

Final Meeting Minutes

January 16, 2008

The Unified Community Advisory Board
Meeting started at 6:11 p.m.

The following list of attendees is annotated to indicate the affiliations of people other than Unified Community Advisory Board (UCAB) members.

Ignacio Gomez	José Garcia, US EPA
Jerry Clevinger	Jim Hatton, EarthTech
Rich Kessler	Glenn Hoeger, Malcolm Pirnie
Gerald Korte	Estella K. Holmes, ASC
Christine Krikliwy	Matt Johnson, Howenstein High School
Marti Lindsey	Daniel Kirpes, Howenstein High School
David Barraza, City of Tucson	Chris Martin, Howenstein High School
Susan Hess, Arizona Department of Environmental Quality (ADEQ)	Pamela Matthews, ERM
Martin Zeleznik, Environmental Protection Agency (EPA)	Denise Moreno, UA
George Warner, ASC	Geoffrey Moss, ERM
Christine Aguirre, ERM	Monica Ramirez, UA, SBRP
Ruth Benson	Jean Roberts, Raytheon
Mark Berge, 162 FW/EM	Daniel Samorano, Raytheon
Jeff Biggs, Tucson Water	Fred Tillman, U.S. Geological Survey
Donna Creech, Shaw Environmental	Bill Wittman, Earth Tech
Stephen Dean, Tucson Water	
Bill DiGuseppi, Earth Tech	
Don Ficklen, AFCEE	

WELCOME/INTRODUCTIONS

Ignacio Gomez opened the meeting, welcoming everyone and thanking them for coming. He expressed the hope that everyone had a Merry Christmas and a Happy New Year, and that the start of this year was going well.

MINUTES FROM OCTOBER 2007 MEETING

Upon motion made and seconded, the minutes for the October 2007 meeting were approved by unanimous vote of 6-0.

NEW BUSINESS

EPA/West Cap, Texas Instruments Update by Martin Zeleznik

Mr. Zeleznik discussed the history of the site. He said that originally Burr Brown (BB) found contamination on their site, which was reported to the EPA and became part of the Superfund site. BB noticed trichloroethene (TCE) in the wells but they had not had any TCE release. This led to an EPA investigation, which showed West Cap as another source of contamination. Because BB/Texas Instruments (TI) already had a treatment plant in place, EPA signed an agreement with TI to treat the West Cap water with TI's water. Pursuant to the 1988 Record of Decision (ROD) specifications, treated water must have a beneficial use and not be released just to the sewers. Usually treated water is reinjected into the ground, but TI re-uses the treated water in its manufacturing process.

EPA installed two new extraction wells in September 2006, expecting also to send that water to TI. TI initially was unsure whether their treatment plant could handle the additional load. EPA offered to pay for upgrades to the TI treatment plant and has been in negotiations for the past year to accomplish this. Recently EPA discovered TI is closing down manufacturing in Tucson in mid-2009, which means there is no longer a use for either the TI-treated water or West Cap-treated water.

Concurrently, EPA has been working with Arizona Department of Environmental Quality (ADEQ) that said it would like to try in-situ chemical oxidation (ISCO) at West Cap. EPA, ADEQ, and TI are exploring an ISCO study to determine the feasibility of ISCO rather than installing a new treatment plant.

Question: Mr. Gomez clarification if this change in systems has been brought about because TI is leaving. He also asked how the ISCO system works.

Mr. Zeleznik reiterated that the ROD states water cannot be put into the sewer, and TI was using it in its manufacturing process. Without it, something else has to be done with the water. EPA will have to install an injection well or come up with another approach. He noted that he had done some training in Florida recently and that ISCO has become a very popular approach to removing TCE.

Mr. Zeleznik explained that ISCO is a chemical oxidation process using potassium permanganate. He said this is a radical change from the pump-and-treat approach, which, if it works, will require a ROD amendment and another outreach process to inform the public.

Mr. Gomez noted that the TCE quantity was pretty heavy. Mr. Zeleznik explained that the first thing to be done will be to knock down the very hot spots, and then work the outlying problem areas. Mr. Zeleznik said he thinks ISCO will be cheaper and faster, but time will tell.

Question: Audience regarding whether the TI clean-up is done.

Mr. Zeleznik said TI seems to have come to the conclusion there is a source that has not been addressed and is preparing for further investigation.

Question: Marti Lindsey regarding how long the EPA study will take.

Mr. Zeleznik said the study should take between six months and a year, but the EPA is in the process of looking for experts who can best judge that. He told the students in the audience that this would be a good chance for them to see the potassium permanganate process in real use.

Question: Geof Moss regarding when the ROD amendment will be put out in draft.

Mr. Zeleznik said perhaps by the end of 2009 but that the decision to do a ROD amendment had not been finalized.

Question: George Warner regarding the disposal of the TCE that is not destroyed by the treatment process.

Mr. Zeleznik said that, as he learned in the training in Florida, there are people starting to apply ISCO in combination with the dual phase extraction. He said there has been success in knocking TCE out fast in high concentrations, but that with low concentrations it appears to take more time.

Question: Ms. Lindsey regarding when TI will close down completely.

Mr. Zeleznik said TI will still have a design operation in the Tucson area; the manufacturing process is being shut down mid-2009.

Question: Gerald Korte regarding the economic difference between ISCO and pump and treat.

Mr. Zeleznik said that information is not available at this time.

Mr. Gomez thanked Mr. Zeleznik for filling in for Matt Jefferson, who was elsewhere doing EPA business.

He also mentioned that Ann Montañó and Janice Crist had called in their absence at tonight's meeting. He noted other Board members were missing, and that he would start buckling down on attendance. Mr. Gomez said this attendance problem has been going on for awhile, and the next time UCAB has a full table he will tell the Board members they either need to be here where the UCAB can use them or be away when UCAB cannot use them.

Airport Property Update by Dave Barraza

Mr. Barraza said he is with the City of Tucson and had been the project coordinator for the Airport Authority until Fred Brinker took the lead on that. He explained that the City of Tucson is a responsible party on this project and is heavily involved in the ongoing treatment activities at the Airport.

Mr. Barraza said the groundwater system has been operating for a couple of months and that the project had encountered some difficulty with a scaling problem. Due to this scaling, the system was shutting down prematurely on a weekly basis because the magnetic suppression system originally approved with the design of the system was not working. An alternative has been implemented, with the addition of a sequestering agent that prevents the scaling by keeping the hard water minerals (i.e., like calcium) soluble. The system has now been operating for approximately three weeks without shutting down.

During December 2007, 13 pounds of TCE were removed. The system is operating at 52 gallons per minute. The SVE treatment system removed 299 pounds of TCE, and a skid-mounted SVE system operating in the corner of Hangar 1 has removed about five pounds of TCE.

Mr. Barraza said a soil clean-up is planned for this year at Teton and Park, which was a former transformer substation. The area is fenced off and approximately 600 tons of soil will be removed. Of that, it is anticipated that 100 tons will exceed the state residential soil remediation levels and will have to be disposed at a hazardous waste treatment facility in Kettleman Hills, California. The remaining soil will be sent to Butterfield Landfill in Mobile, Maricopa County, Arizona. The clean-up should take about one month. The area then will be resampled to ensure all polychlorinated biphenyl-impacted soil has been removed; then EPA and ADEQ will approve the area as having been mitigated properly.

The floor drains in Hangar 1 that were impacted by washing down solvents are planned for cleanup, and the Canally drains will be cleaned out.

Finally this year, Mr. Barraza said they hope to complete the cap on the old construction landfill at the corner of Nogales Highway and Aeropark Boulevard. He explained they are working with the EPA and ADEQ to finalize the conceptual design, which will require an 18-inch impermeable layer besides the asphalt pavement covering.

Question: Denise Moreno regarding any future use for the capped landfill.

Mr. Barraza said this site has been designed for a parking lot. No structures will be placed on the old landfill. Regulations require that water does not pond and there must be a cap that will minimize infiltration so there will be no mechanism to drive any contamination that may be in the landfill.

Question: Audience regarding any groundwater contamination.

A lot of soil vapor and groundwater testing has been done, and there are monitoring wells throughout that area. There seem to be no source areas, and there has been no impact from that landfill directly.

Question: Rich Kessler regarding the Park and Teton area where the removal of 600 tons will leave quite a hole.

Mr. Barraza said the removed soil will be replaced with clean fill to grade.

Question: Mr. Gomez regarding the use of the Park and Teton area.

Mr. Barraza said this area will be restored to its original condition.

Question: Monica Ramirez regarding what was originally disposed of in the old landfill.

The old landfill contains mostly construction debris. Because it was recommended the landfill not be drilled into, extensive monitoring was done beneath the landfill with soil vapor probes as well as deep and shallow groundwater monitoring wells to identify any source. Mr. Barraza said the landfill was in use in the late 1940s-1950s during the modification of aircraft during World War II.

Question: Mr. Moss regarding the influent concentrations at the new groundwater treatment plant.

Mr. Barraza did not recall, but said that because the system is pumping only 56 gallons per minute the concentrations are low. He noted that the sequestering agent being used at the treatment plant also is being used at the City of Tucson's Los Reales Landfill, and said it is an agent typically used in applications for drinking water.

Question: Daniel Samorano regarding the landfill cap, and what will be underneath it.

