

UNIVERSITY OF ARIZONA

RESPONSES TO QUESTIONS FROM THE ORACLE TOWN HALL MEETING OF 11/15/99

SUBJECT: PAGE-TROWBRIDGE RANCH LANDFILL (PTRL)

University representatives attended a meeting of the Oracle Town Hall on November 15, 1999 to discuss the Page-Trowbridge Ranch Landfill (PTRL). The questions below were compiled from 63 index cards with written questions submitted by attendees. The order and categories of questions below have been reproduced as they were submitted by the Town Hall secretary. Each question has been numbered to make it easier to refer to specific responses if follow-up questions arise.

Section A - EPA related (U.S. Environmental Protection Agency)

A.1. Why hasn't the U of A turned this site over to the EPA superfund for clean up and closure?

PTRL is not a superfund site under the federal definition. The federal government uses several criteria to determine whether a site qualifies as a "Superfund" site. These typically include contaminated groundwater or other releases that are a direct threat to health and safety, and abandonment of the site by parties that would normally be responsible for management or cleanup of the site. Since PTRL does not have contaminated groundwater, or other hazardous releases, and the U of A has not abandoned the site, the federal superfund designation is not applicable.

A.2. What position does the U of A take on getting the EPA to take over the site? What would be the objections to that?

The University has no position on the issue of whether the EPA should take over the site. Since ADEQ implements EPA regulations, the impact is exactly the same on the University no matter which agency is in charge. However, the EPA would normally "take over" a site only if the ADEQ had failed to properly use its authority, and the University is unaware of any such accusation.

A.3. When was the last time the EPA reviewed and inspected the cap? Please provide documentation.

Federal EPA inspectors last visited the PTRL on February 24, 1993. This was, of course, prior to installation of the cap and full implementation of the Closure Plan.

A.4. Was the cap that was finally installed EPA tested and approved? If so, when? (I want to see the EPA letter of Approval)

EPA did not test or specifically approve the PTRL Closure Plan because this authority is delegated to ADEQ. Region IX EPA is aware of the site, and has been informed of closure progress through site inspections and being copied on reports and correspondence. If at any point EPA disagreed with the direction being taken, they would have communicated this to ADEQ. The U of A is unaware of any concerns raised by EPA in this regard.

A.5. Where can all EPA reports, tests, etc. (regarding the site, closure and monitoring) be obtained, up to the present time?

Arizona is part of EPA's Region IX, which is located at 75 Hawthorne Street, San Francisco, CA, 94105. We have not reviewed EPA's files, so the extent of their files is unknown. The PTRL has EPA ID# AZD980665814. Within Arizona, ADEQ and the Arizona Radiation Regulatory Agency (ARRA) also have files concerning the PTRL. The U of A also maintains its own records concerning this site.

A.6. Does the EPA believe that four monitoring wells and their placement at Page Ranch are adequate to monitor contaminant movement? Documentation?

Once the EPA delegates authority, it does not issue approval of each step of the plan, although the University would expect to hear from them if they disapproved of the placement of the four wells. It has not received any letter requesting a change. As indicated above, EPA has been copied on key correspondence throughout the site's history, and has inspected the site multiple times.

Section B - About the Cap

B.1 Where geographically/specifically did the clay used in the cap come from? Who provided the clay?

The clay material was purchased from Territorial Consulting, Inc. The contact person was Marc Dotseth. Territorial Consulting was involved in the Saddlebrooke housing development northeast of Catalina, Arizona. The clay material was excavated from the site where the Saddlebrooke development now exists, screened on site, and then trucked to an area adjacent to the PTRL where it was stockpiled until used.

B.2 Has any experiment (such as an actual core sample) been conducted on the cap to establish its actual permeability? Please provide any/all documentation.

The Closure Plan required numerous quality control measurements in the field during cap construction. These tests were conducted and documented by the project manager, SCS Engineers. These tests included soil moisture content, compacted soil density, particle size distribution, and saturated hydraulic conductivity (laboratory permeability). The project specification required one permeability test per 100,000 square feet of surface area per lift. The cover material was placed in six inch lifts. A total of 14 driven tube samples were collected during cap construction and tested in a laboratory to ensure they met the permeability standard. The results of these tests are documented in the Construction Documentation Report prepared by SCS Engineers, dated February 5, 1998. It is important to note that it was essential to test each lift individually to ensure proper construction and not the full thickness of the cap, as such a penetration could adversely impact the cap's overall permeability.

