1200 feet below ground surface. Sandstone/siltstone interbeds or zones occur within the upper Cooper Canyon claystones. These are referred to as the 80-, 125-, 180- and 225-foot zones.

3.2.2 Hydrology – Surface Water and Groundwater

Groundwater occurs in portions of the OAG unit, primarily in the north and east portions of the facility. Groundwater was encountered in the discontinuous 80-foot zone and in the 125-foot zone near the eastern boundary of the facility. Elsewhere within the facility, the 80-foot zone and the 125-foot zone are unsaturated. The 180-foot zone contains groundwater in the northern portion of the facility. The 225-foot zone is saturated and under confined conditions throughout the facility area. The 225-foot zone is considered the uppermost saturated zone, albeit with very low permeability (K~E-08 cm/s) and is the zone in which monitoring is conducted for the RCRA landfill.

Additional geologic and hydrogeologic information is provided in the complete and standalone report entitled *Site Geology and Hydrogeology Report, Waste Control Specialists LLC, Andrews County, Texas,* included as Appendix 4.C

The facilities area is located on the southwest-facing slope that transitions from the Southern High Plains to the Pecos Valley physiographic section. The main surface water drainage in the area is Monument Draw, an ephemeral drainage way about three miles west of the WCS site in New Mexico. Ephemeral streams or drainage ways flow briefly only in direct response to precipitation in the immediate locality. Monument Draw is a reasonably well-defined, southward-draining feature (although not through-going) that is identified on USGS topographic maps.

An ephemeral drainage feature, referred to as the ranch house drainage, crosses the facilities area from east to west, down slope of the main storage and processing facility area. This feature is discernible from the topographic relief, although it is much less pronounced than Monument Draw. This drainage feature is a relict drainage way that is choked with windblown sand and is not through-going to Monument Draw. Drainage from the storage and processing facility is down slope toward the ranch house drainage, and eventually infiltrates into the windblown sands and dune fields to the south and southwest of the facilities area.

The drainage areas within the facilities boundary were evaluated as part of a flood plain analysis conducted in February 2004. The 100-year flood plain extends across the southern portion of the facilities area along the ranch house drainage. The northernmost limit of the 100-year floodplain is south of the existing processing and storage areas associated with the RCRA, TSCA, and radioactive material facilities.

3.2.3 Meteorology and Air Quality

The areas surrounding the WCS site are located in two climatic regions, as identified by the National Oceanic and & Atmospheric Administration (NOAA) and Cooperative Institute for Research in Environmental Services (CIRES) Climate Diagnostics Center. In Texas, the climatic region is known as the Southern High Plains, and in New Mexico, the climatic region is known as the Southeastern Plains. As the climatic regions are identified separately for the two states, and as the majority of the site is located within Texas, the area surrounding the site will be referred to as the Southern High Plains.

The climate of the area is classified as semiarid, characterized by warm, dry summers and mild, dry winters. In semiarid areas such as the Southern High Plains, plant life is short and grasses are drought resistant because of the high possibility of severe drought. Annual precipitation on average is approximately 14 inches and annual evaporation exceeds annual precipitation by nearly five times. The area is subject to occasional winter storms, which produce brief snowfall events of short duration.

During the past 50 years, average maximum daytime temperatures for the area ranged from the low 60s (°F) in winter to the low 90s (°F) in summer; average minimum nighttime temperatures ranged from around 30°F in winter to the mid-60s (°F) in summer.

3.2.4 Air Temperature

The average daily temperature range (the difference between the average daily maximum and average daily minimum temperatures) is approximately 30°F throughout the year.

During winter the mean maximum temperature is around 62°F, and the mean minimum temperature is around 31°F. The lowest temperature observed by the seven NWS Cooperative Stations was -23°F occurring in Seminole, Texas on February 8, 1933. Based on data from three stations - Hobbs, New Mexico, Jal, New Mexico and Seminole, Texas - it is estimated that the area has a 90 percent probability of a 190-day freeze-free period (above 32°F). In summer, the mean maximum temperature is slightly above 93°F. The highest temperature for the region, 114º F was observed at Seminole, Texas, on June 28, 1994. The average daily minimum temperature for the summer months is 65°F.

3.2.5 General Air Flow Patterns

The movement of air masses over the Southern High Plains is in large part governed by winds in the upper portions of the atmosphere. Within the Northern Hemisphere, winds in the upper levels of the atmosphere (25,000 ft to 30,000 ft above the ground) flow from west to east. Upper-atmospheric winds are relatively uniform, with the exception of narrow bands of stronger winds moving at speeds 150 miles per hour (mph) to 300 mph. These are known as jet streams. The formation and movement of air masses and pressure systems, both at the surface and in the upper atmosphere, are directly linked to these jet streams. The two classifications of jet streams that affect weather in the vicinity of the WCS site are the polar and sub-tropical jet streams. The sub-tropical jet stream can influence weather in the region at any time of year, whereas the polar jet stream makes its effects known primarily in the fall, winter, and spring. The average wind speed throughout the year is 4 to 10 knots. Mean monthly wind speeds are highest in spring and early summer as illustrated by the wind roses for Midland. Calms account for about 1 percent to 3 percent of all wind regimes in the region.

During all seasons the prevailing wind is southerly. In the winter, surface air shifts from the predominant southerly flow to a northerly flow, as continental polar air masses enter the area. Northerly winds commonly persist through most of January, although southerly winds still prevail. In spring, the Southern High Plains is known to be one of the windiest areas of the United States. Gusts of wind exceeding 60 mph are not infrequent.

3.2.6 Relative Humidity

Daytime relative humidity values for the area are generally highest in the fall and winter. Relative humidity values for nights and mornings in summer and fall are generally higher than those for winter and spring.

Morning relative humidity levels are highest in October, when the mean early morning levels reach 70 percent to 80 percent. Afternoon relative humidity levels are more variable than early morning levels. The highest mid-day relative humidity levels occur in January, at nearly 50 percent. Mean midday and evening daily relative humidity values in July range between 34 and 47 percent.

3.2.7 Precipitation

Precipitation increases over the Southern High Plains from May through October. According to isopluvial maps for New Mexico and Texas, developed using NOAA Cooperative Station data, annual precipitation typically ranges from about 14 to 18 inches. Average measured rainfall amounts during the past 50 years reveal a mean annual precipitation value for the site of approximately 14 inches.

Precipitation in the Southern High Plains follows a bimodal annual distribution. In winter most of the precipitation in the region is associated with frontal activity, and the amount varies from station to station. The region receives the most rainfall between May and October, although some precipitation occurs during early spring. Localized and often intense thunderstorms are common throughout the summer but are most frequent in July. Regional mean monthly precipitation during winter and summer is 0.5 and 2.0 inches, respectively. The 24-hour, 100-year storm event for the area as calculated by NOAA, produces 6.1 inches of rainfall.

3.2.8 Evaporation

Pan evaporation measurements are known to be greater than evaporation from large water bodies such as lakes or reservoirs. Using a factor to correct for the difference in evaporation, the Texas Water Development Board (TWDB) has estimated gross lake evaporation for 1-minute quadrangles from pan evaporation and lake measurements. Average annual gross lake evaporation for the area surrounding the site is estimated to be between 66.50 and 70.91 inches.

