Roosevelt Irrigation District Groundwater Remediation Project in the West Van Buren Area WQARF Site

Meeting with
U.S. Environmental Protection Agency

March 13, 2018

AGENDA

- Purpose of meeting
- History of WVBA and EPA Involvement
- Site Demographics
- Regional groundwater contaminant plume
- Timeline of RID remedial actions
  - RID Early Response Action / Modified ERA
  - RID Feasibility Study and Selected Groundwater Remedy
- NCP Compliance of RID's Remedial Actions
- Next Steps
  - Cooperative Agreement
  - Future Optimization, if appropriate

PURPOSE OF MEETING

- Brief EPA on the RID Remediation Project:
  - Regional Groundwater P&T Remedy in the West Van Buren Area WQARF Site
  - Voluntary
  - P3 Funded and Performed
  - ADEQ-approved and NCP-compliant
  - Addressing the Largest Groundwater VOC Contaminant Plume in Arizona (one of the largest in the country)
    - Geographic extension of the groundwater contamination migrating from the Motorola 52nd Street Superfund Site
- Seeking EPA administrative help – NOT MONEY

PURPOSE OF MEETING

- RID Project should be the poster-child example of EPA's new Superfund Initiative
  - Administrator Pruitt commissioned the Superfund Task Force on May 22, 2017 ... to "provide recommendations on an expedited timeframe on how the agency can restructure the cleanup process, realign incentives of all involved parties to promote expeditious remediation, reduce the burden on cooperating parties, incentivize parties to remediate sites, encourage private investment in cleanups and sites and promote the revitalization of properties across the country."
- EPA administrative help needed because of the:
  - On-going violations of applicable groundwater cleanup and water quality end use standards,
  - On-going obstruction and delay of needed remediation by PRPs, and
  - On-going social and environmental injustice for exposure of the low income, minority local community to uncontrolled releases of toxic substances

WVBA WQARF Site Timeline

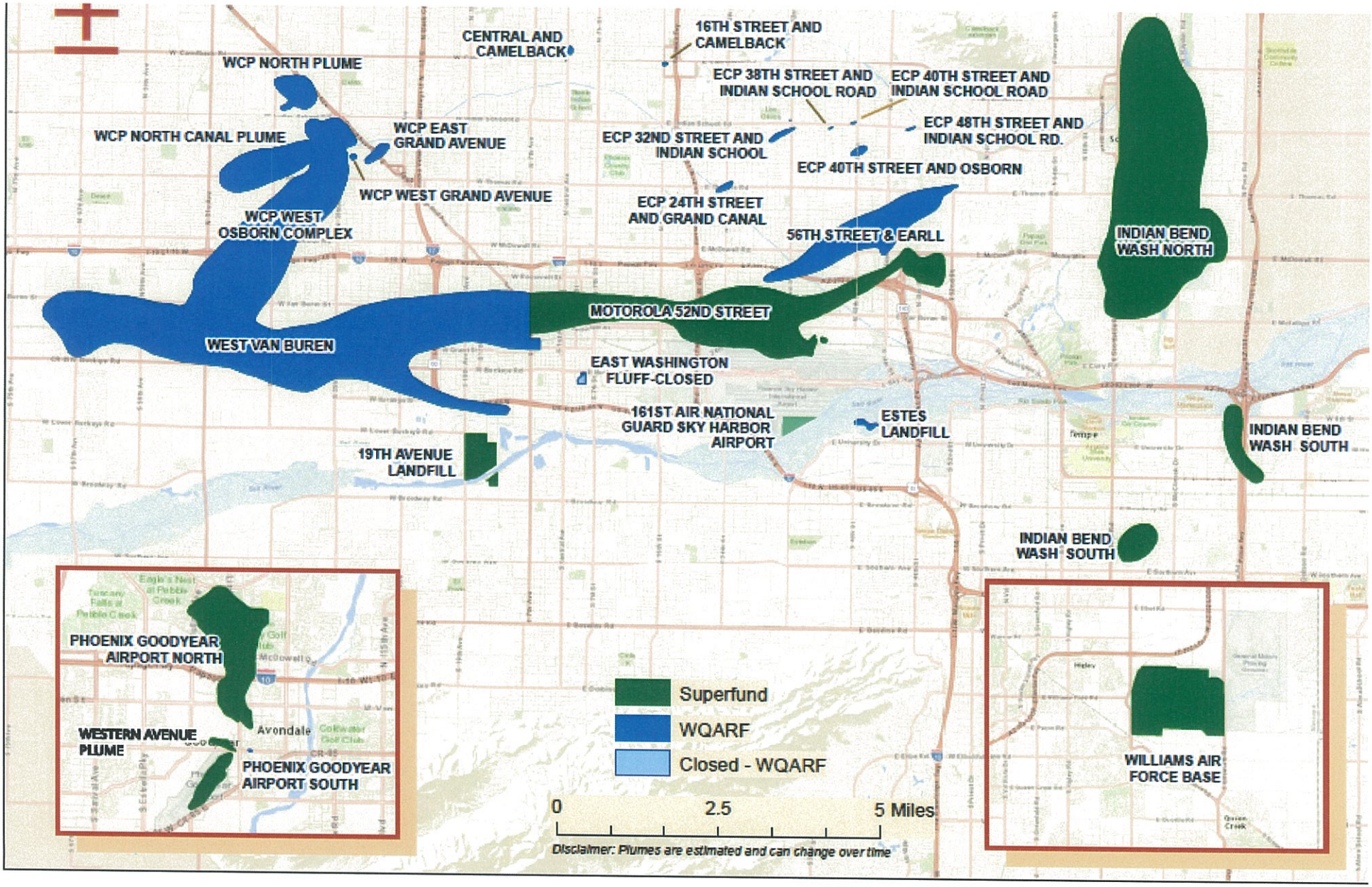
Early History (1987 – 2009):

- WVBA Site listed on WQARF Registry in 1987
- Site characterization, PRP search, facility regulatory actions, and groundwater modeling
  - Over 50 Facilities investigated

  [****WQARF Reform Legislation in 1997 **]*
- Draft Remedial Investigation Report – 2008
  - Nine primary source areas identified
  - Draft RI Report finalized in 2012
- RID/ADEQ/EPA/P3 meetings – 2009
  - Potential OU4 Overfile and Gentleman's Agreement – Verbal

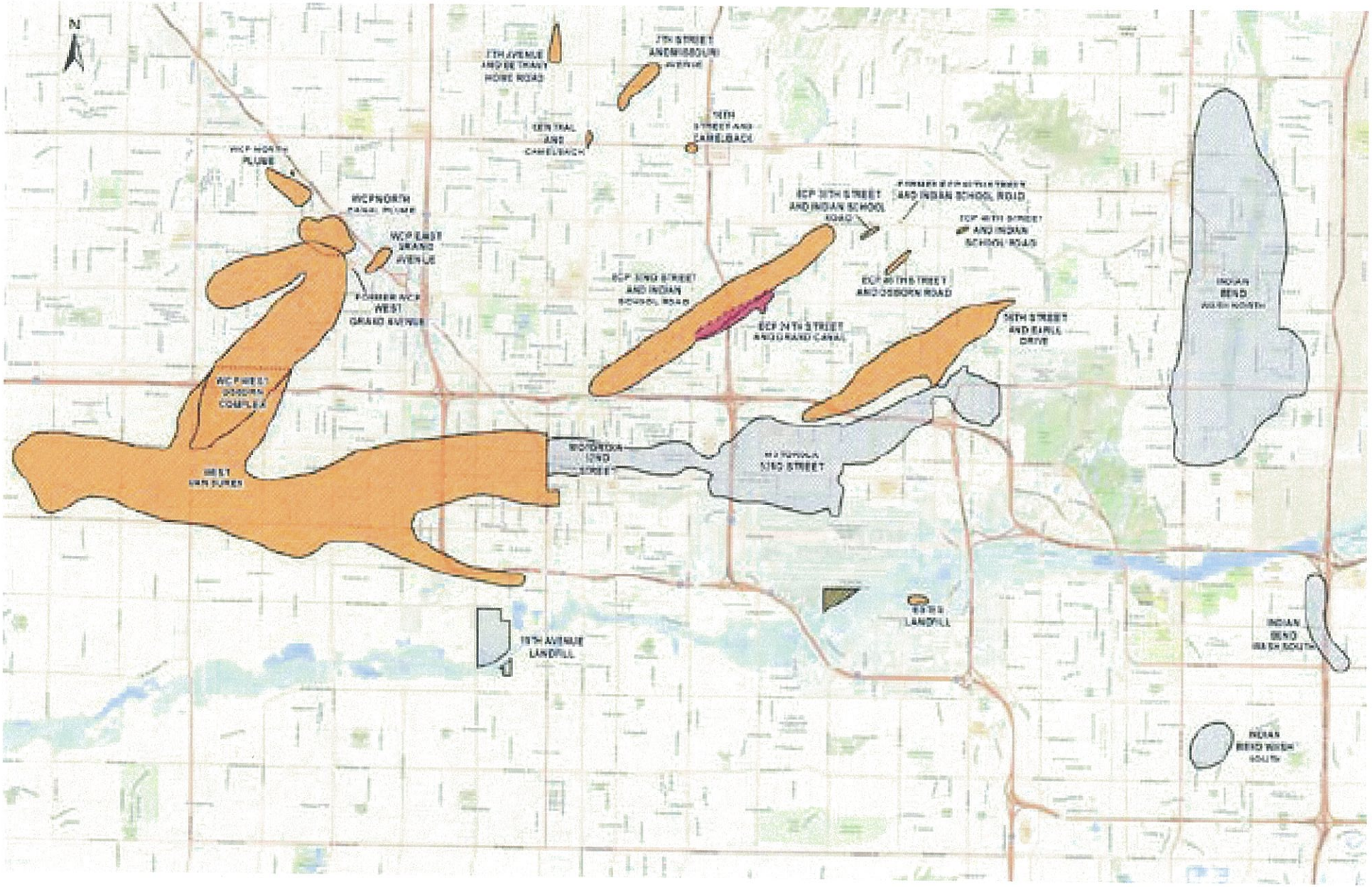
METROPOLITAN PHOENIX SITES

Source: ADEQ FY15 WQARF Annual Report



METROPOLITAN PHOENIX SITES

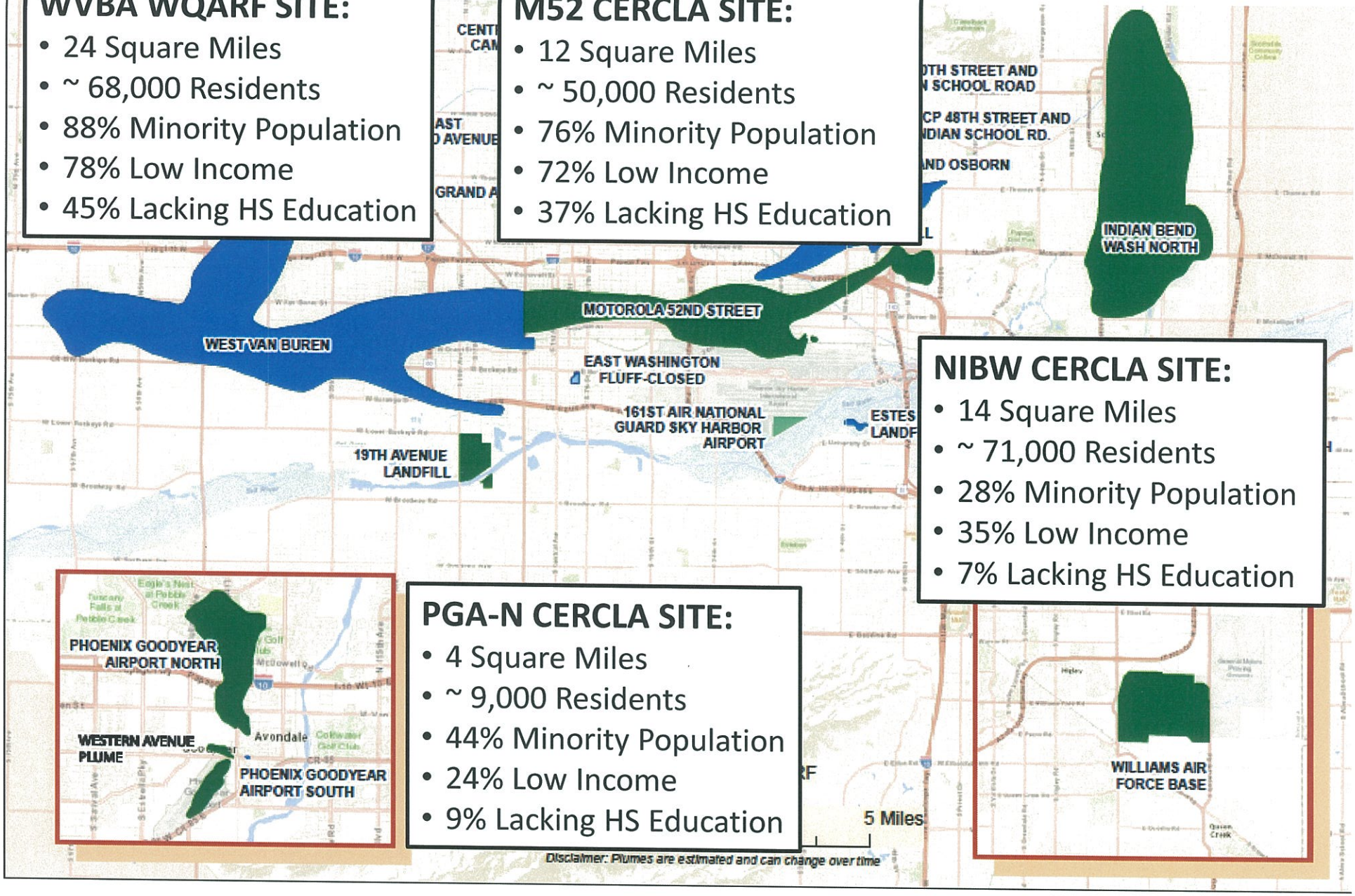
Source: ADEQ FY17 WQARF Annual Report



DEMOGRAPHICS (EJSCREEN)

WVBA WQARF SITE:
- 24 Square Miles
- ~ 68,000 Residents
- 88% Minority Population
- 78% Low Income
- 45% Lacking HS Education

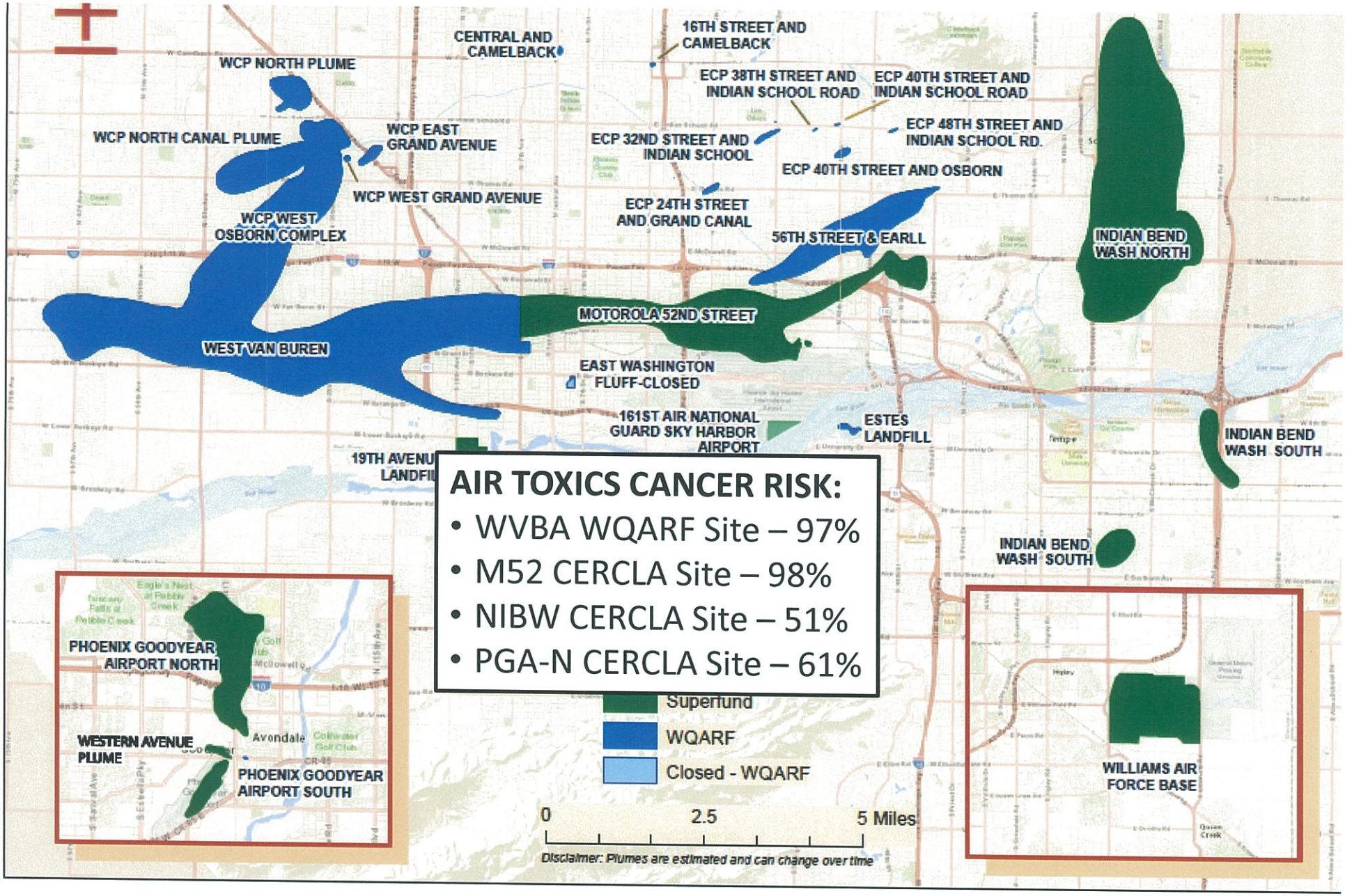
M52 CERCLA SITE:
- 12 Square Miles
- ~ 50,000 Residents
- 76% Minority Population
- 72% Low Income
- 37% Lacking HS Education