Section C - About Subsidence

C.1. Holland says it's caused by ground settling. Parton says it's caused by collapsing metal containers. What tests have been made by the U of A that prove the metal containers have NOT collapsed?

The U of A has communicated to ADEQ that the subsidence observed at the site was due to the natural settling of disturbed, non-compacted soil covering the tops of burial cells. This position was based on personal experience of U of A staff with the actual burial and backfill process, repeated observations during routine site inspections, and a common understanding of how non-compacted soil settles and re-compacts itself over time, particularly after rainfall. The type of subsidence observed was very uniform (flat) across the entire surface of various burial cells, resulting in the surface sinking typically 4-6 inches, with a crack around the perimeter of the original cell. Given that buried waste layers were typically six feet in total thickness, it seems very unlikely that all containers would simultaneously collapse across the width of the burial cell, and if they did, it would not be to a uniform degree. And even if such an unlikely event did occur, the amount of surface sinking would be considerably greater. No specific tests have been conducted to prove this position, as it would require exhumation to determine with complete certainty. The final cap installation included re-compaction of the tops of the cells and installation of geogrid layers to stabilize the soil and prevent future subsidence. No subsidence has been observed since cap installation has been completed.

C.2. Mr. Holland said the cap was doing its job and all the contaminants were still under the site. Is the UA's position that these unlined pits will contain all the contaminants forever without seepage into groundwater? Will we know for sure only when the aquifer shows contamination?

The geology, hydrology, and climate at the PTRL are such that precipitation does not infiltrate very far into the surface soil. In fact, the rate of evaporation from the soil exceeds precipitation for every month of the year. Without the presence of significant moisture to saturate the vadose zone (zone between the surface and groundwater), the buried wastes in the landfill will not migrate in a significant manner. There is minor migration of solvent gas at very

low concentrations around the perimeter of the landfill. The degree of this migration is very small, and does not threaten groundwater. Monitoring of soil gas is being considered as a component of the Post Closure testing for the site.

C.3. One of Mr. Holland's justifications for the safety of the landfill is low rainfall and high rate of evaporation. What about the 1970's & 80's where there were high amounts of rainfall & snow and NO CAP? What happened to the contaminants then?

A 1983 study report by the consulting firm of Hargis & Montgomery describes the relationship between evaporation and precipitation at PTRL. Their study looked at U.S. Department of Commerce precipitation records for Oracle, Arizona from 1931-1982, and evaporation records from the U of A Water Resources Research Center from 1963-1978. This study concludes that evaporation exceeds precipitation every month of the year. This suggests that even prior to the cap installation, there would have been little if any impact on waste migration as a result of rain or snowfall. The report also provides an estimate of a minimum of 100 years for wastes to migrate to a depth of 270 feet, and this would only occur in the unlikely event of complete saturation of the vadose zone. The groundwater beneath the PTRL is at a depth of approximately 650 feet.

C.4. The community is wondering about the logic re the greatly enlarged stock tank above the landfill which fills with rainwater and drains quickly. Doesn't this compromise the buried waste? If not, why not?

The catchment basin and stock tank east of the landfill was enlarged because soil from this area was excavated and used as a mixed component of the landfill cover material. The stock tank is approximately 1/4 mile from the landfill, and has no known effect on buried waste materials. The tank dimensions result in collection of water runoff that is fairly shallow, but with a large surface area. It is generally believed that water loss from this tank is primarily from evaporation rather than a high rate of soil drainage.

Section D - About the Post-Closure Plan

D.1. Please explain precisely why so many years have passed and still no Post-Closure Plan?

Early in the Closure Plan review process, the U of A and ADEQ mutually agreed that development of the Post Closure Plan should wait until the Closure Plan was completed and implemented. The logic was that the Post Closure Plan must reflect long term care of the site based on the final Closure Plan. The Closure Plan went through multiple design changes over several years before final approval and implementation. The delay in preparing a Post Closure plan was acceptable to ADEQ because the main components of such a plan were already in place and ongoing, specifically groundwater monitoring and regular site inspections.

D.2. What will be discussed in the Post Closure Plan meeting? What will the Post Closure Plan include?