3.2.9 Solar Radiation

The highest solar radiation levels occur in June and are about two and a half times greater than the solar radiation in December. Solar radiation levels appear to be relatively uniform over the

region. The highest regional variability occurs in March, and the least occurs in July. The total sunshine for the area (using data from Midland) is 60 to 70 percent in winter and 70 and 80 percent in summer.

3.2.10 Severe Weather Phenomena

Severe weather events characteristic of the Southern High Plains of Texas and Southeastern Plains of New Mexico include flash floods; high winds; dust storms; tornadoes; hail; and on occasion snow, ice, and fog. On average, the Southern High Plains will see approximately 5 days per year with either snow or frozen precipitation; snowfalls rarely exceed 12 inches.

During a 42-year period of record, Andrews County, Texas, reported 21 tornadoes and Lea County, New Mexico, reported 81 tornadoes. Approximately 9.8 percent of the tornadoes reported in the two counties were classified as strong tornadoes: F2 or F3 on the Fujita scale. The strongest tornadoes that occurred in Andrews County were class F2, which correlates to a tornado with wind speeds of 113 to 157 mph that can cause considerable property damage by tearing roofs off houses and demolishing mobile homes. The majority of the tornadoes (65.6 percent) that have occurred in the two counties were F0 (F-zero) tornadoes. F0 tornadoes have wind speeds of 40 to 72 mph and can break branches off trees, uproot shallow-rooted trees, and damage chimneys and billboards.

3.2.11 Ecology – Terrestrial and Aquatic Biota, Endangered Species

Ecosystems in and around the site are typical of the much larger region of West Texas and adjacent areas of New Mexico. The terrain is gently rolling and characterized by shallow washes, some of which are bordered by trees. Soil texture ranges from clay loam to fine sand. Natural vegetation in the region consists primarily of low desert grassland with scattered shrubs and cacti. With few exceptions, the flora and fauna in and around the site area consist of species that occur widely throughout the region. Most of the area is currently grazed or has been grazed.

Areas of pristine habitat do not exist near the facilities area. Cattle and other livestock have grazed the region in the past, when the area was primarily ranchland. As in other areas of desert grassland, overgrazing has reduced the importance of many native grasses and increased shrub cover. Yucca and snakeweed, which are species indicative of overgrazing, are present over much of the area, as are invasive exotic weeds. Subsequent site operations have removed additional habitats, and remaining areas of habitat have been fragmented by the construction of roads and other rights-of-way. In spite of past and ongoing disturbances, the resulting mosaic of land use supports the diverse flora and fauna typical of the region.

Ecological surveys identified six species listed as federal and/or state threatened or endangered that occur or could occur on the Site and in the vicinity. The six species are discussed below:

- American Peregrine Falcon (Falco peregrinus) – Texas state endangered. It was Federally delisted in 1999. An uncommon migrant that would be expected only occasionally in Andrews County. No suitable breeding or feeding habitat exists on or in the vicinity of the site.

- Southwestern Willow Flycatcher (Empidonax traillii extimus) – Federal and Texas State endangered. Because Andrews County is outside its summer range, it is possible, but unlikely, to be seen flying over the site and vicinity during migration. No suitable nesting habitat is present on or near the site.

- Bald Eagle (Haliaeetus leucocephalus) – Federal and Texas State threatened. It is possible, but unlikely, that migrating individuals fly over Andrews County because Andrews County is at the southern edge of its winter range. No suitable nesting or winter roosting habitat is present on or in the vicinity of the site.

- American Swallow-tailed Kite (Elanoides forficatus) – Texas state threatened. Because Andrews County is outside it summer range, it is possible, but unlikely, to be observed flying over the site and vicinity during migration. No suitable breeding or winter habitat is present on or in the vicinity of the site.

- Whooping Crane (Grus americana) – Federal and Texas State endangered. An uncommon migrant that would not be expected in Andrews County. No suitable breeding or feeding habitat exists on or in the vicinity of the site.

- Texas Horned Lizard (Phrynosoma cornutum) – Texas State threatened. The Texas horned lizard is widespread in Texas and was reported from all but a few east Texas counties. Its numbers are diminishing in many parts of the state, but it is frequently encountered in suitable habitat in much of west Texas. The active areas of the storage and processing facility only occupy a minor fraction of the almost 15,000 acres that WCS owns, and any associated loss of habitat will not pose a great threat to the Horned Lizard.

Either the Federal or State government lists these species as threatened or endangered (U.S. Fish and Wildlife Service, 1999; Texas Parks and Wildlife Department, 2003). Suitable habitat for the bird species is limited in the region. Site conditions provide no opportunities for nesting, and only limited opportunities for feeding or roosting.

The black-tailed prairie dog (Cynomys ludovicianus) and the Lesser Prairie Chicken (Tympanuchus pallidictinctus), are both listed as a Candidate Species, Category 1.

Recent decline in population numbers of the lesser prairie chicken, a species that prefers shinnery oak habitat, has shifted concern on public lands towards protection of this habitat. Surveys conducted for lesser prairie chicken indicated that no individuals or active leks were present and no breeding areas were observed. The black-tailed prairie dog was not observed on or near the site.

Two reptile species are of potential concern in the region. The Texas horned lizard is listed as threatened in Texas. In 1993, the Texas Legislature officially designated the Texas horned lizard as the State Reptile of Texas. Andrews County lies within the published range of the Texas horned lizard, and specimens have been reported from the county. An immature individual was observed north of the area surrounding the storage and processing facility on May 4, 1996, and another immature individual on September 1, 1996.

The U.S. Fish and Wildlife Service recently listed the sand dune lizard (Sceloporun arenicolous) as a Candidate Species due to loss of habitat from herbicide spraying to control shinnery oak, and because of surface disturbance for oil and gas development. The habitat of the sand dune lizard is primarily confined to active sand dunes, which are in a limited area of Texas and New Mexico and not present at the facility. Operation of the facility would not adversely affect the species even if it were present, as threats to its survival come from removal of shinnery oak and sand dune surface disturbance.

3.2.12 Natural Hazards – Seismicity, Mineral Resources, Severe Storms

The WCS area and the Central Basin Platform in general, is an area of moderate low intensity background seismic activity. The 2,500-year return period peak probabilistic-based horizontal acceleration at ground surface is 0.04 g. The absence of late-Quaternary faulting and the low to moderate rate of background seismicity, even that associated with petroleum recovery activities, results in low seismic hazard at the WCS site.

WCS lies in a region with crustal properties that indicate minimum risk due to faulting and seismicity. Crustal thickness is the most reliable predictor of seismic activity and faulting in intracratonic regions. Crustal thickness in the vicinity of the WCS site is approximately 30 miles (50 km), one of the three thickest crustal regions in North America. In comparison, the crustal thickness of the Rio Grand Rift is as little as 7.5 miles (12 km) in places.

The Central Basin Platform is an area of moderate, low intensity seismic activity based on data obtained from the National Geophysical Data Center of the National Oceanic and Atmospheric Administration and the U.S. Geological Survey (USGS) Earthquake Data Base available from the National Earthquake Information Center (http://neic.usgs.gov/). The computer search for all recorded seismic activity within a 250 km (155 mile) radius of WCS provided a list of 188 seismic events with 68 suspected duplicates during the period from 1931 to 2003. Seismic

activity for New Mexico and bordering areas, which includes Andrews County, indicates that a large fraction of activity in southeastern New Mexico and adjacent areas of west Texas is induced by oil and gas production, secondary recovery, or waste injection.