There will be a multi-layer type cap above the landfill, using a native fill over the landfill surface, a low permeable-type soil on top of that, and then the asphalt, which will have some compacted AB material.

Question: Gerald Korte regarding the thickness of the asphalt.

The asphalt will be 1-1/2-to 2-inches deep, for small vehicles to park on. Mr. Zeleznik noted that this is all still in the planning stages. He said using a landfill cover for a parking lot is not unusual and there is guidance to come up with a design to meet the criteria. Mr. Barraza added that, once the majority of the sublayer is approved and they know what is equivalent to the 18 inches of non-permeable material, groundwater modeling will be done to ensure that the recharge rate meets the standards required in the ROD.

Question: Bill DiGuseppi regarding any word on the permanganate injections that were going to happen?

Mr. Barraza said there was nothing to report on the injections. He said they have been concentrating on the scaling problem.

Tucson Water 1,4-dioxane Management Update by Stephen Dean/Glen Hoeger

Mr. Dean said that, in addition to the update on the 1,4-dioxane being monitored at the Tucson Airport Remediation Project (TARP) treatment plant, they also would provide a brief illustration of how Tucson Water has been managing 1,4-dioxane using the blending strategies.

Since June 2003, over 216 sampling rounds (648 total samples) have been collected at the TARP treatment plant. The average concentration of 1,4-dioxane coming into the plant as of 8 January is 1.48 parts per billion (ppb), the treated water after the aeration towers is 1.57 ppb, and the blended source at the point of entry (the 12th Avenue Reservoir) is 1.11 ppb.

Mr. Dean then explained that while not currently regulated by EPA or ADEQ, Tucson Water does proactively manage 1,4-dioxane. The water sources used to mitigate and blend are the four TARP north wells, the five south TARP wells, the B-zone drop (from

one of the other zones), and three south-side wells in the general vicinity of the TARP treatment plant. A model is used to predict concentrations being realized. The results from the weekly sampling at the treatment plant and the results of 1,4-dioxane through the state-licensed laboratory are derived from the nine TARP wells. Mr. Hoeger added that when it comes to looking at the blending strategy, the south wellfield is generally a low-flow, high-concentration area (total flow rate of 900 gallons per minute with concentrations ranging from 6 to 10 micrograms per liter). The north wellfield is the high production area, with total flow of 4,000 gallons per minute with concentrations below the detection limit of 1 ppb.

Question: Jim Hatten regarding whether the wells are pumping now or are available as a contingency.

Mr. Dean said the sequencing is (1) the nine TARP wells, then (2) the B-zone drop, and finally the three south-side wells (3), (4), and (5). The sequencing is drive by the 1,4-dioxane calculated values concentration.

Question: Ms. Lindsey regarding the target concentration for 1,4-dioxane.

Tucson Water tries to keep the concentration at 2 ppb or less, and preferably 3 ppb or less.

Question: Christine Krikliwy regarding whether the water is just from south-side wells or also other wells.

Mr. Dean explained that the B-zone drop is indicative of another zone completely, which is actually Avra Valley water (CAP water) and other well sources not in this vicinity.

Question: Mr. Gomez regarding whether this water is dispensed for drinking purposes here on the south side.

Mr. Dean said this water goes into the A-zone several miles to the north, east, and west. The UCAB area is indicative of C-zone. Areas using the A-zone for drinking include the Tucson Water main office and ADEQ/downtown area.

Question: Jean Roberts regarding the water used for blending by priority.

Mr. Dean presented a chart illustrating the wells, flow, and results of 1,4-dioxane sampling. They plug these numbers into a calculated SCADA graphic so at any given time, depending on which wells are running, they always see the calculated 1,4-dioxane value at point of entry (which is north of Santa Cruz Lane Reservoir). An upper alarm

level is set to let them know if any wells go down so the blending strategy can be changed if necessary.

Question: Ms. Moreno regarding whether Tucson Water informs consumers about 1,4-dioxane.

Mr. Dean said information is contained in the annual consumer reports regarding TARP and combined VOC and TCE removal on the website as well. This information does not include 1,4-dioxane specifically (not currently regulated).

Mr. Hoeger explained how the model works using a straight mass balance by calculation twelve times concentration and then a weighted average of the concentrations coming from each of the sources. The model is used as a predictive tool, which can be put in any scenario to understand what the implications are. This is handy when it comes to operating different parts of the system. By looking at the weekly sampling results, Tucson Water can confirm that the model is on target. This provides a level of comfort that the contingency planning is also on target.

Mr. Dean said that the north wells, which are high producers (less than detect on 1,4-dioxane), are key in blending with the south wells to mitigate and manage 1,4-dioxane.

Question: José Garcia regarding whether Tucson Water has received calls from consumers expressing concern about 1,4-dioxane.

Mr. Dean said he had not received any calls, nor was he aware of anyone else in recent history at Tucson Water who had received any calls.

Susan Hess noted such calls would more likely be received by the public information officer. Jeff Biggs said that in the beginning, in 2002, Tucson Water did receive some calls but that they dropped off rapidly as the plans to mitigate the problem were discussed.

Question: Ms. Morena regarding what sources have been identified.

1,4-dioxane is being monitored at all five south wells.

ANG Groundwater Extraction, Treatment and Recharge System Update by Christine Aguirre

Ms. Aguirre presented slides showing the ANG efforts in remediating TCE Plume B and a map showing the location of Plume B in relation to Plume A. She then explained the ANG treatment system, GWETRS (Groundwater Extraction Treatment and Recharge System). She showed a process flow diagram of the treatment system, noting water is pumped from the aquifer to a large collection tank. This water is sent through

an air stripper, while a blower blows air through the water to volatilize the TCE. The vapor goes to a heater where it is heated and sent to a carbon filter that treats the TCE. The vapor is then discharged to the atmosphere. The treated water from the air stripper is transferred to a granulated active carbon filter, which removes any larger sediment, and is then injected back into the aquifer.

Ms. Aguirre noted the treatment system was started in May 1997; since then over 600 million gallons of groundwater have been treated. About 25 percent has been taken from the upper subunit, and 75 percent has been extracted from the lower subunit; in all 33 pounds of TCE have been removed. Based on data collected this past summer, the plume has decreased considerably over the last 10 years.

Question: Ms. Lindsey regarding the map as presented, which shows the plume ending abruptly, and who is responsible for the rest of the plume.

Ms. Aguirre said there is no data because there are no wells to characterize where the plume goes. Mr. Moss interjected that the plume is generally connected all the way up to West Cap.

Future activities will include continuing operation of the treatment system and the installation of two new monitoring wells at the base to further characterize the plumes in the upper and lower subunits.

Question: Mr. Korte regarding the depth of the subunit.

Ms. Aguirre said the lower subunit is screened to 150 feet. Ms. Aguirre explained that the upper and the lower subunits are part of the upper regional aquifer and that there is a separating confining layer.

Ms. Aguirre pointed out there are no monitoring wells in areas of the upper and the lower subunit in the southwestern portion of the 162nd Air Wing, noting monitoring wells would be installed on the property boundary.

Question: Mr. Samorano regarding whether the offgas is sampled.

Ms. Aguirre said the off-gas is sampled right before the vapor goes through the carbon and again where it comes out. She said the sequestering agent used is sodium hexometaphosphate.

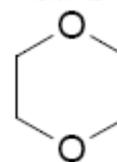
Mr. Gomez added that the Board had taken tours of the plant, and said the ANG is very clean regarding its area of work. Ms. Aguirre said that the two new monitoring wells are scheduled to be installed 11 February. The well in the lower subunit will be drilled to 150 feet. In the upper subunit the well will be about 100 feet deep.

Mr. Moss noted that the plume had not only shrunk in terms of area it covers, but that the concentrations are much lower. In the last year there have been no concentrations over 10 ppb.

Howenstein School Oxidation Chemistry Presentation by Matt Johnson and Daniel Kirpes

Mr. Johnson explained that oxidation is defined as a loss of electrons and reduction is defined as a gain of electrons. He discussed what happens when electrons are transferred. He explained that the 1,4-dioxane molecule is a 6-sided ring structure with two oxygens (diox) located at positions 1 and 4. The "ane" indicates the chemical structure is held together with single bonds. 1,4-dioxane was used as a stabilizer for TCE, and released into the water in the dumping of TCE.

1,4-dioxane molecular structure



Mr. Kirpes pointed out that 1,4-dioxane affects the kidney and liver and is a probable carcinogen. Taken in large amounts quickly, 1,4-dioxane can kill, but usually exposure is not high enough for that to happen. The best way to oxidize 1,4-dioxane is with a mix of ozone and hydrogen peroxide, which produces a radical capable of oxidizing 1,4-dioxane better than either alone. He noted that potassium permanganate does not work well on dioxane. He discussed equations for hydrogen peroxide alone and with the OH (hydroxyl) radical, which always produces carbon dioxide. Mr. Kirpes then discussed the redox part of the equation. The electrons are oxidized from the dioxane, meaning it loses electrons and transfers those electrons to the water it is in. That changes the dioxane to carbon dioxide and some hydrogen.