The Post Closure Plan serves as the application and documentation for a Post Closure permit to be issued by ADEQ to the U of A. ADEQ will solicit public comment on the Plan, and if requested, they will schedule a public hearing. The typical agenda of such hearings is for the regulatory agency to make a brief presentation about their review of the Plan, conduct question and answer discussions, and allow interested parties to make formal comments that are placed in the official record for the hearing. Following the hearing, ADEQ will prepare a written response to public comments received, and will advise the U of A of any changes needed in the Post Closure Plan. The complete Post Closure Plan will be available for inspection during the public comment period.

Section E - About Testing/Monitoring

E.1. Is there any monitoring now of off-gassing from the toxic wastes? If so, who is doing it, with what results and how will the condition be corrected? If not, why not?

There is no current monitoring of off-gassing from the PTRL. The last testing that was done was part of the three phase subsurface soil study, which concluded in 1991. Concentrations measured previously have been very low, indicating minor migration of vapor through voids in soils immediately adjacent to the landfill. Additional perimeter soil monitoring is being considered as a Post Closure requirement.

E.2. Can you establish exactly where the toxic wastes are now—with solid data? If so, please provide data.

The installed cap overlays all of the wastes buried at the PTRL. This is based on maps and records on file with UA Risk Management and UA Radiation Control. There is no evidence of any waste burials at any other locations on the property.

E.3. How have you established that the toxins have not migrated? Supply data?

No contamination has been detected in the groundwater. Given the climate and soil conditions as described in the Hargis and Montgomery Report (See response to C.3. above), significant vertical migration appears to be highly unlikely. Minor levels of horizontal migration have been observed in the form of low vapor concentrations in soil samples collected around the perimeter of the site in 1991. As indicated above, additional perimeter soil monitoring is being considered as a Post Closure requirement.

E.4. How do you justify your assertion that all toxins are still under the site, given the latest scientific data re water movement from the Yucca Mountain Project (actual chaos underground).

I am not familiar with the Yucca Mountain Project, or the degree of applicability of any studies from that site to the conditions at PTRL.

E.5. Mr. Holland, do you assert that even if water has infiltrated into the cells, the contaminants will not migrate?

Again referring to the Hargis & Montgomery report (See C.3. above), significant migration appears to be highly unlikely given the actual conditions at this site. According to this report, significant vertical movement of buried wastes will only occur if the entire vadose zone between the surface and the groundwater (650') becomes saturated.

E.6. What about lateral drainage? Mr. Holland did not respond to that. Please do so now?

The Closure Plan design provides for surface drainage swales to capture and direct surface flow from precipitation around the burial areas. This is necessary to minimize erosion of the cap. Additionally, the cap itself includes a layer of geonet, which promotes horizontal drainage in the unlikely event that the cover material becomes completely saturated by rainfall.

E.7. What is your proof that the monitoring wells are in the right place to be able to detect migration? What is your proof that there are enough wells? How often have you been testing the wells?

EPA regulations require a minimum of three down-gradient and one up-gradient monitoring wells for hazardous waste landfills. For a site limited to just over three acres, with very deep groundwater, four wells are considered acceptable by ADEQ. The groundwater monitoring system has been reviewed and inspected by ADEQ multiple times. Neither ADEQ or EPA have indicated that the number of monitoring wells or any well location is deficient. ADEQ did conclude that Well 1 should be replaced since the casing perforations were 50 feet below the surface of the water in the aquifer, which fell short of the requirement for all wells to monitor the uppermost part of the aquifer. To correct this deficiency, Well 5 was drilled in 1990 to replace Well 1. The wells have historically been tested twice each year. With the installation of the cap, the sampling frequency is now once per year.

E.8. How fast do you estimate that the toxins will move down towards our wells? On what is your estimate based?

See the response to question C.3. above. The report by Hargis & Montgomery estimates 100 years for wastes to migrate to a depth of 270 feet, and then only if the vadose zone becomes completely saturated. Groundwater depth is actually at 650 feet. If these conclusions are extrapolated, this finding suggests that even with complete vadose zone saturation, it would take more than 240 years for contamination to reach groundwater. With both the nature of the climate at the site and the construction of the cap working to prevent vadose zone saturation, it is reasonable to conclude that the time necessary for materials to reach groundwater would likely far exceed the estimates described above.

E.9. Is monitoring of the water coming INTO the Oracle Junction wells left up to the AZ Water Co.? Do you get their test results?