The largest earthquake in the vicinity of WCS, referred to as the Rattlesnake Canyon earthquake with a magnitude of 5, occurred in 1992. The Rattlesnake Canyon earthquake was located by seismograph stations monitored by the New Mexico Institute of Mining and Technology at latitude 32°17.80N and longitude 103°10.33W, which is approximately 11 miles southwest of the facility. The location of the Rattlesnake Canyon earthquake was approximately three miles east of the Paleozoic west platform fault. The Rattlesnake Canyon earthquake was interpreted as a reverse fault, with movement consistent with the approximately east–west maximum horizontal stress orientation.

The NEIC database also included a magnitude M = 3 earthquake that occurred on June 2, 2001, with the epicenter located 13 kilometers (8 miles) from the WCS facility. The coordinates of this earthquake epicenter provided by the NEIC were plotted relative to the NEIC location of the Rattlesnake Canyon Earthquake. The two earthquake epicenters are located very close to each other. The June 2, 2001 earthquake is located only 3.75 kilometers west of the Rattlesnake Canyon epicenter. If one assumes the same methodological bias by the USGS in locating the two epicenters, then it is possible that the June 2, 2001 earthquake occurred on the same fault as the Rattlesnake Canyon earthquake.

The seismic hazard at a particular geographic position is due to ground motion or shaking. Seismic hazard is based on historical seismic activity and frequently presented as Peak Ground Acceleration (PGA) maps. The maps present the probability of the PGA due to earthquakes exceeding a particular value of acceleration (expressed as a fraction or percent of gravitational acceleration) over a particular time period. A PGA of greater than about 0.2 g is considered the acceleration level at which considerable damage can begin to occur to weakly built structures. A seismic hazard map of the western United States prepared by the USGS indicates that at the 90% probability level over a 50-year time period, the PGA of the southeastern New Mexico/Andrews County area would not exceed approximately 0.02 to 0.03 g (site specific search yields 0.0253 g). Golder Associates (1998) calculated the PGA at the WCS site for the Rattlesnake Canyon earthquake in the range of 0.06 to 0.07 g, which is well below the PGA of 0.2 g where considerable damage can begin to occur to weakly built structures.

A site-specific probabilistic seismic analysis was also conducted to: (1) identify all potential seismic sources in the region surrounding the site that may significantly contribute to its seismic hazard; (2) characterize the location, geometry, orientation, maximum earthquake magnitude, and earthquake recurrence of these seismic sources; (3) estimate the horizontal ground motions on soft rock for an annual probability of exceedance of $4x10^{-4}$ (return period of 2,500 years) by performing a probabilistic seismic hazard analysis; (4) assess the effects of the subsurface

geology on strong ground shaking at the WCS site; and (5) develop seismic design ground motions at specified design locations.

The probabilistic analysis concluded that the largest contributor to the seismic hazard at the WCS site is the background seismicity of the Southern Great Plains seismic source zone. The results indicated a peak acceleration of approximately 0.05 g, resulting in a modest increase in ground motion. The small calculated peak accelerations and minimal ground motion resulting from the probabilistic seismic analysis indicates that the WCS site is in a seismically stable zone.

3.3 RADIOLOGICAL ENVIRONMENT

3.3.1 Background Radiation Exposures

WCS has accumulated more than a decade of environmental monitoring data. These data show that no member of the public or the environment has been exposed to radiation by routine operations at the facility. All releases from the facility have been well within regulatory limits. Doses to the public do not exceed the limits specified in 30 TAC §336. 313(a)(1). Thus, radiation exposures to the public outside of the controlled perimeter of the facility do not exceed those resulting from natural background.

3.3.2 Background Radioactivity

Mean values for background radioactivity have been established from environmental monitoring data collected for the existing facility. Additional data will be collected during the pre-operational monitoring programs for the proposed byproduct material and low-level radioactive waste disposal facilities. These collective monitoring data, as well as the data collected concurrently from the perimeter monitoring program, will provide a much more comprehensive dataset representative of the range of conditions that can occur over time and space than the current site background dataset. Consequently, WCS will establish updated site-wide background values encompassing the expanded baseline dataset.

All data in the background dataset obtained from locations within the existing operational areas of the site after their start-up will be evaluated for trends. If a trend is identified in the background data attributable to prior waste management activities at the site, the data will either be excluded from the computation of the background limits or will be adjusted to remove the bias associated with the apparently-affected measurements. In addition, historical data will be reviewed to identify any data of questionable quality, and any such data will also be excluded from the computation of background limits.

3.4 SOCIOECONOMIC ENVIRONMENT

3.4.1 Demographic characteristics

3.4.1.1 Existing and Projected Population, Including Race/Ethnicity

Baseline demographic data were collected for the ROI, which is defined as Lea County, New Mexico, and Andrews, Gaines and Winkler Counties in Texas. The cities of Andrews, Texas and Eunice, New Mexico are the closest population centers to the site at distances of about 30 miles southeast and six miles west, respectively. Other population centers are at distances from the site as follows:

- Hobbs, Lea County, New Mexico: 20 miles north
- Jal, Lea County, New Mexico: 23 miles south
- Lovington, Lea County, New Mexico: 39 miles north-northwest
- Seminole, Gaines County, Texas: 32 miles east-northeast
- Denver City, Gaines County, Texas: 40 miles north-northeast

Aside from these communities, the population density around the site is extremely low. The combined population of the four counties is 90,155 based on the 2000 U.S. Census. This represents a 2.9 percent decrease over the 1990 population of 92,852 persons. The most prominent racial population within the ROI is White, with 49,927 persons or 55.4 percent — slightly higher than New Mexico and Texas averages of 44.7 percent and 52.4 percent respectively. The largest minority population is Hispanic or Latino, with 35,543 persons, or 39.4 percent, followed by the Black or African American population totaling 2,966 persons, or 3.3 percent of the population.

TWDB population projections show the 2040 population of the three Texas counties (Andrews, Gaines, Winkler) that border the facility as 43,959, a 26.9 percent increase over the 2000 population of 34,644. The Texas State Data Center (TSDC) provides population projections by race/ethnicity. The TSDC prepares four alternate scenarios based on different net migration assumptions; the 0.5 Scenario was chosen as the most appropriate for long-term planning. This scenario assumes that future rates of net migration will be one-half of those of the 1990s. This scenario projected growth ranging from 10.8 percent to 42.5 percent in the three Texas counties, driven primarily by an increase in the Hispanic population. The population projection data for the State of New Mexico is based on the 2000 U.S. Census. These data show a decline in the

population of Lea County from 55,490 in 2000 to 49,417 in 2030. Population projections for New Mexico counties by race and ethnicity are not available.

3.4.1.2 Age, Education, HealthCharacteristics

The age distribution for the ROI indicates that individuals, ages 20 to 44 years, comprise the largest percentage of the population, at 30,124 persons, or 33.4 percent. Educational attainment in the ROI is predominantly represented by persons who earned a high school diploma (16,583 persons, or 18.4 percent of the population) followed by persons who reached 9th to 12th grade but did not receive a diploma (11,197 persons or 12.4 percent). The smallest category of educational attainment for the ROI is graduate or professional degrees, represented by 2,110 persons or 2.3 percent.