The students explained stoichiometry, which predicts the amount of hydrogen peroxide is needed for oxidation. Using an example of 8.8 grams of 1,4-dioxane, about 34 grams of hydrogen peroxide would create 17.6 grams of carbon dioxide mixed into 25.2 grams of water. They explained how ozone can either directly oxidize dioxane or it can be converted to a radical, saying one way it creates scavengers and the other it creates more off-gases. Explaining the stoichiometry for ozone, 8.8 grams of 1,4-dioxane would need 48 grams of ozone to oxidize it.

They then showed a figure of a water treatment plant, where water is pumped in, tested, sent to the plant where hydrogen peroxide and ozone are added, and placed under ultraviolet light, which oxidizes much quicker. The water is then sent out, tested again, and injected into the groundwater.

The students demonstrated how soil oxidizes, using hydrogen peroxide to create oxygen gas. This is done by breaking the magnesium into more particles, which is not as dangerous to human health as manganese is alone.

Mr. Gomez said he was very impressed with the presentation and that he was proud that the students are interested in these problems, that they would be the ones to find not only the causes but the effects for fixing these problems. He said this contamination has been in the cleanup process for over 20 years and this is the first time the water treatment plant has been explained in this way. He thanked the students and their teacher, Chris Martin, for attending the UCAB meetings. Mr. Gomez said he would push for more activities and interest from local area schools, saying that there is a curriculum at Sunnyside and Desert View High Schools that teaches the history of this contamination. He pointed out that Howenstein has been the only school to come regularly to UCAB meetings and shown interest in what the UCAB is doing, and they aren't even located in the contaminated area.

Ms. Lindsey added Mr. Johnson and Mr. Kirpes had created the poster for the presentation with the Airport, and asked that they come explain the poster at the next meeting. She said these students have been studying TCE for two years and have a good grasp of it. Mr. Gomez said also he would ask that they receive a certificate of appreciation for their work from the EPA and invited them to speak to the UCAB any time.

U.S./Mexico Binational Center for Environmental Sciences and Toxicology and University of Arizona Superfund Basic Research Presentation by Denise Moreno

Following up on the presentation by Ms. Ramirez at the October UCAB meeting, Ms. Moreno presented a review of what the US/Mexico Binational Center for Environmental Sciences and Toxicology (the Center) is and what the Center does. She said the Center's areas of concern to the environment are arsenic and heavy metals, particularly looking at lead and other metals found in the southwest (Mexico and the U.S./Mexico border region). At the same time, the Center also is looking at chlorinated solvents – TCE in Tucson and macuiladores along the U.S./Mexico border. In general the Center is concerned with natural resources like surface and groundwater.

A huge demographic explosion occurred along the border due to the North American Free Trade Agreement, which increased trade and increased environmental and social issues. Health concerns that the Center is looking at in the U.S. and Mexico are:

- Arsenic and its relation to diabetes and probably breast and other cancers; and
- The effects of heavy metals, particularly lead and also arsenic, on children.

Ms. Moreno introduced photographs of Dr. Dean Carter, who was one of the early faculty members who established the Mexican partners, and A. Jay Gandolfi, the current co-director now interacting with the Mexican partners.

The mission of the Center is to support environmental science/toxicology training and research & development by communicating with stakeholders on risk assessment and contaminant remediation along the Board region.

The Center is a conduit for information and also for technical resources and community outreach. Ms. Moreno said they work with 11 universities and institutions in Mexico, i.e., UNAM, one of the biggest science research universities in Mexico; the equivalent to CINEVESTAV, the National Science Foundation; CISECE in Ensenada; and of course their colleagues in Sonora. These 11 partners are some of the top Mexican researchers in their fields in environmental engineering and environmental toxicology, a multi-disciplinary team with diverse expertise in both the U.S. and Mexico.

One of the Center's objectives is to increase involvement and knowledge of stakeholders. To accomplish this, specialized three-day training/workshops are held at a partnering university in Mexico with binational Superfund investigators from the U.S. Faculty, students, and diverse members of the community can learn about the up-and-coming information on TCE cleanup, new information on toxicology, etc. It is a way to transfer information from the U.S. into Mexico, which is very important as the Center works on a trans-boundary perspective.

Ms. Moreno said the Center also does community outreach through displaying information at various events and through SciTransfer bulletins. They have the only Spanish toxicology book available in Mexico, which gets a huge amount of downloads from Mexican students.

An emphasis for the Center is to break the paradigm of the developed country going into the emerging country to give the developed country the solution, the Center builds human capital by giving scholarships to students to learn technologies in the U.S. that they can take back to Mexico. They then become professionals in Mexico in the environmental sciences and work with us as colleagues in the future. From an economic and also a social science perspective, this is a way to bring nations together.

The Center responds to requests from communities like the Valle Verde neighborhood that contacted them because they were affected by TCE contamination in their water wells. The community asked the Center to present fate and transport information, as well as toxicology information.

Also, the Center has collaborative research projects both in the U.S. and Mexico:

- Looking at mine tailing and phyto-stabilization/environmental remediation in Nacozari Sonora, stabilizing a mine tailing located in the middle of a town;
- Creating permeable reactive barriers to be placed in the Ensenada Landfill in Baja, California;
- Looking at the possible relation of arsenic to diabetes and breast cancer; and
- Studying the long-term effects of heavy metals on children.

Mr. Gomez added that Ms. Ramirez and Ms. Moreno have been attending UCAB meetings regularly for several years. He said their work with Mexico is instrumental in creating a good relationship between both countries. In response to a question from the audience, Ms. Moreno said the Center has been in the works for almost 10 years, and had become an actual Center in the last two or three years after receiving a federal earmark from the EPA. Mr. Gomez invited Ms. Ramirez and Ms. Moreno to continue to present updates to the UCAB about the work they are doing.

UCAB Subcommittee TAG Report by Igacio Gomez

Mr. Gomez noted the Board has been contemplating whether to obtain a Technical Assistance Grant (TAG) regarding the TCE contamination. He said that he does not feel a TAG is needed for TCE; however, it might be needed for the 1,4-dioxane contamination. Mr. Gomez said the 1,4-dioxane issue needs to be discussed with the community, perhaps through a public forum. He pointed out this contaminant is a problem and will have to be remedied. He noted discussions are in the minutes, and Gerry Hyatt has come from San Francisco to update the Board on the effects of 1,4-dioxane. The message will have to be put out to the media with announcements through the radio, television, and newspaper so the public won't come to UCAB later to say, "how come we weren't told about this problem?" Usually UCAB has been the spokesperson for the community, but the public needs to be more involved. Also, Mr. Gomez said he felt Tucson Water needs to be more involved in this issue, letting the public know more about what is going on.

Mr. Garcia said that, while there is no timetable yet of when the treatment unit for 1,4-dioxane will go up, a fact sheet will go out to coincide with that to inform the public of what is going on. Reiterating what Tucson Water has said, the levels have not gotten above 3 ppb. The water has always been safe from 1,4-dioxane, and the treatment unit will ensure that will continue. He suggested the possibility of an open house, perhaps at El Pueblo Center, to inform the public. Mr. Gomez said the only way the public can be informed is through the media. He said this is something we have to do to pacify the public, let them know the problem is not as bad as it seems, and that like TCE, 1,4-dioxane can be cleaned up. Mr. Gomez expressed the opinion that, years ago when the contamination was discovered, the agencies were not up front, that they knew about the

contamination and still let the public keep drinking the contaminated water. He said today everyone has a good working relationship and that the agencies have been upfront with the public.

Ms. Lindsey said she likes the idea of a public meeting or open house/forum to update the community. However, UCAB should connect with a few more community groups to have enough man-power to pull it off.

Mr. Gomez tabled the TAG issue. He then noted that the Hayden-Winkleman area is being considered for designation as a Superfund site, and said that UCAB can offer its assistance. He said he is proud of the Board, and will begin pushing current members to attend and for more members to join. The UCAB should be a Board of 20 members, and Mr. Gomez noted it is not right for a few to be doing the work for the others. He said he is going to ask for more interest from the schools and the neighborhood associations.

Call to Government Agencies

George Warner said that once the Advanced Oxidation Process system is installed, the whole technology will be demonstrated at the plant to UCAB members. He said because of security, he was not sure the demonstration would be open to the public.

Mr. Gomez said he heard that Earth Tech had taken over the responsibility of the TCE cleanup. Mr. Warner explained Earth Tech had been hired as a subcontractor, just as Tucson Water hires Malcolm Pirnie. Bill DiGiuseppi reminded the Board that announcement had been made previously. Mr. Warner noted Earth Tech has been here since 1990 and has a lot of experience.

Rich Kessler said Saturday, 19 April, the Elvira Neighborhood Association will be having a Health and Wellness Neighborhood Fiesta. He invited anyone at the UCAB meeting wishing to set up a table to call him at 520-573-1132. The Fiesta will be held at the Santa Clara Elementary School from 10:00 a.m. to 5:00 p.m. He said there will be a climbing wall, a jumping castle, face painting, and a train for kids. He noted that over 500 people came to the last Fiesta.

Mr. Gomez pointed out that Mr. Kessler has been an instrumental member of the UCAB and that Raytheon and other entities have always been supportive of community efforts such as this.

Call to Audience

Ms. Ramirez announced that on 22 January, 12:00 p.m., in the UA College of Pharmacy room 333, there would be a talk by Dr. Mark Brusseau on the difficulties of removing

TCE in the non-aqueous phase liquids. This talk is open to the public and is being broadcast world-wide so there would be comments and questions from around the world. Ms. Ramirez said her number is 520-260-6620, and she would be happy to answer questions.