Arizona Water Company is responsible for monitoring the quality of water they deliver. The parameters and frequency are governed by ADEQ regulations. These results are not provided to the University of Arizona, and there is no particular reason they should be. All water utilities are required by law to notify ADEQ and their customers in the event of contaminant detection, and to conduct re-sampling and other additional steps as warranted by the specific type of contamination problem. The Radiation Control Office at the University does routinely conduct radioactivity tests on water from four off-site wells, including an Arizona Water Co. well at Oracle Junction.

E.10. Why aren't all testing records being provided to the Oracle residents? Can we get them now?

All VOC testing results are forwarded to ADEQ as required by regulation. Radioactivity testing results are reported to ARRA if over 10% of the tritium drinking water limit and are reviewed by ARRA during routine inspections of the University's radiation compliance program. In December 1999, a historical report of drinking water analyses for radioactivity of on-site and off-site wells from 1984-1999 was provided to the Oracle Steering Committee. The U of A is planning to start producing an annual report in the spring of each year that will summarize site activities for the previous year, including the University's analytical testing results. This report will be provided to the Oracle Town Hall Steering Committee.

E.11. When our wells become contaminated by Page Ranch Dump, what can be done about it? Can the toxins be neutralized? Can the pollution be stopped before it reaches Oracle Junction Wells?

In the unlikely event of groundwater contamination from PTRL, a number of potential engineering solutions would have to be evaluated to find the one best suited for the situation. Most approaches involve some degree of pumping contaminated water to the surface, stripping it of contaminants, and then recharging it back to the aquifer. The purpose of the monitoring wells at PTRL is to detect groundwater contamination before it migrates to any drinking water wells.

E.12. If a contamination plume does exist, can it be stopped, diverted, or neutralized? If there is seepage, what will you do?

See the response to E.11. above.

E.13. If radioactive or toxic materials percolate into our drinking water how long would it be before we know?

If the U of A detects contamination in the monitoring wells at PTRL, we are required to immediately notify ADEQ and begin follow-up testing. If the Arizona Water Company detects contamination in the water they are delivering to their customers, they are required to notify ADEQ and their customers within timeframes specified in ADEQ regulations.

E.14. How many testing sites are you monitoring? Are you aware that 'vadose' water flow is chaotic and an order of magnitude might not encounter a plume. (Annie Holmes)

There are four groundwater monitoring wells located around the landfill at PTRL. In addition, four off-site wells are currently being monitored for radioactivity. The issue of chaotic water flow in the vadose zone has not been evaluated for this site. However, the evidence available indicates that moisture conditions in the vadose zone remain constant (very low), and are essentially unaffected by events on or near the surface.

E.15. Have the two Titan missile site wells been tested since 1962? Since one of the wells tested radioactive, would it not be prudent to open and test both wells ASAP?

The Titan missile site well borings were sealed, and are unavailable for sampling. The available documentation concerning these wells is limited and incomplete. The previously quoted sampling result of 50 picocuries of radiation is meaningless without complete units and identification of the radioisotopes measured. The Titan well analysis referenced (1960) preceded the first burials of radioactive waste at PTRL in 1962. It is highly probable that the radioactivity measured was either radon or other naturally-occurring radioisotopes, such as uranium and its decay products (daughters). The EPA's most stringent new standard for radon in drinking water is 300 picocuries per liter, and with appropriate public education, can be as high as 4,000 picocuries per liter. Although no limit for uranium in drinking water currently exists, the EPA has been mandated by Federal Court to establish a final standard by the year 2000.

E.16. Who has been doing the testing of the monitoring wells, and at what levels?

Groundwater samples are collected at the site by UA Risk Management and Safety staff for volatile organics, and several other inorganic indicator parameters. Samples are transported to a state licensed commercial laboratory (currently Turner Labs in Tucson) for analysis and report preparation. The analytical detection limits for each parameter are based on the published EPA water analysis method, and the quality assurance data generated by the laboratory. There is a written Groundwater Sampling and Analysis Plan, outlining these procedures in detail, which is a required component of the Post Closure Plan, currently under ADEQ review. Duplicate samples are collected at the same time for radioactivity analysis, which is performed by the Radiation Control Office of the University. In addition, off-site wells are tested as noted in the response to E.9 above. Radioactivity detection limits vary with each test, but samples are now, and for several years have been, analyzed to assure that tritium levels as low as 400 picocuries/liter could be detected. This level was established based upon recommendations from the EPA Laboratory in Las Vegas.