Mortality patterns have been fairly stable and similar throughout the ROI. Death rates in the ROI and the state of New Mexico have stayed flat, while increasing slightly in Texas from 1999 to 2001. An epidemiological study tracked the incidence of cancer by county of residence in Texas for the years 1996-2000 (Texas Department of State Health Services, 2004.). Both Andrews and Gaines counties have lower average annual rates of cancer incidence than the statewide rate of 445.6 per 100,000. From 1999 to 2003, there was generally a higher rate of death in Lea County than in the State of New Mexico, with the exception of Hispanic persons. White and Hispanic persons had a higher alcohol-related death rate in Lea County than in New Mexico. Lea County also had a higher rate of smoking-related deaths for White and Black persons, but a lower rate than New Mexico for Hispanic persons. Additionally, Lea County had the second highest smoking-related death rate in the state, with 428 deaths (4.6% of the statewide total). Indeed, Lea County had a higher rate of adult smoking than the state across all races. Lea County generally had a smaller drug-related death rate and suicide death rate than the state. However, Lea County had the 5th highest rate of adult chronic/heavy drinking rates in New Mexico, with 2,360 heavy drinkers (3.8% of the statewide total).

3.4.1.3 Housing Characteristics

Data for housing characteristics show the majority of housing units in the ROI are owner-occupied. The median value for owner-occupied housing for Lea County, New Mexico is $47,300; Andrews County $38,900; Gaines County $42,300; and Winkler County $27,600. These values are lower than the state median values of $94,600 (New Mexico) and $77,800 (Texas). The ROI is 84 percent owner-occupied housing, compared to 87 percent in New Mexico and 91 percent in Texas.

3.4.1.4 Income and Poverty Status

According to 2000 Census Bureau data, the highest median household income for the ROI is in Andrews County ($34,036) while Hobbs, New Mexico, located in Lea County has the lowest median household income of $28,100. This is slightly lower than the state median household incomes for New Mexico ($34,133) and Texas ($39,927). The age group with the highest average median household income is 45 to 54 years, followed by the 35 to 44 years group; the age group under 25 years has the lowest median household income in the ROI. These incomes are consistent with New Mexico and Texas statewide incomes for corresponding age groups.

When evaluating the poverty status of the population, there is no city or county within the ROI that exceeds 50 percent below the poverty level, which is calculated by the U.S. Census Bureau. The U.S. Department of Health and Human Services calculates slightly different poverty guidelines to determine eligibility for certain programs; these guidelines are updated every year. The 2008 poverty guideline is $21,200 for a family of four. In 1999, the poverty guideline for a family of four was $16,700. For the Black or African American population within Eunice, New Mexico, 78.9 percent of individuals and 100 percent of families were living below the poverty level. Median household income was substantially lower for Black and Hispanic persons than for White persons.

3.4.1.5 Employment

The employment rate in the ROI ranges from a low of 45.1 percent in Jal, New Mexico to a high of 55.7 percent in Seminole, Texas. These employment rates are slightly lower than the state employment percentages of 55.7 for New Mexico and 59.1 for Texas. The unemployment percentages range from the highest (5.9 percent) in Eunice, New Mexico, to the lowest (2.3 percent) in Seminole, Texas. These rates are similar to the State of New Mexico's unemployment rate of 4.4 percent and the State of Texas' rate of 3.8 percent.

Employment within the ROI is primarily in the industries of education, health and social services (21.6 percent) and agriculture, forestry, fishing and hunting, and mining (21.3 percent). The lowest percentage of persons employed is in the information industry (1.2 percent). All of the industry percentages are fairly consistent with their respective state percentages with the exception of the agriculture, forestry, fishing and hunting, and mining industry (21.3 percent), which is significantly higher than New Mexico (4.0 percent) and Texas (2.7 percent). The industry with the lowest percentage compared to the respective states is professional, scientific, management, administrative, and waste management services, which comprises 3.9 percent of the ROI's employed population in comparison to New Mexico (9.4 percent) and Texas (9.5 percent).

More recent data for employment by industry are available for Texas by county. According to the Texas Workforce Commission (2008), in the third quarter of 2007, a total of 5,510 persons

were employed in Andrews County. The top three industries in terms of employment in the county were natural resources and mining (1,217 employees); local government (1,055 employees); and leisure and hospitality (809 employees).

3.4.2 Fiscal, Governmental and Community Services

3.4.2.1 Andrews County

Located in the oil-rich Permian Basin, Andrews County has produced over two billion barrels of oil since the 1920s. In an economy supported by the annual production of over 39 million barrels of oil, more than 2,000 of the county's 5,050 workers are connected to the oil industry. Widespread ranching, limited farming, and diversified industrial enterprises provide the essential basis for the region's economy. The town of Andrews is home to a plant that assembles Kirby vacuum cleaners and a plant that manufactures fiberglass tanks. In 2006, Andrews County had a tax base (total certified net taxable value) of over $3.1 billion dollars. The County's general fund tax rate was .3446 per $100, and its road and bridge tax rate was .0572 per $100 (Andrews County Appraisal District, 2008).

One library, two financial institutions, and a bi-weekly newspaper serve the city of Andrews. Fraternal and civic organizations include the Lions Club, Rotary Club, 4H, and Boy Scouts/Girl Scouts of America. Local facilities serving the community of Andrews include 35 churches, a museum, a municipal swimming pool, golf course, tennis courts, youth club/center, parks, and athletic fields.

3.4.2.2 Lea County

The Lea County community was initially agriculturally based, but the discovery of oil and gas in the mid 1920s has had a significant impact on the region. Today the county's agricultural heritage continues to have underlying influences on the area's development with an active dairy industry as well as farming and ranching. The oil and gas industry still has a strong effect on the local economy, and in addition, there is a growing manufacturing sector. Three libraries, nine financial institutions, and two daily newspapers serve Lea County. Cities in Lea County that are within the ROI include Hobbs, Eunice and Jal.

In Lea County, there are five public school districts and two private schools. During the 2000-2001 academic year the county had a total of 39 schools with 11,963 students enrolled in pre-kindergarten through twelfth grade (NCES, 2004). The school district closest to the WCS facility is in Eunice, located six miles to the west, with the other districts located in Hobbs, Jal, Lovington, and Tatum. The main campus of the College of the Southwest (CSW) is located just north of Hobbs. A branch campus is located in Carlsbad. Between the two campuses, the 2003

enrollment was approximately 900 students. New Mexico Junior College, located in Hobbs, has a current enrollment of 3,239.

3.4.3 Existing Social Structure in the Region

In connection with the pending low-level radioactive waste disposal licensing process, the investigation of existing community attitudes and perceptions incorporated a two-tier procedure. The first tier investigation consisted of an informal sample of community attitudes and perceptions of the WCS operation. The second tier consisted of a random sample telephone survey. The social and economic investigations also included research from secondary sources on the history of settlement and economic development in the region. The results of those investigations of past and present social structure, with specific emphasis on the cultural environment, are summarized herein.

