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RECEIVED

September 20, 2001

Steve Pullen
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

RE: HRM 01-02(P)
Triassic Park Waste Disposal Facility

Dear Mr. Clarke:

Enclosed please find a copy of Gandy Marley, Inc.'s . Notice of Filing of Comments that Constitute Applicant's Response to Public Meeting Questions/Comments. Please call me if you have any questions regarding this matter.

Sincerely,

DOLAN & DOMENICI, P.C.

Michael J. Doyle

Michael J. Doyle, Esq.

Encls. as noted

STATE OF NEW MEXICO
ENVIRONMENT DEPARTMENT
BEFORE HEARING OFFICER FELICIA ORTH

IN THE MATTER OF THE DRAFT
FINAL PERMIT FOR THE TRIASSIC
PARK WASTE DISPOSAL FACILITY
U.S. EPA NO. NM0001002484

No. HRM 01-02(P)

NOTICE OF FILING

COMES NOW the applicant Triassic Park, by and through it counsel of record, Dolan & Domenici, P.C. (Pete V. Domenici, Jr., Esq.), and provides notice of filing of the following documents:

1. Comments that constitute the Applicant's Response to Public Meeting Questions/Comments. Additional Comments responding to public questions will be submitted by separate submittal of the applicant.

DOLAN & DOMENICI, P.C.

Michael J. Doyle for

Pete V. Domenici, Jr., Esq.
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I hereby certify that a true copy
of the foregoing was sent via fax and USPS
to counsel for CURE and counsel for NMED,
via courier to the hearing clerk, faxed to
administrative record in Roswell c/o Linda
Cole of the NMED and to Steve Pullen of the NMED,
and mailed to Jimi Gadzia this 20th day of September, 2001.

Michael J. Doyle

Pete V. Domenici, Jr., Esq.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
1	**Where are similar facilities located?** Response: The map presented in Attachment A indicates the names and locations of other TSD facilities in the western US as of 1998.
2	**Is the proposed facility prepared to control a fire considering the distance from Roswell's assistance?** Response: Fire fighting equipment will be available at the site as indicated in the permit application (Section 5.3 and Appendix M). This will include fire extinguishers in all trucks and heavy equipment, a water truck for water hauling and spraying, and heavy earth moving equipment (scrapers and dozers) for hauling and spreading soil over possible fire areas. In addition, GMI will maintain a minimum 10,000 gallon water storage reservoir for fire fighting water. All enclosed buildings will be designed and constructed with internal fire suppression systems that are consistent with Chaves County building code requirements. Facility personnel will be prepared to implement immediate fire control measures at the site. Additional assistance will be provided by fire departments located in Roswell and Tatum as required. We have contacted the Chaves County Fire Services Administrator, who indicated that volunteer fire departments in Roswell would respond to any fire emergency at the site. If required, they may request coordination and assistance from other fire departments, including those from the City of Roswell, State Fish and Wildlife, Bureau of Land Management or Tatum. Triassic Park Disposal Facility provides sufficient fire control materials, personnel and equipment to control a hazardous material/waste release including the unlikely event of a fire. Personnel are HAZWOPER trained and certified as required by the Occupational Health and Safety Administration (OSHA) under Federal Code of Regulations, 40 CFR. In addition Triassic Park Disposal Facility will cooperate with the local communities to insure training is current. Triassic Park Disposal Facility will cooperate with local communities to train together in a simulated release scenario on-site. Triassic Park Disposal Facility will cooperate with local communities and carriers to simulate a hazardous waste release in route (off-site) to the Disposal Facility including release mediation and fire control. Facility owner/operators will procure equipment for use at the treatment, storage and disposal facility that is compatible with OSHA requirements regarding safety equipment. The equipment will be equipped with Type ABC, hand held fire suppression units. Primarily all extinguisher equipment will be mounted outside the cab of trucks, tractors, scrapers, motor graders, water trucks and on-site transfer vehicles such as Roll-off tractors and truck-tractors utilized to transport hazardous waste within the facility. Extinguishers mounted outside of vehicles enhance the ability to acquire the fire fighting equipment and begin suppression operations quickly. Triassic Park Disposal Facility personnel are trained in and HAZWOPER certified and are briefed daily on the type of waste to be received during their respective shifts. Superintendents, managers, foremen and other site personnel will be equipped with two-way hand held radios and Cellular Telephones to enhance on site communication and for quick response in case of on-site release and/or fire. In addition all vehicles that are operated by Triassic Park personnel will be equipped with two-way radios to contact office personnel and site managers. All on-site vehicles will be inspected and maintained in compliance to manufacturer's specifications and cleaned (decontaminated), after each shift of operation.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
3	**Chaves and Lea Counties have relatively high cancer rates with respect to the rest of NM. It was suggested that the proposed facility would add to the Counties' problems.** We have consulted the recently published study of William F. Athas for the New Mexico Department of Health (Cancer in New Mexico: Changing Patterns and Emerging Trends, 1970-1996) and note the county-specific cancer incidence and mortality rates found in that study. Chaves and Lea Counties are, relative to the rates in other counties, high in both categories. However, the designed purpose of the permit and the environmental controls that are to be employed during facility operation are believed to prevent the facility from contributing additional cancer risks to the area. Prevention of detrimental impacts on the health and safety of workers at the facility and human health and environmental health around the facility is of concern regardless of in which county the facility is located. Low as well as relatively high county cancer rates should not increase residents. To further address the concerns that cancer risks might increase from facility operations, a constant, long-term, pond evaporation and subsequent exposure release was evaluated (for details see Attachment B). The three short-term situations, barrel spill and extremely rapid pond evaporations (one hour, eight hour), are infrequent or accidental situations and likely will be of less concern when compared to the possible constant daily releases for many years modeled by the long-term, evaporation scenario. Lifetime exposure is normally considered necessary for cancer to develop from levels of chemicals that are found in the environment. Once chemicals are released into the air they diffuse out and are often diluted to low concentrations before anyone breathes the air; this is particularly true in this area where the nearest homes are located miles from the facility. Using the air levels of benzene from the two-pond evaporation model, cancer risks at various intervals from the facility were estimated. The USEPA and Region 6 USEPA (New Mexico Regional Office)[2001] have determined that one in one million (1E-06) risk of an individual developing cancer is the lowest level of concern, termed a *de minimis* risk. One million people would need to be exposed to that level of chemical and under similar conditions to result in one additional cancer over a lifetime of exposure. The air concentration of benzene to which people could be exposed on a daily basis over their lifetime and not exceed a 1E-06 risk was determined by EPA (2001) as 0.25 micrograms/cubic meter [ug/m^3] (0.09 parts per billion). This level would be protective for residential and recreational exposures. The modeled concentrations from the ponds indicate that long-term daily levels will be less than 0.25 ug/m^3 at about a mile northwest of the facility and less than a mile in all other directions. Currently, the closest residence is 2.9 miles (4.7 km) from the facility. Air concentrations of benzene will be considerably lower than the 0.25 ug/m^3 at that location. As you move away from the facility, the air levels rapidly drop off because of dispersion, essentially they dilute. Indications of the risks from the modeled concentrations that may be present at the various homes around the facility are given below. As noted, all risks are considerably below EPA's *de minimis* low risk level of 1E-06 (one in one million).

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No | **COMMENT**

Reference Location	Name	Distance in miles	Modeled ug/m^3	Risk
1	Ricky Pearce	6.5	0.0047	2E-08
2	Roy Fort Ranch	7.4	0.0146	6E-08
3	Jarrod Johnson	9.75	0.0022	9E-09
4	Jake Luce	6.75	0.0039	2E-08
5	Bill Kolb	4.75	0.0052	2E-08
6	Marley Ranch	2.9	0.0076	3E-08
7	Corky Glenn	9.0	0.0064	3E-08
8	Mark Watts	6.5	0.0099	4E-08
9		8.9	0.0025	1E-08
10	Stanley Andrus	9.75	0.0010	4E-09
11	Jess Tolton	9.9	0.0010	4E-09

Conclusions

Four release scenarios from the facility were considered: a spill of a barrel of volatile waste; a very, short-term, high-rate evaporative loss of all the volatiles in a pond (over one hour); a short-term evaporative loss of the volatiles from ponds over 8 hours; and a more realistic, long-term (many years), evaporative loss of materials from ponds. All four scenarios considered the waste to be present at the maximum permit concentration of 500 ppm and that the source concentration did not decrease. Benzene was chosen as a representative chemical because of its high volatility and strong carcinogenic response. Air concentrations were modeled using EPA air models to estimate air concentrations that could be present under a given scenario around the facility.