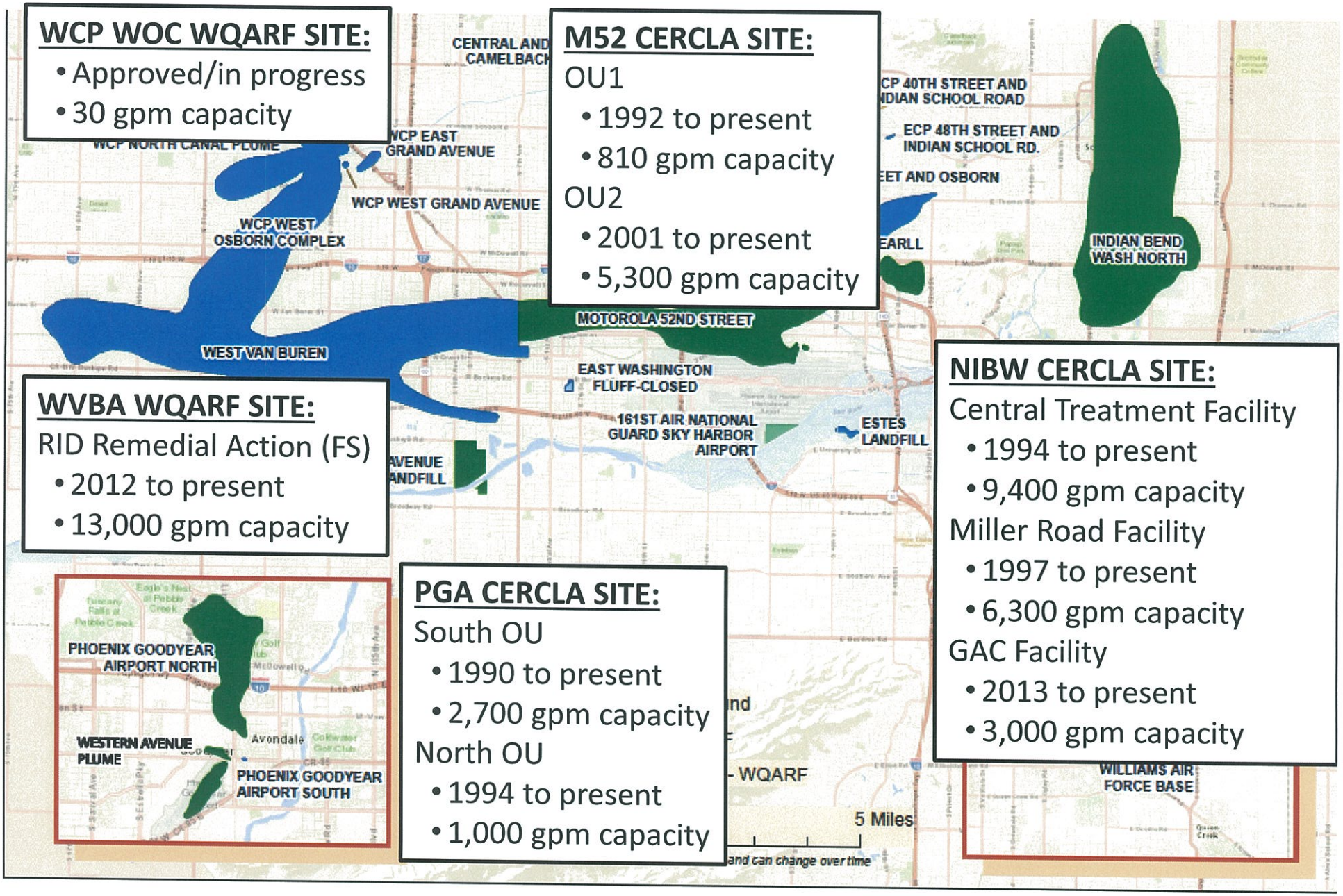
NIBW CERCLA SITE:
- 14 Square Miles
- ~ 71,000 Residents
- 28% Minority Population
- 35% Low Income
- 7% Lacking HS Education

PGA-N CERCLA SITE:
- 4 Square Miles
- ~ 9,000 Residents
- 44% Minority Population
- 24% Low Income
- 9% Lacking HS Education

DEMOGRAPHICS (EJSCREEN)



GROUNDWATER P&T REMEDIAL ACTIONS



WCP WOC WQARF SITE:
- Approved/in progress
- 30 gpm capacity

M52 CERCLA SITE:

OU1
- 1992 to present
- 810 gpm capacity

OU2
- 2001 to present
- 5,300 gpm capacity

WVBA WQARF SITE:

RID Remedial Action (FS)
- 2012 to present
- 13,000 gpm capacity

PGA CERCLA SITE:

South OU
- 1990 to present
- 2,700 gpm capacity

North OU
- 1994 to present
- 1,000 gpm capacity

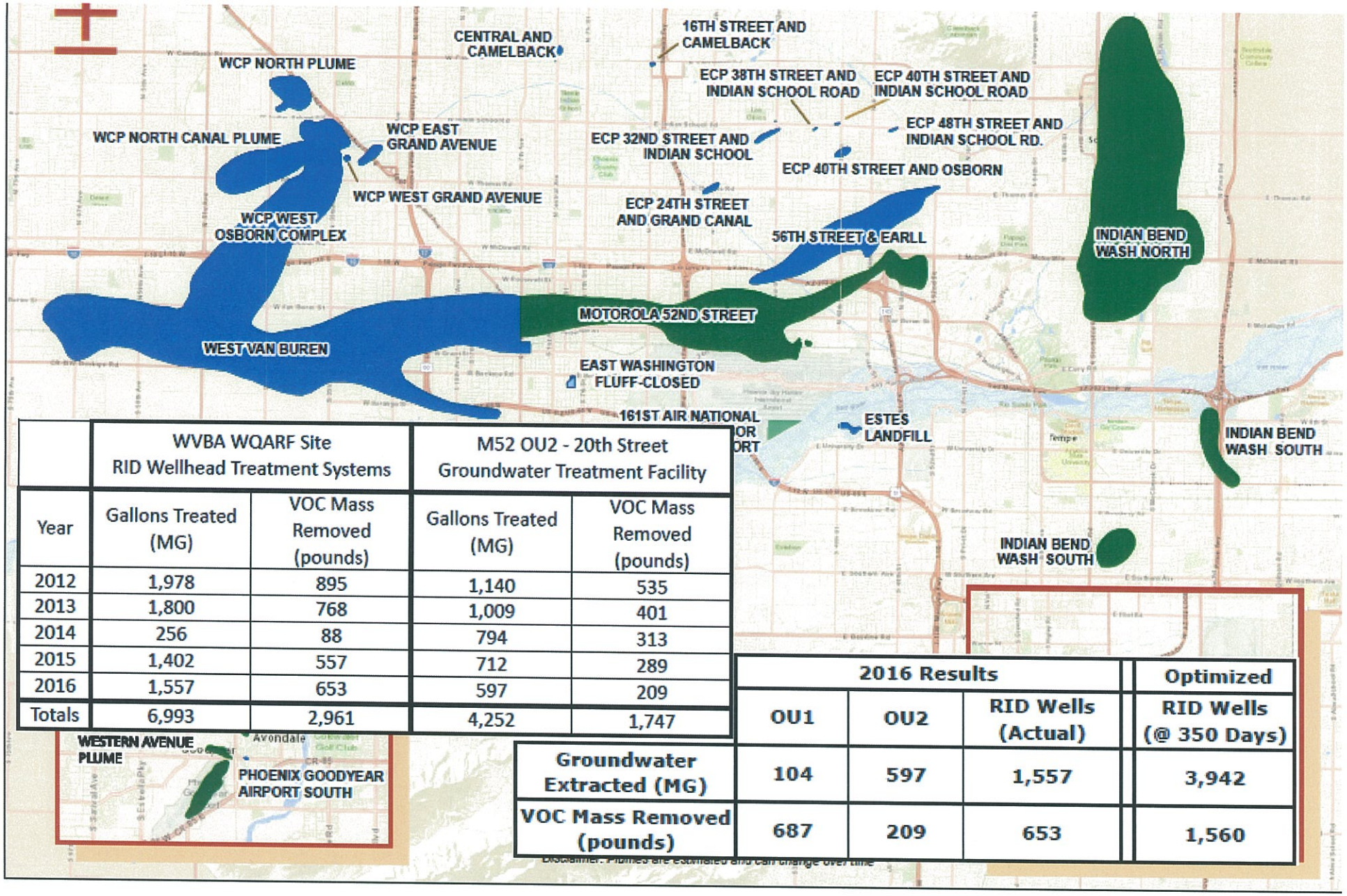
NIBW CERCLA SITE:

Central Treatment Facility
- 1994 to present
- 9,400 gpm capacity

Miller Road Facility
- 1997 to present
- 6,300 gpm capacity

GAC Facility
- 2013 to present
- 3,000 gpm capacity

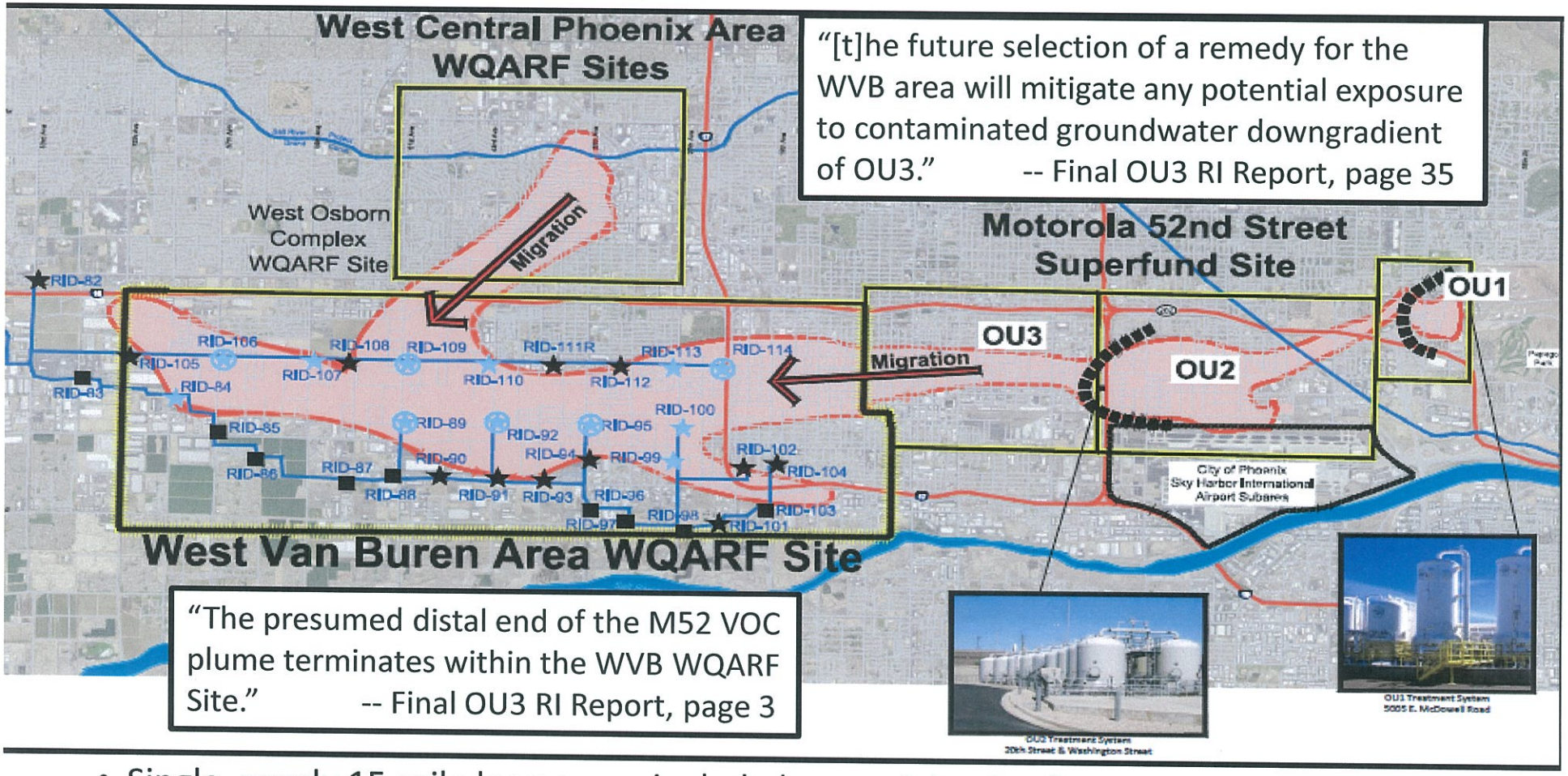
REMEDIAL ACTION METRICS



	WVBA WQARF Site RID Wellhead Treatment Systems		M52 OU2 - 20th Street Groundwater Treatment Facility	
Year	Gallons Treated (MG)	VOC Mass Removed (pounds)	Gallons Treated (MG)	VOC Mass Removed (pounds)
2012	1,978	895	1,140	535
2013	1,800	768	1,009	401
2014	256	88	794	313
2015	1,402	557	712	289
2016	1,557	653	597	209
Totals	6,993	2,961	4,252	1,747

	2016 Results			Optimized
	OU1	OU2	RID Wells (Actual)	RID Wells (@ 350 Days)
Groundwater Extracted (MG)	104	597	1,557	3,942
VOC Mass Removed (pounds)	687	209	653	1,560

CENTRAL PHOENIX REGIONAL PLUME

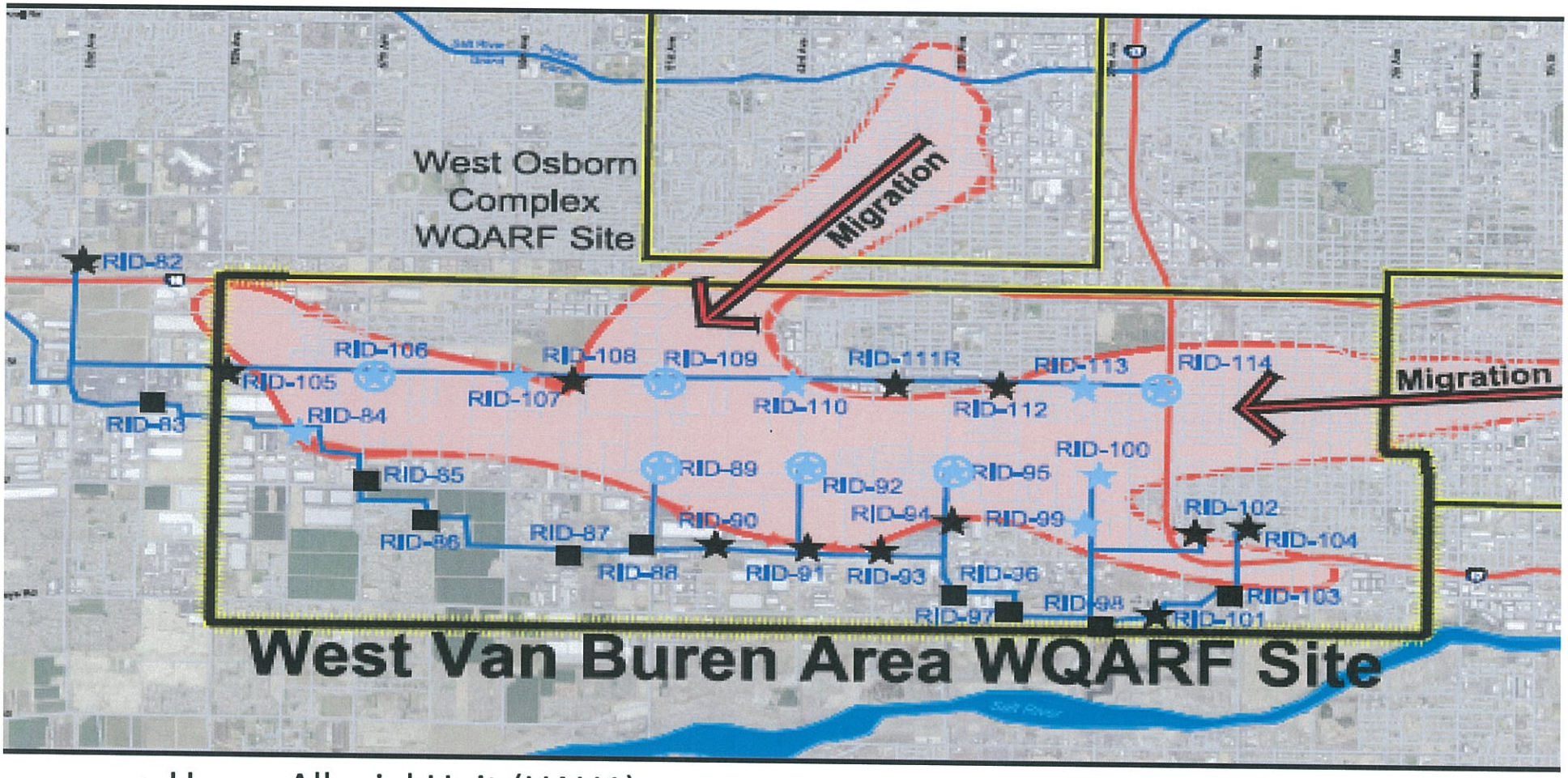


"[t]he future selection of a remedy for the WVB area will mitigate any potential exposure to contaminated groundwater downgradient of OU3." -- Final OU3 RI Report, page 35