Before successful oil exploration, the majority of the ROI was inhospitable to widespread human occupation due to the lack of a stable year-round water supply. The hardiness and self-reliance of the original settlers is a continuing source public pride among area residents. Although Lea and Andrews counties share similar histories, their consciousness of place relates to their respective states. Midland-Odessa is very much the reference city for residents in Texas ROI counties, while New Mexico ROI residents look to Carlsbad as the nearest large city.

With the discovery of oil in Hobbs on June 13, 1928, the ROI entered the industrial era. By 1929, a tent city of 5,000 had grown up in Hobbs. Oil and gas discoveries in 1929 led to the incorporation of Eunice. In 1929, the Deep Rock Oil Company made the first major oil discovery in Andrews County, Texas. Throughout the thirties, forties, and fifties, oil production and related services continued, accompanied by relatively high incomes for industry workers. As the oil industry developed, many of the large-ranch oil royalty owners moved to the cities. In 1967, world oil prices collapsed and many of the local employees and business contractors of the large oil and gas companies were relocated. At that time, administrative oil company offices closed in the cities of Andrews, Jal, and Hobbs. Many of the dependent service companies went bankrupt. In mature hydrocarbon producing areas, population and employment tend to fluctuate in correlation with oil prices. Petroleum production, like other mining industries, has a declining production curve; therefore currently needed secondary and tertiary methods of oil extraction are only economically viable in times of high oil prices.

A major element of the ROI population's experience with the oil and gas industry is an awareness of the increasingly strict regulatory environment, including cleanup requirements, that has occurred since the "wildcat days" when a heavy rain could easily contaminate the limited water supplies with toxic chemicals. This experience provides the backdrop against which many residents see the WCS processing and storage facility and the attendant environmental regulations as an attractive diversification prospect for their area, more stable and safer than the oil and gas business.

The first tier field investigation consisted of an informal sample of community attitudes and perceptions of the WCS operation stratified by two distinct groups: (1) community leaders; and (2) general community population. The sample was clustered by two geographic areas: Andrews and Lea Counties. The investigation revealed a notable homogeneity of positive community attitudes toward and perceptions of the WCS facility, which included current processing and storage operations, and acceptance of the associated risks across race/ethnicity, income, social status and geographic groups. Explicit efforts were made to identify and include in the first tier survey individuals and/or groups with divergent views about the WCS operation and the proposed disposal facility.

When asked for their opinion overall, 70 percent of respondents agree strongly with the development of the facility, 20 percent agree moderately, eight percent agree minimally, and two percent disagree strongly. No one stated that they had no opinion. Nonetheless, two entities have been previously organized to oppose the WCS facility and other nuclear-related projects in Texas. One organization, Atomic Waste & Radiation Education (AWARE), had an office in Andrews, but the phone number is no longer connected. Presumably this organization's opposition to the WCS facility is associated with general opposition to nuclear power development related radioactive waste issues. Another organization, Texas Radiation On-line, is largely one site programmer based in Austin. This individual has expressed numerous concerns specifically about the WCS low-level radioactive waste disposal capabilities.

The Texas Sierra Club recently opposed the licensing of a byproduct material disposal facility in Andrews County. Approximately twelve requests for a public meeting were submitted. Eleven letters were submitted by individuals residing in or around Eunice, New Mexico using an identical form letter to request a public meeting in Eunice, New Mexico, and one additional request to conduct a public meeting was submitted by the Sierra Club which named two members residing in and around Eunice, New Mexico. There were no requests for a public meeting made by individuals residing in Andrews County, Texas where the facility is located, or by groups on behalf of members who reside in Andrews County. Therefore, the Executive Director determined that there was not a significant degree of public interest in the application and decided against conducting a public meeting on the WCS application for a license authorizing by-product material disposal.

During the low-level licensing process, TCEQ requested that a more intensive survey of community perceptions and attitudes be undertaken. In response, the investigation was graduated to a second tier level involving a random sample survey. A public opinion polling firm, Baselice & Associates, Inc., was retained to perform a random telephone survey to identify public attitudes related to WCS operations and the management of radioactive waste in Andrews County. The survey included open-ended questions related to the public's understanding of WCS and perceived positive and negative impacts of WCS in Andrews County.

The Baselice survey found that the image of WCS is 70 percent positive/ten percent negative in Andrews County, and 42 percent positive/eight percent negative in the total survey area. Less than one in four respondents (23 percent) recalled seeing, reading, or hearing something recently about WCS in the survey area. Recall was 11-15 percent outside of Andrews County, but recall reached 44 percent inside of Andrews County. By nearly a five-to-one margin (14 percent to 3 percent), the impact of what respondents have seen, read or heard about WCS has been positive. Knowledge of what WCS does is not universal, as 53 percent of respondents in the survey area (69 percent in Andrews County) mention some type of storage or disposal, with 20 percent mentioning something in regard to low-level radioactive waste. Another 37 percent of respondents are unclear what WCS does.

A general summary of the stratification analysis indicates that the ROI is more industrial-based, with lower median incomes, higher unemployment, and generally lower minority populations than their respective states. The surveys reveal a rural-urban differentiation, in that the ROI's larger cities are more similar in income and employment stratification to state averages than rural or unincorporated areas.

With some exceptions, the ROI is economically interdependent, with most residents working in or near their residence and evidently within the ROI. The public sector has benefited greatly from tax revenues from oil and gas production, which have supported a greater level of educational, health, and emergency response resources than would exist in regional economies dependent upon less lucrative industries. With the exception of a casino in Hobbs and a few other recreational activities, the regional economy is largely dependent upon basic industries, especially resource extraction.

4.0 ENVIRONMENTAL CONSIDERATIONS

4.1 MONITORING PROGRAM AND RESULTS

4.1.1 Effluent Release Monitoring

4.1.1.1 Radiological

Effluent monitoring is generally not conducted as a primary way to assess radiological releases to the environment. There is reliance on the environmental monitoring program to indicate the any effluent releases from the facility. Effluent release monitoring is conducted at the exhaust stack of the processing facility. Particulate monitoring is conducted on a routine basis, and monitoring for Tritium gas is conducted when Tritium is being processed.

4.1.1.1.1 Gaseous

Effluent release monitoring is conducted at the exhaust stack of the processing facility. Particulate monitoring is conducted on a routine basis, and monitoring for Tritium gas is conducted when Tritium is being processed.

4.1.1.1.2 Liquid

Samples are taken from the liquid effluent sumps prior to release to the environment.

4.1.1.1.3 Solid Waste

There is no solid waste radiological effluent release monitoring required for the storage and processing facility.

4.1.1.1.4 Direct Gamma

There is no requirement for making direct gamma measurements as part of the effluent release monitoring program at the storage and processing facility.

4.1.1.2 Chemical

4.1.1.2.1 Gaseous

No effluent monitoring is required for gaseous chemical constituents.

4.1.1.2.2 Liquid

No effluent monitoring is required for liquid chemical constituents.