1. Volatiles (benzene) in area air after spilling the contents of a barrel were determined to be below the National Institute for Occupational Safety and Health (NIOSH) Standards of 1.0 ppm for 2 hours and 0.1 ppm average for 8 hours even at the closest home (Marley Ranch-2.9 miles from the facility). Modeled air concentrations at the Marley Ranch were estimated to be 0.008 ppm.
2. Volatiles (benzene) in ambient air from the rapid (one hour) volatilization of a pond were still below both the 2 hour and 8 hour NIOSH Standards at the Marley Ranch and less at homes more distant from the facility.
3. The volatiles (benzene) in area air from the summer time eight hours of evaporation of two ponds indicated that air concentrations would be 14-120+ times lower than the NIOSH 8 hour Standard at area homes.
4. Volatiles (benzene) in ambient air from long-term continuous volatilization of material from the two ponds indicated that the concentrations would be 17-250 times lower than a level indicated by USEPA, Region 6 as of minimal concern (0.25 ug/m^3).
5. Lifetime risks from volatiles in the ambient air around the 11 homes nearby the facility ranged from 6E-08 to 4E-09. Risks below 1E-06 are considered by EPA to be of minimal concern.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
4	**Where will the facility obtain its water supply?** **a. Has GMI attempted to secure water rights?** Response: GMI is currently investigating the procurement of legal water rights that would allow them to haul or pipe water to the site for use during construction and operation of the facility.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
5	**Air emissions:** **a. Confusion regarding prevailing wind direction (SW or SE).** The wind rosette that is presented in the permit application indicates that the prevailing wind direction is from the SE. However, local property owners in the immediate vicinity of the proposed site indicated that the prevailing wind direction is from the SW. The specific wind direction (SE or SW) does not impact any features of the facility design or operation. The facility will incorporate various engineering control measures to reduce the impacts of wind at the site. These will include daily cover soil over the landfill waste materials, moisture conditioning of disturbed areas to avoid dust generation, and seeding as soon as possible after disturbance. However, the short answer is, the wind direction does not matter. For acute health threats, it is the worst hour that is the problem, even if it only occurs once. In Attachment B, we evaluate short-term exposure based on assumed worst-case release conditions and find low short-term downwind exposure. Since this evaluation was done with assumed hypothetical worst case meteorological conditions it doesn't matter what direction the wind blows; the concentrations will be the same, or lower, regardless of wind direction. Obviously, over a longer term, release and meteorological conditions will vary with time. Ambient impacts, and hence exposure, will depend on factors other than wind direction, including wind speed and atmospheric stability. Long term modeling using representative meteorological data will predict maximum ambient impacts at specified locations taking into account the effects of these variables and others. We have done so and discuss the results later. Briefly, however, annual concentrations at all of the identified nearby residences are well below the concentrations EPA and NIOSH have established as protective of health. **b. Neighbor suggested that the valley has at times a unique temperature inversion situation that would trap emissions.** Response: We acknowledge that temperature and fog conditions may reduce dispersion in the air surrounding the site. However, based on the types of wastes that will be accepted at the site, we do not expect that there will be any gases generated that could be harmful to human health and the environment at the perimeter of the ponds or the landfill. Even during temperature inversions or heavy fog conditions, any gases present at the perimeter of these facilities would not pose a threat and would be reduced in concentration in direct proportion to the distance from the facility. Furthermore, EPA has determined that treatment, storage and disposal of these wastes will not present an air hazard. As presented in Appendix B, worst-case scenarios were evaluated with actual ambient meteorological data and with hypothetical worst-case data, including an assumed severe capping inversion. Ambient impacts were low. Some kind of inversion or capping at some time is not a unique phenomenon. A meteorological data set reasonably representative of the site (and for a site such as this, just about anywhere in the Permian Basin area will be representative) will include these conditions. Moreover, hypothetical worst-case meteorological conditions can be, and was, evaluated as well (see Barrel Spill section in Appendix B). **c. Request for the establishment of a baseline (existing) air quality standard.** Response: We have contacted the NMED Air Quality Bureau regarding existing air monitoring and emissions data in the site vicinity and any requirements for particulate monitoring during construction or operations. These requirements will be incorporated into any site-specific permits that may be required prior to the start of construction.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
5	(Continued) The air quality permit process assumes a pristine environment for toxics, and considers the impacts of the source. For criteria pollutants such as particulates, the permit process takes into account the monitored background concentrations, and the impacts of the proposed facility and neighboring facilities. New Mexico has monitoring data for particulates and gaseous criteria pollutants, but not for toxics, probably because it's difficult to monitor for non-specific substances, and because there are no identified sources in the area and unless there's an identified source, monitoring is likely to miss the location(s) of maximum concentration altogether. Monitoring would be largely a waste of time in most cases, including this one. Mathematical predictive methods are more credible and are in fact often used to identify appropriate locations for monitoring. We have more confidence in the conservative mathematical predictions than in monitoring data of uncertain quality, and the predictions tell us that impacts will be low.
6	**Where will wastes come from?** Response: The specific sources for waste will be from throughout the US. However, it is expected that the majority will be from within the State of New Mexico or within the western US.
7	**Who are surrounding landowners?** Response: Section 1.1 of the permit application discusses, and Figure 1.1 illustrates, the ownership of the property surrounding the site
8	**Concern that nearby land would devalue.** Response: We have contacted two other privately owned TSD facilities in the western US, and they have not indicated at noticeable increase or decrease of the property values as a result of the construction or operation of the facility.
9	**Is there a history of releases (presumably to the groundwater and air) from similar facilities?** Response: Review of EPA records indicates that there has not been any release to groundwater from these facilities.
10	**Personnel training.** Response: Section 7 of the permit application presents considerable details on the training that will be required for facility personnel, visitor and or offsite emergency personnel. All of the training will be conducted in full compliance with 40 CFR 264 requirements
11	**Why did GMI wait to investigate the northern portion of the proposed site until NMED required them to?** Response: GMI has always contended that the original exploration work that was done to support the original permit application provided adequate characterization of the site. Additional characterization studies were conducted at the suggestion of NMED and they were agreed to solely to facilitate issuing the draft permit. None of the additional studies that were conducted have modified our original conclusions of the geologic and hydrologic conditions at the site. This further confirms that our original conclusions were correct. NMED has agreed with our conclusions regarding the geologic and hydrologic conditions at the site in the Groundwater Monitoring waiver. The history of conducting the site specific geologic and hydrologic studies in the northern half of the site is as follows. Prior to the 1999 Stratigraphic and Groundwater Characterization Drilling Program, all drill holes had been completed in the southern two-thirds of the proposed project site. These holes had been drilled on a surveyed grid pattern that had been previously approved by NMED personnel. A total of 33 drill holes were completed on this grid pattern, 26 of them within the proposed site boundary. These holes were drilled to characterize the geology and hydrology in the area of the proposed landfill. In 1999, NMED suggested that additional holes be drilled to the north of the pre-existing drilling to characterize the geology underlying the proposed operations facilities. An additional nine drill holes were approved and drilled in July 1999. The results of this 1999 drilling were consistent with results of all earlier drilling.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
12	**Something regarding permit modifications.** Response: Class 2 or 3 Permit modifications will be required for any changes in permit conditions (size or expansion of facilities, modifications of waste materials accepted at the site, or operational changes, etc.). These permit modifications will require GMI and NMED to request additional public input prior to approval. In addition, the current regulations require that the permit be reviewed every 5 years. This review process will allow NMED to require modifications to the design, construction, operation, or closure of the proposed facilities to reflect the best available technologies.
13	**Were site characterization boreholes sufficiently sealed?** Response: Yes. Characterization boreholes were grouted with a mixture of bentonite and cement. To ensure that the holes were properly sealed, this mixture was injected into the hole through open-ended drill pipe – from the bottom to the top. A surface plug of cement was placed at the surface to prevent water from entering and contaminating the hole.
14	**Will the liner truly be compatible with all potential mixtures of wastes?** Response: The liners proposed for the Triassic Park Facility (HDPE and Geosynthetic Clay Liners) have a long history of use at hazardous facilities throughout the world. They have been tested, in the laboratory and in actual operating facilities, with various mixtures of leachates from TSD facilities. The tests have indicated good compatibility. In addition, EPA recommends HDPE and clay liners be used for this type of TSD facility. The supporting information is presented in Appendices H-4 and H-5 of the permit application engineering report.
15	**Wind erosion** Response: Due to the daily cover that will be placed over the waste and the dust control measures that will be implemented, we do not believe that wind erosion from the landfill will be an issue. In addition, for the Phase IA landfill, the waste will generally be below the crest of the landfill. Particulate emissions from the facility in the form of windblown dust, small as these emissions are, will probably be one of the greatest source of air emissions from this facility. There are very protective standards in place for particulate matter and a well-tested air quality permit process in place for these emissions. The permit process is designed to assure that health is protected.
16	**Gas emissions from landfill and evaporation pond** Response: Based on Land Disposal Restrictions (LDRs), we do not believe there will be substantial gas emissions from the landfill. Due to the limited organic concentrations to be placed in the evaporation pond, we do not expect gas emissions from the pond to be harmful to human health or the environment. The limits identified in LDRs (for the landfill) and in maximum allowable organic concentrations (for the pond) are based on EPA criteria to be protective of human health and the environment. To confirm these conditions, the permit application specifies that a survey to detect organic vapors will be performed at the landfill on a quarterly basis (see Section 5.2.2 of Permit Application).