"The presumed distal end of the M52 VOC plume terminates within the WVB WQARF Site." -- Final OU3 RI Report, page 3

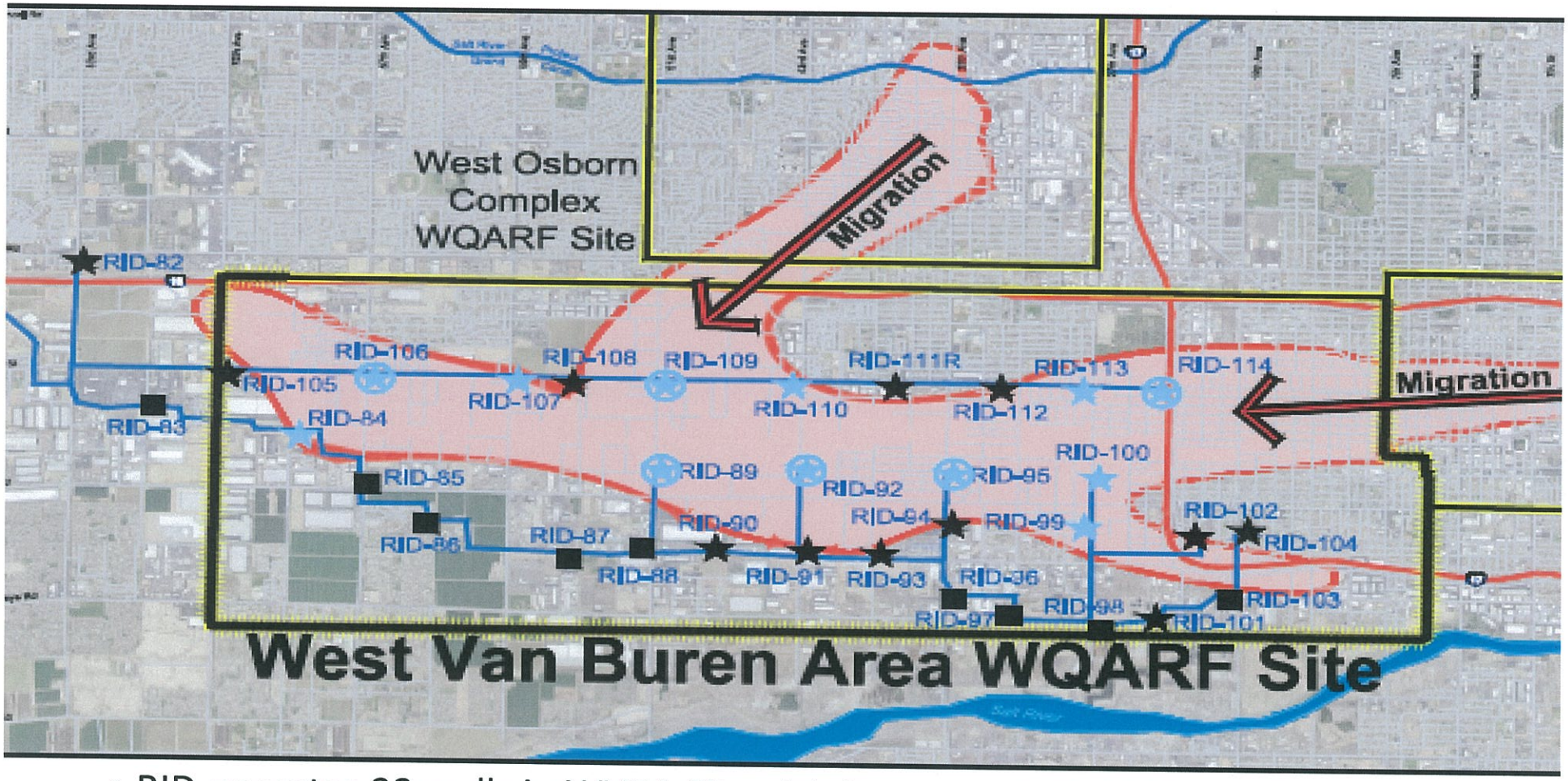
- Single, nearly 15-mile long commingled plume originating from numerous, widespread VOC releases within 3 separate "Superfund" sites
- VOC contamination generally limited to shallow (UAU) groundwater system
- RID pumping creates regional hydraulic trough or sink within the WVBA Site, resulting in area-wide hydraulic control of the shallow groundwater system (*See* Feasibility Study Report prepared by the West Van Buren Working Group, December 2015)

DEGREE OF WVBA CONTAMINATION



- Upper Alluvial Unit (UAU1)
  - Up to 68 ppb TCE and 84 ppb PCE
  - Concentrations declining
- Upper Alluvial Unit (UAU2)
  - Up to 189 ppb TCE and 12 ppb PCE
  - Concentrations steady
- Middle Alluvial Unit (upper MAU) – not well defined

RID OPERATIONS IN WVBA SITE



- RID operates 33 wells in WVBA Site vicinity; pump ~ 80,000 acre-feet per year
- At least 23 RID wells impacted by VOCs with 12 wells exceeding TCE and/or PCE MCLs … with up to 92 ppb TCE and 21 ppb PCE
- RID conveys water in Salt and Main Canal to Goodyear and Buckeye; for irrigation & future M&I uses

RID'S VOLUNTARY REMEDIAL ACTIONS

- RID Agreement to Conduct Work (2009)
- RID Early Response Action (2010)
- RID Wellhead Treatment Pilot Proposal (2011)
- RID Installs LGAC Treatment Systems at 4 wells (2012)
- RID Modified Early Response Action (2012)
- RID Feasibility Study Work Plan (2013)
- RID Feasibility Study Report (2014)
- RID Proposed Remedial Action Plan (2015, later withdrawn at ADEQ's request)
- RID Requests for Funding Options (2016-2017)
  - ADEQ (Orphan Share, Reimbursement, Cost Sharing)
  - Private Funds (Secured but no government assurance of right to implement ADEQ-approved remedial action)
  - EPA (oversight or funds)

ADEQ APPROVALS OF RID WORK

KEY WORK PRODUCTS:

- **Agreement to Conduct Work** – ADEQ execution on October 9, 2009
  - "ADEQ has determined that releases or threatened releases of hazardous substances have occurred ... resulting in groundwater contamination that impacted multiple RID water supply wells which may present an imminent and substantial endangerment to the public health, welfare, or the environment."
  - "Parties desire that RID conduct the ERA and FS (collectively the 'Work')"
  - "RID agrees to conduct all Work under the approved Plan. ... All Work conducted by RID shall be performed in accordance with rules adopted under A.R.S. § 49-282.06."

ADEQ APPROVALS OF RID WORK

- **ERA Work Plan** – ADEQ approval on June 24, 2010
  - ADEQ "has reviewed ... the ERA Work Plan. The Work Plan summarizes technical information regarding the Site, provides justification for an ERA, and describes an ERA remedy designed to remediate contaminated groundwater within the Site."
  - "In addition to the ERA Work Plan, ADEQ has also carefully analyzed technical and legal documents and correspondence contained in the State file, including submittals by RID and other interested parties since September 2009, and comments received through the public participation process."
  - "RID has a unique opportunity to increase the removal of contamination from the aquifer via its wells ... [and] [w]ithout treatment, these contaminants will continue to degrade the quality of the aquifer within the Site."
  - The ERA will "maximize the benefit of pumping and treating contaminated groundwater within the Site, which is intended to result in aquifer restoration and reduce the cost of the final remedy."
  - "ADEQ analyzed the ERA Work Plan to determine compliance with applicable state statutes and rules."

ADEQ APPROVALS (cont.)

- **Wellhead Treatment System Pilot Proposal** – ADEQ approval on Sept. 2, 2011
  - The work is "being undertaken to determine whether well head treatment can be an effective treatment technology … [to reduce] the costs of the final remedy … and/or mitigating contaminant exposure."
  - "ADEQ concurs that the implementation of the work plan may yield data justifying a modification to the ERA, and therefore agrees to its implementation."
- **Modified ERA Work Plan** – ADEQ approval on Feb. 1, 2013
  - "ADEQ has reviewed the Modified ERA Work Plan only as it pertains to the objectives … <u>to protect RID's supply of water and addressing current and future risks to public health, welfare, and the environment</u>."
  - "ADEQ conditionally approves the October 2012 Modified ERA Work Plan [and] this approval supersedes ADEQ's approval of the previous ERA Work Plan."
  - "ADEQ's conditional approval is <u>contingent on RID's implementation of … measures to limit these exposures" from volatilization of hazardous VOCs since the "long-term effects are uncertain and data also shows that … 'significant volatilization and transfer of contaminants, from water into the air, is occurring and ongoing.'"</u>
- **Feasibility Study Work Plan** – ADEQ approval on July 6, 2013

ADEQ APPROVALS (cont.)

- **Wellhead Treatment System O&M Plan** – ADEQ approval in April 2015; most recent version approved in Feb. 2016
- **Revised Draft Feasibility Study Report** – ADEQ approval on April 13, 2015
  - "ADEQ has determined that the FS Report meets the requirements of Arizona Revised Statutes 49-287.03 and Arizona Administrative Code R-18-16-407."
  - "... because competing State-wide budget priorities have resulted in continued underfunding of WQARF, ADEQ will be discontinuing all discretionary work on the WVB WQARF Site at this time."
- **WQARF Reimbursement** – ADEQ approval in FYs 2013-2015 for a total of more than $600,000
  - ADEQ reimbursed RID "for its reasonable, necessary and cost-effective remedial action costs that were incurred in response to a release or threat of a release of a hazardous substance ... that presents an immediate and substantial endangerment to the public health or environment."

RID EARLY RESPONSE ACTION

Original ERA Work Plan – As Approved

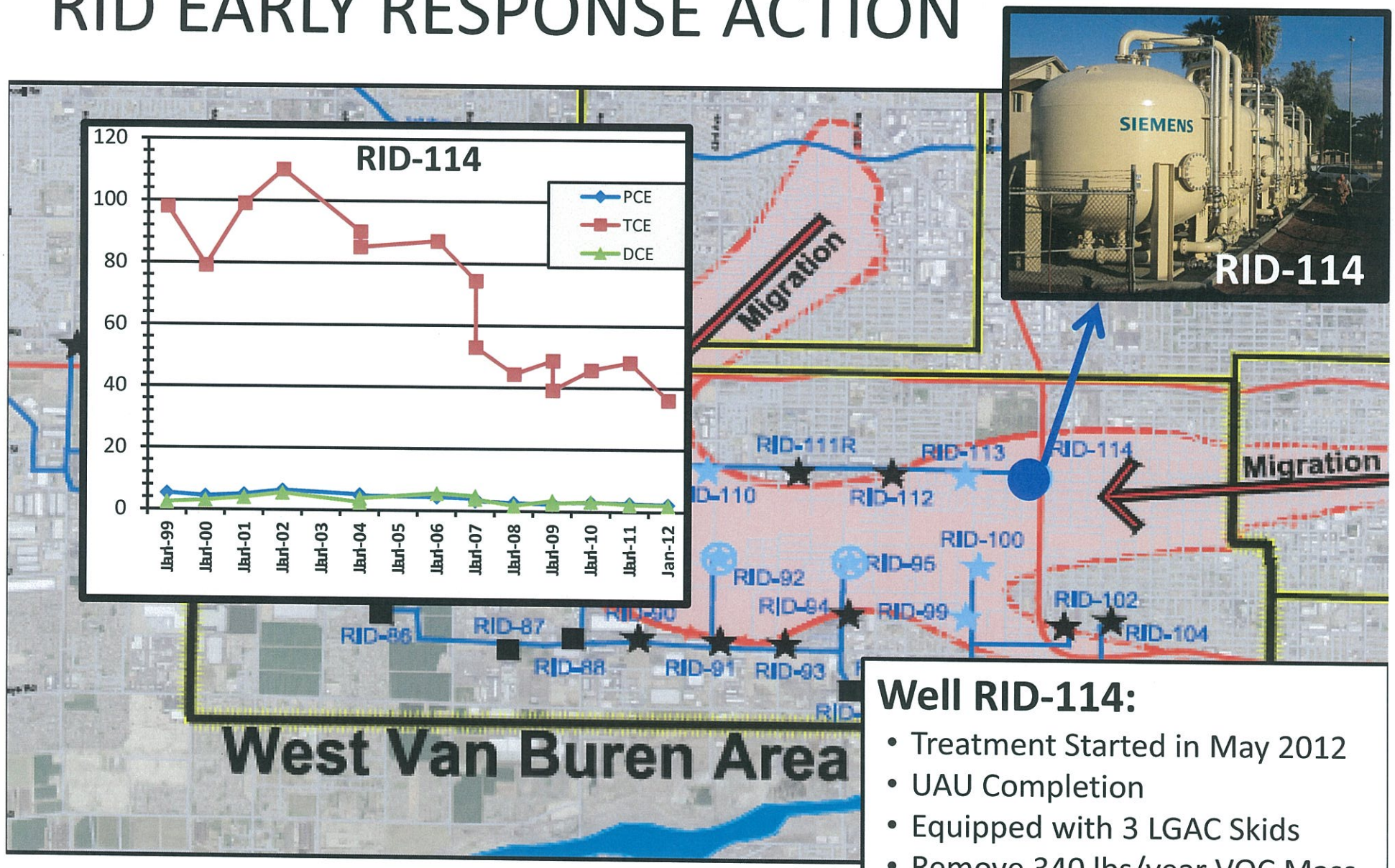
- A new priority pumping regimen for the RID wellfield to maximize removal of hazardous substances from the groundwater while maintaining current annual groundwater withdrawal
- Address the 10 most highly contaminated RID wells to remove thousands of pounds of VOCs from the groundwater annually
- Construction of a new centralized treatment facility to reliably remove VOCs and reduce their concentrations to meet standards applicable for all beneficial uses.
- Physical improvements to selected RID wells and canals to reduce emission of VOCs from water to air and to reduce exposure to VOCs
- Discharge of treated water to the RID Main Canal for irrigation use or to a new pipeline for potable use.

RID EARLY RESPONSE ACTION

"Modified" ERA Work Plan – As Approved

- Utilizes wellhead treatment systems with LGAC at 8 most highly contaminated RID wells in lieu of the central water treatment facility
- Eliminates lateral pipelines to connect southern tier wells and the Salt Canal
- Utilizes a combination of treatment and blending to effectively reduce the concentration of VOCs from several additional wells with lower contaminant concentrations, resulting in lower volume of contaminated water being directly treated while ensuring RID water supplies meet applicable MCLs to ensure protection of all current and reasonably foreseeable end uses
- Reduces capital and O&M costs by 50%