4.1.2 Environmental Monitoring

4.1.2.1 Radiological

WCS conducts routine radiological monitoring of environmental media to provide data for evaluating the potential impacts of licensed operations on the environment. Samples of air, soil, vegetation, and biological tissue are collected as part of this monitoring program for determination of the concentrations of radiological constituents in these media. Direct measurements of ambient radiation levels are also made as part of the radiological monitoring program. In addition, groundwater samples have been collected and analyzed as part of the radiological monitoring program, although groundwater has not been identified as a principal media of concern due to the depth of the uppermost saturated strata that is considered to be the uppermost aquifer for the purposes of groundwater monitoring

4.1.2.1.1 Air

Air monitoring stations (particulate, tritium and radon) are collocated with ambient gamma monitoring stations (denoted as TLD locations) for the storage and processing facility. Pre-operational monitoring data collected in 1996 was presented in the application for the original license authorizing the WCS radioactive materials storage and processing facility. Comparison of the preoperational monitoring data to operational monitoring data display nearly identical concentration variations over time at all stations, both in terms of the pattern and the magnitude of the concentrations. This holds true for stations in the immediate vicinity of the storage and processing activities, those removed from those activities, and the control station located approximately 3.5 miles east of the Texas-New Mexico state line. While the pattern of tritium variation, included with the air particulate data graphs, is similar at all stations, the tritium concentration peaks in the vicinity of the storage and processing facility are greater than those at the remote stations. This is consistent with observations in the annual reports that localized

increases in tritium concentrations are observed to coincide with the processing of wastes with notable tritium content.

Available air particulate and tritium data since 2001 are predominantly non-detectable, with the exception of beryllium-7, and data available from 2000, which contain some detectable concentrations of certain radionuclides, which cannot be tied to the applicable station locations.

Radon has been consistently at what are considered background levels at all sampling stations. Normal fluctuations have occurred throughout the sampling periods. Requiring a lower limit of detection from the laboratory in late 2003 and early 2004 has improved the sensitivity of the analysis.

4.1.2.1.2 Soil

Soil data indicate low-levels of naturally-occurring and anthropogenic radionuclides, with occasional, anomalously-elevated concentrations being reported at stations proximal to and distal from the storage and processing activities. The occurrence of these anomalous concentrations at locations removed from radioactive materials handling areas and the subsequent return to typically observed concentrations indicate that the anomalous concentrations are likely an artifact of the sampling and analytical process.

4.1.2.1.3 Vegetation

Vegetation data show no impact from activities at the WCS site.

4.1.2.1.4 Sediment

Because there are no perennial surface water bodies with 5 miles of the site, no sediment sampling has been conducted.

4.1.2.1.5 Surface Water

The Depression Pond, which is an internally-drained basin to the east of the site, is the only naturally-occurring, perennial (year-round) water body within a five mile radius of the facilities area. This feature is located over 2,000 feet to the east of the main WCS storage and processing facility area, while any runoff from the storage and processing facility that may leave WCS property flows to the west into the drainage area of Monument Draw in New Mexico. Other perennial surface water features are man-made ponds, consisting of various stock tanks located across the area and man-made features located at the quarry west of the site. Consequently,

surface water monitoring has not been formally included as part of the radiological environmental monitoring program. Baker Spring, one of the man-made features located at the quarry, has held water in a depression in the red bed clays since 2004. As a result of the recent, prolonged presence of water in Baker Spring, WCS has collected water samples from this location several times in the past few years.

4.1.2.1.6 Groundwater

The results from groundwater sampling show how the program has been refined over the years. This included filtering the water sample to remove suspended material that is normally associated with well water. This allows the result to be indicative of material that is soluble. The soluble fraction would contain radioactive material that is leached from operation activities. Filtering of the water samples was started just recently and the data prior to that had results suspected to be impacted by sediment.

4.1.2.1.7 Direct Radiation

Thermoluminescent dosimeters (TLDs) have been the primary devices used to collect direct radiation data at the facility since 1996. In 2005, WCS initiated the parallel use of optically stimulated luminescent dosimeters (OSLs) at all TLD monitoring locations. In 2007 the OSL was used exclusively at all locations including five locations where the State places TLDs. WCS has continued to place TLDs at those locations also. A comparison of the data for the two years showed essentially no difference in the two types of dosimeters in measuring ambient gamma radiation. Background fluctuations in ambient gamma radiation is noticed throughout the historical data. The impact of storage of material on the LSA pad is evident on several stations. The area is administratively controlled so it is not accessible to the public.

4.1.2.2 Chemical

Non-radiological (chemical) environmental monitoring is not required by and has not been conducted under the existing license, nor is it contemplated for the renewal license.

4.2 POSTULATED ACCIDENTS

Analysis of potential accidents is required to assure that the combination of proper operation of the facility and design of safety features provides a high degree of safety for members of the public.

The highest TEDE is for Category 1 radionuclides, which are contact handled (CH) in the building fire scenario with a dose of 0.470 rem at the 2 kilometer distance. The remote handled (RH) material in category 1 building fire scenario gives 0.068 rem at 2 kilometers. Category 2, 3 and 4 radionuclides had very low dose contribution for all events and scenarios. The doses for all categories of radionuclides decrease with distance.

For the vehicle fire, the Category 1 radionuclides again pose the highest TEDE with the highest for contact handled waste at 0.021 rem at 2 kilometers.

The explosion scenario showed similar trends with the CH waste with Category 1 radionuclides having the highest TEDE of all scenarios at 0.35 rem in the building scenario at a distance of 2 kilometers. The vehicle explosion scenario for CH waste had a dose of 0.015 rem at 2 kilometers.

For the railroad scenario the highest TEDE was from the resuspension event at 2 kilometers with a dose of 0.052 rem per hour from Category 1 CH waste. For the plume scenario the Category 1 CH waste had a dose of 0.043 rem.

The highest TEDE for each scenario was achieved from the CH Category 1 waste. The RH Category 1 waste was the next highest contributor. The highest projected dose was from the fire scenario with a dose of 0.470 rem at 2 kilometers. The explosion scenario had a projected dose of 0.350 rem at 2 kilometers. The use of conservative factors such as the amount of material released and that all released material is 1 micron in size would infer the actual dose to a member of the public would be well below the projected doses given here.

A more detailed discussion of the accident analysis impacts for the facility is provided in the report entitled: *Accident Analysis Report to Detail Off-Site Radiological Dose Assessment for the Waste Control Specialists LLC* is provided Appendix 4.E.

4.3 EMERGENCY PREPAREDNESS

The institutional foundation of emergency preparedness at WCS is the Emergency Response Plan (ERP), which is the site plan for the management, planning, preparedness, response to, mitigation of, and recovery from emergencies affecting the site. The ERP provides the framework for response to radiological and hazardous material events that may involve workers, public health and safety, and the environment. The ERP is compatible with regulatory and industry standards of performance; and addresses all standard Emergency Management System (EMS) functions associated with the treatment, storage and disposal of waste containing radiological and hazardous constituents. The WCS ERP was developed using the guidance contained in USNRC Regulatory Guide 3.67 - Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities.

The ERP has been developed to provide controls for emergency planning, preparedness, and response to emergencies at its storage and processing facility in Andrews County Texas. It establishes organizational direction for ensuring safe facility operation, protection of the workers, the public, and the environment. The Emergency Plan describes a program for responding to and mitigating radiological and non-radiological incidences typically associated with operations at waste management facilities that includes, but is ·not limited to, fires, hazardous material releases (radioactive, non-radioactive, and radioactive mixed waste), and natural events as they may impact the waste products managed onsite.

The information contained in the ERP encompasses all necessary and appropriate regulatory requirements. The ERP is developed to include radiological and non-radiological emergency incidents that are deemed credible when hazard analyses are applied to routine operations of the facility. In summary the ERP delineates necessary and sufficient emergency response capabilities for managing all reasonably anticipated emergency conditions associated with the operation of the facility.