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
17	**Difference between alluvial water and site geology** Response: The alluvial material in Chaves County (below the Caprock) is a thin veneer of recent erosional debris. Most of this material was eroded from the Ogallala Formation and spread across the land surface like a blanket. The thickness of this material ranges from 0-60 feet. Because the alluvial material was laid down on the land surface, it's slope conforms to the topography. It is too recent to have undergone any deformation, it simply reflects the orientation of the underlying surface. In the area of the proposed site, the topography (and the alluvial sediments) slope away from the Caprock – from the east to the west. Regionally, the town of Roswell is approximately 500 feet lower than the proposed site – so the regional slope of the land surface is generally from the east to the west. Any water contained in these shallow alluvial sediments could have a westerly trend (towards the Pecos River.) The proposed site, however, is located within different host sediments, in a vastly different geologic setting than that represented by the surface alluvial sediments and is protective of the shallow surface alluvium. The Triassic Park Disposal Facility site was specifically sited in Triassic-aged sediments to avoid issues with surface alluvium. Differences between the site geology and the alluvial sediments include: • The lithology of the Triassic sediments are vastly different. The upper portion of these sediments at the site (Upper Dockum) consist of low-permeability mudstones and siltstones. The lower portion (Lower Dockum) is comprised of a 600-650-foot sequence of low-permeability mudstones. These sediments were deposited within and on the flanks of a large Triassic lake. These lacustrine sediments have been the subject of many geologic investigations and are well documented in the geologic literature. In contrast, the alluvial sediments consist of a mix of clays, sands and gravels – deposited as erosional outwash material. • The structure within the Traissic sediments is also very different from the surface alluvial sediments. The Triassic sediments (and the underlying Permian sediments) are over 200 million years old and have undergone regional deformation. They are situated on the western flank of the Permian Basin and dip gently to the east. This contrasts significantly to the Quaternary alluvial sediments which are Recent in age (less than a million years old) and conform to regional topography (generally toward the west). The proposed landfill is sited at the boundary of the Upper and Lower Dockum units, which dip gently to the east. Because the landfill is developed entirely within Triassic sediments, any potential leakage from this landfill is subject to the lithologic and structural conditions of these sediments. Because both the Quaternary alluvium and Triassic sediments are unsaturated at the proposed site, there is no hydraulic continuity between these units at the site. Additionally, these two units are physically separated as discussed previously.
18	**Scope of economic benefit of operating facility** Response: The facility will create 25 to 35 jobs at the site. It is expected that the majority of these can be filled by the local work force with some site-specific training. In addition, there will be a number of associated jobs that will be supported by the facility both during construction and operations. These are all in addition to the trucking services that will be required to transport the waste to the site.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
19	**Traffic volumes and routes** Triassic Park Disposal Facility owner/operators have estimated the site could accept up to 3 to 5 shipments/hour; however, it is expected to average 1 to 2 shipments/hour. In order for the facility to accept a shipment the following procedure must be completed: a) Shipment is stopped at the facility entrance in order for the driver to present shipping papers to the facility personnel. This is in order to verify the shipment is consigned to this facility. b) Shipment is escorted into facility and weighed to confirm shipping paper data. c) Shipment is sampled while on the scales and sample taken to the on-site laboratory for analysis and content verification. d) Site Lab analysis must be in compliance with the shipping paper description for the shipment to be allowed to off-load the shipment. e) If analysis is compliant shipment is escorted to unloading site and off-loaded. f) Transportation vehicle is checked for contamination, and decontaminated if necessary. g) Vehicle is decontaminated and escorted to scaled for tare weight. h) Vehicle is weighed and escorted to main entrance to await release instructions. i) Vehicle must be in compliance with DOT standards before being released for highway travel. In many instances the above process consumes approximately 30 to 45 minutes prior to the vehicle being returned to roadworthy condition and released. **Traffic Routes:** The U.S. Department of Transportation has designated transportation routes for hazardous material to be restricted to U.S. Highways, such as U.S. 285 and U.S. 380; however, a hazardous waste may be transported via any highway that is capable of withstanding the load safely. U.S. 285 is a Federal Highway designated route for hazardous material, especially radioactive waste or any hazardous material being transported, and is designated as the "WIPP Route". U.S. 380 is a Federal Highway, also is a designated hazardous route, and may be used for radioactive shipments if so designated by the state of New Mexico with approval of the Department of Transportation. Since these two routes are U.S. Highways and funding for the maintenance, repair and construction is by the Federal Highway Fund supplementing State funds, they are expected to be utilized for hazardous transportation. Traffic volumes of these two routes are relatively small compared to the Interstate System. The State of New Mexico maintains traffic count monitors throughout the primary highway system. Traffic volume counts are available on U.S. 380 from Roswell to Tatum (480 trucks/day) and from Tatum to Roswell (530 trucks/day). The truck classification could be Class 3 to Class 8 trucks (pick-up trucks to 18-wheelers). As mentioned in Comment No. 2 the State of New Mexico has not monitored trucks approaching Roswell from the North, South and West due to the Roswell by-pass construction, this restricts the volume count that could pass on North Main adjacent to NMMI. Traffic volumes are not expected to impact the present patterns or result in any congestion on the highways that could be utilized to transport hazardous waste to the site. The majority of hazardous material transporters are from the oil fields between Tatum and Roswell and the surrounding area. These vehicles are operating daily and pose no increase to the operation of the TPDF traffic.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
20	**Potential for collapse features** Response: A question was asked of NMED about the possibility of collapse features at the site. The question came from a Peggy Johnson from Socorro. Ms. Johnson called from the New Mexico School of Mines, but contrary to what was announced to the participants at the Public Meeting by Steve Pullen, she is not a professor (or on the staff) at the University. A collapse feature is structural phenomena that results from dissolution of material in the subsurface, resulting in the "caving in" or collapsing of overlying sediments into the void. In some cases, this can result in the formation of a cylindrical structure or "breccia pipe", extending from the zone of dissolution to the land surface. These features are well documented on the north and south rims of the Grand Canyon in Arizona, where these breccia pipes have been mined as mineral deposits. In this region, the origin of these collapse features are dissolution zones in the deeper Redwall Limestone. Ms. Johnson was citing a Groundwater Investigation Report of Southern Lea County, New Mexico, published by the New Mexico School of Mines in 1961. In this report, several possible collapse features were identified in Southern Lea County in a surface geological setting very similar to that of the proposed site. In this area of Lea County, Triassic sediments are exposed immediately below the contact with the Ogallala Formation. In a five township area (180 sq. mi.), five possible collapse features were identified. Drilling was performed on one of these, confirming approximately 40-60 feet of displacement. It is true that the surface geology in this portion of Lea County is similar to that of the proposed site. However, the subsurface geology is quite different. This area of Lea County is on the flank of the groundwater basin called the Delaware Basin (the proposed site is located within the Roswell Basin). The Delaware Basin is delineated by the presence of the Capitan Limestone, which is a large ancient reef system which encircles the basin. The Capitan Limestone is well known for its cave systems (dissolution features), such as the Carlsbad Caverns and numerous other caves in the Guadalupe Mountains. North and east of Carlsbad, New Mexico, the Capitan Limestone enters the subsurface and underlies some of the potash mines in Eddy County. In mine workings in this area, breccia pipes have been encountered. Geologic investigations attributed these collapse features to dissolution within the underlying Capitan Limestone and down-dropping of overlying sediments. The area in Southern Lea County, where possible collapse features are recognized, is on the eastern flank of the Delaware Basin and underlain by the Capitan Limestone. This represents a major difference is the geologic setting of this area compared to that of the proposed site. The Southern Lea County area is approximately 70 miles south of the proposed site, the geologic literature contains no descriptions of collapse features within the Roswell Basin and there have been no suspected features identified in the project area.
21	**Clarify that Facility may accept MSW and C&D waste.** GMI , based on discussions with NMED, has requested that the facility be allowed to dispose of Municipal Solid Waste (MSW) and Construction and Demolition (C&D) waste. If substantial amounts of MSW are accepted at the facility and regular gas monitoring of the landfill (as required by the Draft Permit) indicates that gases are being generated, then modification of the cover design may be required. The modifications would be required to allow for venting of the gases.
22	**USGS Groundwater Quality wells (particularly the Windsor Well)** GMI put in another data request to the USGS and the information supplied was identical to the information included in the Part B Application.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
22	(Continued) The information that we received from the New Mexico District Office of the U.S. Geological Survey is summarized below. This office is located at 5338 Montgomery Blvd. NE in Albuquerque. Their telephone number is (505) 830-7900. Robert Gold is responsible for conducting the searches for groundwater information. 1. **Information on the Railroad Mountain and Camino del Diablo dikes** - A literature research of the Centennial Science and Engineering Library at the University of New Mexico turned up the following references on the Railroad Mountain dike and the Camino del Diablo dike: A. There is a relatively new U.S. Geological Survey Bulletin 2063, published in 1995. The title is *Mineral and Energy Resources of the Roswell Resource Area, East-Central New Mexico*. Authors are Susan Bartsch-Winkler and Alessandro J. Donatich. There is a brief description of both dikes and they are located on a couple of plates within the document. The Camino del Diablo dike is described as having a negative topographic expression and is 20 miles long and 50 feet wide. It is a Tertiary intrusive consisting of surficially altered andesite to basaltic diabase. All documentation on the dikes referenced Kelley, so it didn't appear that they did any field work on these features. This publication gives summary descriptions of stratigraphic units in the Roswell area (including Permian and Triassic sediments). It talks about structure, karst features, collapse features, etc. There were no descriptions of dissolution features in the vicinity of the Triassic Park Disposal Facility. The geologic descriptions in the area of the Gandy Marley site as presented in the Part B Application are very similar to those presented in this publication. B. One of the most definitive publications on the structure in the Roswell area was done by Vincent C. Kelley in 1971 in a publication entitled *Geology of the Pecos country, southeaster New Mexico*. This document described the structural setting of the 'Pecos Slope" - the large portion of southeastern New Mexico that gently dips eastward toward the center of the Permian Basin in Texas. In this publication he has a brief description of the Railroad Mountain and Camino del Diablo dikes. He also maps three smaller east-west dikes between these two longer dikes. Near Ruidoso he also mapped swarms of dikes associated with the Sierra Blanca intrusive. He does not connect these dike systems and offers no explanation for a source of the intrusive dikes in Chaves County. He provides some general stratigraphic descriptions of the units present at the Triassic Park Disposal Facility. These descriptions present no new information on the geology of the area. He also describes a couple of 'sink holes', but these are not in Chaves County. C. *A Study of the Roswell Artesian Basin* by the Roswell Geological Society published in 1968 is the document you showed me that referenced the two dikes. All these publications mention the dikes but do not go into any particular detail. They are somewhat of a curiosity but do not appear to exercise any geologic control over sedimentation, groundwater, etc. None of these publications present information that would change any existing geologic interpretations of the Gandy Marley site.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
23	**1. Alluvium adjacent to the landfill** - When the sides of the upper portion of the landfill are lined, the alluvium will be removed for a lateral distance of 16 feet from the side of the landfill. This material will be replaced with clay – resulting in a "clay plug" that will remain in place during operations and closure. This plug is intended to prevent potential fluids in the alluvium from entering the landfill and to keep leachate in the landfill from migrating out to the environment. However, during Phase 1A (current draft permit) only the north slope of the landfill will be lined to the crest. The alluvial material adjacent to the landfill on this slope will still be stripped away for a distance of 16 feet and the clay plug will be placed. On the remaining slopes that are not lined to the crest, the alluvial materials will be removed, but the clay and liner materials will not be placed. Instead, a small drainage ditch will be constructed on the top of the Upper Dockum sediments to control any potential fluid movement from the alluvium. Under these operating conditions, monitoring wells on the periphery of the landfill in the alluvial material would provide absolutely no information. There will be no waste activities in the landfill adjacent to this unit And more importantly, the unit will be entirely exposed and any contained fluids would be caught in the drainage ditch. We propose that the two monitoring wells originally scheduled for development adjacent to the landfill be included in the fence of 'western boundary' wells.
24	**Clarify the Waste Volumes that the Site is expected to accept.** The volume of waste within Phase IA is estimated at approximately 550,000 cubic yards. Assuming an average unit weight of 1.4 tons/cubic yard, the estimated weight of waste that could be stored is approximately 781,000 tons. We have estimated that Phase IA could be filled in 2 to 6 years. This would result in a filling rate of 91,666 to 275,000 cubic yards per year or 130,166 to 390,500 tons per year. The Permit Application indicates that we could be allowed to accept up to 42,000 tons/year of 491 different waste type. This does not indicate that the facility would be willing or could accept all of these waste codes at this rate. If this acceptance was achieved it would mean that the facility would be filled in less then two weeks. Hopefully, this example indicated that we will not be accepting 491 different types of waste at a rate of 42,000 tons/year. These rates were listed in the Permit Application to ensure that the facility could accept a small volumes of a wide variety of waste types or a large volume of a single waste type.
25	**How will the facility regulate the mixture of various chemicals?** The Waste Analysis Plan requires that each type of waste disposed of or treated at the site be characterized. This characterization will allow the Facility to assess the compatibility of mixing various types of waste. Any wastes that are not compatible will not be allowed to be placed together.
26	**Will the facility accept DOE waste? Specifically, will the facility accept nerve gas?** The facility may accept DOE waste, if it meets the waste acceptance criteria. The facility is prohibited from accepting compressed gases. Therefore, we will not accept nerve gas.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS

No	COMMENT
27	**What gases will be emitted from the evaporation pond?** That depends on what's put into the evaporation pond. The facility is prohibited from handling liquids with a VOC content exceeding 500 ppm except under conditions designed to limit evaporation. Therefore, large quantities of highly volatile substances will not be put into the pond; in fact, most of the substances put into the pond will likely be aqueous solutions and the primary evaporant will be water.
28	**Where any sites evaluated for locating this facility outside of Chaves and Lea County?** Gandy Marley examined several possible sites in Chaves and Lea Countries and the Triassic Park site was the most favorable. The citing study was limited to Chaves and Lea Counties because of available private land that was suitable for this type of development.
29	**What odors can be expected from the site?** Again, that depends on what's in the ponds. Different substances have different odor thresholds. However, we can make some estimates as follows. We calculated the evaporation rate of 500 ppm of a hypothetical substance mixed with 5000 gallons of liquid added to a pond, with the assumption that all of the hypothetical volatile substance, about 20 pounds, would evaporate in an hour. This is a high evaporation rate. This hypothetical substance was modeled for maximum 1-hour ambient concentrations. The maximum modeled fenceline concentration of this hypothetical evaporant was about 5676 micrograms per cubic meter (ug/m3), 1-hour average. Many common substances have 50% odor thresholds (that is, it is barely perceptible to 50% of the population) less than this. The following table illustrates the distance to the 50% odor threshold for a few common odorous substances. Substance / Threshold ug/m3 / Distance km Gasoline / 3800 / 0.4 Formaldehyde / 2200 / 0.7 Phenol / 500 / 1.9 Note that these are distances from the pond(s); the facility is approximately 1.2 X 1.6 km, so the maximum modeled distance to the odor threshold may not extend beyond the property boundary. Note also that these are maximum modeled distances under worst-case conditions and with an assumed high-volatility substance introduced to the pond at a high rate.
30	**What is the expected time frame for the facility to be operating?** The facility could operate indefinitely provided expansions of the landfill can be permitted through NMED.