E.17. "Ground water has been tested continuously since 1986." Define 'continuously' and please provide the results of all the tests and who did them.

The on-site groundwater wells were installed in 1984, and sampling began at that time. A regular schedule of testing twice each year was adopted in 1986, and continued until 1998 when the sampling frequency was reduced to once per year (this was approved by ADEQ based on completion of the cap). Sampling is accomplished as described in the response to E.16. above. The off-site wells have been sampled since 1979 on a monthly schedule until 1998, when a quarterly schedule was adopted.

E.18. How often are the tests done? And by whom? Has the same laboratory done all the testing. Do you consider a 2nd opinion worthwhile?

See responses to E.16. and E.17. above. The U of A uses competitive bidding in accordance with our procurement regulations to periodically renew this award to a qualified laboratory vendor. Several different labs have been used during the monitoring history of PTRL. A 2nd opinion can certainly be useful if appropriate steps are taken to ensure that samples delivered to each lab are completely identical, and that analytical procedures followed are also identical. The most important consideration would be the quality assurance measures in place at each lab to ensure accurate, repeatable results. On multiple occasions, ADEQ has conducted sampling inspections at PTRL, and performed their own independent laboratory analyses. As with all U of A collected samples, all results have been clean.

The U of A Radiation Control Office has always performed the radioactivity analyses. During the period 1979-1998, this office routinely participated in the EPA Tritium In Water Performance Evaluation Study by analyzing tritium in water in blind samples and reporting the results to EPA. The laboratory's performance has been well within accepted limits. A summary of those results can be made available upon request.

E.19. When you had laboratory contamination, why didn't you retest immediately, and provide the results?

The measured concentrations that were attributed to laboratory contamination were very low, and not present in each well, or in duplicates, which suggested lab contamination or some other source of analytical error. The next regularly scheduled sampling event was considered by UA and ADEQ to be soon enough to verify this. Subsequent sample results were clean, and the results were forwarded to ADEQ.

E.20. What levels are you monitoring at? If toxins are moving horizontally, how will you discover that with the present number and placement of wells?

See response to E.16. above concerning analytical limits. If significant horizontal migration occurs, this will be most detectable near the surface. Some form of perimeter soil monitoring is being considered as part of the Post Closure monitoring plan.

E.21. Please name those U of A scientists—hydrologists, geologists, etc—who have reviewed the Closure Plan, the regional land development plans, the monitoring well data, and the DEQ commentary since the conclusion of the work of the AD Hoc Committee on Page Ranch?

U of A faculty members have not reviewed the Closure Plan or other related data about PTRL. The Closure Plan was prepared by the Phoenix office of SCS Engineers, which specializes in environmental engineering and development of plans such as this. The document was reviewed by UA Risk Management and Safety staff, UA Radiation Control, State Risk Management, and of course, ADEQ, which approved the final version for implementation.

Section F - About Documentation/Data & Communication

F.1. Did the University ever implement an effort at "waste reduction at site", as agreed to by Risk Management Dept., President Koffler, the Ad Hoc committee and was promised to the citizens of Oracle?

The U of A developed a Pollution Prevention Plan for the reduction of hazardous waste from campus operations in 1994, as required by Arizona Revised Statutes § 49-972. The wording of this question isn't clear whether the phrase "waste reduction at site" refers to the reduction of current levels of hazardous waste generation, or exhumation of buried wastes. No wastes have been exhumed from PTRL.

F.2. Who might have copies of the documentation the U of A says it lacks (such as on radioactive testing).

The U of A Radiation Control has separate files on radioactive waste issues at PTRL. A packet of requested information was recently provided to the Secretary for the Oracle Town Hall. Other records will be made available this month to the Oracle Town Hall in response to a Freedom of Information Act request.

F.3. Where is the written proof that the Fed. EPA approved of the installed cap?

See response to question A.4. above.

F.4. The U of A representatives have just told us that the Dump is not dangerous. Where is the proof of that? We want to see it.

PTRL is a hazardous waste landfill. The wastes buried therein are by definition, hazardous. The question at hand is whether the Closure Plan, groundwater monitoring system, and other steps taken provide an adequate strategy to prevent migration of waste, and to detect such an event if it occurs. The only "proof" that can be offered is that the steps taken have been designed by professional engineers in accordance with published EPA guidance documents, and reviewed by regulatory agencies charged with the task of ensuring adequacy of design and proper implementation.