5.0 IMPACT ANALYSIS

5.1 SOCIOECONOMIC IMPACTS

This section describes the direct, indirect, and cumulative impacts of renewing the WCS storage and processing facility license application. Indirect and induced economic impacts were quantified based on multipliers calculated by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). The multipliers are produced by BEA's Regional Input-Output (I-O) Modeling System (RIMS II) using data on the local area personal income and the national input-output accounts. RIMS multipliers can be used to estimate not only total regional impacts, but also the impacts on each of 38 industry aggregations.

5.1.1 Direct Impacts

In 2008, the WCS facility employs 105 workers at the Andrews County site under current operations (Beach, 2008) and 71 are estimated to be attributable to storage and processing functions at the facility. Direct income effects arising from the continued operation of the storage and processing facility are estimated to be $3,498,525 per year based on 71 employees earning an average (weighted) of $49,275 per year. Annually, $2,955,991 of output is attributable to the processing and storage component of the WCS facility. No substantial change in storage and processing wages, or output is anticipated in the near future. The impact of the proposed relicensing and continued operation of the storage and processing facility on local demand for labor and wage rates is expected to be small.

No substantial in-migration of population to the ROI is expected from the facility's operation-related job growth. In 2007, the residential locations of the employees of WCS were distributed about the ROI as follows: 49 percent in Andrews; 40 percent in New Mexico; 1.6 percent in Odessa; 1.6 percent in Midland; and 0.8 percent in Seminole. Some of the new professional, technical and managerial jobs created at the facility site will probably be filled from workers outside the ROI. This would have the effect of slightly increasing the income and educational levels in the ROI. Little impact on the ROI's existing age or race/ethnicity characteristics is expected.

The most recent tax appraisal value of the WCS complex was $8,103,210. The WCS facility has paid property taxes and sales taxes to local taxing jurisdictions and communities since its inception. The facility also makes substantial contributions to local charitable and community organizations, which in 2007, amounted to about $49,000. In addition, under Texas law, a portion of the state fees collected by the state of Texas is given to Andrews County.

Limited social impacts are expected due to the proposed relicensing action, and those that do occur will likely be of a positive character. The continued employment base, new job

opportunities, local output and sales, incomes, tax revenues and economic stability resulting from the diversification of the ROI's export base associated with the facilities will likely be seen by the communities in the ROI as positive social and economic outcomes.

5.1.2 Indirect Impacts

Application of the updated RIMS II employment multipliers suggests that the continued operation of the storage and processing facility will support an additional 58 indirect and induced workers in the ROI. Total employment generated in the region by the continued operation of the storage and processing facility component is therefore estimated at 129 jobs. $1,413,259 in total additional household earnings would result from the estimated $2,955,991 of annual business sales (2007) by the storage and processing component of the WCS facility. Approximately $1,787,488 in indirect and induced business output or sales will be generated annually in the ROI as a consequence of the continued operation of the facility's storage and processing component.

Currently, the WCS site-generated traffic is quite low, totaling about 90 daily trips, primarily from employees, deliveries, and visitors. On any given day, WCS can expect to see from one to a dozen truck and or rail cars arrive at the site. The rail from Eunice, New Mexico, to the WCS facility is owned by WCS. The WCS spur ties into a rail line that runs from Monahans, Texas, to Navajo, New Mexico, owned by the Texas New Mexico Railway (TNMR), which ties in to the Union Pacific rail line in Monahans, Texas. Trucks arrive at the site utilizing State Highway 176 which runs from a point twenty-five miles west of Eunice, New Mexico, to Big Spring, Texas. Transport vehicles are not limited to specific highways except during specific situations. The continued operation of the storage and processing facility is not anticipated to cause an increase in traffic volumes and therefore is not expected to have a noticeable impact on traffic accidents in the ROI.

There are few noise-sensitive receptors located in the vicinity of the facility. The WCS site is located in an area that is in attainment of all National Ambient Air Quality Standards. Continued operation of the processing and storage facilities at the WCS site is not expected to have any discernible impact on noise, air pollution and traffic congestion.

Since the continued operations at the storage and processing component of the facility would be entirely contained within the WCS property and adjacent uses are characterized by agricultural and resource extraction operations, no adverse impacts on proximal property values are expected as a result of the new facility operation.

5.1.3 Cumulative Impacts

Cumulative impacts may be defined as the impacts of a proposed action when added to those of other past, present, or reasonably foreseeable future actions, regardless of which agency or entity undertakes those actions. The most important past actions that have affected the residents and businesses of the ROI include the development and periodic fluctuation of the ROI's hydrocarbon resources. The location of the WCS complex in Andrews County in the 1990s is the most recent past action that will likely affect the socioeconomic situation of the ROI. Current and reasonably foreseeable future actions that will likely affect the social and economic base of the ROI include: (1) the continued operation of the WCS radioactive waste storage and processing component; (2) the proposed WCS low-level radioactive waste and byproduct materials disposal facilities, subject to pending licensing proceedings; (3) the NEF (currently under construction across the state boundary in New Mexico); and (4) the 2005 federal Energy Policy Act featuring a renewed reliance on nuclear energy, including a proposed high temperature research reactor.

The most important cumulative socioeconomic effects likely to arise as a result of the proposed and reasonably foreseeable actions identified above include: (1) increased output, employment, and income within the ROI; (2) increased property and sales tax base development and positive net fiscal impacts to communities, especially in Lea County, New Mexico; (3) increased potential for future nuclear materials disposal and processing-related economic development in the ROI; (4) increased truck and rail traffic within the ROI, especially in Andrews and Eunice, and within the transportation corridors through which wastes would travel to the disposal complex; (5) increased community perceptions of risk associated with the transportation of wastes; (6) increased perceptions of risk and uncertainty associated with the notion that recent developments and decisions could foster a growing regional potential for the emergence of a nuclear material processing and disposal complex in southeast New Mexico and west Texas; and (7) a fluctuating demand for NEF construction-related social and community services over the eight-year construction period.

In the context of these identified cumulative actions, the incremental effects of the continued operation of the WCS waste material storage and processing facility are seen to be relatively small. Assuming that both the low-level and byproducts license applications are approved and the additional components go forward the incremental cumulative effects of these actions are also expected to be relatively modest. Of greater potential cumulative effect on area-wide economic development and employment, however, is the gradual development of an advanced technology economic sector related to nuclear processing, research, development and waste disposal.

The clustering of related industries, such as nuclear materials processing, in a region can give rise to agglomeration economies that accelerate economic development. The roles of technological innovation and external economies, particularly economies of agglomeration, in regional economic development have received attention in regional Texas economies.

The vehicle traffic effects attributable to the WCS and NEF facilities would be expected to accumulate and could represent a moderate potential for congestion, noise, and traffic accidents in the vicinity of the two facilities on New Mexico Highway 18 and New Mexico Highway 234 in Eunice, New Mexico, and Texas State Highway 176 east of Eunice in Andrews County.