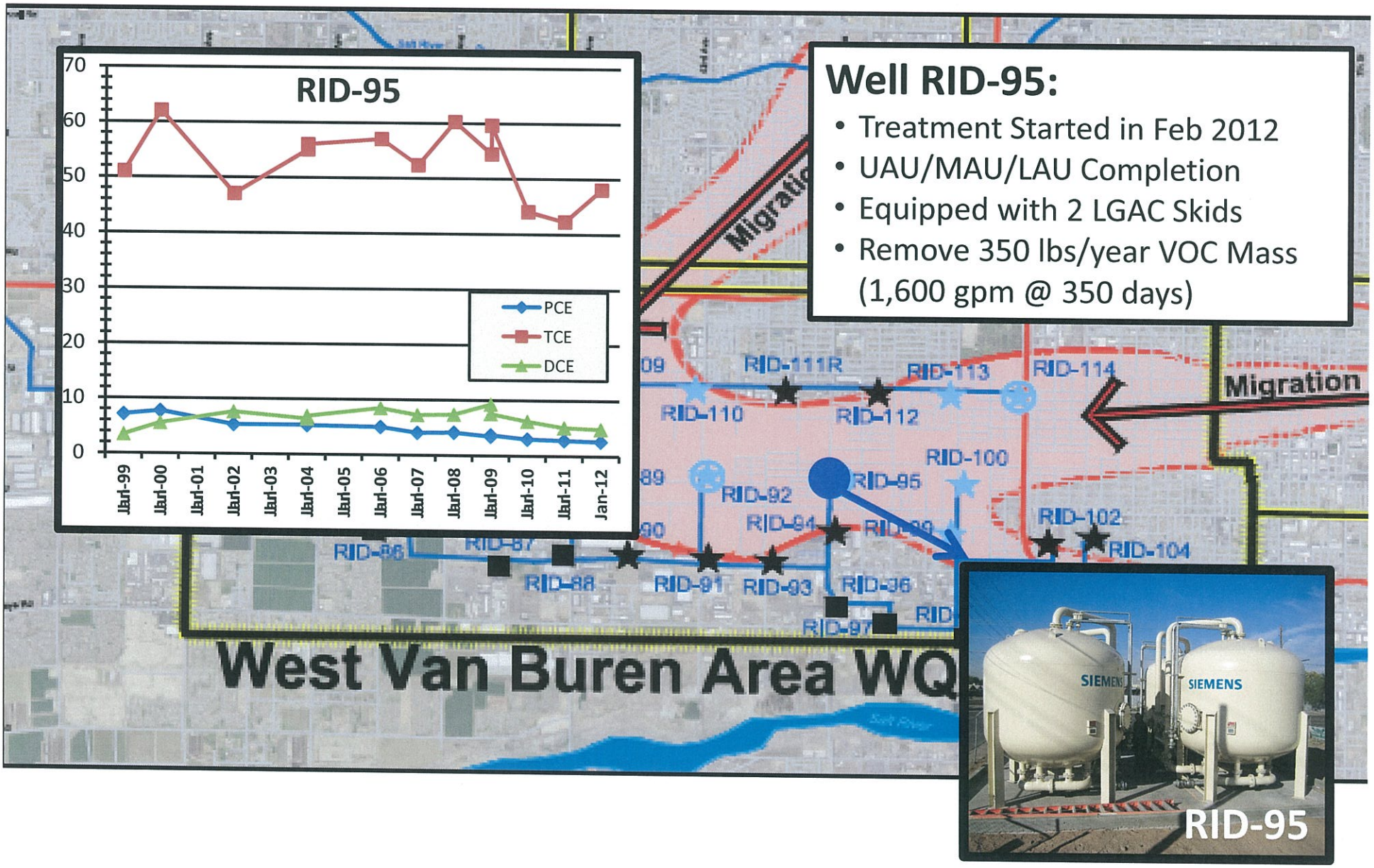
RID EARLY RESPONSE ACTION



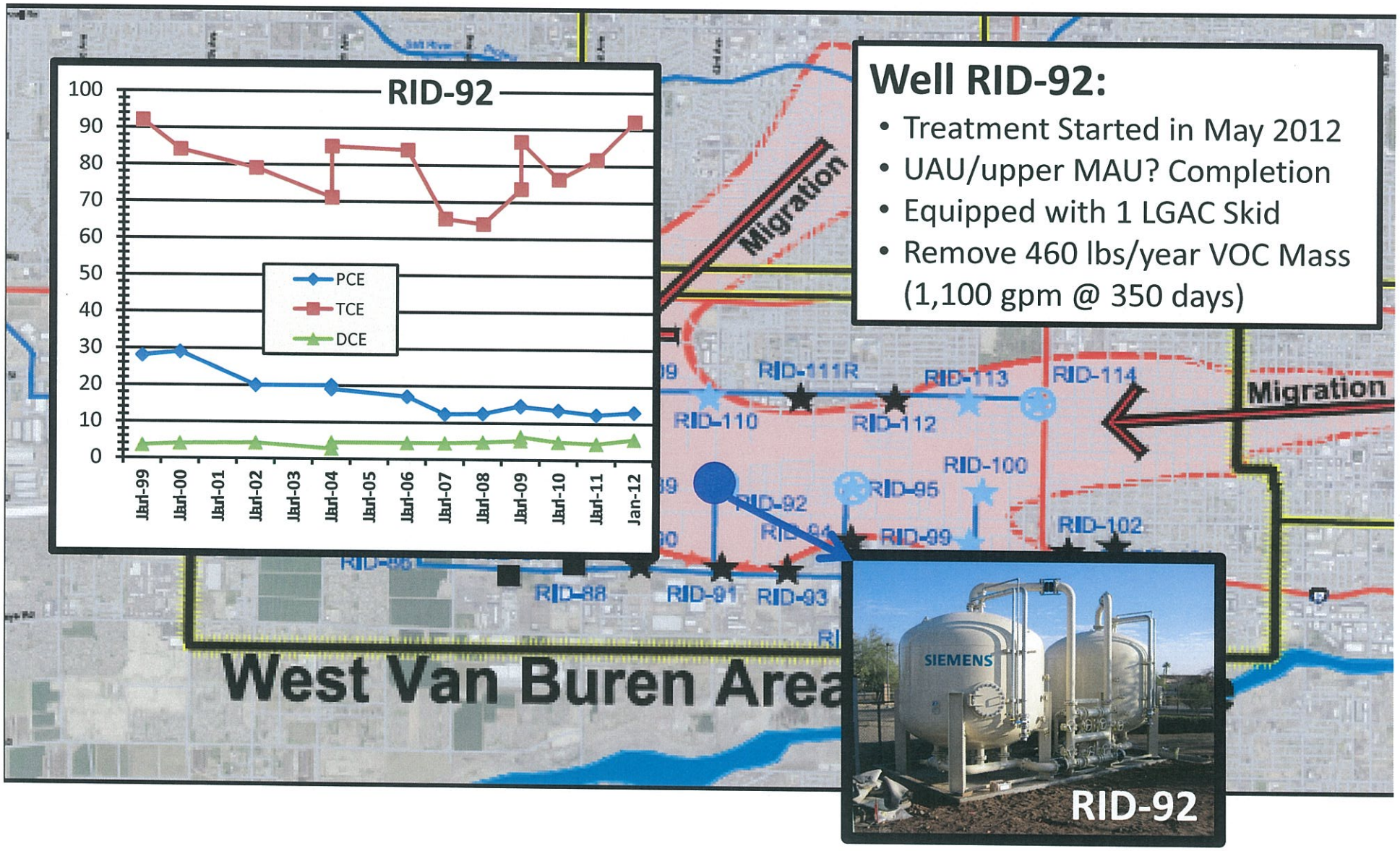
Well RID-114:

- Treatment Started in May 2012
- UAU Completion
- Equipped with 3 LGAC Skids
- Remove 340 lbs/year VOC Mass (2,400 gpm @ 350 days)
- Currently out of service

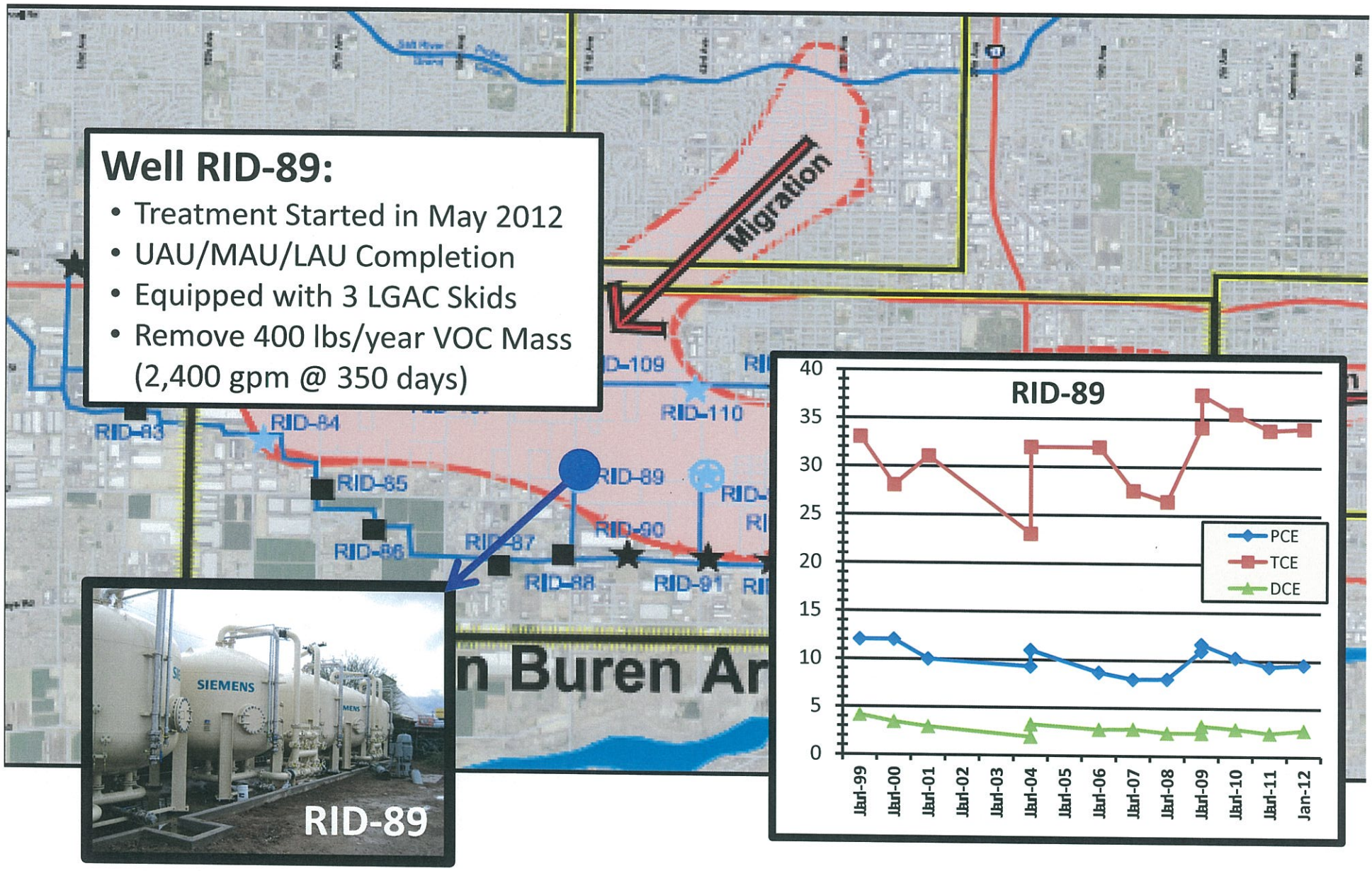
RID EARLY RESPONSE ACTION



RID EARLY RESPONSE ACTION



RID EARLY RESPONSE ACTION



RID FEASIBILITY STUDY REPORT

Feasibility Study Report – As Approved

- Updated ADEQ Central Phoenix Plume Model applied to comparative analysis of remedial alternative
- Four Remedial Alternatives Evaluated:

  Reference Remedy – treatment at 9 RID well sites with blending to address other impacted wells; 2 replacement wells

  Less Aggressive Alternative – treatment at 6 RID well sites with blending to address other impacted wells; 1 replacement well

  More Aggressive Alternative – treatment at 6 RID well sites with blending and re-injection to address other impacted wells; 1 replacement well

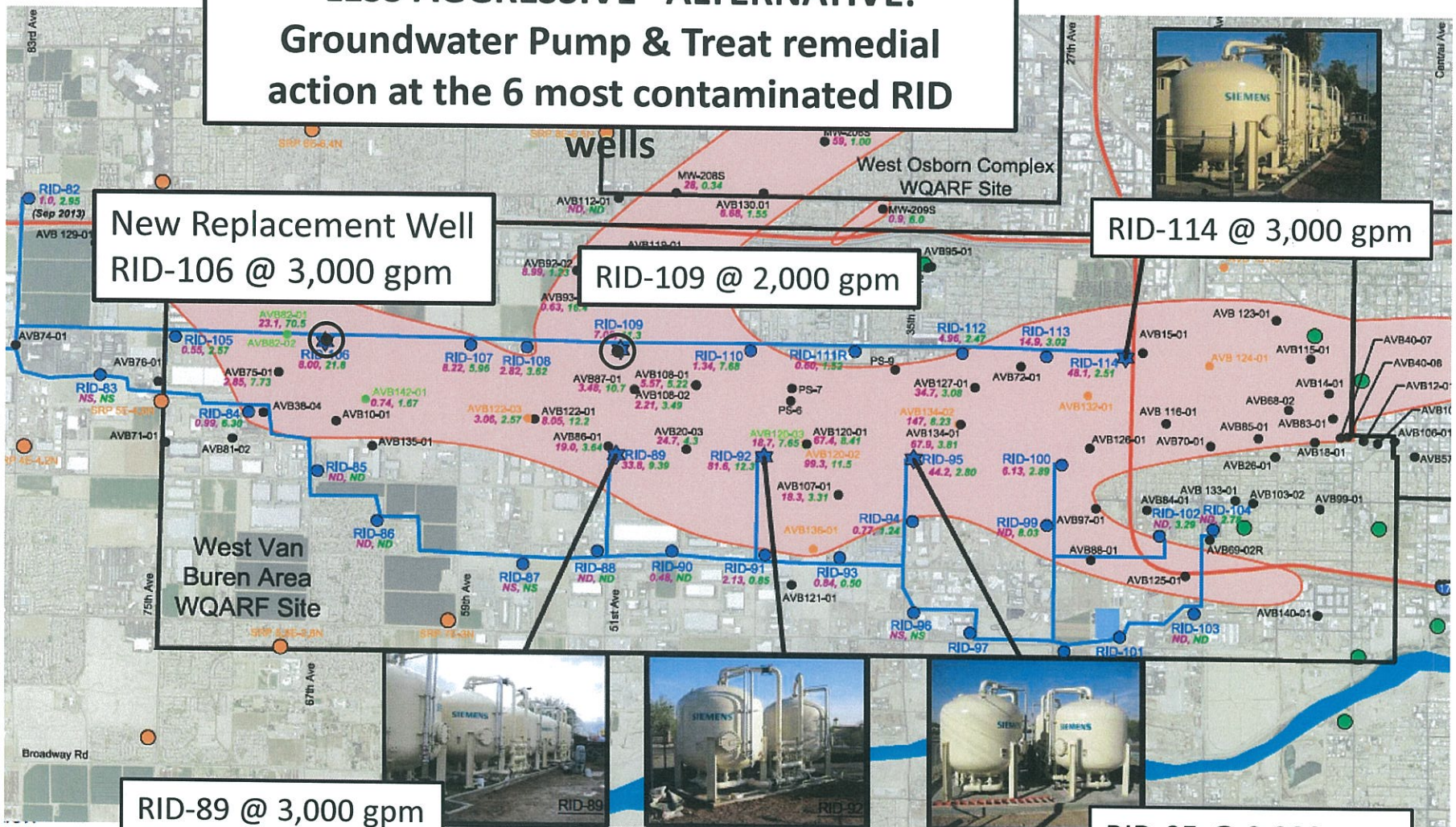
  Most Aggressive Alternative –treatment at all 12 RID well sites exceeding MCLs; 2 replacement wells
- Less Aggressive Alternative was selected remedy

  $9.4 Million – Capital Cost

  $2.0 Million – Annual O&M

ADEQ-Approved FS Remedial Action

"LESS AGGRESSIVE" ALTERNATIVE:
Groundwater Pump & Treat remedial action at the 6 most contaminated RID



PRIVIL NEY

RID COMPLIANCE WITH NCP

- **Reasonable, necessary and cost-effective course of action to protect public health and the environment**
  - ADEQ approvals determined RID remedial actions to be "reasonable, necessary and cost-effective"
  - RID remedial actions meet applicable state water quality standards and USEPA maximum contaminant levels (MCLs) that are exceeded at WVBA Site and RID's water supply wells
  - RID remedial actions utilize reliable LGAC treatment for VOCs
  - RID remedial actions are more cost-effective than other Arizona VOC-contaminated groundwater cleanups (See attached comparison chart)
- **Provide public information and community input**
  - RID prepared and submitted at least 70 letters, responding to 37 ADEQ letters and/or requests and 114 PRP communications and/or work products
  - RID attended at least 45 meetings with ADEQ
  - RID attended at least 73 meetings with other stakeholders (e.g. CAB, ADWR, PRPs, elected officials, water providers, cities, etc)

RID COMPLIANCE WITH NCP (cont.)

- **Evaluation of the health and environmental threat**
  - RID remedial actions prevent exposure to groundwater containing COCs exceeding USEPA MCLs
  - RID remedial actions contain and capture groundwater containing COCs exceeding MCLs
  - RID remedial actions restore aquifer to beneficial use, which is potable water
- **Evaluate alternatives to achieve remedial objectives**
  - ADEQ approval determined that RID's FS Report complied with the requirements of ARS § 49-287.03 and AAC R-18-16-407
- **Comply with all ARARs**
  - RID remedial actions achieve ADEQ's remedial action criteria in A.R.S. § 49-282.06.A-B (See attached WQARF/Superfund comparison charts)

U.S. DISTRICT COURT'S SUMMARY JUDGMENT

Compliance with NCP:

- "RID was able to meet its burden of providing evidence that it substantially complied with CERCLA."
- "In considering RID's overall methods, however, the Court finds that 'while certainly not in perfect compliance,' RID did as a matter of law substantially comply with the applicable requirements set forth in the NCP."

Compliance with Public Participation:

- "RID has demonstrated that it engaged in an extensive public vetting process of its ERA and MERA proposals, and that Defendants themselves participated in this process."

Compliance with ARARs:

- "The record indicates that RID gave substantial thought and attention to compliance with site-specific Arizona law."

U.S. DISTRICT JUDGE'S STATEMENTS

Remediation is Necessary:

- "It ... astounds me, to be honest with you, as to why the public entities here didn't step up more forcefully on all bases to do something about what is admittedly a very serious problem."
- "I don't think anybody disagrees, or if they do, I don't know on what basis they could possibly suggest that there aren't plumes of very deadly carcinogenic chemicals floating around underneath the city of Phoenix, Arizona."