SUMMARY OF GMI RESPONSES TO COMMENTS FROM PUBLIC INFORMATION MEETINGS	
No	**COMMENT**
31	**What are the expected hours of operations?** At this time the facility would be expected to operate during daylight hours 5 to 6 days per week. However, depending on waste receipts the facility (or portions of the facility) could operate 7 days/week, 24 hours per day.
32	**How will the facility be expanded?** The facility will only be expanded after design and operating plans have been approved by NMED as part of a permit modifications.

Attachment A

Map of Treatment, Storage and Disposal Facilities in the Western US

TSD Facilities in Western US

Attachment B

Air Modeling Assessment
And
Potential Risk to Human Health and the Environment from Possible Air Releases

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Subject: Triassic Park Waste Disposal Facility September 17, 2001

Dear Mr. Dolan,

As per your request, I have evaluated potential risks to human health and the environment from possible air releases from the Triassic Park Waste Disposal Facility. The proposed facility will be located in the cattle country of eastern Chaves County, New Mexico. Public concerns were voiced during the Draft Permit Comment period about possible impacts. Since the facility has not been constructed, necessity dictates that modeling must be used to determine potential air releases and that worst-case scenarios must be evaluated in the models as a substitute for actual operations sampling data. Although the models used are unto themselves conservative estimates, this worst-case approach provides an additional margin of safety and confidence that human health and the environment will be protected.

Modeled Worst-Case Scenarios

Four release situations were considered: a spill of a barrel of a volatile substance, a high-rate evaporative loss of volatiles from a pond (one hour), a high evaporation rate loss (summer time) of materials from ponds over eight hours, and a more realistic long-term evaporation of materials from ponds based on area evaporation rates. All four scenarios considered waste to be present at maximum permit concentrations (500 ppm, mg/L) and utilized U.S. Environmental Protection Agency (EPA) models in the calculations. The calculations estimated concentrations of the volatile substance at various distances from the facility.

Benzene was chosen as a representative volatile chemical. It is a highly volatile organic substance and is one of the most potent (strongest) known human carcinogens, particularly in relation to inhalation (air) exposures. In addition, benzene's chemical and toxicological properties as well as environmental transport and fate are well-studied by the scientific community (We have information on how it acts in the environment.) Although the ponds and barrels may have a number of solvents present in addition to benzene, assuming all of the material present is benzene should be a worst-case situation.

The method employed by EPA (1986, 1999) to address multiple-chemical mixtures is to assume additive response, since synergism is extremely rare among chemicals and does not appear to occur among the volatile organic chemicals. Therefore, assuming that all of the 500 ppm volatile organic chemical material modeled is present as one of the most toxic chemicals is a conservative approach.

Barrel Spill

The barrel spill scenario assumed that a barrel (55 gallons) was dumped and its entire contents were allowed to evaporate. The maximum allowed waste concentration, 500 parts-per-million (ppm), of benzene was present in the barrel. Although spills are required by federal and state environmental protection agencies to be immediately cleaned-up, it was assumed that all the material was allowed to evaporate. Concentrations of benzene at various distances from the spill were determined and compared to potential toxic impacts. The closest home (Marley Ranch) is 2.9 miles (4.7 km) from the facility. The National Institute for Occupational Safety and Health (NIOSH) has recommended that benzene exposures be controlled over 2 hours to an average level of 1.0 ppm or less [3.2 mg/m^3] (NIOSH 1976). They further indicated that over 8 hours, the average exposure should not exceed 0.1 ppm [0.32 mg/m^3] (NIOSH 1996). Ambient air concentrations at the nearest home, Marley Ranch, from the barrel spill were found to range between 0.0172 ppm (3 km) and 0.00648 ppm (5 km), the ranch is at 4.7 km (approximately 0.008 ppm). The air levels at their maximum concentration for the ranch would be 10 times less than the 8 hour Standard and 100 times less than the 2 hour Standard.

Short-Term Evaporation Pond Release-One hour

The rapid, short-term evaporation from a waste pond scenario assumed that the contents of one of the ponds would evaporate in one hour. It should be noted that annual average evaporation rates for ponds for the area are in the realm of 200 gallons per hour, a 50-fold slower rate than used in the model. The maximum allowable concentration of benzene was assumed to be present in the pond. Air concentrations were modeled at various distances from the pond and compared to potential toxic impacts. Again, applying the NIOSH Standards (1976, 1996) of 1.0 ppm average for 2 hours and 0.1 ppm average for 8 hours, the air benzene levels at the Marley Ranch (4.7 km) were determined to be below either Standard. Concentrations were modeled to be 0.1 ppm at 3.8 km, 0.9 km closer, from the facility.

Short-Term Evaporation Pond Release- Eight Hour

The short-term evaporation from a waste pond scenario considered the volatilization of benzene from two ponds during 8 hours of maximum release in July. The maximum allowable concentration of benzene, 500 ppm, was not depleted during volatilization. Air concentrations were modeled to determine potential impacts at each of the nearby neighbors. Comparing the NIOSH 8 hour average Standard, 0.1 ppm or 320 ug/ m^3, to the modeled maximum air concentrations at the nearby homes, all air levels were at least 14

times lower than the Standard and ambient air at some locations was 120+ times lower than the Standard of 320ug/m^3.

Long-Term Evaporation Pond Release- Lifetime Exposure

The long-term, evaporation, pond release utilized a similar scenario to the short-term ponds. Maximum allowable concentrations of benzene were modeled to determine the levels that should be present at various distances from the facility. However, the evaporation rate was modified to reflect those seen in the area, a site near Roswell, NM., conservatively, benzene containing material was constantly being added to the pond to maintain the level at 500 ppm, and both ponds were considered in the evaluation. We believe this is more realistic because it uses area-specific evaporation rates, but it maintains its conservative nature since concentrations in the ponds are not allowed to go down. The benzene air concentration that has been identified by USEPA, Region 6 (2001) to pose minimal cancer risk from a lifetime exposure, a *de minimis* risk, is 0.25 ug/m^3 or 0.09 ppb. The 0.25 ug/ m^3 level was determined by EPA based on 30 years of exposure, 24 hours per day, and 350 days per year to vapors and material that may be attached to particulates (dust) in the air through inhalation (breathing). Air levels at the nearby homes were determined to be 17 to 250 times lower than the 0.25 ug/ m^3 standard.