F.5. There are different stories of when the dumping first started—is the U of A using a convenient date because of lack of documentation?

The first use of PTRL was for radioactive wastes only. There was no license issued to the U of A for this purpose until 1962. The records on file with U of A Radiation Control document the first burial as occurring in 1962. A statement attributed to Bob Dorsey, former U of A Risk Management Director, indicates burials starting in 1962 "with some isolated prior use". Mr. Dorsey was not at the U of A in 1962, and we believe this statement to be anecdotal, without any documented basis. All of the information available in U of A files supports 1962 as the first year of burial activity at PTRL.

F.6. Where/what is the proof on which the University bases their claim that there was no dumping before 1962?

See F.5. above.

F.7. Why aren't testing/monitoring records being provided to the Oracle residents—and on a regular basis?

See response to E.10. above.

F.8. Is there bio-hazard (germs) from the hospitals in the landfill?

PTRL has not been used for disposal of medical wastes. The U of A formerly operated a pathological incinerator on campus for these wastes, and for at least the last ten years or so, has been shipping these materials off campus for incineration and disposal. There were animal carcasses, animal bedding and other research biological waste buried at PTRL, but this was due to the presence of radioactive materials, not infectious agents. The Radiation Control Office required, both then and now, that all such waste be treated by the laboratory prior to pick-up to de-activate any potentially infectious agent.

F.9. The University keeps telling us that they want to do the right thing and work with us, but no one has communicated with us for years, and nothing has happened. Why do we have to fight to get information? Will you now commit to informing the people of Oracle what is (and might be) happening from now on?

The U of A has acknowledged that communication with Oracle residents has not been adequate in recent years. A letter was recently sent to the Oracle Town Hall Steering Committee outlining several proposals for improving the flow of information on a regular basis.

F.10. It seems as if the recent burst in the media has forced the U of A to speak out. What guarantee do we have that we'll be told about what's happening with the long delayed Post Closure Plan?

ADEQ is required to advertise the public comment period for the Post Closure Plan. Additionally, Mr. Holland committed at the Town Hall Meeting to advise Mr. Rush when the public comment period starts.

F.11. When U of A officials lie in the press (ex: 'between the surface & ground water there is 500 feet of clay that acts as a natural barrier') and a U of A map shows layers of a sand/gravel/clay mix, how can we ever be sure the University is telling us the truth?

The "500 feet of clay" statement was incorrect, and was made by a U of A staff member who is not directly involved in the management of the site. This incorrect statement has been made multiple times during the site's history, and occasionally re-surfaces. In this instance, the statement was not a lie, it was a mistake arising from a source who had heard it in prior years. The U of A agrees that there is not a 500 foot clay layer, and the well drilling logs accurately document actual soil conditions beneath the site. Additionally, the U of A certainly has no reason to intentionally mislead anyone concerning the site, when accurate data such as well drilling logs are available to any and all interested parties for review.

F.12. When Mr. Parton reported that he sent a request to the Office of the Custodian of Public Records for all and any documents concerning radiation/radiation testing anywhere in the University system, he was told the Univ. did not have any. How do you explain that suddenly those documents are being assembled?

The U of A Department of Risk Management and Safety originally understood the request (as it was communicated by the Custodian of Public Records) to be for records in that department's custody. Risk Management and Safety is the lead department within the U of A for management of PTRL, so the bulk of records about the site are in this office. In hindsight, we should have queried Radiation Control for any files under their control. The information requested from U of A Radiation Control was turned over to the Secretary of the Oracle Town Hall on December 13, at a meeting in Saddlebrooke. As indicated in F2, other information will be made available prior to the end of January 2000.

F.13. What type of precautions should Oracle residents take about their water?

No precautions are warranted due to the existence of the PTRL, because groundwater is not contaminated, and the site is considerably removed geographically from drinking water wells serving Oracle. If Oracle residents are customers of Arizona Water Company, they should be able to obtain water quality data from the water utility, or from ADEQ. Owners of private wells should conduct whatever level of testing they deem necessary to feel comfortable using their well water.

F.14. At the meeting in Oracle, Mr. Holland stated that Oracle residents should seek independent testing of Page Ranch wells. Who does he suggest should perform such testing and who does he suggest should pay for it?