RID Remedial Actions are Cost-Effective:

- "Defendants have not presented evidence of the existence of any other 'significantly more cost effective permanent remedial alternative'"

Next Steps

- Cooperative Agreement to accelerate implementation of NCP-Compliant and ADEQ-approved remedial action
- Future optimization of NCP-Compliant and ADEQ-approved remedial action, if appropriate

Cooperative Agreement with RID to Implement NCP-Compliant and ADEQ-approved P&T Remedial Action

- "A State or political subdivision thereof ... may apply to the President to carry out actions authorized in this section." 42 U.S.C. § 9604(d)(1)(A)
- "Whenever any hazardous substance is released or there is a substantial threat of release into the environment … which may present an imminent and substantial danger to the public health or welfare, the President is authorized to act, consistent with the national contingency plan, … and provide for remedial action relating to such hazardous substance … or take any other response measure consistent with the [NCP] which the President deems necessary to protect the public health or welfare or the environment." 42 U.S.C. § 9604(a)(1)
- "When the President determines that such action will be done properly and promptly by the owner or operator of the facility … the President may allow such person to carry out the action." 42 U.S.C. § 9604(a)(1)
- "[T]he President may respond to any releases or threat of release if in the President's discretion, it constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner." 42 U.S.C. § 9604(a)(4)

COOPERATIVE AGREEMENT COMPLIES WITH NEW SUPERFUND INITIATIVE

- Promotes expeditious remediation of Arizona's largest groundwater contaminant plume and one of the largest in the country
- Reduces the burden on cooperating parties
- Incentivizes parties to remediate site
- Encourages private investment in cleanups
- Avoids Environmental Justice issues with local minority community
- Promotes economic development with remediated water
- Avoids EPA Superfund expenditures/costs

Arizona and ADEQ Unable to Respond to WVBA Contamination

- Despite ADEQ's position that "the State of Arizona will no longer accept delays at the [WVB Site]" and requires a "remedial action plan that is comprehensive and covers all activities necessary to conduct a final regional remedy for the WVB Site," Arizona and ADEQ have no money for the WVBA Site
  - "... because competing State-wide budget priorities have resulted in continued underfunding of WQARF, ADEQ will be discontinuing all discretionary work on the WVB WQARF Site at this time." (April 2015)
  - ADEQ current budget is $0 for the WVBA Site
  - Governor's current budget will discontinue General Fund support for the WQARF program.

Arizona Refuses to Provide Certainty for the RID Remedial Actions to be Implemented with Private Funds

- The Arizona Department of Water Resources (ADWR) has stated that no Poor Quality Groundwater Withdrawal Permit (PQGWP) will be issued at WVBA Site (unlike virtually all groundwater cleanups in Arizona)
- Although ADWR acknowledged in June 2017 that no PQGWP is necessary because of RID's existing water rights, the current ADWR Director is unwilling to confirm RID's water rights to implement duration of remedy
  - Former ADWR Director noted that "the Department concurs that RID has the ability to deliver the remediated groundwater to non-irrigation customers within its service area [and] [b]ecause RID was in existence and engaged in the withdrawal, delivery and distribution of groundwater as of January 1, 1977, it has the right to withdraw and transport groundwater to landowners within its service area, which may include new non-irrigation customers." (ADWR's November 7, 2011 letter)
  - ADWR "determined that the duration of the [RID-SRP] agreement would not affect the legal availability of the groundwater for purposes of [Assured Water Supply] determinations." (ADWR's October 21, 2013 letter)
- Current ADWR Director revoked ADWR's October 21, 2013 letter and granted a PRP the ability to veto any clarification letter
  - ADWR's draft clarification letter reaffirmed its October 21, 2013 determination because it "was based on ADWR's reading of the face of the agreements, and the fact ADWR did not see an expiration date in the most recent agreement."
  - Although ADWR rejected that PRP's effort to draft ADWR's response, ADWR's legal counsel noted that no clarification letter would be forthcoming without that PRP's approval

*Current ADWR Director actively opposed the RID remedial actions while employed for the City of Phoenix. Although the current Director was the supervisor for Mr. Craddock, the ADWR staffer that signed the October 21, 2013 letter, the ADWR Director personally revoked that letter on March 31, 2015 in response to a February 18, 2014 letter from the PRP to Mr. Craddock.

** The former ADWR Director was requested by the outgoing Governor's Chief of Staff in 2014 to revoke the October 21, 2013 letter in front of Henry Darwin, then the ADEQ Director. The former ADWR Director and Henry Darwin were targeted during the change in administrations for their actions relating to the RID remedial actions.

FUTURE OPTIMIZATION, IF APPROPRIATE

- Potential for additional cost savings and accelerating full implementation;
- Enhance plume containment of the leading, downgradient extent of the plume;
- Enhance mass removal and aquifer restoration by focused extraction from the most highly contaminated central core of the contaminant plume; and
- Address additional contaminants not presently identified as WVBA COCs

(TABLE 1)

09/30/14

Five WQARF Requirements[1] that must be Addressed Specifically during Remedy Selection and in the Proposed Remedial Action Plan

Roosevelt Irrigation District's (RID's) FS Report[2]	WQARF Requirements[4]	Working Group's FS (WGFS) Report[5]
MEETS WQARF REQUIREMENT No. 1 **All four RID proposed alternative remedies "assure the protection of public health and welfare and the environment" posed by the hazardous substances present in the groundwater within the WVBA WQARF Site.** • All four RID proposed alternative remedies eliminate the risks posed to the community by the "significant volatilization and transfer of contaminants from the [contaminated ground] water into the air" as required by ADEQ,[3] and the risks posed to the environment from continued contaminant migration resulting in contamination of additional groundwater resources.	**1. Assure the protection of public health and welfare and the environment (ARS § 49-282.06.A.1)** • Remedial actions include "taking such other actions as may be necessary to prevent, minimize or mitigate damage to the public health or welfare or to the environment which may otherwise result from a release or threat of release of a hazardous substance." (ARS § 49-281.12) • "In setting [water quality standards for all waters in all aquifers], the director shall consider, but not be limited to, ... the protection of the public health and the	FAILS WQARF REQUIREMENT No. 1 **All three WGFS proposed alternative remedies fail to "assure the protection of public health and welfare and the environment" posed by the hazardous substances present in the groundwater within the WVBA WQARF Site.** • Contrary to ADEQ's determination that the groundwater contamination "may present an imminent and substantial endangerment to the public health, welfare or the environment within the [WVBA] WQARF Site,"[6] all three WGFS proposed alternative remedies fail to address the risks posed to the community by the "significant volatilization and transfer of contaminants, from

[1] The five mandatory WQARF requirements are found in ARS §§ 49-282.06.A.1, A.2, A.3 and B.4.b and AAC R18-16-407.E.1.

[2] RID is an irrigation district operating in Arizona since 1923 with 32 wells located within or adjacent to the West Van Buren Area (WVBA) Water Quality Assurance Revolving Fund (WQARF) Site, 14 of which are contaminated by hazardous volatile organic compounds (VOCs) in the groundwater above Arizona aquifer water quality standards and Arizona drinking water standards, the remaining RID wells are threatened by the groundwater contamination. The RID Feasibility Study Report can be found on ADEQ's website at http://www.azdeq.gov/environ/waste/sps/download/wvb/2014-07%20Draft%20RID%20FS_1.pdf.

[3] See ADEQ, Approval of RID's Modified Early Response Action (February 1, 2013).

[4] "The [WQARF] feasibility study is a process to identify a reference remedy and alternative remedies that appear to be capable of achieving remedial objectives and to evaluate them based on the comparison criteria to select a remedy that complies with ARS § 49-282.06. (AAC R18-16-407.A) CERCLA remedial selection requirements (See Attachment 2) also are applicable or relevant and appropriate as WQARF was "modeled on the ... CERCLA, the federal superfund program" (Ariz. Admin. Register at 1492 (2002)) and Arizona law provides, "in setting [water quality standards for all waters in all aquifers], the director shall consider,...guidelines, action levels or numerical criteria adopted or recommended by the United States environmental protection agency or any other federal agency" (ARS § 49-221.C) and "the director [of ADEQ] may adopt CERCLA rules, guidelines or procedures by reference to the extent consistent with the article" (ARS § 49-282.06.B). More importantly, the WVBA WQARF Site is directly downgradient of the Motorola 52nd Street federal Superfund Site from which contaminated groundwater enters the WVBA Site. As a result, failure of a WQARF cleanup to substantially comply with the CERCLA requirements could provide EPA the opportunity to overfile, as it did on the East Washington WQARF Site, and take over control of the WVBA WQARF Site, which will delay cleanup of the WVBA WQARF Site and could impose additional cleanup requirements at substantial cost.

[5] The Working Group's Feasibility Study Report can be found on ADEQ's website at: http://www.azdeq.gov/environ/waste/sps/download/wvb/2014-07%20Draft%20WVBWG%20FS.pdf.

[6] Agreement to Conduct Work between ADEQ and RID, dated October 8, 2009.

- Each RID proposed alternative remedy will remove and treat more than 2,500 pounds per year of hazardous substances (*i.e.*, volatile organic compounds (VOCs) that are known and suspected carcinogens) that would otherwise volatize and transfer from the groundwater into the air, or remain and continue to migrate and contaminate additional groundwater resources.

All four RID proposed alternative remedies will achieve the applicable Arizona aquifer water quality standards (*i.e.*, the MCLs adopted by EPA) that "assure protection of public health and welfare and the environment."

- Arizona law has established that the "primary drinking water maximum contaminant levels (MCLs) established by the [EPA] administrator... are adopted as drinking water aquifer water quality standards." (ARS § 49-223.A)
- Each RID proposed alternative remedy includes physical containment, controlled migration, and removal and treatment measures in order to control and cleanup the groundwater contaminants and to ensure compliance with applicable Arizona aquifer water quality standards (*i.e.*, the MCLs adopted by EPA) in order to environment ... the provisions and requirements of the safe drinking water act...[and] guidelines, action levels or numerical criteria adopted or recommended by the United States environmental protection agency or any other federal agency."[7] (ARS § 49-221.C)
- "The department shall ... promote the restoration and reclamation of degraded or despoiled areas and natural resources." (ARS § 49-104.A.13)
- "The director shall adopt, by rule, water quality standards for...all waters in all aquifers to preserve and protect the quality of those waters for all present and reasonably foreseeable future uses."[8] (ARS § 49-221.A)
- "All aquifers in this state ... shall be classified for drinking water protected use." (ARS § 49-224.B)
- "Remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF site prohibits or limits groundwater use." (ADEQ, Remedial Objectives Report, WVBA WQARF Registry Site, 3-3 (August 2012))

the [contaminated ground] water into the air" as required by ADEQ[3], and the risks posed to the environment by continued contaminant migration resulting in contamination of additional groundwater resources.

- All three WGFS proposed alternative remedies fail to comply with applicable ADEQ and EPA policies and guidance prohibiting "the relocation of contaminants from one media (groundwater) to another (air)."[9]
- All three WGFS proposed alternative remedies leave elevated concentrations of hazardous substances in the form of known carcinogens in the WVBA WQARF Site that after 2025, according to the assertions in the WGFS, will be allowed to migrate uncontrolled downgradient "towards the regional pumping depression known as the Like Sink, near the Luke Air Force Base" (WGFS, 7), resulting in contamination of additional groundwater resources.

All three WGFS proposed alternative remedies fail to achieve the applicable Arizona aquifer water quality standards (*i.e.*, the MCLs adopted by EPA) that "assure the protection of public health and welfare and the environment."

- All three WGFS proposed alternative remedies fail to treat all the contaminated groundwater extracted from the WVBA WQARF Site at RID well

[7] Chemical-specific standards that define acceptable risk levels (e.g., non-zero MCLGs, MCLs) also may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment." EPA, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (OSWER Directive 9355.0-30, April 22, 1991).

[8] Arizona has determined that "reasonability foreseeable uses of water are those likely to occur within 100 years unless a longer time period is shown to be reasonable." AAC R18-16-406.D.

[9] Letter from Amanda Stone to Keith Takata (November 14, 2007). *See also* "A remedy that achieves an acceptable risk level in one medium may not be preferred if it only achieves this level by transferring contaminants to another medium." *Guidance on Remedial Actions, 4-9.* "Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwater as a source of contamination to other media." *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration,* 9 (June 26, 2009).

preserve and protect the quality of those [ground] waters for all present and reasonably foreseeable future uses" (*i.e.*, as a drinking water source) (ARS § 49-221.A). • Consistent with other Phoenix-area Superfund and WQARF sites, each RID proposed alternative remedy will remove and treat contaminated groundwater at RID well sites in the WVBA WQARF Site[10] (with concentrations up to 75 ppb for TCE, a known carcinogen with a MCL of 5 ppb) to applicable Arizona water quality standards that "assure the protection of public health and welfare and the environment".[11] • All four RID proposed alternative remedies employ remedial strategies and measures to remove and treat contaminated groundwater that "will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF site prohibits or limits groundwater uses."		sites[10] (with concentrations up to 75 ppb for TCE, a known carcinogen with a MCL of 5 ppb), to applicable Arizona water quality standards that "assure the protection of public health and welfare and the environment," and as treated at all other Phoenix-area Superfund and WQARF sites.[11] • All three WGFS proposed alternative remedies fail to include remedial strategies and measures necessary to control and cleanup the groundwater contaminants and ensure compliance with applicable Arizona aquifer water quality standards (*i.e.*, the MCLs adopted by EPA) in order to "preserve and protect the quality of those waters for all present and reasonably foreseeable future uses" (*i.e.*, as a drinking water source) (ARS § 49-221.A.) • All three WGFS proposed alternative remedies cease any treatment after 2025, according to the assertions in the WGFS,[12] regardless if applicable Arizona water quality standards (for protection of "public health and welfare and the environment" or for an aquifer classified as a drinking water aquifer) have not been achieved, "public health and welfare and environmental" risks remain, or the contamination associated with the WVBA WQARF Site prohibits or limits any "reasonably foreseeable future uses" of the aquifer.

[10] "Factoring this regional pumping [from RID's wells] and potential future changes to regional pumping into the FS remedial alternatives is necessary and critical." (WGFS, 19). However, the RID wells that are "necessary and critical" to each WGFS proposed alternative remedy are not treated to address the risks posed to "public health and welfare and the environment" by the contaminated groundwater or included in the cost estimate of the WGFS alternatives.

[11] North Indian Bend Wash Superfund Site, Motorola 52nd Street Superfund Site, Phoenix-Goodyear Airport Superfund Site, 56th Street and Earl WQARF Site, and the West Central Phoenix WQARF Site.

[12] Based on the false assertions in the WGFS that RID wells cease operating in 2025, the one or two new smaller extraction wells proposed in all three WGFS alternative remedies will cease operating in 2025 "based on the assumption that the efficacy of the new extraction well primarily depends on operating alongside the current RID pumping regime." (WGFS, 49 and 54) Similarly, the Less Aggressive Remedy relies solely on RID's wells for any benefit, which the Working Group inaccurately claims will cease pumping in 2025.

		Failure of all three WGFS proposed alternative remedies to "assure protection of public health and welfare and the environment" is sufficient evidence that all three WGFS proposed alternative remedies fail to meet Arizona's mandatory WQARF requirement No. 1

MEETS WQARF REQUIREMENT No. 2
 	
All four RID proposed alternative remedies include remedial strategies and measures commonly utilized at other similarly contaminated Arizona sites that "provide for the control, management [and] cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state."
 	
• All four RID proposed alternative remedies will "control, manage [and] cleanup the hazardous substances in order to allow the maximum beneficial use of the waters of the state" by physically containing, controlling and removing the contaminants to "preserve, protect and restore" the quality of the aquifer in the WVBA WQARF Site to its Arizona drinking water protected use classification and by utilizing preferred and proven technologies to treat the extracted groundwater to applicable Arizona drinking water MCLs for its "reasonably foreseeable use" as a drinking water source.
• All four RID proposed alternative remedies will return a significant groundwater supply to its "maximum beneficial use" as a drinking water source, which has been demonstrated as "practicable" at the Motorola 52nd Street Superfund Site directly adjacent to the WVBA WQARF Site.
	2. To the extent practicable, provide for the control, management or cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state. (ARS § 49-282.06.A.2)
	
	• "The department shall ... promote the restoration and reclamation of degraded or despoiled areas and natural resources." (ARS § 49-104.A.13)
	• "The director shall adopt, by rule, water quality standards for...all waters in all aquifers to preserve and protect the quality of those waters for all present and reasonably foreseeable future uses."[13] (ARS § 49-221.A)
	• "All aquifers in this state...shall be classified for drinking water protected use." (ARS § 49-224.B)
	• "Remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF Site prohibits or limits groundwater use." (ADEQ, Remedial Objectives Report, WVBA WQARF Registry Site, 3-3 (August 2012))
		FAILS WQARF REQUIREMENT No. 2
		
		All three WGFS proposed alternative remedies fail "to the extent practicable" to "provide for the control, management or cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state."
		
		• All three WGFS proposed alternative remedies fail to include remedial strategies and measures commonly utilized at other similarly contaminated Arizona sites to "control, manage or cleanup the hazardous substances in order to allow the maximum beneficial use of the waters of the state."
		  o All three WGFS proposed alternative remedies fail to include any physical contaminant, controlled migration, plume remediation or treatment strategies or measures in order to "preserve, protect or restore" the quality of the aquifer in the WVBA WQARF Site to its Arizona drinking water protected use classification or to "preserve, protect or restore" the quality of the extracted groundwater to applicable Arizona drinking water MCLs for its "reasonably foreseeable use" as a drinking water source.
		  o All three WGFS proposed alternative remedies cease any "control, management or cleanup" of

[13] Arizona has determined that "reasonability foreseeable uses of water are those likely to occur within 100 years unless a longer time period is shown to be reasonable." AAC R18-16-406.D.