Finally, Mr. Gomez announced that this is Jean Roberts' last meeting, as she is retiring from Raytheon. He said she had served Air Force Plant 44 as the environmental program director for several years and has been helpful to the Board. He thanked Ms. Roberts and invited her to continue to attend UCAB meetings.

Follow-up Action Items

There were no follow-up action items discussed.

Open Discussion/Next Meeting Agenda

Ms. Lindsey said she would like to present the final report for the TCE curriculum and discuss how to get it more into the communities. She felt the Sunnyside School District had fallen down on its agreement with her and not used the program as Mr. Martin has at the Howenstein High School. Ms. Lindsey noted that the experience of the Howenstein students shows this is a topic that can be interesting to high school students. Mr. Gomez said he was fortunate to have worked with Dr. Raoul Bejarno, past Superintendent of Sunnyside School District. Dr. Bejarno was instrumental in starting the curriculum program with the UCAB and did in seven years what a superintendent who has been there 20-some years did not accomplish. Mr. Gomez said he would push the school district to have more input.

Upon motion made and seconded, the meeting was adjourned at 7:56 p.m.

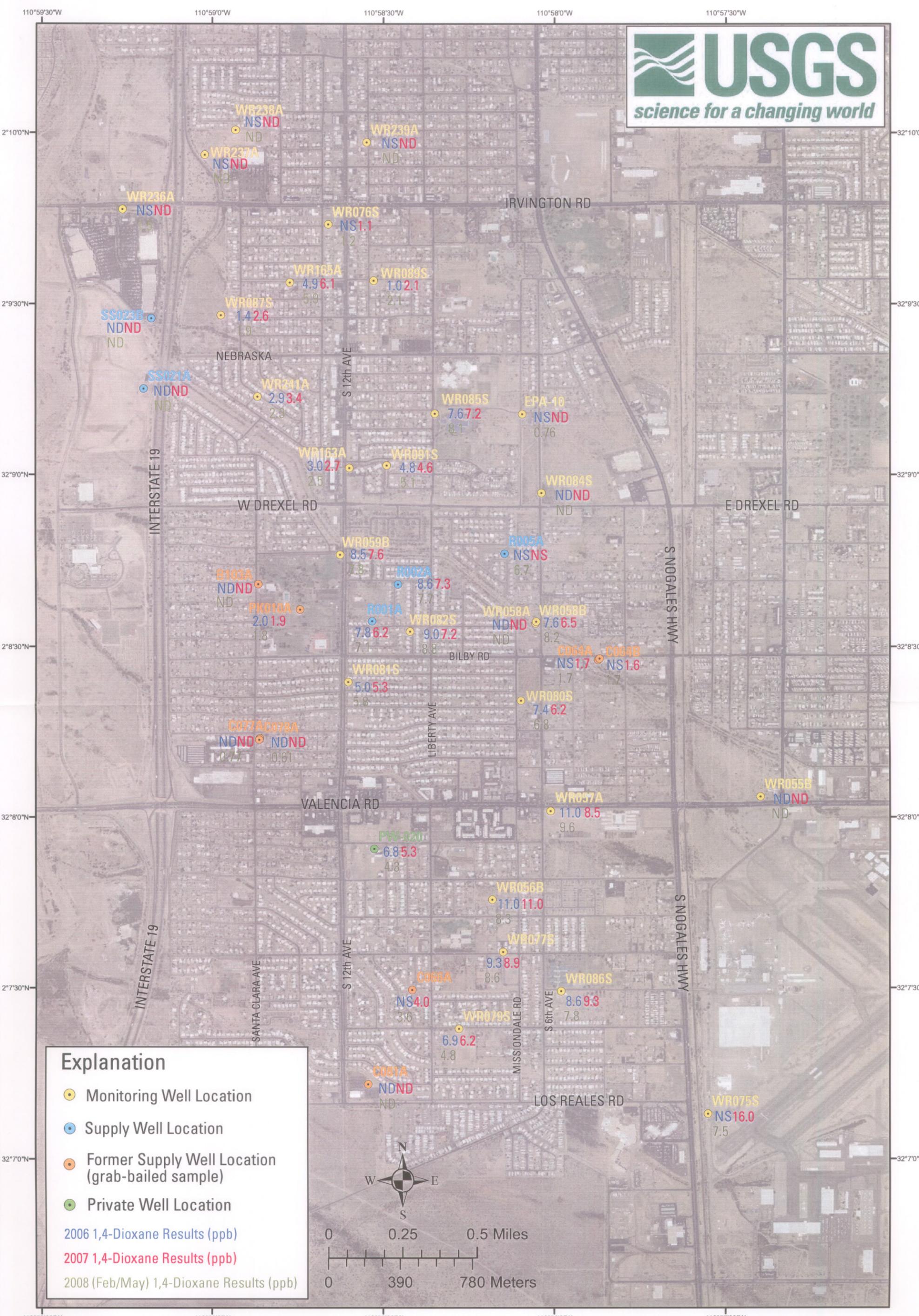
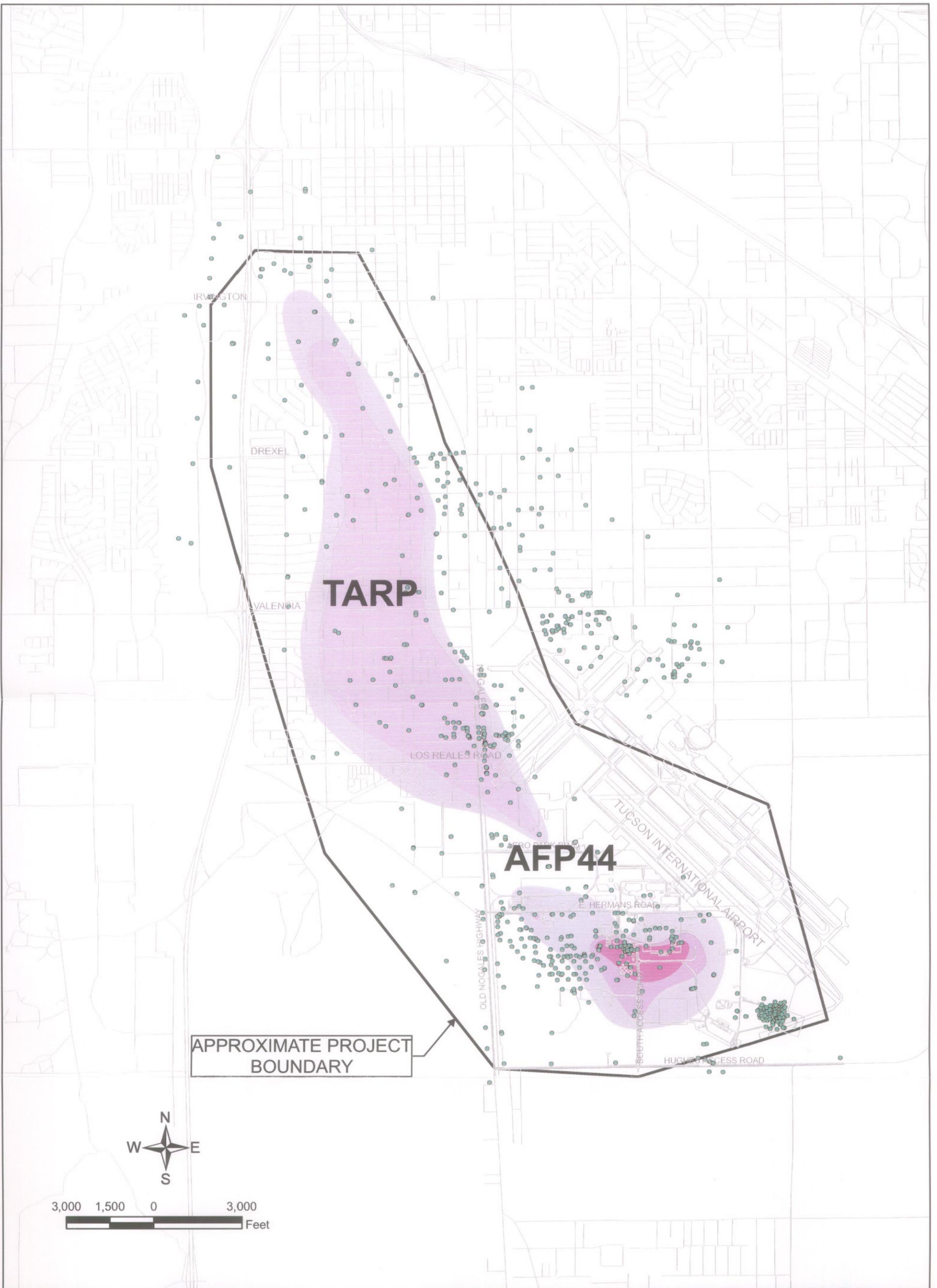


Figure 1. Concentration of 1,4-dioxane in wells sampled in the western Tucson Airport Remediation Project (TARP) region during the February/May 2008 (green), August 2007 (red), and August/September 2006 (blue) sampling rounds. Results presented in units of micrograms per liter (ppb). Wells not sampled are labeled NS. Concentrations below detection limits (1.0 ppb for 2006 and 2007, 0.5 ppb for 2008) are labeled ND.