The results of the long-term air-modeling scenario was used to compare to potential human health and environmental impacts. These impacts were considered with respect to stated public health concerns and cancer and will be addressed in that context below.

Response to Public Comments on the Draft Permit

Chaves and Lea Counties have relatively high cancer rates with respect to the rest of NM. It was suggested that the proposed facility would add to the counties problems.

Response: We have consulted the recently published study of William F. Athas for the New Mexico Department of Health (Cancer in New Mexico: Changing Patterns and Emerging Trends, 1970-1996) and note the county-specific cancer incidence and mortality rates found in that study. Chaves and Lea Counties are, relative to the rates in other counties, high in both categories. However, the designed purpose of the permit and the environmental controls that are to be employed during facility operation are believed to prevent the facility from contributing additional cancer risks to the area. Prevention of detrimental impacts on the health and safety of workers at the facility and human health and environmental health around the facility is of concern regardless of in which county the facility is located. Low as well as relatively high county cancer rates should not increase residents.

To further address the concerns that cancer risks might increase from facility operations, a constant, long-term, pond evaporation and subsequent exposure release was evaluated. The three short-term situations, barrel spill and extremely rapid pond evaporations (one hour, eight hour), are infrequent or accidental situations and likely will be of less concern when compared to the possible constant daily releases for many years modeled by the

long-term, evaporation scenario. Lifetime exposure is normally considered necessary for cancer to develop from levels of chemicals that are found in the environment. Once chemicals are released into the air they diffuse out and are often diluted to low concentrations before anyone breathes the air; this is particularly true in this area where the nearest homes are located miles from the facility. Using the air levels of benzene from the two-pond evaporation model, cancer risks at various intervals from the facility were estimated. The USEPA and Region 6 USEPA (New Mexico Regional Office)[2001] have determined that one in one million (1E-06) risk of an individual developing cancer is the lowest level of concern, termed a *de minimis* risk. One million people would need to be exposed to that level of chemical and under similar conditions to result in one additional cancer over a lifetime of exposure. The air concentration of benzene to which people could be exposed on a daily basis over their lifetime and not exceed a 1E-06 risk was determined by EPA (2001) as 0.25 micrograms/cubic meter [ug/m^3] (0.09 parts per billion). This level would be protective for residential and recreational exposures. The modeled concentrations from the ponds indicate that long-term daily levels will be less than 0.25 ug/m^3 at about a mile northwest of the facility and less than a mile in all other directions. Currently, the closest residence is 2.9 miles (4.7 km) from the facility. Air concentrations of benzene will be considerably lower than the 0.25 ug/m^3 at that location. As you move away from the facility, the air levels rapidly drop off because of dispersion, essentially they dilute. Indications of the risks from the modeled concentrations that may be present at the various homes around the facility are given below. As noted, all risks are considerably below EPA's *de minimis* low risk level of 1E-06 (one in one million).

Reference Location	Name	Distance in miles	Modeled ug/m^3	Risk
1	Ricky Pearce	6.5	0.0047	2E-08
2	Roy Fort Ranch	7.4	0.0146	6E-08
3	Jarrod Johnson	9.75	0.0022	9E-09
4	Jake Luce	6.75	0.0039	2E-08
5	Bill Kolb	4.75	0.0052	2E-08
6	Marley Ranch	2.9	0.0076	3E-08
7	Corky Glenn	9.0	0.0064	3E-08
8	Mark Watts	6.5	0.0099	4E-08
9		8.9	0.0025	1E-08
10	Stanley Andrus	9.75	0.0010	4E-09
11	Jess Tolton	9.9	0.0010	4E-09

Conclusions

Four release scenarios from the facility were considered: a spill of a barrel of volatile waste; a very, short-term, high-rate evaporative loss of all the volatiles in a pond (over one hour); a short-term evaporative loss of the volatiles from ponds over 8 hours; and a more realistic, long-term (many years), evaporative loss of materials from ponds. All four scenarios considered the waste to be present at the maximum permit concentration of 500 ppm and that the source concentration did not decrease. Benzene was chosen as a

representative chemical because of its high volatility and strong carcinogenic response. Air concentrations were modeled using EPA air models to estimate air concentrations that could be present under a given scenario around the facility.

1. Volatiles (benzene) in area air after spilling the contents of a barrel were determined to be below the National Institute for Occupational Safety and Health (NIOSH) Standards of 1.0 ppm for 2 hours and 0.1 ppm average for 8 hours even at the closest home (Marley Ranch-2.9 miles from the facility). Modeled air concentrations at the Marley Ranch were estimated to be 0.008 ppm.
2. Volatiles (benzene) in ambient air from the rapid (one hour) volatilization of a pond were still below both the 2 hour and 8 hour NIOSH Standards at the Marley Ranch and less at homes more distant from the facility.
3. The volatiles (benzene) in area air from the summer time eight hours of evaporation of two ponds indicated that air concentrations would be 14-120+ times lower than the NIOSH 8 hour Standard at area homes.
4. Volatiles (benzene) in ambient air from long-term continuous volatilization of material from the two ponds indicated that the concentrations would be 17-250 times lower than a level indicated by USEPA, Region 6 as of minimal concern (0.25 ug/m^3).
5. Lifetime risks from volatiles in the ambient air around the 11 homes nearby the facility ranged from 6E-08 to 4E-09. Risks below 1E-06 are considered by EPA to be of minimal concern.

_____

Albert Westerman, Ph.D.

September 13, 2001

Daniel Dolan
Dolan & Domenici, PC
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Re: Triassic Park Waste Disposal Draft Testimony

Dear Mr. Dolan

As requested, I am responding to comments on the draft permit, and evaluating potential airborne releases and impacts. Below are the details.

RESPONSE TO COMMENTS IN DRAFT PERMIT

The following responds directly to several comments on the NMED draft permit. Comments are reproduced here, with my response.

Chaves and Lea Counties have relatively high cancer rates with respect to the rest of NM. It was suggested that the proposed facility would add to the Counties' problems.

This presumes that the facility will somehow result in exposure of the population to carcinogens, which I doubt will be the case. This facility is just not a big source of carcinogens, for one thing. Not all hazardous wastes are carcinogens (in fact, most are not); not all hazardous wastes are volatile (many are not); and the likely quantities and handling methods at this facility are extremely unlikely to result in substantial emissions.

Furthermore, New Mexico's air quality program includes appropriate safeguards for potential airborne exposure. For example, the threshold emission rates for Toxic Air Pollutants (TAPs) at 20 NMAC 2.72, which includes carcinogens, are based on worst-case release and transport conditions resulting in an assumed exposure of 1% of the most conservative Occupational Exposure Limit (OEL). Since occupational exposure limits assume long-term, near-continuous exposure, they are very conservative and protective. For this facility, any releases of potential carcinogens would necessarily be at a relatively low concentration and of limited duration, due to the stringent limitations in the draft permit. We do not expect toxic emissions from this facility to approach the thresholds for evaluation of toxic air pollutants, much less to result in substantial impacts. However, if evaluation of potential releases indicates that the TAP thresholds could be exceeded, then we believe that the air permit program is more than adequate to protect human health and is the preferred vehicle for protection against airborne hazards.

Several toxic substances, including benzene, are separately regulated by EPA as Hazardous Air Pollutants (HAPs) and are also addressed by the permit program. Congress has established uniform, national emission thresholds for HAPs. Facilities which emit 10 or more tons a year of a single HAP, or 25 tons per year total HAPs, are subject to Title V of the Clean Air Act, and consequent regulation as a major source. Such sources are also subject to New Mexico's air quality regulations.

To put this amount into perspective, 10 tons per year corresponds to an average emission rate of 2.3 lb/hr. The draft hazardous waste permit terms for this facility limit VOC content in open or uncontrolled containers to 500 parts per million (ppm) by weight. A 55 gallon barrel containing 500 ppm of benzene contains a total of approximately 0.20 pounds of benzene. Thus, for the facility to be a major source of HAPs would require the entire contents of 11 barrels each containing 500 ppm benzene to evaporate every hour continuously for a year. This is an absurdly large amount of benzene.