• All four RID proposed alternative remedies not only address the contaminated groundwater in the WVBA WQARF Site to meet both the applicable Arizona aquifer water quality standards for aquifer classification and protection purposes and the applicable Arizona drinking water standards (*i.e.,* the MCLs) for human consumption purposes which will "allow the maximum beneficial uses of the waters of the state", as required by state law, but they also address the exposure and health risks posed to the community by the transfer of contaminants from one environmental media (the groundwater) to another (the air). • All four RID proposed alternative remedies employ remedial strategies and measures to remove and treat contaminated groundwater that "will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF site prohibits or limits groundwater uses."		the hazardous substances after 2025, according to the assertions in the WGFS,[14] regardless if applicable cleanup standards have not been achieved, public health and welfare and environmental risks remain, or the contamination associated with the WVBA WQARF Site prohibits or limits the "reasonably foreseeable future uses" of the groundwater.[15] o All three WGFS proposed alternative remedies leave elevated concentrations of hazardous substances in the form of known carcinogens in the WVBA WQARF Site groundwater that after 2025, according to the assertions in the WGFS, will be allowed to migrate uncontrolled downgradient "towards the regional pumping depression known as the Luke Sink, near the Luke Air Force Base" (WGFS, 7) and contaminate additional groundwater resources, adversely affecting the future beneficial uses of such waters of the state. **Failure of all three WGFS proposed alternative remedies, "to the extent practicable, [to] provide for the control, management or cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state" is sufficient evidence that all three WGFS proposed alternative remedies fail to meet Arizona's mandatory WQARF requirement No 2.**

[14] Based on the false assertions in the WGFS that RID wells cease operating in 2025, the one or two new smaller extraction wells proposed in all three WGFS alternative remedies will cease operating in 2025 "based on the assumption that the efficacy of the new extraction well primarily depends on operating alongside the current RID pumping regime." WGFS, 49 and 54. Similarly, the Less Aggressive Remedy relies solely on RID's wells for any benefit, which the Working Group inaccurately claims will cease pumping in 2025.

[15] According to EPA, there is "a preference for remedies that employ treatment that permanently and significantly reduce the mobility, toxicity, or volume of hazardous substances as a principal element. Emphasis is placed on destruction or detoxification of hazardous materials *rather than on protection strictly through prevention of exposure,*" as proposed in all three WGFS alternative remedies. *EPA, Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites*, 2-2 (December 1988).

MEETS WQARF REQUIREMENT No. 3		FAILS WQARF REQUIREMENT No. 3
All four RID proposed alternative remedies are "reasonable, necessary, cost-effective and technically feasible" when and as compared to all other existing major groundwater cleanup sites in Arizona. • Each RID proposed alternative remedy is "reasonable, necessary, ... and technically feasible" since it utilizes proven and preferred state-of-the-art "pump and treat" (with granular activated carbon) technology to remove and treat elevated concentrations of hazardous VOCs in the groundwater that are known and suspected carcinogens and to prohibit the hazardous VOCs being transferred from groundwater to air, consistent with applicable Arizona and federal standards and policies.[16] • Each RID proposed alternative remedy utilizes existing water infrastructure and established end uses to derive a very "reasonable" and "cost-effective solution" compared to all other existing major groundwater cleanup sites in Arizona.[17] • ADEQ already has determined that similar remedial actions, submitted by RID to achieve the same cleanup standards but generally larger in scope than the RID proposed alternative remedies, were "reasonable, necessary, cost-effective and	**3. Be reasonable, necessary, cost-effective and technically feasible. (ARS § 49-282.06.A.3)**	**All three WGFS proposed alternative remedies fail to satisfy this WQARF "comparative" requirement because, as noted above and below, all three WGFS proposed alternative remedies fail to meet the other mandatory and "substantive" WQARF requirements (Nos. 1, 2, 4 and 5) to enable an apples-to-apples comparison.** • All three WGFS proposed alternative remedies also fail to include the costs to operate and maintain the RID wells that are factored "into the [WG]FS remedial alternatives [as] necessary and critical." (WGFS, 19).[18] • The WGFS Report, in fact, acknowledges that "the relative cost of any potential additional benefit" is a disadvantage for both the proposed Reference Remedy and More Aggressive Remedy, which cease to operate after 2025, according to the assertions in the WGFS (WGFS, 53 and 57), making them less "reasonable, necessary, or cost-effective" as compared to RID's proposed alternative remedies. **Failure of all three WGFS proposed alternative remedies to meet the other mandatory and substantive WQARF requirements by not incorporating the previous ADEQ-approved "reasonable, necessary, cost-effective and**

[16] Letter from Amanda Stone to Keith Takata (November 14, 2007). *See also* "A remedy that achieves an acceptable risk level in one medium may not be preferred if it only achieves this level by transferring contaminants to another medium." *Guidance on Remedial Actions, 4-9.* "Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwater as a source of contamination to other media." *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration,* 9 (June 26, 2009).

[17] See Attachment 3.

[18] "Factoring this regional pumping [from RID's wells] and potential future changes to regional pumping into the FS remedial alternatives is necessary and critical." (WGFS, 19). However, the RID wells that are "necessary and critical" to each WGFS proposed alternative remedy are not treated to address the risks posed to "public health and welfare and the environment" by the contaminated groundwater or included in the cost estimate of the WGFS alternatives.

technically feasible" and consistent with A.R.S. § 49-282.06.A within the WVBA WQARF Site.[19] • Each RID proposed alternative remedy is "necessary" as a matter of Arizona law in order to "protect or provide a water supply" at any RID well within the WVBA WQARF Site that either is "threatened"[20] by the groundwater contamination or "would not be fit for its current of reasonably foreseeable end uses [*i.e.*, as a drinking water source as established by the Remedial Objectives for the WVBA WQARF Site] without treatment due to the release of hazardous substances"[21]		**technically practicable" remedial actions for the WVBA WQARF Site[19] and the WGFS Report admission that the WGFS costs are excessive compared to the overall effectiveness of the RID proposed alternative remedies is sufficient evidence that all three WGFS proposed alternative remedies fail to meet Arizona's mandatory WQARF requirement No. 3.**
MEETS WQARF REQUIREMENT No. 4 **All four RID proposed alternative remedies address any existing well in the WVBA WQARF Site that "would now or in the reasonably foreseeable future produce water that would not be fit for its current or reasonably foreseeable end uses [*i.e.*, as a drinking water source] without treatment due to the release of hazardous substances."** • ADEQ has established the "reasonably foreseeable end use" for the groundwater in the WVBA WQARF Site as a drinking water source in its Remedial Objectives Report for the WVBA WQARF Site[22] and ADEQ's Land and Water Survey for the WVBA WQARF Site.[23]	**4. <u>For remediation of waters of the state, the selected remedial action shall address, at a minimum, any well</u> that at the time of selection of the remedial action either supplies water for municipal, domestic, industrial, irrigation or agricultural uses or is part of a public water system <u>if the well would now or in the reasonably foreseeable future produce water that would not be fit for its current or reasonably foreseeable end uses[24] without treatment due to the release of hazardous substances.</u> The specific measures to address any such well shall not reduce the supply of water available to the owner of the well. (ARS § 49-282.06.B.4.b)**	FAILS WQARF REQUIREMENT No. 4 **All three WGFS proposed alternative remedies fail to address, *at a minimum*, the RID water supply wells impacted by groundwater contamination above the applicable numeric and narrative Arizona aquifer water quality standards and the applicable Remedial Objectives established for the WVBA WQARF Site that ADEQ has determined "may present an imminent and substantial endangerment to the public health, welfare or the environment within the [WVBA] WQARF Site."[25]** • The failure of all three WGFS proposed alternative remedies to address such impacted RID wells is contrary to the findings in the WGFS Report that each RID well within the WVBA WQARF Site, at the

[19] *See* ADEQ, Approval of RID's Early Response Action (June 24, 2010); ADEQ, Approval of RID's Modified Early Response Action (February 1, 2013); ADEQ, Approval of RID's Request for ADEQ Reimbursement for Incurred Costs in FY2013 (August 16, 2013); ADEQ, Approval of RID's Request for ADEQ Reimbursement for Incurred Costs in FY2014 (July 21, 2014).
[20] Cite R18-16-405.I, included text.
[21] ARS § 49-282.06.B.4.b.
[22] *See* ADEQ, Remedial Objectives Report, West Van Buren Area WQARF Registry Site, Phoenix, Arizona, 3-3 (August 8, 2012).
[23] http://www.azdeq.gov/environ/waste/sps/download/wvb/apps/app_k.pdf.
[24] Arizona has determined that "reasonably foreseeable uses of water are those likely to occur within 100 years unless a longer time period is shown to be reasonable." AAC R18-16-406.D.
[25] Agreement to Conduct Work between ADEQ and RID, dated October 8, 2009.

		time of the selection of the remedy, "supplies water for irrigation"[26] and that the RID wells within the WVBA WQARF Site "would now or in the reasonably foreseeable future produce water that would not be fit for its ... reasonably foreseeable end uses without treatment due to the release of hazardous substances."[27] • All three WGFS proposed alternative remedies include future measures to address all threatened, but not yet impacted, City of Tolleson, City of Phoenix, Salt River Project and private wells, but fail to address, as required by this mandatory requirement, the existing RID water supply wells that are currently impacted above the applicable Arizona numeric and narrative aquifer water quality standards, the Remedial Objectives established for the WVBA WQARF Site, and the reasonably foreseeable end uses established by ADEQ's Land and Water Survey for the WVBA WQARF Site. **Failure of all three WGFS proposed alternative remedies to address, at a minimum, the existing RID water supply wells impacted by the groundwater contamination above the applicable Arizona numeric and narrative aquifer water quality standards, the Remedial Objectives established for the WVBA WQARF Site, and the reasonably foreseeable end uses established by ADEQ's Land and Water Survey for the WVBA WQARF Site is sufficient evidence that all three WGFS proposed alternative remedies fail to meet Arizona's mandatory WQARF requirement No. 4.**

[26] "RID has approximately 32 irrigation wells located within or adjacent to the WVBA. Although those wells are presently used exclusively for irrigation, RID's water provider plan states that RID may seek to pump those wells to supply drinking water." (WGFS, 38)

[27] The WGFS acknowledges that the WVBA COCs are currently above the AWQS and would require treatment before the water could be pumped for its reasonable foreseeable water end use as a drinking water supply: "If the COP is required to pump the UAU aquifer in the WVBA in the future prior to the time COCs have been reduced to AWQS, then a contingent measure such as well-head treatment ... may be appropriate." (WGFS, 41)

MEETS WQARF REQUIREMENT No. 5	5. The reference remedy and alternative remedies shall be capable of achieving all of the remedial objectives. (AAC R18-16-407.E.1)	FAILS WQARF REQUIREMENT No. 5
All four RID proposed alternative remedies will "protect, restore, replace or otherwise provide a water supply" for all well owners within or adjacent to the WVBA WQARF Site whose "current and reasonably foreseeable future uses are impaired or lost due to contamination from the site," including a drinking water source as established by applicable Arizona law, the Remedial Objectives for the WVBA WQARF Site, and the reasonably foreseeable end uses established by ADEQ's Land and Water Survey for the WVBA WQARF Site. • All four RID proposed alternative remedies will achieve all Remedial Objectives for the WVBA WQARF Site by including remedial strategies and measures that will control further migration of the plume, contain the plume within its current boundaries and remove and treat the contaminants "to protect, restore, replace or otherwise provide a water supply...if the current and reasonably foreseeable future uses [including a drinking water source] are impaired or lost due to contamination from the site." • All four RID proposed alternative remedies "shall remain in effect as long as required to ensure the continued achievement of those [remedial] objectives."	• ADEQ has established the following mandatory Remedial Objective for the WVBA WQARF Site: "To protect, restore, replace or otherwise provide a water supply for municipal use by currently and reasonably foreseeable future municipal well owners within the WVBA WQARF Site if the current and reasonably foreseeable future uses are impaired or lost due to contamination from the site. Remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF Site prohibits or limits groundwater use." (ADEQ, Remedial Objectives Report, WVBA WQARF Registry Site, 3-3 (August 2012)) • "Where remedial measures are relied upon to achieve Remedial Objectives, such remedial measures shall remain in effect as long as required to ensure the continued achievement of those objectives." (AAC R18-16-407.G). • ADEQ acknowledges that RID constitutes a "reasonably foreseeable future municipal well owner[] within the WVBA WQAR Site." (ADEQ, Remedial Objectives Report, WVBA WQARF Registry Site, 3-3 (August 2012))	**All three WGFS proposed alternative remedies fail to include remedial strategies or measures that will "protect, restore, replace or otherwise provide a [drinking] water supply" for RID's existing water supply wells that "are impaired or lost due to contamination from the [WVBA] site" based on the groundwater contamination that currently impacts 14 RID wells above the applicable Arizona numeric and narrative aquifer water quality standards, the Remedial Objectives for the WVBA WQARF Site, and the reasonably foreseeable end uses established by ADEQ's Land and Water Survey for the WVBA WQARF Site.** • Also, each WGFS proposed alternative remedy after 2025, according to the assertions in the WGFS, would allow for the uncontrolled downgradient migration of the hazardous substances "towards the regional pumping depression known as the Luke Sink, near the Luke Air Force Base" (WGFS, 7) that could threaten and impact additional groundwater resources and other existing water supply wells, and thereby impair "reasonably foreseeable future uses." • All three WGFS proposed alternative remedies cease any treatment after 2025, according to the assertions in the WGFS, regardless if all the Remedial Objectives and cleanup standards (for "protection of public health and welfare and the environment" or for an aquifer classified as a drinking water aquifer) have not been achieved, "public health and welfare and environmental" risks remain, or the contamination associated with the WVBA WQARF Site prohibits or limits present or reasonably foreseeable future groundwater uses.

		Failure of all three WGFS proposed alternative remedies "to protect, restore, replace or otherwise provide a [drinking] water supply" for RID's existing water supply wells that "are impaired or lost to [groundwater] contamination from the [WVBA] site" is sufficient evidence that all three WGFS proposed alternative remedies fail to meet Arizona's mandatory WQARF requirement No. 5.

(TABLE 2)

09/30/14

Five CERCLA Requirements[1] that Must be Addressed Specifically during Remedy Selection and Must be Discussed in any EPA Record of Decision

Roosevelt Irrigation District's (RID) FS Report[2]	CERCLA Requirements[4]	Working Group's FS (WGFS) Report[5]
MEETS CERCLA REQUIREMENT No. 1 **All four RID proposed alternative remedies "eliminate, reduce, or control risks to human health and the environment" posed by the hazardous substances present in the groundwater within the WVBA WQARF Site.** • All four RID proposed alternative remedies "eliminate, reduce or control" the risks posed to the community from the contaminated groundwater by the "significant volatilization and transfer of contaminants from the water into the air,"[3] and the risks posed to the environment by continued contaminant migration resulting in	**1. Protect human health and the environment (CERCLA Section 121(b))** • "The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment." (NCP, 40 CFR § 300.430(a)(1)). • "Alternatives shall be developed that protect human health and the environment by recycling waste or by eliminating, reducing and/or controlling risks posed through each pathway by	FAILS CERCLA REQUIREMENT No. 1 **All three WGFS proposed alternative remedies fail to "eliminate, reduce, or control risks to human health and the environment" posed by the hazardous substances present in the groundwater within the WVBA WQARF Site.** • All three WGFS proposed alternative remedies fail to address the risks posed to the community from the contaminated groundwater by the "significant volatilization and transfer of contaminants from the water into the air,"[3] or the risks posed to the environment by continued contaminant migration resulting in contamination of additional

[1] EPA, *Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites,* 2-1 (December 1988) (noting that this guidance "has been prepared on the basis of CERCLA as amended by SARA [the Superfund Amendments and Reauthorization Act] and the existing NCP [National Contingency Plan] and is consistent with the proposed NCP and directives issued by the Office of Solid Waste and Emergency Response.").

[2] RID is an irrigation district operating in Arizona since 1923 with 32 wells located within or adjacent to the West Van Buren Area (WVBA) Water Quality Assurance Revolving Fund (WQARF) Site, 14 of which are contaminated by hazardous volatile organic compounds (VOC) in the groundwater above Arizona aquifer water quality standards and Arizona drinking water standards, the remaining RID wells are threatened by the groundwater contamination. The RID Feasibility Study Report can be found on ADEQ's website at http://www.azdeq.gov/environ/waste/sps/download/wvb/2014-07%20Draft%20RID%20FS_1.pdf.

[3] ADEQ, Approval of RID's Modified Early Response Action (February 1, 2013).

[4] The CERCLA requirements are applicable or relevant and appropriate to cleanups under the Arizona WQARF Program. First, Arizona law mandates that "in setting [water quality standards for all waters in all aquifers], the director shall consider, but not be limited to, ... guidelines, action levels or numerical criteria adopted or recommended by the United States environmental protection agency or any other federal agency." (ARS § 49-221.C) Arizona law also authorizes, "the director [of ADEQ] may adopt CERCLA rules, guidelines or procedures by reference to the extent consistent with this article." (ARS § 49-282.06.B) Additionally, the WQARF Program is "Arizona's version of the federal 'superfund' program" and was "modeled on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the federal superfund statute." Ariz. Admin. Register at 1492 (2002). More importantly, the WVBA WQARF Site is directly downgradient of the Motorola 52nd Street federal Superfund Site from which contaminated groundwater enters the WVBA Site. As a result, failure of a WQARF cleanup to substantially comply with CERCLA requirements could provide EPA the opportunity to overfile, as it did on the East Washington WQARF Site, and take over control of the WVBA WQARF Site, which will delay cleanup of the WVBA WQARF Site and may impose additional cleanup requirements at substantial cost.