APPROXIMATE PROJECT BOUNDARY



3,000 1,500 0 3,000 Feet

SITE LOCATION MAP
TUCSON AREA REMEDIATION PROJECT

ACCESSION
U.S. AIR FORCE TFWMT 44
TUCSON, ARIZONA

Requested by:
Date:
Revised by:
Submitted by:
 A tyco International Ltd. Company





Tucson Water

1,4-Dioxane Management

Tucson Water Manages
1,4-Dioxane in Water from
the TARP Water Treatment
Plant by Blending

- 1,4-Dioxane Not Regulated
- Tucson Water Proactively Manages



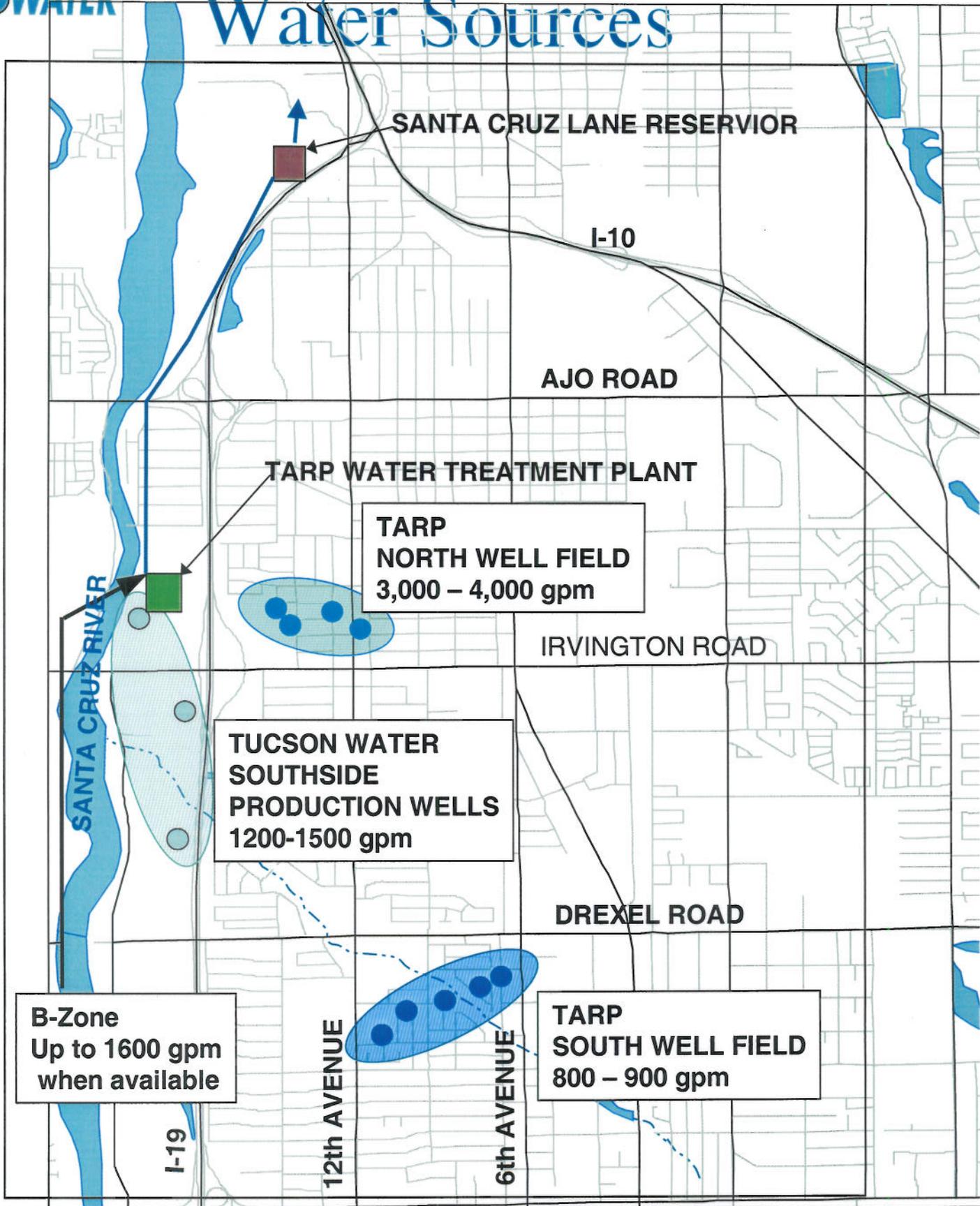
Tucson Water

1,4-Dioxane Management

1. Water Sources Include:
 - TARP South Well Field
 - TARP North Well Field
 - Southside Production Wells
 - B-Zone
2. Model Is Used to Predict Concentrations Based on Flow Data from Water Sources and Results of 1,4-Dioxane Analyses
3. Contingency Plans Are Made Based on Model Results



Water Sources





TARP

1,4-Dioxane Model

Quarterly 1,4-Dioxane Sample Results for Remediation Wells and Southside Production Wells Are Used in Model to Predict Concentrations at the Santa Cruz Lane Reservoir.

Flow Meters at Well Sites Provide Continual Flow Data

Weekly 1,4-Dioxane Sample Results for Treatment Plant Influent, Effluent, and at the Reservoir Are Used to Confirm Accuracy of the Model.

	1,4-Dioxane* (ppb)	Avg. Flow Rate** (gpm)	Flow Fraction	Average Concentration (ppb)
R-001A	8.2	126		
R-002A	10.1	64		
R-003A***	9.2	274		
R-004A	10.4	364		
R-005A	8.9	124		
SWF Combined	9.5			
Safety Factor	0.0			
R-006A	<1.0	1,074		
R-007A	<1.0	1,102		
R-008A	<1.0	770		
R-009A	<1.0	1,117		
South Wells	9.5	952	0.19	1.26
North Wells	<1.0	4,063	0.81	0.43
Total TARP Influent:		5,015	1.00	1.7
TARP Effluent:			0.77	2.0
B-Zone Drop:	0	1,500	0.23	1.6
South Side Wellfield	0	0	0.00	1.6
Santa Cruz Lane Reservoir Point-of-entry SP-830				1.6

* 1,4-Dioxane Concentrations based on November 2007 sampling event.

** Average flow rates based on December 2007 data reports released by Tucson Water.



Implementation

07/15/06 changed impellers on pump #1, now per 06/12/06 Corona de Tucson replacing old fan

TARP WELLS

WELL-ID	EFF	DIOXANE PPB	H-O-A MODE	ON-OFF STATUS	FLOW	
					RATED	ACTUAL
R-001-A	4	7.4000	OFF-SY	RUNNING	119	114
R-002-A	7	9.9000	OFF-SY	RUNNING	63	63
R-003-A	1	10.800	OFF-SY	RUNNING	263	271
R-004-A	2	9.2100	OFF-SY	OFF	370	0
R-005-A	3	8.0000	OFF-SY	RUNNING	124	141
R-006-A	5	0.0000	OFF-SY	RUNNING	1091	1048
R-007-A	6	0.0000	OFF-SY	OFF	1091	0
R-008-A	8	0.0000	OFF-SY	RUNNING	851	848
R-009-A	9	0.0000	OFF-SY	RUNNING	1077	1308

SS WELLS

WELL-ID	D P	G A S	C L Z	R U H	DIOXANL PPB	H-O-A MODE	ON-OFF STATUS	RATED		ACTUAL	
								FLOW	PRESSURE	FLOW	PRESSURE
TARP B ZONE MOV	1				0.0000	COMPUT	28 %	N/A	N/A	1737	not available
SS-001-A	2				0.0000	COMPUT	RUNNING *	217	0	0	not available
SS-021-A	3				0.0000	COMPUT	OFF *	628	0	55	not available
SS-023-B	4				0.0000	COMPUT	OFF *	555	0	0	4