In a letter to Mr. Rush and the Oracle Town Hall Steering Committee, an invitation was extended by the U of A for a few individuals to observe the sample collection process, tour the site, and have a set of duplicate samples of groundwater analyzed at a state certified laboratory chosen by the Town Hall. The U of A will pay for this duplicate analysis. Regular compliance sampling will be conducted on January 19, 2000. Due to late notice of this event, UA and Oracle were unable to coordinate an acceptable split sample for this round of sampling. Another sampling event will be scheduled during Spring 2000 to provide an opportunity for Oracle to have the water tested at a lab chosen by the community.

Section G - Cost Issues

G.1. If money was not the issue (as stated by Mr. Holland) why wasn't the waste exhumed years ago, as advised by the Ad Hoc committee and promised by President Koffler?

Cost is only one of multiple issues that arise in any discussion of exhumation. The cost of such an undertaking, while not the only issue, is probably the key issue. However, exhumation seems particularly unnecessary when two-thirds of the radioactivity buried at PTRL has already decayed to levels below regulatory concern. PTRL is managed with public funds. Given that the Closure Plan has been designed, approved, and implemented in accordance with regulations considered adequate by multiple regulatory agencies, and with no evidence of groundwater contamination, some would consider a costly, hazardous, and highly complex exhumation project to be an unnecessary use of public funds. If exhumation were to be performed, the waste would have to go to a site managed under the same regulations, by the same or equivalent regulatory body and with the same federal oversight.

G.2. Do technologies exist that can stop the pollution before it reaches Oracle Junction Wells and, if so, what do they cost?

The installed cap at PTRL is designed to prevent migration of wastes by preventing the infiltration of rainfall. In the unlikely event of groundwater contamination, the monitoring wells are intended to detect such an occurrence long before it becomes an issue for the Arizona Water Company wells, or any other wells in the region.

G.3. What is the U of A's current allocated budget for the Page Ranch Landfill—and what does that cover?

U of A currently budgets \$10,000 annually for groundwater analysis, site maintenance and repairs. This budget is for operational expenses only, and does not include staff time. The staff who perform work associated with PTRL have many additional responsibilities, and that portion of their time attributable to PTRL is not tracked.

G.4. How much has the DEQ/EPA spent on all regulatory work since the closure of the Page Ranch Landfill?

The U of A does not have this information.

G.5. How much has the University of Arizona spent on Page Ranch since its dumping stopped?

Not including U of A staff time, the expenses associated with designing and implementing the PTRL Closure Plan were funded by the Arizona Department of Administration Risk Management Section (ADOA-RMS). This agency provides state funded insurance coverage for state agencies including the universities. ADOA-RMS expended approximately \$1.8 million dollars on the PTRL project, with most of the cost being for engineering and construction services. The U of A's insurance claim with ADOA-RMS was closed in January, 1999. Currently, costs for monitoring and maintenance of the site are the responsibility of the U of A.

G.6. Mr. Holland stated that all toxic wastes are being sent out of state. SENT WHERE? And at what cost?

The U of A maintains contracts for waste shipping and disposal with several EPA licensed firms. Wastes are segregated and shipped to various disposal locations around the country depending on their hazard characteristics. For example, waste solutions containing metals are sent to a recovery facility where the metals are extracted for recycling and the remaining acid solution is neutralized, while flammable solvent wastes are sent to another facility for high temperature incineration. All regulated hazardous wastes from the U of A are treated and disposed of in other states, as there are no commercial facilities available within Arizona. Disposal facilities are selected through competitive bidding for vendors that can meet the University's specifications for licensing, insurance, and environmental safety. Costs for hazardous waste disposal are currently \$225,000 annually for operating costs including disposal fees, and approximately \$150,000 annually for aggregate salaries/benefits of the four full time employees that carry out this program for the University. The volume of waste generated annually has reduced somewhat in recent years due to waste minimization efforts. The 1999 RCRA waste volume for the U of A was approximately 85 tons. These totals are do not include radioactive wastes, which are managed separately by the Radiation Control Office, or biological wastes, which are not regulated as EPA hazardous wastes.