[5] The Working Group's Feasibility Study Report can be found on ADEQ's website at: http://www.azdeq.gov/environ/waste/sps/download/wvb/2014-07%20Draft%20WVBWG%20FS.pdf.

contamination of additional groundwater resources.

- Each RID proposed alternative remedy will "eliminate" by removal and treatment more than 2,500 pounds per year of hazardous substances (*i.e.*, volatile organic compounds (VOCs) that are known and suspected carcinogens) that would otherwise volatize and transfer from the water into the air in the community, or remain and continue to migrate in the groundwater, resulting in contamination of additional groundwater resources.

All four RID proposed alternative remedies will "protect human health and the environment by restoring ground water to its beneficial uses within a reasonable time frame" and provide "especially long-term effectiveness and performance, short-term effectiveness, and compliance with ARARs [applicable or relevant and appropriate requirements under federal or state laws]."

- Each RID proposed alternative remedy will remove and treat hazardous substances present in the a site." (NCP, 40 CFR § 300.430(e)(2)).[6]
- "The goal of Superfund ground-water remediation is to protect human health and the environment by restoring ground water to its beneficial uses[6] within a reasonable time frame."[7]
- "Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following: applicable or relevant and appropriate requirements [(ARARs)][7] under federal or state environmental or facility siting laws ... [and] the MCL[8] [maximum contaminant level] promulgated for that contaminant ... shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water." (NCP, 40 CFR § 300.430(e)(2)(i)(A) and (C))
- "Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term groundwater resources."
  - All three WGFS proposed alternative remedies fail to comply with applicable EPA and ADEQ policies and guidance prohibiting "the relocation of contaminants from one media (groundwater) to another (air)."[9]
  - According to the assertions in the WGFS, after 2025, all three WGFS proposed alternative remedies cease any measures to control contaminant migration, to achieve plume containment or remediation, or to treat groundwater contamination.[10]

All three WGFS proposed alternative remedies fail to "protect human health and the environment by restoring ground water to its beneficial uses within a reasonable time frame" or to provide "especially long-term effectiveness and performance, short-term effectiveness, and compliance with ARARs."

- According to the WGFS Report, "the WVBA regional plume is too large, however, for full plume remediation." (WGFS, 24). However, in an

[6] "A remedy that achieves an acceptable risk level in one medium may not be preferred if it only achieves this level by transferring contaminants to another medium." *Guidance on Remedial Actions, 4-9.* "Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwater as a source of contamination to other media." *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration,* 9 (June 26, 2009). *See also* Letter from Amanda Stone to Keith Takata (November 14, 2007).

[7] "Chemical-specific standards that define acceptable risk levels (e.g., non-zero MCLGs, MCLs) also may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment." EPA, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (OSWER Directive 9355.0-30, April 22, 1991).

[8] "Superfund groundwater remedies for existing or potential sources of drinking water should reduce concentrations to existing MCLs or to more stringent State standards." *Guidance on Remedial Actions*, 2-8. "Although MCLs are developed using cost and technical considerations, they are also protective of human health." *Id.* at 2-9.

[9] "A remedy that achieves an acceptable risk level in one medium may not be preferred if it only achieves this level by transferring contaminants to another medium." *Guidance on Remedial Actions, 4-9.* "Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwater as a source of contamination to other media." *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration,* 9 (June 26, 2009). *See also* Letter from Amanda Stone to Keith Takata (November 14, 2007).

[10] "Remedial actions should be designed to prevent, as quickly as possible and to the extent practicable, further spread of a plume in these complex systems." *Guidance on Remedial Actions*, 5-4

groundwater to applicable Arizona and federal maximum contaminant levels (MCLs) in order to restore the aquifer to its reasonably foreseeable beneficial use (as a drinking water source[11]) within a reasonable time[12] and to protect human health and the environment from unacceptable "exposure levels." • The RID wellhead treatment pilot project performed at four highly-contaminated RID wells in the WVBA WQARF Site, as agreed to by ADEQ, has demonstrated that removal and granular-activated-carbon (GAC) treatment of the existing groundwater contaminants can achieve short- and long-term effectiveness that will comply with Arizona and federal ARARs. **All four RID proposed alternative remedies will achieve "acceptable exposure levels that are protective of human health and the environment" as established by Arizona and federal ARARs and the MCLs.** • Consistent with other Phoenix-area Superfund and WQARF Sites, each RID proposed alternative remedy will treat contaminated groundwater extracted from the WVBA WQARF Site[13] (with concentrations up to 75 ppb for TCE, a known carcinogen with an ARAR and MCL of 5 ppb) to "acceptable exposure levels that are protective of human health and the environment" (*i.e.*, to	effectiveness, and compliance with ARARs." (NCP, 40 CFR § 300.430(e)(9)(iii)(A)). • "Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals. (NCP, 40 CFR § 300.430(e)(9)(iii)(A)). • "Alternatives that do not provide adequate protection of human health and the environment shall be eliminated from further consideration." (NCP, 40 CFR § 300.430(e)(7)(i)).	apparent contradiction of that statement, the WGFS Report acknowledges that removal and granular-activated-carbon (GAC) treatment of contaminated groundwater to drinking water standards at the Motorola 52nd Street federal Superfund Site directly upgradient of the WVBA WQARF Site has resulted in "significant declines in VOC concentrations ... in some cases by an order of magnitude or more" along with "an overall narrowing of the plume width" within a relatively short period of current groundwater pumping. (WGFS, 20) • According to the WGFS Report, only two WGFS proposed alternative remedies provide any "localized remediation," but those only include one or two new smaller wells that "would cease operating at the end of 2025." (WGFS, 49 and 54). **All three WGFS proposed alternative remedies fail to meet "acceptable exposure levels that are protective of human health and the environment" as established by Arizona and federal ARARs and the MCLs.** • All three WGFS proposed alternative remedies fail to treat all contaminated groundwater extracted from the WVBA WQARF Site[13] (with concentrations up to 75 ppb for TCE, a known carcinogen with an ARAR and MCL of 5 ppb), as

[11] Arizona's law defines "reasonably foreseeable uses of water" as "those likely to occur within 100 years unless a longer time period is shown to be reasonable. Arizona law also requires "all aquifers in this state...shall be classified for drinking water protected use...(ARS § 49-224.B) and "primary drinking water maximum contaminant levels [MCLs] established by the [EPA] administrator...are adopted as drinking water aquifer water quality standards..." (ARS § 49-223.A)

[12] *Guidance on Remedial Actions*, 1-1. EPA identifies "a reasonable time frame" as being "less than 100 years." *Id.* at 5-8. "A rapid remedial alternative generally should be developed for groundwater that is a current or potential source of drinking water. This alternative should achieve the selected cleanup level throughout the area of attainment within the shortest time technically feasible." *Id.* at 5-9.

[13] "Factoring this regional pumping [from RID's wells] and potential future changes to regional pumping into the FS remedial alternatives is necessary and critical." (WGFS, 19). However, the RID wells that are "necessary and critical" to each WGFS proposed alternative remedies are not treated to address the risks to "public health and welfare and the environment" posed by the contaminated groundwater or included in the cost estimate of the WGFS alternatives.

applicable Arizona and federal ARARs and the MCLs). • Each RID proposed alternative remedy will provide for removal and treatment of the contaminated groundwater to ensure compliance with Arizona's aquifer water quality standards and federal ARARs (*i.e.*, MCLs)[14] in order to "preserve and protect the quality of those waters for all present and reasonably foreseeable future uses" (*i.e.*, as a drinking water source). (ARS § 49-221.A; § 49-224.B)		treated at all other Phoenix-area Superfund and WQARF Sites.[15] • All three WGFS proposed alternative remedies fail to meet applicable Arizona water quality standards and federal ARARs for "all waters in all aquifers to preserve and protect the quality of those waters for all present and reasonably foreseeable future uses."[16] (ARS § 49-221.A) Arizona state law has determined that the "primary drinking water maximum contaminant levels [MCLs] established by the [EPA] administrator ...are adopted as drinking water aquifer water quality standards" (ARS § 49-223.A) and, therefore, are federal ARARs at the WVBA WQARF Site. **Failure of all three WGFS proposed alternative remedies to "provide adequate protection of human health and the environment" is sufficient evidence that all three WGFS proposed alternative remedies "shall be eliminated from further consideration."**
MEETS CERCLA REQUIREMENT No. 2 **All four RID proposed alternative remedies treat all extracted contaminated groundwater to attain "acceptable exposure levels" established by Arizona and federal ARARs, which include the MCL of 5 ppb for the known carcinogen TCE.** • All four RID proposed alternative remedies attain the same "acceptable exposure levels" (*i.e.*, groundwater restoration to MCLs, treatment to MCLs for reasonably foreseeable end use as a drinking water source, and prohibition of the transfer of contaminants from groundwater into air) as required by Arizona and federal ARARs at	**2. Attain the applicable or relevant and appropriate requirements (ARARs) of Federal and State laws (CERCLA Section 121(d)(2)(A)).** • "Maximum contaminant level goals ... that are set above zero" or the "maximum contaminant level [MCL] shall be attained where relevant and appropriate." (NCP, 40 CFR § 300.430(3)(B) and (C). • The "effectiveness" criterion "focuses on the degree to which an alternative ... complies with ARARs. ... Alternatives providing significantly less effectiveness than other, more promising	FAILS CERCLA REQUIREMENT No. 2 **All three WGFS proposed alternative remedies fail to treat all extracted contaminated groundwater to attain "acceptable exposure levels" established by Arizona and federal ARARs, which include the MCL of 5 ppb for the known carcinogen TCE, unlike the other groundwater remedies in Scottsdale, Goodyear, East Phoenix and elsewhere in the State.** • As noted above, all three WGFS proposed alternative remedies fail to attain water quality ARARs established under Arizona's groundwater classification system that "all aquifers in this state ... shall be classified for drinking water protected

[14] *See* ARS § 49-223.A.

[15] North Indian Bend Wash Superfund Site, Motorola 52nd Street Superfund Site, Phoenix-Goodyear Airport Superfund Site, 56th Street and Earl WQARF Site, and a West Central Phoenix WQARF Site.

[16] Arizona has determined that "reasonably foreseeable uses of water are those likely to occur within 100 years unless a longer time period is shown to be reasonable." AAC R18-16-406.D.

the groundwater remedies in Scottsdale, Goodyear, East Phoenix and elsewhere in the State. • Each RID proposed alternative remedy will allow ADEQ to fulfill its duty[17] and comply with Arizona and federal ARARs to restore the aquifer to meet its drinking-water protected use aquifer classification[18] and to meet the applicable Arizona aquifer water quality standards (*i.e.*, the MCLs "are adopted as [Arizona] drinking water aquifer water quality standards"). (ARS § 49-223.A) • All four RID proposed alternative remedies comply with Arizona's legal mandate (and federal ARAR) that, at a minimum, the selected remedy shall address any existing well that is not now or will not be fit for its current or reasonably foreseeable end use[19] (which ADEQ has established as a drinking water source in its Remedial Objectives Report for the WVBA WQARF Site).[20] • All four RID proposed alternative remedies comply with Arizona's Remedial Objectives (and federal ARAR) for the WVBA WQARF Site requiring "remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WQARF Site prohibits or limits groundwater use."[21]	alternatives may be eliminated." (NCP, 40 CFR § 300.430(e)(7)(i)). • "For ground water that is a current or potential source of drinking water ... cleanup levels generally will be based on chemical-specific ARARs [*i.e.*, MCLs] or health-based levels."[22] • "Some states have developed and promulgated their own ground-water classification systems. A State's classification system may be used to determine remediation goals. Furthermore, a promulgated State system may be an ARAR."[23] • "Alternatives that do not meet ARARs ... should be screened out."[24]	use." (ARS § 49-224.B) Arizona has clearly established that the "primary drinking water [MCLs] established by the [EPA] administrator ...are adopted as drinking water aquifer water quality standards" (ARS § 49-223.A) and, therefore, are federal ARARs at the WVBA WQARF Site. • All three WGFS proposed alternative remedies fail to comply with the federal ARAR established by Arizona state law that mandates "for remediation of waters of the state, the selected remedial action shall address, at a minimum, any well that at the time of selection of the remedial action either supplies water for municipal, domestic, industrial, irrigation or agricultural uses or is part of a public water system if the well would now or in the reasonably foreseeable future produce water that would not be fit for its current or reasonably foreseeable end uses without treatment due to the release of hazardous substances."[19] • All three WGFS proposed alternative remedies fail to comply with the federal ARAR established by ADEQ in the Remedial Objectives Report for the WVBA WQARF Site that "remedial actions will be in place for as long as need for the water exists, the resource remains available and the contamination associated with the WVBA WQARF site prohibits or limits groundwater use."[21] **Failure of all three WGFS proposed alternative remedies to "meet ARARs" is sufficient evidence that all three WGFS alternatives "should be screened out."**

[17] Pursuant to Ariz. Rev. Stat. § 49-104.A.13, "the department shall ... promote the restoration and reclamation of degraded or despoiled areas and natural resources."
[18] *See* ARS § 49-224.B.
[19] *See* ARS § 49-282.06.B.4.b.
[20] *See* ADEQ, Remedial Objectives Report, West Van Buren Area WQARF Registry Site, Phoenix, Arizona, 3-3 (August 8, 2012) and ARS § 49-282.06.B.4.b.
[21] Remedial Objectives Report, 3-3.
[22] *Guidance on Remedial Actions*, 4-1.
[23] *Id.* at 2-5.
[24] *Id.* at 5-11.

MEETS CERCLA REQUIREMENT No. 3 **All four RID proposed alternative remedies "reflect a cost-effective solution taking into consideration short and long-term costs" when and as compared to all other existing major groundwater cleanup sites in Arizona.**[25] • RID's FS Report includes all costs to operate and maintain the RID proposed alternative remedies until "acceptable exposure levels" established by federal and Arizona ARARs are achieved. • Each RID proposed alternative remedy utilizes existing water infrastructure and established end uses to derive a very "cost-effective solution" compared to all other existing groundwater cleanup sites in Arizona.[25]	**3. Reflect a cost-effective solution, taking into consideration short- and long-term costs (CERCLA Section 121(a))** • "The costs of construction and any long-term costs to operate and maintain the alternatives shall be considered." (NCP, 40 CFR § 300.430(e)(7)(iii)). • "Costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives." (NCP, 40 CFR § 300.430(e)(7)(iii)).	FAILS CERCLA REQUIREMENT No. 3 **All three WGFS proposed alternative remedies fail to satisfy this comparative CERCLA requirement because, as noted above and below, all three WGFS proposed alternative remedies fail to comply with the other mandatory and substantive CERCLA requirements (Nos. 1, 2, 4 and 5) to enable an apples-to-apples comparison.** • All three WGFS proposed alternative remedies fail to include the costs to operate and maintain the RID wells that are factored "into the [WG] FS remedial alternatives [as] necessary and critical." (WGFS, 19). • The WGFS Report also acknowledges that "the relative cost of any potential additional benefit" is a disadvantage for both the proposed Reference Remedy and More Aggressive Remedy, which cease to operate after 2025, according to the assertions in the WGFS Report (WGFS, 53 and 57), making them a less "cost-effective solution" as compared to RID's proposed alternative remedies. **Failure of all three WGFS proposed alternative remedies to "reflect a cost-effective solution" and the WGFS Report admission that the costs are "excessive compared to the overall effectiveness" of the RID proposed alternative remedies is sufficient evidence that all three WGFS alternatives should be eliminated.**
MEETS CERCLA REQUIREMENT No. 4 **All four RID proposed alternative remedies incorporate "permanent solutions and treatment technologies" (utilized and proven at other similarly contaminated Arizona sites) to remove the elevated concentrations of known and suspected carcinogens**	**4. Use permanent solutions and treatment technologies or resource recovery technologies to the maximum extent practicable (CERCLA Section 121(b))** • "The national goal of the remedy selection process is to select remedies that are protective	FAILS CERCLA REQUIREMENT No. 4 **All three WGFS proposed alternative remedies fail to provide "permanent solutions" that are "protective of human health and the environment, that maintain protection over time, and that**

[25] See Attachment 3.

in the groundwater, to "minimize untreated waste" being transferred from groundwater to air, and to achieve applicable Arizona and federal ARAR cleanup standards and exposure levels. • All four RID proposed alternative remedies will be permanently "protective of human health and the environment" by treating the contaminated groundwater to "acceptable exposure levels" (*i.e.*, applicable MCLs) and ensuring that such protection will continue until the applicable cleanup standards are achieved. • All four RID proposed alternative remedies will return a significant groundwater supply to its "maximum beneficial use" as a drinking source, which has been demonstrated as "practicable" at the Motorola 52nd Street federal Superfund Site directly adjacent to the WVBA WQARF Site. • All four RID proposed alternative remedies will ensure "long-term effectiveness" by removing and treating the contaminated waters until applicable cleanup standards and exposure levels are achieved to minimize any residual risk to the community or to the environment from "untreated waste."	of human health and the environment, that maintain protection over time, and that minimize untreated waste." (NCP, 40 CFR § 300.430(a)(1)). • "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site." (NCP, 40 CFR § 300.430(a)(1)(iii)(F)). • The "effectiveness" criterion "focuses on the degree to which an alternative ... minimizes residual risks and affords long-term protection. ... Alternatives providing significantly less effectiveness than other, more promising alternatives may be eliminated." (NCP, 40 CFR § 300.430(e)(7)(i)). • "Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful. Factors that shall be considered, as appropriate, include the following: (1) Magnitude of residual risk remaining from untreated waste or treatment residuals at the conclusion of the remedial activities ... (2) Adequacy and reliability of controls such as containment systems." (NCP, 40 CFR § 300.430(e)(9)(iii)(C)).[26]	**minimize untreated waste" to the "maximum extent practicable."** • As noted above, all three WGFS proposed alternative remedies fail to attain "acceptable exposure levels that are protective of human health and the environment" as established by Arizona and federal ARARs and the MCLs. • All three WGFS proposed alternative remedies fail to provide "long-term effectiveness and permanence" as any "treatment technologies" cease in 2025,[27] according to the assertions in the WGFS, regardless if applicable cleanup standards have not been achieved, public health and environmental risks remain, or the contamination associated with the WVBA WQARF Site prohibits or limits groundwater uses. • All three WGFS proposed alternative remedies leave elevated concentrations of "untreated waste" in the form of known and suspected carcinogens in the WVBA WQARF Site groundwater that after 2025, according to the assertions in the WGFS, will be "uncontained" and allowed to migrate uncontrolled downgradient "towards the regional pumping depression known as the Luke Sink, near the Luke Air Force Base" (WGFS, 7) and contaminate additional groundwater resources and other existing water supply wells. • All three WGFS proposed alternative remedies fail to "return usable ground waters to their beneficial uses wherever practicable."