We evaluate several release scenarios later in this document. Basically, even the hypothetical worst-case scenarios if allowed to persist unchecked do not result in hazardous ambient concentrations at the neighboring residences.

Confusion regarding prevailing wind direction (SW or SE).
The short answer is, it doesn't matter. For acute health threats, it is the worst hour that is the problem, even if it only occurs once. Later in this document we evaluate short-term exposure based on assumed worst-case release conditions and find low short-term downwind exposure. Since this evaluation was done with assumed hypothetical worst case meteorological conditions it doesn't matter what direction the wind blows; the concentrations will be the same, or lower, regardless of wind direction.

Obviously, over a longer term, release and meteorological conditions will vary with time. Ambient impacts, and hence exposure, will depend on factors other than wind direction, including wind speed and atmospheric stability. Long term modeling using representative meteorological data will predict maximum ambient impacts at specified locations taking into account the effects of these variables and others. We have done so and discuss the results later. Briefly, however, annual concentrations at all of the identified nearby residences are well below the concentrations EPA and NIOSH have established as protective of health.

Neighbor suggested that the valley has at times a unique temperature inversion situation that would trap emissions.
Again, as described later, worst-case scenarios were evaluated with actual ambient meteorological data and with hypothetical worst-case data, including an assumed severe capping inversion. Ambient impacts were low.

Some kind of inversion or capping at some time is not a unique phenomenon. A meteorological data set reasonably representative of the site (and for a site such as this, just about anywhere in the Permian Basin area will be representative) will include these conditions. Moreover, hypothetical worst-case meteorological conditions can be, and was, evaluated as well (see Barrel Spill section below).

Request for the establishment of a baseline (existing) air quality standard.
Presumably for toxics? The air quality permit process assumes a pristine environment for toxics, and considers the impacts of the source. For criteria pollutants such as particulates, the permit process takes into account the monitored background concentrations, and the impacts of the proposed facility and neighboring facilities.

New Mexico has monitoring data for particulates and gaseous criteria pollutants, but not for toxics, probably because it's difficult to monitor for non-specific substances, and because there are no identified sources in the area and unless there's an identified source, monitoring is likely to miss the location(s) of maximum concentration althgether. Monitoring would be largely a waste of time in most cases, including this one. Mathematical predictive methods are more credible and are in fact often used to identify appropriate locations for monitoring. I have more confidence in the conservative mathematical predictions than in monitoring data of uncertain quality, and the predictions tell me that impacts will be low.

Wind Erosion
Particulate emissions from the facility in the form of windblown dust, small as these emissions are, will probably be one of the greatest source of air emissions

from this facility. There are very protective standards in place for particulate matter and a well-tested air quality permit process in place for these emissions. The permit process is designed to assure that health is protected.

Gas Emissions from Landfill and Evaporation Pond
Gas emissions from the pond are expected to be relatively low, but will of course depend on the nature of the volatile substances, if any, introduced into the pond. We have evaluated worst-case scenarios from the pond and find ambient impacts to be low; well below any health-related thresholds of concern.

Gas emissions and consequent impacts from the landfill will be even less than from the pond.

What gases will be emitted from the evaporation pond?
That depends on what's put into the evaporation pond. The facility is prohibited from handling liquids with a VOC content exceeding 500 ppm except under conditions designed to limit evaporation. Therefore, large quantities of highly volatile substances will not be put into the pond; in fact, most of the substances put into the pond will likely be aqueous solutions and the primary evaporant will be water.

What odors can be expected from the site?
Again, that depends on what's in the ponds. Different substances have different odor thresholds. However, we can make some estimates as follows.

We calculated the evaporation rate of 500 ppm of a hypothetical substance mixed with 5000 gallons of liquid added to a pond, with the assumption that all of the hypothetical volatile substance, about 20 pounds, would evaporate in an hour. This is a high evaporation rate. This hypothetical substance was modeled for maximum 1-hour ambient concentrations.

The maximum modeled fenceline concentration of this hypothetical evaporant was about 5676 micrograms per cubic meter (ug/m3), 1-hour average. Many common substances have 50% odor thresholds (that is, it is barely perceptible to 50% of the population) less than this. The following table illustrates the distance to the 50% odor threshold for a few common odorous substances.

Substance	Threshold ug/m3	Distance km
Gasoline	3800	0.4
Formaldehyde	2200	0.7
Phenol	500	1.9

Note that these are distances from the pond(s); the facility is approximately 1.2 X 1.6 km, so the maximum modeled distance to the odor threshold may not extend beyond the property boundary. Note also that these are maximum modeled distances under worst-case conditions and with an assumed high-volatility substance introduced to the pond at a high rate.

MODELING OF WORST-CASE INCIDENTS
We evaluated three worst-case scenarios; a spill of a barrel of a volatile substance, and both short-term evaporation and ongoing evaporation of a volatile substance from a pond. We considered benzene as the volatile substance for these cases because it is a fairly common carcinogen the behavior of which is well understood. It is also extremely toxic; a demonstrated low risk from benzene implies that the risk from other, less toxic, substances will carry even less risk.

Note that none of these scenarios consider any regulatory or operational constraints on the facility such as might be imposed by a permit or included in facility operating plans. They are contrary to common sense as well. For instance,

assuming that a barrel spill would be allowed to spread unchecked, then allowed to evaporate, is unlikely since the facility will be required to develop and implement written spill response plans prior to commencing operation.

Similarly, the assumption that the ponds will contain 500 ppm VOCs, including commercially valuable substances such as benzene; and be allowed to evaporate unchecked and be continually replenished; is ludicrous.

Keep in mind that this is worst-case modeling intended to identify the worst that can happen, not what will actually happen. Going back to the earlier comment about monitoring, modeling identifies the maximum impact a monitor would detect (with a safety factor added to the modeled impacts) under any circumstances; actual monitored concentrations will always be less.

Barrel Spill The barrel spill is representative of a chemical handling accident. We assumed that a 55 gallon barrel of benzene would be spilled and spread in an uncontrolled puddle, then evaporate in its entirety. This is clearly a worst-case, since the facility will have in place procedures and equipment to control spills so an uncontrolled spill is not a likely event; and a spill containing 55 gallons of benzene is unlikely, as most wastes are dilute and/or mixtures. This barrel spill is intended to evaluate worst-case, short-term, or acute, hazards.

We modeled this spill both in the dead of winter with a capping inversion present, and in mid-summer under maximally dispersive conditions. We used ALOHA, EPA's model for emergency responders, as it is very conservative and designed to over-predict with a considerable margin of safety to protect responders, and allows manual overriding of defaults and adjustment of parameters to explore the consequences of events.

Summertime conditions result in the higher modeled short-term concentrations. The IDLH (Immediately Dangerous to Life and Health) threshold for benzene is 500 ppm. Modeled concentrations drop below this level at a distance of 16 yards, or approximately the distance from the extreme eastern edge of the drum handling unit to the eastern fenceline. Modeled off-site impacts do not exceed the IDLH.

Concentration decreases dramatically downwind as illustrated in the following table. Note that the concentrations indoors are greatly reduced as well. For comparison, the Threshold Limit Value (TLV), or maximum allowable industrial exposure, is 10 ppm. Note also that these distances are from the assumed location of the release; the facility dimensions are approximately 1.2 X 1.6 km, so the highest modeled impacts are likely to occur on the property.

Distance	Concentration			
km	outdoors		indoors	
	ppm	%TLV	ppm	%TLV
0.5	0.588	5.9%	0.19	1.9%
1	0.15	1.5%	0.0486	0.5%
1.5	0.0663	0.7%	0.0221	0.2%
2	0.0375	0.4%	0.0126	0.1%
3	0.0172	0.2%	0.0058	0.1%
5	0.00648	0.1%	0.0022	0.02%

No offsite impacts resulting from this assumed worst-case spill scenario exceed the IDLH, and offsite impacts at even a modest distance from the point of the accident are well below the TLV for benzene. The modeled benzene concentrations can be used to evaluate the consequences of releases of other chemicals.