Regarding radioactive waste, there are primarily four treatment/disposal avenues which waste may take. Mixed waste, which is radioactive and contains RCRA-controlled substances, is shipped to Texas for incineration or other treatment as appropriate under EPA regulations and Texas law. Most liquid scintillation waste (radiation detection medium) and certain animal carcasses containing very low levels of tritium and carbon-14 are classified as de-regulated waste and may be disposed without regard to their radioactivity. The scintillation waste is shipped to Florida for incineration at an EPA licensed facility. Although de-regulated carcasses may be buried at a sanitary landfill, the small number generated at the University are incinerated as biomedical waste at an incinerator in Phoenix. All other waste is currently stored on campus, pending opening of a regional (multi-state) disposal facility. However, federal interference has terminated plans to open the **Southwestern Low-Level Waste Disposal Compact in Ward Valley, near Needles, California.**

G.7. The U of A promised Oracle citizens in the mid 1980's to dig up and remove containerized waste. Ted Williams, then head of AZ DHS, said this was unnecessary. Where is Ted Williams? Who does he work for?

Until 1987, ADEQ did not exist, and hazardous waste regulations were enforced by the Arizona Department of Health Services (ADHS), which at the time was directed by Ted Williams. Mr. Williams' current status and/or employment is not known by the U of A.

G.8. How much would it cost to dig up waste from 'uncollapsed' containers and taken elsewhere?

The cost of exhumation of PTRL has not been fully evaluated. The task would involve very controlled, almost surgical excavation of buried materials, on-site analytical testing to verify waste characteristics, re-packaging in new DOT containers for transportation, identification of disposal facilities, and then removal of any remaining contaminated soils, followed by analytical verification of complete remediation. Informal estimates from the late 1980s suggested a cost of at least ten million dollars to complete this task. It is unknown what assumptions went into this estimate, or how it would relate to an estimate in year 2000 dollars. Some costs may be less now due to improvements in remediation technology, while others have undoubtedly increased due to inflation, and the smaller number of acceptable waste disposal sites.

Section H - Financial Liability

H.1. If Oracle wells become polluted by Page Ranch Landfill deposits, who is financially responsible?

The U of A is insured as a state agency under the provisions of Arizona Revised Statutes §41-621 *et seq.* This statutory program is administered by the Arizona Department of Administration, Risk Management Section (ADOA-RMS). ADOA-RMS finances liability and losses incurred by the State of Arizona through a combination of self insurance and purchased commercial insurance. State agencies, including the U of A, contribute a portion of their annual budget to a central fund administered by ADOA-RMS to pay for this program.

H.2. If Oracle wells become polluted by contaminants migrating from the Page Ranch Landfill, who pays for cleanup? Decline in property values? Health related costs? Mental anguish?

See response H.1. above.

Section I - Regional Development

I.1. Do you believe it is prudent for developers to proceed with golf courses and housing construction in Falcon Valley contiguous to Page Ranch, BEFORE the issues of contaminant migration from the waste dump are resolved with reliable data?

The available data concerning PTRL and previous testing has been provided to the developer's engineer for their review. The developer will presumably make decisions based on either an acceptance of the existing data, or following the development of additional data. Part of the proposed development, particularly the installation of irrigation wells near the southwestern corner of PTRL will actually contribute valuable new and additional information about regional hydrology. Additionally, these wells will provide an added opportunity to identify groundwater contamination long before any drinking water wells are impacted.

I.2. Given that regional development water use will change the area from 'arid' to 'irrigated', have contaminant migration patterns been recalculated? If so, please submit data to Oracle Town Hall. If not, why not? If not, when?

The term "arid" and "irrigated" refer to conditions on top of and just below land surface. It is the U of A's understanding that irrigation of golf courses is restricted by the Arizona Department of Water Resources from having any measurable impact on soil moisture below a depth of 18 inches. Based on the conclusions of the Hargis

& Montgomery report (see response C.3. above), then surface irrigation is not expected to impact contaminant migration.

I.3. Has a bond been posted which protects future homeowners if well contamination occurs? Have other financial devices been developed to protect homeowners if University calculations about waste migration prove to be wrong?

The state insurance coverage referenced above (response H.1.) is statutory, and exists within the ability of the State of Arizona to obtain funds to meet its obligations. For most government entities, this ability arises from the entity's taxation authority. This is why EPA regulations provide an exemption for government owned hazardous waste facilities from the financial assurance requirements that are applicable to private, commercial operations.

Questions about this document may be directed to:

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