[26] "Remedial actions should be designed to prevent, as quickly as possible and to the extent practicable, further spread of a plume in these complex systems." *Guidance on Remedial Actions*, 5-4.

[27] Based on the false assertions in the WGFS that RID's wells cease operating in 2025, the one or two new smaller extraction wells proposed in all three WGFS alternative remedies will cease operating in 2025 "based on the assumption that the efficacy of the new extraction well primarily depends on operating alongside the current RID pumping regime." WGFS, 49 and 54. Similarly, the Less Aggressive Remedy relies solely on RID's wells for any benefit, which the Working Group inaccurately claims will cease pumping in 2025.

		○ This is contrary to applicable Arizona and federal ARARs and the removal and treatment of contaminated groundwater to drinking water MCL standards performed at the Motorola 52nd Street federal Superfund Site directly upgradient of the WVBA WQARF Site that the Working Group acknowledges has resulted in "significant declines in VOC concentrations ... in some cases by an order of magnitude or more" along with "an overall narrowing of the plume width" within a relatively short period of current groundwater pumping. (WGFS, 20) ○ Contrary to the WGFS Report, treatment of the upper aquifer unit (UAU) to achieve the beneficial uses of that portion of the aquifer that has been "classified for drinking water protected use" (ARS § 49-224.B) is "practicable" given that ADEQ already has approved such treatment as "reasonable, necessary and cost-effective" and consistent with A.R.S. § 49-282.06.A within the WVBA WQARF Site.[28] **Failure of all three WGFS proposed alternative remedies to "maintain protection over time," to "return usable ground waters to their beneficial uses" and to "minimize residual risks" as required at other federal Superfund and WQARF sites in Arizona, including ADEQ's prior early response action approvals for the WVBA WQARF Site, is sufficient evidence that all three WGFS alternatives should be eliminated.**

[28] *See* ADEQ, Approval of RID's Early Response Action (June 24, 2010); ADEQ, Approval of RID's Modified Early Response Action (February 1, 2013); ADEQ, Approval of RID's Request for ADEQ Reimbursement for Incurred Costs in FY2013 (August 16, 2013); ADEQ, Approval of RID's Request for ADEQ Reimbursement for Incurred Costs in FY2014 (July 21, 2014)

MEETS CERCLA REQUIREMENT No. 5	5. The preference for remedies that permanently and significantly reduce the mobility, toxicity, or volume of hazardous substances as a principal element or explain why such a remedy was not selected (CERCLA Section 121(b))	FAILS CERCLA REQUIREMENT No. 5
All four RID proposed alternative remedies through groundwater extraction and treatment will "permanently and significantly reduce the mobility, toxicity and volume of hazardous substances" present in the groundwater within the WVBA WQARF Site by utilizing proven and preferred "treatment" technologies that will "permanently" ensure that the remedy is "protective of human health and the environment." • "Treatment" is the principal element of each of the four RID proposed alternative remedies in order to address the "principal threats posed" at the WVBA WQARF Site and to "return usable ground waters to their beneficial uses." • All four RID proposed alternative remedies not only remove and treat the contaminated groundwater to meet the applicable MCLs, as required by Arizona and federal ARARs, but also address the transfer of contaminants from one environmental media (the groundwater) to another (the air).	"EPA expects to use treatment to address the principal threats posed by a site, wherever practicable. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds, and highly mobile materials." (NCP, 40 CFR § 300.430(a)(1)(iii)(A))."[29] • When balancing trade-offs among alternatives, "the balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment. The balance shall also consider the preference for treatment as a principal element." (NCP, 40 CFR § 300.430(f)(1)(ii)(E)). • "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site." (NCP, 40 CFR § 300.430(a)(1)((iii)(F)).[30] • "Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to	**All three WGFS proposed alternative remedies fail to treat all the extracted contaminated groundwater included in their proposed alternative remedies[31] (even though elevated concentrations are present up to 75 ppb for a known carcinogen TCE with an ARAR and MCL of 5 ppb), and thereby fail to "permanently and significantly reduce the mobility, toxicity or volume of the hazardous substances" in the WVBA WQARF Site.** • The "preference" for "treatment" is not the "principal element" in the three WGFS proposed alternative remedies. Instead and according to the WGFS Report, the elevated TCE concentrations will be "uncontained" and allowed to transfer to the air of surrounding communities until 2025 and then will be allowed to migrate uncontrolled downgradient "towards the regional pumping depression known as the Luke Sink, near the Luke Air Force Base" (WGFS, 7) and contaminate additional groundwater resources and other existing water supply wells. • As noted above, all three WGFS proposed alternative remedies cease any "treatment technologies" in 2025,[32] according to the assertions in the WGFS, regardless if applicable cleanup standards (for protection of public health

[29] "Emphasis is placed on destruction or detoxification of hazardous materials rather than on protection simply through prevention of exposure," as proposed in the three WGFS alternative remedies. *Guidance on Remedial Actions*, 2-2. "A natural attenuation response action ... should not, however, substitute for active response measures, unless such measures have been determined not to be practicable." *Id.* at 5-7.

[30] The preamble to the NCP states that "remediation levels generally should be attained throughout the contaminated plume." (55 FR 8754, March 8, 1990)

[31] "Factoring this regional pumping [from RID's wells] and potential future changes to regional pumping into the FS remedial alternatives is necessary and critical." (WGFS, 19). However, the RID wells that are "necessary and critical" to each WGFS proposed alternative remedy are not treated to address the risks posed to human health and the environment by the contaminated groundwater or included in the cost estimates of the WGFS alternatives.

[32] Based on the false assertions in the WGFS that RID's wells cease operating in 2025, the one or two new smaller extraction wells proposed in all three WGFS alternative remedies will cease operating in 2025 "based on the assumption that the efficacy of the new extraction well primarily depends on operating alongside the current RID pumping regime." WGFS, 49 and 54. Similarly, the Less Aggressive Remedy relies solely on RID's wells for any benefit, which the Working Group inaccurately claims will cease pumping in 2025.

	MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwater as a source of contamination to other media."[33]	and the environment or for an aquifer that is classified as a drinking water aquifer) have not been achieved, public health and environmental risks remain, or the contamination associated with the WVBA WQARF site prohibits or limits groundwater uses. **Failure of all three WGFS proposed alternative remedies to treat or control the contaminated groundwater so as not to "permanently and significantly reduce the mobility, toxicity or volume of hazardous substances" in the WVBA WQARF Site is sufficient evidence that all three WGFS alternatives should be eliminated.**

[33] *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration*, 9 (June 26, 2009).

TABLE 10. GROUNDWATER REMEDIAL ACTIONS - COMPARATIVE ANALYSIS
West Van Buren Area WQARF Site

Site	Treatment Technology	Required Treatment Levels[1]	End Use of Remediated Water	Remedy Capital Cost (in years completed)	Remedy Capital Cost (2014 dollars)[2]	Design Treatment Capacity	Normalized[3] Capital Costs/ Treatment Capacity ($/gpm)	Amount of Groundwater Extracted Through 2013	Amount of VOC Mass Removed Through 2013	Average Annual Groundwater Pump & Treat Rate	Annual VOC Mass Removal Rate	Annual Remedy O&M Costs	Routine O&M Cost ($/lb$_{VOC}$)	Routine O&M Cost ($/Kgal)
M52 CERCLA Site Operable Unit 1	Air Stripping with VGAC	Primary Drinking Water Standards	Industrial Sanitary Sewer Irrigation	$3.1 MM[b] (1992)	$5.3 MM	810 gpm[g]	$6,490	3.6 billion gallons[j]	23,635 pounds[j]	230 gpm[j] (2010-2013) 215 gpm[j]	813 pounds/year[j] (2010-2013) 899 pounds[j]	$1.3 MM/year[p] (2006-2010)	$1,210[p] $1,446	$6.37[p] (2006-2010) $11.50
M52 CERCLA Site Operable Unit 2	LGAC (lead/lag)	Primary Drinking Water Standards	Irrigation	$12.0 MM[c] (2001)	$16.2 MM	5,300 gpm[g]	$3,057	13.3 billion gallons[k]	14,116 pounds[k]	2,108 gpm[k] (2010-2013) 1,919 gpm[k]	612 pounds/year[k] (2010-2013), 401 pounds[k]	$1.1 MM/year[p] (2006-2010)	$794[p] $2,743	$0.84[p] (2006-2010) $1.09
NIBW CERCLA Site Central Groundwater Treatment Facility	Air Stripping with VGAC	Primary Drinking Water Standards	Drinking Water	$10.4 MM[d] (1993-2000)	$16.2 MM	9,400 gpm[d]	$1,723	56.8 billion gallons[l]	51,129 pounds[l] (TCE only)	4,343 gpm[l] (2010-2013) 3,624 gpm[l]	TCE only 1,065 pounds/year[l] (2010-2013) 1,004 pounds[l]	$0.86 MM/year[q] (2005-2009)	$807 (2010-2013) $856	$0.37 (2010-2013) $0.45
NIBW CERCLA Site Miller Road Treatment Facility	Air Stripping with VGAC	Primary Drinking Water Standards	Drinking Water	$10.3 MM[d] (1995-97)	$15.3 MM	6,300 gpm[d]	$2,429	32.4 billion gallons[l]	7,937 pounds[l] (TCE only)	4,891 gpm[l] (2010-2013) 4,033 gpm[l]	TCE only 574 pounds/year[l] (2010-2013) 401 pounds[l]	$0.54 MM/year[q] (2005-2007) ~$2.3 MM/year (2008)	$932 - 4,064 (2010-2013) $1,334 - 5,818	$0.21 - 0.91 (2010-2013) $0.25 - 1.11
TIAA CERCLA Site Tucson Airport Remediation Project	Air Stripping with VGAC	Primary Drinking Water Standards	Drinking Water	$8.7 MM[e] (1994)	$13.9 MM	6,200 gpm[h]	$2,242	38.1 billion gallons[m]	4,570 pounds[m] (TCE only through 2012)	3,274 gpm[m] (2010-2013) 2,511 gpm[m]	TCE only 161 pounds/year[m] (2010-2013) 107 pounds[m]	$0.85 MM/year[h] (before 1,4-dioxane treatment began)	$5,280 (2010-2013) $7,944	$0.49 (2010-2013) $0.64
WVBA Site Proposed Less Aggressive Alternative Remedy	LGAC (lead/lag)	Primary Drinking Water Standards	Irrigation Drinking Water[a]	~$9.4 MM[f]	~$9.4 MM	~13,300 gpm[f,i]	~$707	—	—	~11,758 gpm[n]	~2,503 pounds/year[o]	~$1.7 MM/year[f,r]	~$670	~$0.27
WVBA Site Proposed Reference Remedy	LGAC (lead/lag)	Primary Drinking Water Standards	Irrigation Drinking Water[a]	~$13.6 MM[f]	~$13.6 MM	~19,500 gpm[f,i]	~$697	—	—	~16,071 gpm[n]	~2,620 pounds/year[o]	~$2.5 MM/year[f,r]	~$883	~$0.29
WVBA Site Proposed More Aggressive Alternative Remedy	LGAC (lead/lag)	Primary Drinking Water Standards	Irrigation Drinking Water[a]	~$14.6 MM[f]	~$14.6 MM	~13,300 gpm[f,i]	~$1,098	—	—	~12,142 gpm[n]	~2,569 pounds/year[o]	~$1.8 MM/year[f,r]	~$708	~$0.28
WVBA Site Proposed Most Aggressive Alternative Remedy	LGAC (lead/lag)	Primary Drinking Water Standards	Irrigation Drinking Water[a]	~$19.5 MM[f]	~$19.5 MM	~29,100 gpm[f,i]	~$670	—	—	~23,047 gpm[n]	~3,164 pounds/year[o]	~$3.5 MM/year[f,r]	~$1,120	~$0.29

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TABLE 10. GROUNDWATER REMEDIAL ACTIONS - COMPARATIVE ANALYSIS
West Van Buren Area WQARF Site

Notes:

1) Treatment Levels applicable to site Contaminants of Concern
2) Based on percentage increase in Consumer Price Index (CPI) from dates of construction completion through May 2014.
3) Capital Cost in 2014 dollars relative to design treatment capacity in gpm.

* Values in red denote 2013 reported values/metrics

Abbreviations:

M52 = Motorola 52nd Street Superfund Site
NIBW = North Indian Bend Wash
TIAA = Tucson International Airport Area
WVBA = West Van Buren Area
VGAC = vapor-phase GAC
LGAC = liquid-phase GAC
lb = pound
Kgal = thousand gallons
MM = million
gpm = gallons per minute
O&M = operation and maintenance
VOC = volatile organic compound
TCE = trichloroethene
~ = values are estimates
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)

Explanation:

a) A major portion of remediated water is planned for municipal use pending RID construction of a separate conveyance pipeline from the WVBA Site to District land.
b) *Letter of Determination for Motorola 52nd Street Facility* , Phoenix, dated September 30, 1988.
c) *Final Remedial Action Report for Motorola 52nd Street Superfund Site, Operable Unit 2 Area* , Phoenix, Arizona, prepared by Black & Veatch Corporation, dated September 12, 2003.
d) *Final Feasibility Study Addendum* , North Indian Bend Wash Superfund Site, Scottsdale, Arizona, prepared by the NIBW Participating Companies, dated November 15, 2000 (*See* Table M5 in Appendix M, Volume 5).
e) Verbal communication: Mr. Jeff Biggs, Project Coordinator, Tucson Airport Remediation Project, Tucson Water.
f) *Draft Feasibility Study Report* , West Van Buren Area WQARF Site, Phoenix, Arizona, prepared by Synergy Environmental (*See* Table 5 for design treatment capacity and Table 7 for capital and O&M costs).
g) *2011 Sitewide Five-Year Review Report, Motorola 52nd Street Superfund Site* , Phoenix, Arizona, prepared by URS Corporation, September 2011 (See Sections 4.1 and 4.2; Tables 4-1 and 4-2).
h) *First Five-Year Report for Tucson International Airport Area Superfund Site* , Pima County, Arizona, prepared by U.S. Environmental Protection Agency, September 2013 (*See* Section 4.2.1 for pounds of VOCs removed and volume of groundwater extraction over 216 month period, and Section 4.3.1 for O&M costs [2001]).
i) The proposed remedy provides remediation of up to 26,800 gpm water supply when including blending of other contaminated supply wells that would operate according to an approved remedial action plan.
j) Information pertaining to amount of groundwater treated and mass removed is from annual Operable Unit No. 1 Effectiveness Reports prepared by Clear Creek Associates.
k) Information pertaining to amount of groundwater treated and mass removed is from annual Effectiveness Reports for 20th Street Groundwater Treatment Facility, Operable Unit 2 Area prepared by Connestoga-Rovers & Associates.
l) Information pertaining toamount of groundwater treated and mass removed is from annual Site Monitoring Reports, NIBW Superfund Site prepared by the NIBW Participating Companies.
m) Information pertaining to amount of groundwater treated and mass removed is from annual Water Quality Reports prepared by Tucson Water.
n) Estimated pumping rate is based on assigned pumping of remedy wells developed for the FS Model (see Appendix F).
o) Based on reported 2013 concentrations of PCE, TCE, and 1,1-DCE and projected pumping in groundwater modeling scenarios (see Appendix F).
p) *Motorola 52nd St. Superfund Site, Five-Year Review Completed Fact Sheet* , prepared by Environmental Protection Agency and Arizona Department of Environmental Quality (*See* page 2 for average VOC mass removed and average volume of groundwater extracted for 2006-2010).
q) *First Five-Year Review, Indian Bend Wash Superfund Site* , Scottsdale and Tempe, Maricopa County, Arizona, prepared by U.S. Environmental Protection Agency, September 2011 (*See* Table 4-8; periodic rehabilitation costs not included in O&M Costs Summary).
r) Excluding line item costs for area-wide groundwater monitoring and capital equipment costs from Table 7 *Draft Feasibility Study Report* , West Van Buren Area WQARF Site, Phoenix, Arizona, prepared by Synergy Environmental.

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