TARP RE-LIFT B ZONE MOV **1737** GPM

DIOXANE PGE #30
(CALCULATED) **1.042** PPB

SAMPLE DATES 08/09/2006 ALARM SET AT 1.00 HI
ALARM SET AT 1.50 HIHI

ISOLATED
WELLS

A ZONE
WELLS

TARP WELL
ALARMS

DISMISS

Tucson ANG Presentation January 2008 UCAB Meeting

ANG/CEVR
162nd Fighter Wing
Tucson, Arizona

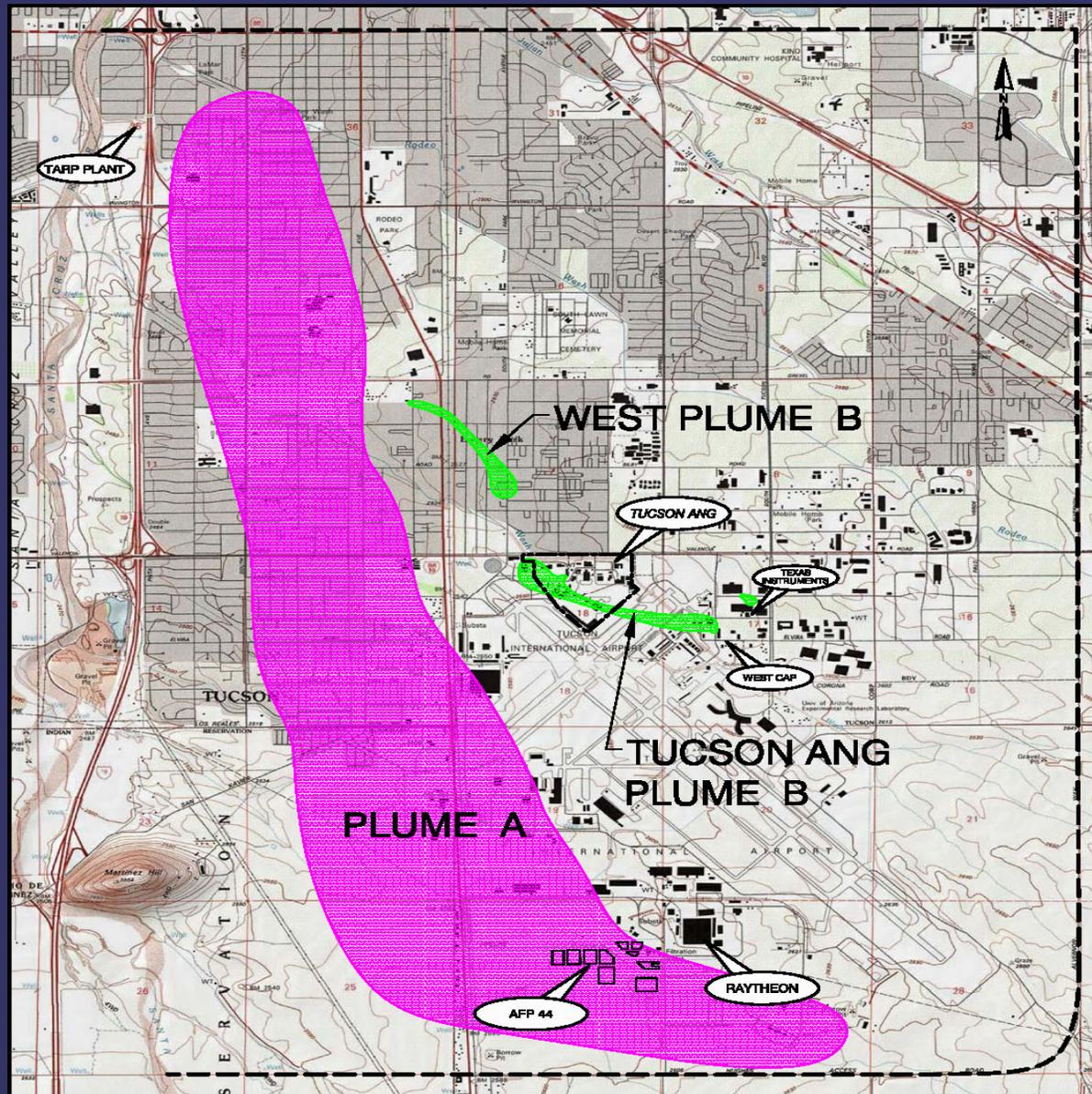


AGENDA



- **Location of Tucson ANG Plume B**
- **Description of GWETRS Operation and Performance**
- **Future Activities**

TIAA Superfund Site



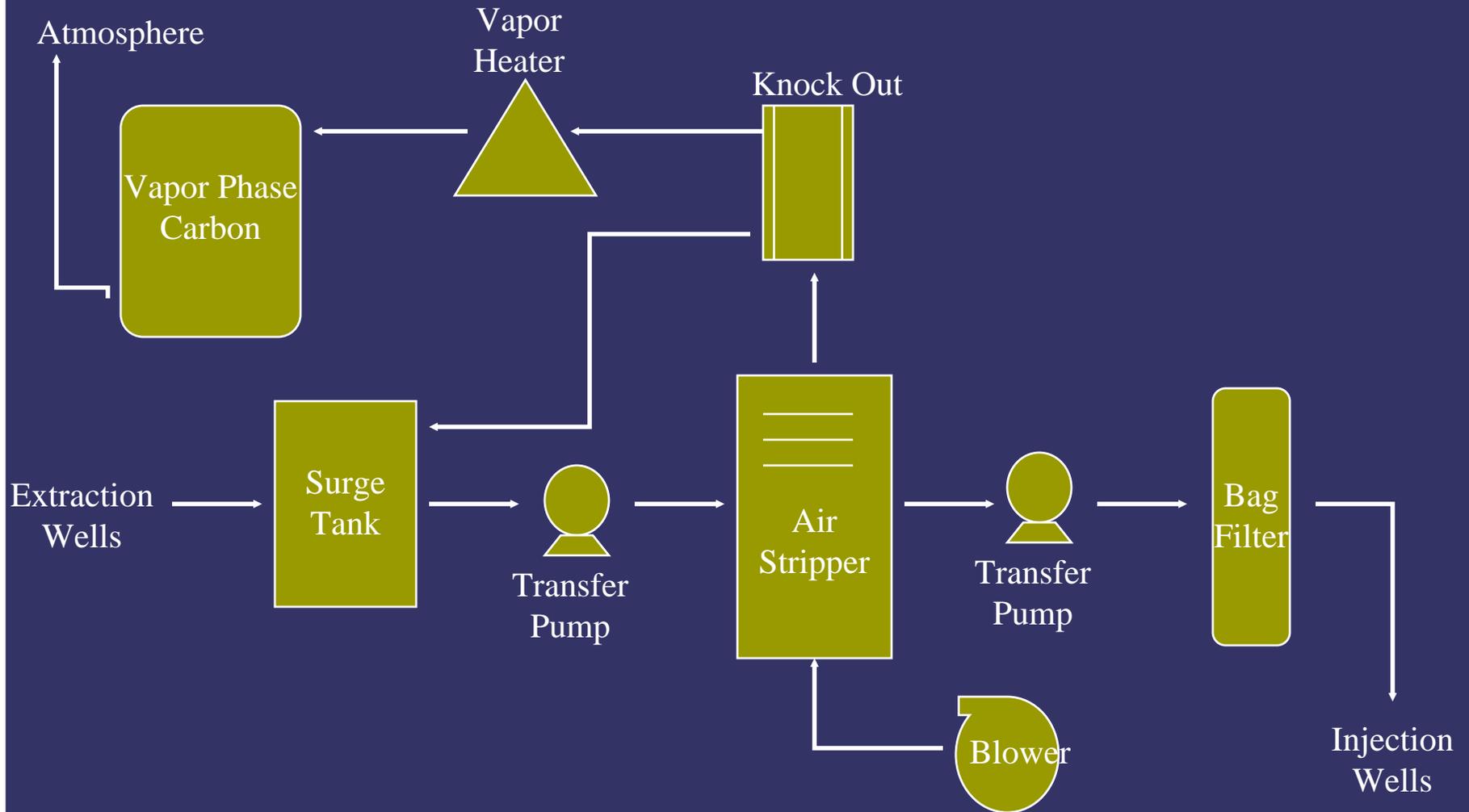
ANG Groundwater Extraction, Treatment and Recharge System (GWETRS)