No changes in land or water use are projected to result from continued operation of the WCS facilities. From a cumulative perspective, however, local municipal and industrial water supplies for the City of Eunice, New Mexico, could be stressed during the construction phase, and possibly the operation phase, of the NEF. Substantial improvements to the City's water treatment, storage and distribution systems would likely be required to serve the construction and operations phases of the NEF project as well as associated residential and commercial development within the City itself.

Given the relatively low level of concern revealed in the survey, it is unlikely that regional perceptions of potential water or livestock contamination would affect agricultural production and sales. Cumulative effects to ranching through effects to agricultural sales are, therefore, not expected. Minimal cumulative effects to historic, archeological, and scenic resources are anticipated.

Cultural resources effects are not likely to be substantially affected within the WCS project area. Field investigations within the 10-km radius from the WCS facility concluded that no significant historic sites and seven NRHP eligible sites occur in the area. Because the continued processing and storage activities would not involve construction there would be no adverse effect upon historic or archeological properties within 10 km of the facility. Coordination with NMHPD and THC was conducted in March and July of 2006 and the agencies concurred with the findings on July 20 and July 21, 2006. With respect to scenic resources, the area's modest, rather than dramatic visual character is more likely to be affected by developments other than the WCS facility, such as the Lea County landfill, resource extraction or disposal facilities, oil well pump jacks, and the nuclear enrichment facility, now under construction.

5.1.4 Mitigation Measures and Other Benefits

Mitigation for the social and economic effects of WCS continuing storage and processing operation includes participation in the local and regional economies through property and sales taxes, contributions to local organizations, and involvement of its employees in community organizations and activities. In 2007, WCS donated approximately $49,000 to various community organizations, in addition to its contribution of $27,562 to the Andrews Educational Foundation. WCS has also donated land for the current Lea County Municipal Landfill.

5.1.5 Environmental Justice

The percentage of minority and low income populations within the four-county ROI is comparable with those of Texas and New Mexico. According to the 2000 census, the most prominent racial population within the ROI is White, with about 55 percent — slightly higher than New Mexico and Texas averages of 44.7 percent and 52.4 percent respectively. The largest minority population is Hispanic or Latino, with about 39 percent, which compares with statewide percentages of 42.1 for New Mexico and 32.0 for Texas. The Black or African American population in the ROI amounts to about 3.3 percent of the population, higher than statewide percentage of 1.7 for New Mexico but substantially lower than Texas's 11.3 percent.

According to 2000 Census Bureau data, the highest median household income for the ROI is in Andrews County ($34,036) while Hobbs, New Mexico, located in Lea County has the lowest median household income of $28,100. These numbers are slightly lower than the state median household incomes for New Mexico ($34,133) and Texas ($39,927). There is no city or county within the ROI that exceeds 50 percent below the poverty level, which is calculated by the U.S. Census Bureau. However, according to U.S. Department of Health and Human Services poverty guidelines for 1999 (the last year census data were available on incomes) nearly 79 percent of the Black or African American population in Eunice, New Mexico, were living below the poverty level. Median household income was substantially lower for Black and Hispanic persons than for White persons.

Following Nuclear Regulatory Commission guidance for Environmental Justice analyses (NRC 2003), census tract level population data were also collected within a four-mile radius from the WCS facility and compared with similar data for the affected counties. By this comparison, no disproportionate, adverse effects to minority or low-income populations were identified or are expected to occur as a result of continued operation of the storage and processing facility.

5.1.6 Limited English Proficiency

According to the 2000 Census, persons five years of age and older that speak English either "not well" or "not at all" ranged from 4.1 percent in Seminole, Texas, to 10.6 percent in Winkler County, Texas, compared to the statewide average of 5.0 percent for New Mexico and 7.4 percent for Texas. The percentage of persons who spoke English not well or not at all was 5.9 percent in Eunice and 7.5 percent in the City of Andrews. The primary language spoken at home other than English was Spanish: of the 8,478 persons that spoke English "not well" or "not at all," 94.7 percent (8,032 persons) spoke Spanish as their primary language.

In terms of hiring practices, it is a WCS requirement that employees speak and read English (for safety reasons). Public notices required by TCEQ have to be printed exactly as provided by the agencies to be valid and they are in English only. Currently, WCS is producing a Spanish

language educational brochure and video tape. The facility has also recently run advertisements on Spanish radio and TV in the Midland/Odessa market (Beach, 2008).

5.1.7 Summary of Socioeconomic Impacts

The social and economic effects of the continued operation of the WCS storage and processing facility on the ROI communities are generally positive, both empirically and in terms of measured community perceptions. The prevailing attitudes and perceptions of risk in the community strongly suggest that WCS storage and processing facilities and the economic and fiscal impacts associated with them have been and would continue to be assimilated into the existing socioeconomic structure of the ROI. The general perception is expected to continue that the job opportunities, increased local output and sales, income, tax revenues and economic stability resulting from the diversification of the ROI's export base provided by the storage and processing facilities represent positive social and economic outcomes within the ROI communities.

5.2 ENVIRONMENTAL EFFECTS OF RADIOLOGICAL RELEASES

5.2.1 Environmental Effects of Routine Releases

WCS has accumulated more than a decade of environmental monitoring data. These data are represented by the annual radiological environmental monitoring reports that have been prepared for operating years 2001 through 2006. This data shows that no member of the public or the environment has been affected by routine operations at the facility. All releases from the facility have been well within regulatory limits.

Two public dose scenarios are evaluated in each annual radiological monitoring report: (1) a bounding scenario that assumes exposure to a WCS worker that has not completed radiation worker training and is assigned to the site administrative building area, and (2) a more realistic, perimeter exposure scenario based on a casual observer being present at the site boundary. All annual estimates of public dose have been less than 10 millirem per year (mrem/yr) for the bounding scenario and less than 0.5 mrem/yr for the perimeter exposure scenario, demonstrating that doses to the public do not exceed the limits specified in 30 TAC 336. 313(a)(1).

5.2.2 Environmental Effects of Accidents

The highest TEDE for each scenario evaluated in section 4.2 of this report was achieved from the CH Category 1 waste. The RH Category 1 waste was the next highest contributor. The highest projected dose was from the fire scenario with a dose of 0.470 rem at 2 kilometers. The

explosion scenario had a projected dose of 0.350 rem at 2 kilometers. The use of conservative factors such as the amount of material released and that all released material is 1 micron in size would infer the actual dose to a member of the public would be well below the projected doses given here. This makes the projected doses less than the 100 mrem public limit.

6.0 STATUS OF COMPLIANCE

During the past seven years the facility has been the subject of numerous Compliance Evaluation Inspections conducted by TCEQ representatives. As is noted in the most recent Compliance History summary prepared by the TCEQ on April 17, 2008, the WCS Andrews County facility has a site rating of 3.01 points and a classification of "AVERAGE." The company rating and classification are also 2.06 points and "AVERAGE," respectively. A copy of the Compliance History summary is provided in Appendix 2.C.

During the period May 4, 1998 to January 9, 2008, TDH inspections have not led to any compliance orders or judgments being issued to WCS. One matter related to a failure to respond to a Notice of Violation (NOV) was referred to escalated enforcement on 8/26/2003 and was resolved on 10/20/2003. TDH has not assessed any fines or penalties against WCS. TDH has only issued three NOV's to WCS during this time period. WCS promptly resolved all alleged violations listed in the NOV's. In fact, TDH rescinded the allegations listed in two of the three NOV's.