Short-term Evaporation from a Pond, Hypothetical Worst-Case Emissions
We modeled short-term evaporation of benzene from one of the ponds as representative of a worst-case short-term hazard from continuous exposure to evaporants from the ponds. This modeling was done with EPA's current regulatory dispersion model ISCST3, using actual digitized terrain data and meteorological

data from a location near Artesia, NM (bp's Empire Abo Gas Plant). ISCST3 calculates ambient concentrations for user-selected averaging times (in this case, 1hour) at user-selected locations. In this case, we defined a receptor grid extending 5 km from the facility in all directions.

The short-term emission rate of benzene from a pond was calculated using the procedure recommended by EPA in document EPA-450/4-88-009, *A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*, Section 4-12. The calculated emission rate is such that most of the benzene in the pond evaporates in an hour's time. This is a very high calculated emission rate, much higher than would be observed in practice.

This scenario is based on the following assumptions;

- One pond contains 500 ppm benzene solution.
- A pond temperature of 25 C and a surface wind speed of 5 m/sec, to promote a very high evaporation rate, approximately equivalent to the evaporation of about 10,000 gallons of 500 ppm benzene-water solution. By way of comparison, the annual average calculated evaporation rate from a pond is about 300 gallons per hour.
- Potential continuous exposure at any point outside the fenceline.

As is normal for EPA's dispersion models, ISCST3 is well validated and known to over-predict ambient concentrations. Based on this modeling, the maximum 1-hour average impact occurs at the northwest corner of the facility, and is predicted to be 7350 ug/m3, or 2.6 ppm.

Not surprisingly, the modeled footprint from the facility is relatively symmetrical but with a very slight bias towards the northwest, suggesting that dispersion conditions are such as to result in higher ambient impacts when the winds are from the southeast.

The following table illustrates the modeled maximum distance from the modeled pond to various 1-hour ambient concentration levels, expressed in ppm. 1 ppm is OSHA's PEL for the work place.

Concentration ppm	Distance km
1	0.7
0.1	3.8
0.01	17.8

Note that the modeled distances to various concentrations are much greater than for the worst-case barrel spill, which involves much more benzene. This is because of the extremely conservative nature of this calculation.

Short- and Long-Term Evaporation from a Pond

We also considered a more realistic general scenario, related to the odor evaluation described earlier. This scenario assumes continuous introduction of 500 ppm VOC-containing liquid at a rate equal to the evaporation rate as measured at a location near Roswell. This rate is 76" a year. The two ponds together have a surface area of approximately 75,240 square feet, so the annual evaporation rate is 476,520 cubic feet a year, or 3,564,370 gallons a year. The total volume of the two ponds is 5.2 million gallons, so to be conservative we assumed one turnover a year evaporation rate (that is, that the entire contents of both ponds would evaporate in a year. This is about half again the calculated evaporation rate.) This corresponds to an annual evaporation rate of 594 gallons per hour. Assuming 500 ppm of volatile substance of about the density of water, the calculated VOC emission rate is about 2.39 lb/hr for the two ponds, slightly greater than the HAP major source emission rate identified earlier. We believe this is a realistic yet very conservative estimate of the actual behavior of the ponds, as it is based on

observable physical phenomena and operating limitations. It is certainly much more appropriate for evaluating annual impacts than the short-term nature of the barrel spill scenario. Note that the emission rate calculated from the Roswell evaporation rate rather than from the one turnover a year assumption is approximately 1.6 pounds per hour, still a very conservative emission rate.

We evaluated maximum ambient impacts at each of the 11 nearby neighbors, illustrated in the following table. Note that the "reference" values are for long term benzene exposure based on 30 year exposure, 24-hours a day, 350 days a year; and are EPA's 1-in-a-million cancer risk thresholds. Annual modeled averages are the closest that we can simulate this exposure.

Reference	Name	Distance	Annual	
		mi	modeled ug/m3	reference ug/m3
1	Ricky Pearce	6.5	0.0070	0.25
2	Roy Fort Ranch	7.4	0.0022	0.25
3	Jarrod Johnson	9.75	0.0033	0.25
4	Jake Luce	6.75	0.0058	0.25
5	Bill Kolb	4.75	0.0076	0.25
6	Marley Ranch	2.9	0.0112	0.25
7	Corky Glenn	9	0.0094	0.25
8	Mark Watts	6.5	0.0146	0.25
9	*Unknown*	8.9	0.0037	0.25
10	Stanley Andrus	9.75	0.0015	0.25
11	Jess Tolton	9.9	0.0015	0.25

None of the modeled annual average impacts approach EPA's guidance value for an assumed 1 in a million cancer risk.

Note that there is not a direct correlation between distance and impact in this scenario. This is because the more realistic modeling used here takes into account terrain and meteorology, while the screening modeling used for the barrel spill evaluation considers only worst-case downwind concentrations. The short term model based on the EPA evaporation methodology does use local meteorology, but we treated it as a screening model as well, not considering direction or terrain. The more refined modeling described here is much more indicative of possible impacts.

We also considered a special case of this same scenario. The historic data indicates that evaporation is greatest in the summer months. We considered the case where the evaporation rate is 10" a month for the month of July, and assumed that all of the evaporation occurred during an 8-hour period each day; that is, about 1/3 of an inch per day for an 8-hour period. We calculated the maximum possible evaporation rate as above, which with generous assumptions and safety factors is a calculated 46712 gallons per day, which if it all evaporates during an eight-hour period is a maximum VOC emission rate of 186.9 lb/hr, an incredible rate. We modeled this absurd maximum hypothetical emission rate for 8-hour concentrations, as though it occurred continuously, to evaluate the effects of shorter-term worst-case exposures. This scenario is even more conservative than the hypothetical evaporation from a pond based on EPA's methodology described earlier.

The following table illustrates modeled impacts. The "modeled" values are the maximum modeled 8-hour average values for each receptor. The "reference" values are the NIOSH Relative Effect Level for benzene, 8-hour exposure.

Reference	Name	Distance	8-hr	
			modeled	reference
		mi	ug/m3	ug/m3
1	Ricky Pearce	6.5	10.9300	320
2	Roy Fort Ranch	7.4	6.6200	320
3	Jarrod Johnson	9.75	3.4100	320
4	Jake Luce	6.75	5.5900	320
5	Bill Kolb	4.75	2.5200	320
6	Marley Ranch	2.9	7.6700	320
7	Corky Glenn	9	11.0100	320
8	Mark Watts	6.5	21.6900	320
9	*Unknown*	8.9	12.9500	320
10	Stanley Andrus	9.75	7.5300	320
11	Jess Tolton	9.9	6.1800	320

We think this, while very conservative, is a more credible evaluation of short-term impacts for this hypothetical worst-case scenario.

Conclusions

Based on very conservative assumptions about the operation of the facility, and realistic meteorological and terrain data, we predict long- and short-term ambient impacts at the neighboring residences to be well below recognized standards for protecting human health.

These assumptions on which the evaluation of impacts are based ignore regulatory and practical constraints on the facility's operation and are designed to evaluate worst-case, "what if?" situations. As a practical matter, we do not think they will occur.

New Mexico has a very protective air quality program, which specifically addresses toxic and hazardous air pollutants. A facility simply cannot emit toxic air pollutants at levels that threaten human health. This facility will be evaluated for potential emissions of criteria, toxic, and hazardous air pollutants and if appropriate, seek an air quality permit.

An air quality permit application includes a demonstration that health will be protected through meeting ambient standards or, in the case of toxic air pollutants, the conservative levels set by the New Mexico Environment Department. The air quality permit program is the appropriate place to consider airborne hazards, as that is where the expertise, and regulatory structure, lies.

At this point, applying very conservative assumptions (conservative to the point of absurdity), it appears that health is not threatened even for worst-case hypothetical scenarios. Additional information as it is developed will likely reduce the apparent threat.

Please let me know if you require anything further.

Sincerely

R C Cudney, QEP