Delivering sustainable solutions in a more competitive world

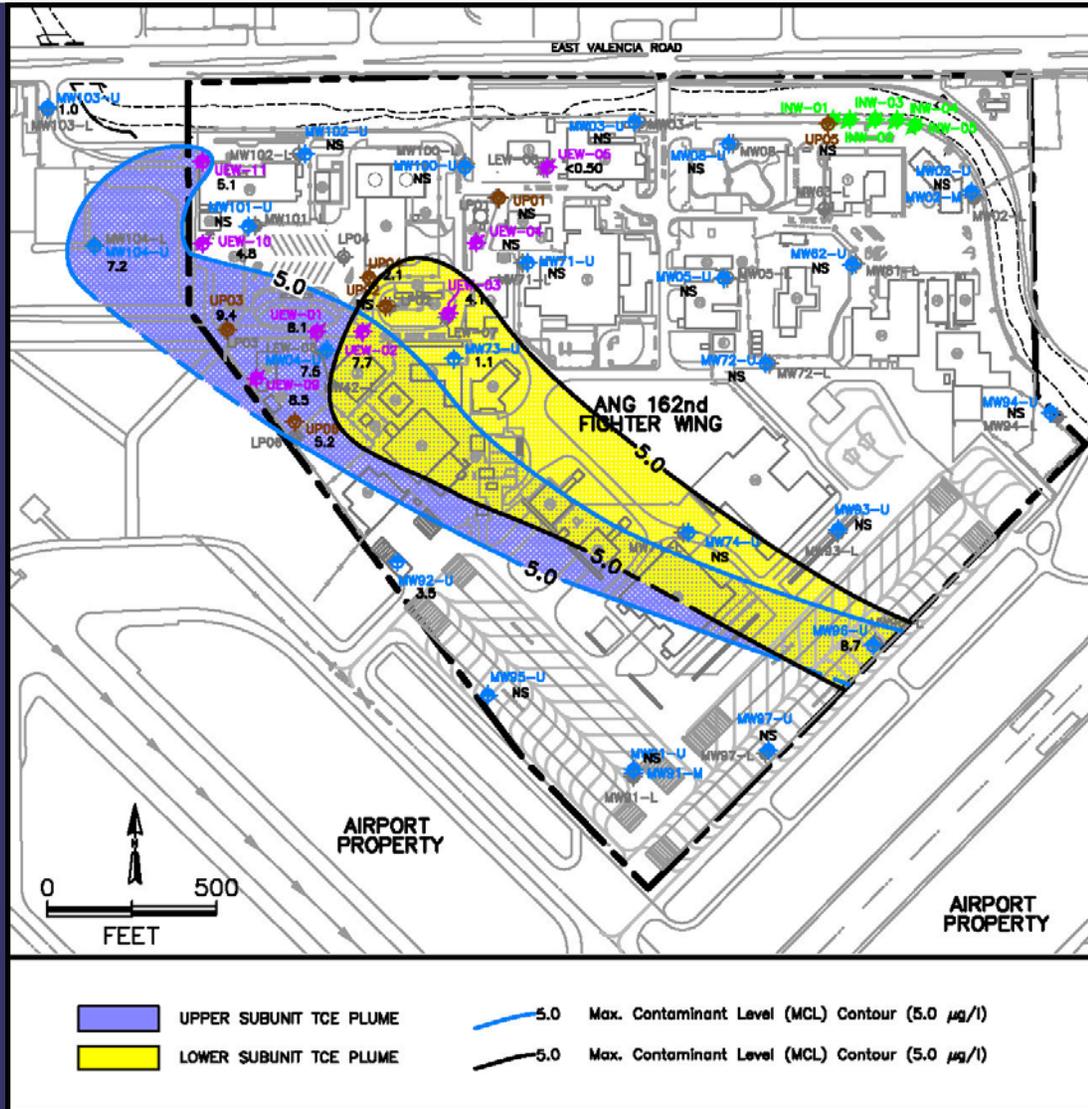


GWETRS Process Flow Diagram



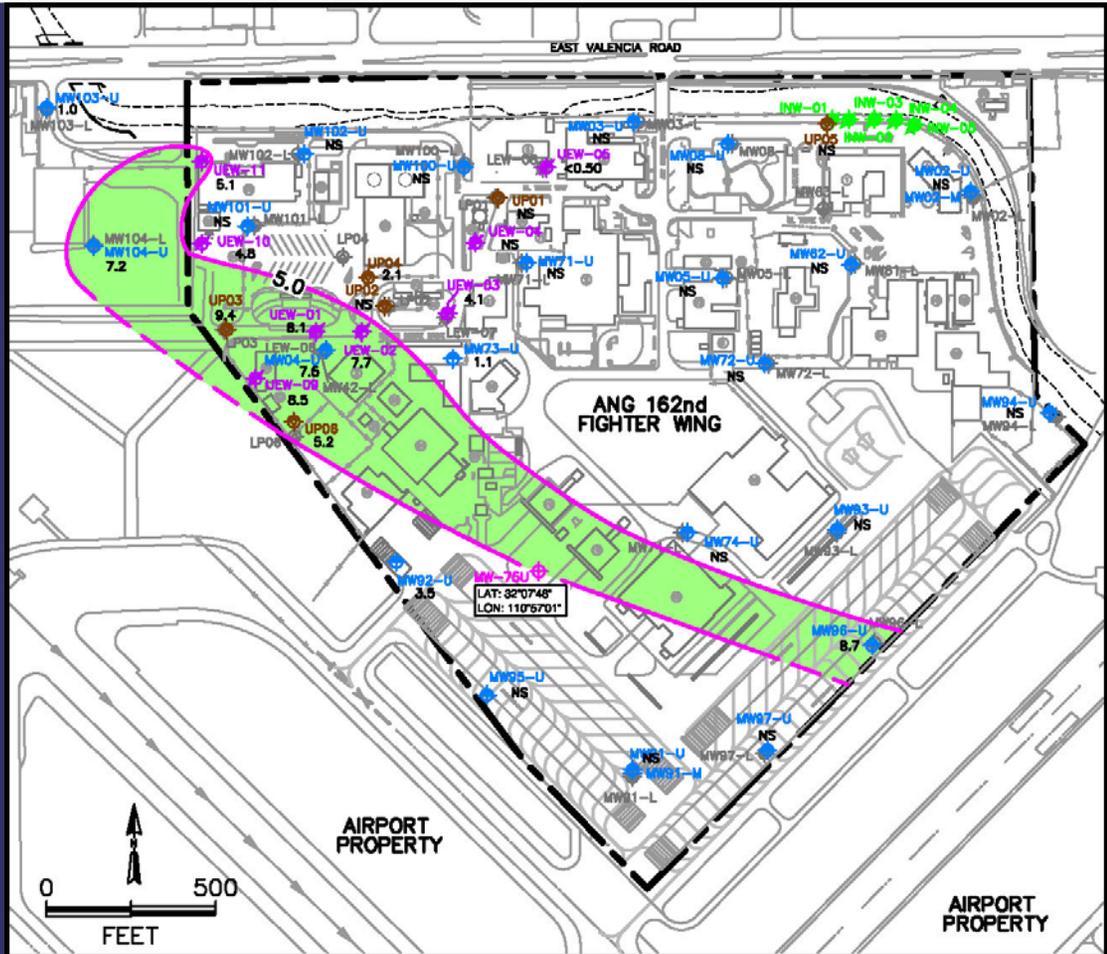
GWETRS OPERATIONS SUMMARY

- GWETRS Operation Began on 15 May 1997
- Gallons treated through 31 December 2007 = 610,000,000
 - Upper Subunit = 137,000,000 gallons
 - Lower Subunit = 448,000,000 gallons
- TCE removed through 31 December 2007 = 32.9 pounds
- Historical Influent TCE Concentrations ranged from 3.4 to 18 µg/L



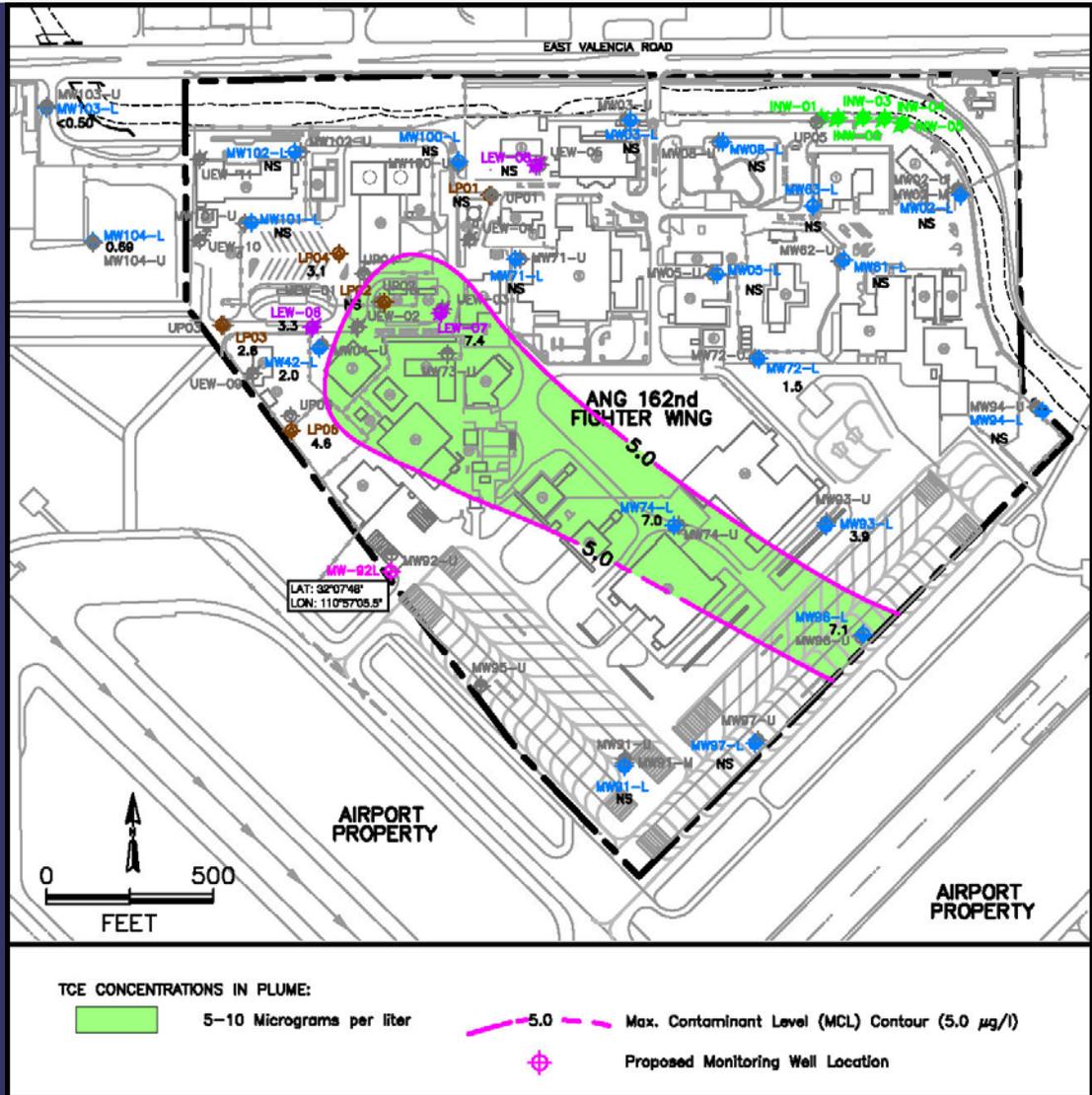
FUTURE ACTIVITIES

- Continue Operation of GWETRS
- Install two monitoring wells on Tucson ANG property to further characterize TCE plumes in upper and lower subunits



TCE CONCENTRATIONS IN PLUME:
 5-10 Micrograms per liter
 5.0 Max. Contaminant Level (MCL) Contour (5.0 µg/l)
 Proposed Monitoring Well Location

TCE Plume in the Upper Subunit of the Upper Regional Aquifer (August 2007)



TCE Plume in the Lower Subunit of the Upper Regional Aquifer (August 2007)

QUESTIONS?

U.S. - Mexico Binational Center



for Environmental Sciences and Toxicology

Unified Community Advisory Board
Tucson International Airport Area
Superfund Site
January 16, 2008
Tucson, Arizona

Outline

- I. Why a Binational Center?
Background Information
- II. Mission Statement
- III. Collaborative Partners
- IV. Objectives and Activities
- V. Contact Information

Background: Environmental Concerns

- Arsenic
 - Natural source
- Heavy Metals
 - Mining industry
 - Other industrial operations



Image from: tx.usgs.gov/geography/prj_HUD.htm

Background: Environmental Concerns (continued)

- Chlorinated Solvents
 - Assembly plants (*Maquiladoras*)
 - Dry cleaning
 - Military bases
- Natural Resources
 - Surface water and groundwater



Image from: tx.usgs.gov/geography/prj_HUD.htm

Background: Social Issues



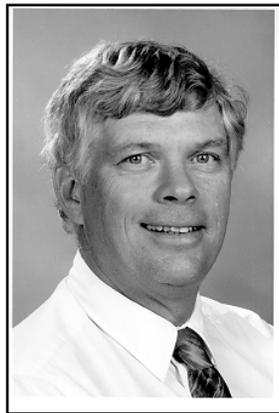
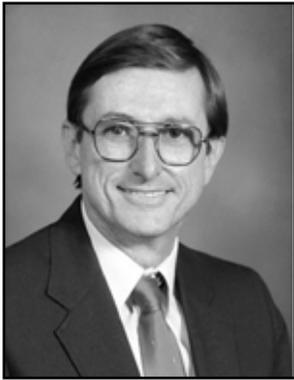
- Demographic Explosion
- Increase in Trade
- Environmental Justice/Social Justice

Background: Human Health Concerns

- Arsenic
- Diabetes
- Breast cancer and other cancers
- Children's Health
 - Heavy metal exposure
 - Effects of toxicants



Background: Evolution of Binational Relationship



- Early faculty partnerships
- Interactions between founder Dr. Dean Carter
- Current Director, Dr. A. Jay Gandolfi

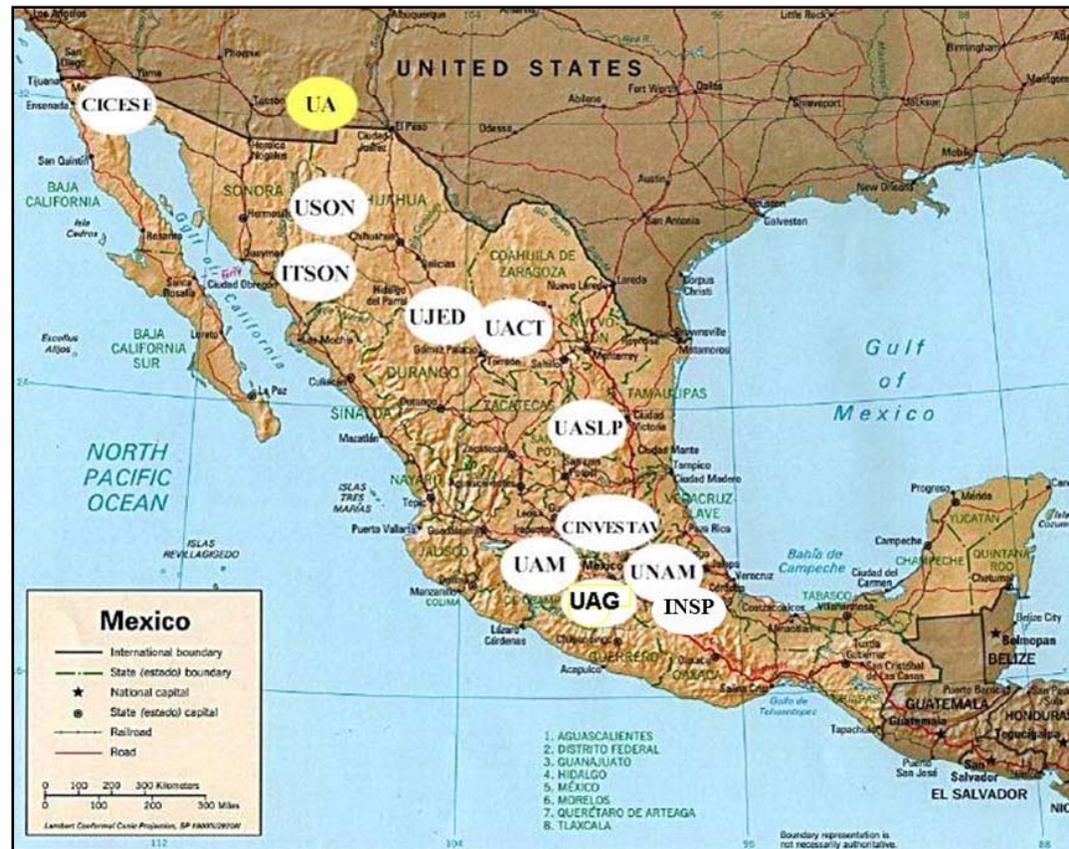
U.S.-Mexico Binational Center for Environmental Sciences and Toxicology -Mission-

U.S. - Mexico Binational Center



To support environmental science/toxicology training and research & development by communicating with stakeholders on risk assessment and contaminant remediation along the Border region.

Partnering Universities/Institutions



Partnering Universities/Institutions (continued)

- A total of eleven partnering institutions and universities
- Top Mexican researchers within their respective fields
- Multidisciplinary expertise

U.S.-Mexico Binational Center: Objective & Activities

- Increase Capacity of Stakeholders:
 - Specialized workshops
 - Coordination with Mexican partnering universities/institutions



U.S.-Mexico Binational Center: Objective & Activities (continued)



- Increase Capacity of Stakeholders:
 - Community outreach
 - Southwestern Arizona and Border region

U.S.-Mexico Binational Center: Objective & Activities (continued)

- Increase Capacity of Stakeholders:
 - Spanish Language Online Materials
 - Professional and basic science Spanish language materials
 - Spanish Language Information Sheets
 - Trichloroethylene, mine dust
 - Arsenic and Hazardous Waste Landfills



U.S.-Mexico Binational Center: Objective & Activities



- Promote Information/Technology Transfer:
 - Mexican Student/Scientist Training



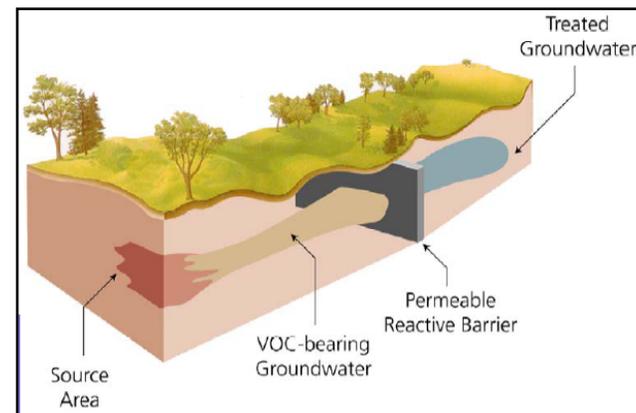
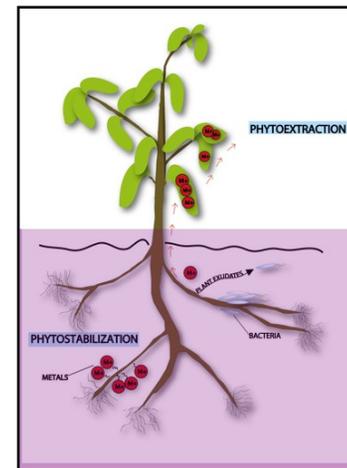
U.S.-Mexico Binational Center: Objective & Activities

- Sponsor Border Community Meeting:
 - Provide information regarding local concern
 - Nacozeni, Sonora, Mexico and Nogales, Arizona



U.S.-Mexico Binational Center: Objective & Activities

- U.S.-Mexico Collaborative Research Projects:
 - Mine Tailings: Phytostabilization and Phytoremediation
 - Landfill Leachate Plumes



U.S.-Mexico Binational Center: Objective & Activities (continued)



- U.S.-Mexico Collaborative Research Projects:
 - Arsenic and Health: Diabetes and Breast Cancer
 - Long-term Effects of Heavy Metals on Children's Health

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Questions



For more information visit our new
Website at:

<http://binational.pharmacy.arizona.edu/>